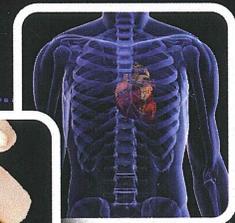
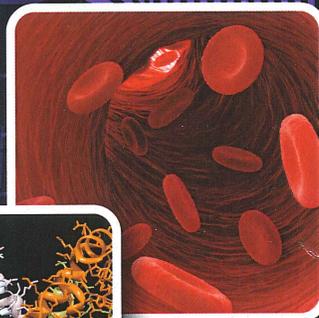
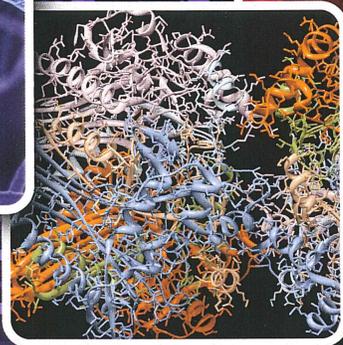
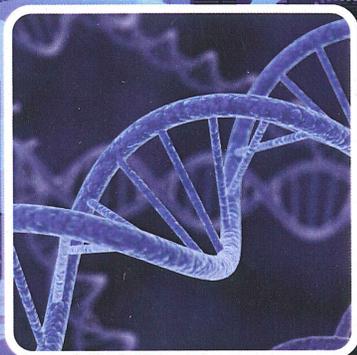




7th WORLD CONGRESS OF BIOMECHANICS



ORGANIZED BY:

World Council of Biomechanics

IN CONJUNCTION WITH:

American Society of Biomechanics

American Society of Mechanical Engineers

Australian and New Zealand Society of Biomechanics

Canadian Society for Biomechanics

European Society of Biomechanics

German Society of Biomechanics

Global Enterprise for MicroMechanics
and Molecular Medicine

International Society of Biomechanics

US National Committee on Biomechanics

**JULY 6-11
2014**



7th World Congress of Biomechanics

Boston, Massachusetts
July 6-11, 2014

WELCOME FROM THE ORGANIZING COMMITTEE

Welcome to the 7th World Congress of Biomechanics! We are pleased to welcome you to Boston, MA just after the US Independence Day celebrations.

This 7th WCB is an unprecedented gathering of international experts from around the world who are working at the cutting edge of mechanics applied to challenges in biology, physiology, and medicine. More than 4,000 researchers from engineering, biology, physics, mathematics, computer science, and clinical specialties are converging on the Hynes Convention Center in Boston to share recent discoveries from labs across the globe.

Over the course of this six-day conference, we look forward to plenary lectures, awards for both accomplished senior researchers and aspiring graduate students, a range of contributed talks, workshops, and a vibrant series of daily poster sessions. Additionally, we encourage you to benefit from the many vendor exhibitions that highlight the latest technologies, publication venues, and medical devices.

The WCB is organized by the World Council of Biomechanics, and this 7th WCB benefited from coordination with several international societies who planned key meetings and events to coincide with this quadrennial conference. These groups include the American Society of Biomechanics, American Society of Mechanical Engineers, Australian and New Zealand Society of Biomechanics, Canadian Society for Biomechanics, European Society for Biomechanics, German Society for Biomechanics, Global Enterprise for MicroMechanics and Molecular Medicine, International Society of Biomechanics, and US National Committee on Biomechanics. We thank them for expanding the scope and strengthening the community of international researchers who gather to celebrate new findings and challenges this week.

Planning a conference of this breadth and size requires significant force and energy! We have benefited from a dedicated Technical Program Chair in Prof. Jay Humphrey, a committed WCB Organizing Committee, a team of visionary track and session organizers throughout the world, and a talented conference organization team at Practical Productions. The quality of this conference was made possible by the sustained enthusiasm and effort of this team over the past four years, and to your interest and participation. Thank you for joining us to share and learn, and may the connections that you make this week strengthen your research and professional relationships in the years to come!

Sincerely,

Roger D. Kamm (MIT)

Muhammad Zaman (Boston University)

Krystyn J. Van Vliet (MIT)
Congress Co-Chairs

On behalf of our 7th WCB Organizing Committee:

Kristen Billiar (Worcester Polytechnic Institute), Matthew Gounis (UMass. Med.), Michele Grimm (Wayne State University), Tammy Donahue (Colorado State University), Jay Humphrey (Yale University), Jeff Ruberti (Northeastern University), Geert Schmid-Schönbein (UC San Diego), and Jonathan Vande Geest (University of Arizona)

THANK YOU FROM THE TECHNICAL PROGRAM COMMITTEE

This historic congress was made possible by the efforts of many, some of whom we wish to acknowledge here. Under the leadership of its Chair, Geert Schmid-Schönbein, The World Council of Biomechanics consistently provided excellent guidance and support, including the naming of ten outstanding Plenary Lecturers (Joan Bechtold, Neil Broom, Dennis Discher, Ben Fabry, Farsh Guilak, Mimi Koehl, Masahiro Sokabe, Melody Swartz, Charles Taylor, and Marco Viceconti) and twelve Track Co-Chairs who engaged the international community and brought together such a diverse and exciting set of podium sessions. The Co-Chairs are: Michael Sheetz and Monica Soncini (Molecular Track), C.T. Lim and Sam Safran (Cellular Track), Lori Setton and Nikos Stergiopoulos (Tissue Track), Ellen Kuhl and H-J. Wilke (Organ Track), Gang Bao and James Goh (Materials / Devices / Techniques Track), and Scott Delp and Merryn Tawhai (Special Topics). These Track Co-Chairs were assisted by literally hundreds of session Co-Chairs, who are named elsewhere in this program and to whom we are most grateful. Many professional societies and their representatives played vital roles as well, particularly in recommending additional Plenary Lecturers, session chairs, and reviewers as well as in organizing student paper competitions, awards sessions, and workshops. They include: Rod Barrett (Australian and New Zealand Society of Biomechanics), Kris Billiar (American Society of Mechanical Engineering – Bioengineering Division), John Challis (American Society of Biomechanics and International Society of Biomechanics), Clark Dickerson (Canadian Society of Biomechanics), Stephen Ferguson (European Society of Biomechanics), and Annegret Muendermann (German Society of Biomechanics). Andy Anderson and Michele Grimm (American Society of Mechanical Engineering – Bioengineering Division) played special roles in organizing the society-independent B.S., M.S., and Ph.D. paper competitions. The response to our call for student papers was incredible – the future of biomechanics is clearly very bright.

Although our original goal was 3000 presentations, the response to this congress went well beyond our initial expectations. Over 5500 abstracts were received for consideration and we are extremely grateful to the over 500 reviewers who kindly assisted us in evaluating these many abstracts. These reviewers were asked to review as scientists, not specialists, to ensure that the program held broad appeal, and we thank them for their timely

and conscientious efforts. We were fortunate to be able to expand our initially planned program to ultimately accommodate over 4200 presentations, though we regret that many deserving abstracts could not be accepted simply because of a lack of space or time. We very much appreciate the willingness of so many who ultimately accepted our invitation to come together in Boston to present their latest findings.

Lucy Nye provided gracious and expert help with the web-based abstract submission and review process, Iris Lim provided expert assistance with data entry, and Eileen Healy and Andrea Caldwell provided wonderful direction and organization throughout our about 1.5 year process. We thank Krystyn Van Vliet and Muhammad Zaman, Congress Co-Chairs, for their many insightful suggestions and support. Finally, and foremost, we thank Roger Kamm, Congress Chair, for his outstanding leadership, advice, and individual efforts that enabled this congress to achieve the international support and overwhelming response that we all have enjoyed.

In closing, on behalf of the Technical Program Committee (Stephen Ferguson – Europe Representative, Takeo Matsumoto – Asia Representative, and Jennifer West – Americas Representative), I wish to thank everyone for your assistance, guidance, patience, and most importantly participation in making this World Congress the most diverse and exciting to date. It is my hope that the technical program will lead to new ideas, new collaborations, and new friendships, and that together we can continue to advance basic science, technology, and clinical care through the power and promise of biomechanics.

Sincerely,



Jay D. Humphrey
Chair, Technical Program, 7th World Congress of
Biomechanics
Chair, United States National Committee on
Biomechanics

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Please see online

<http://wcb2014.com/event-info/technicalprogram/>

and your WCB2014 Program Flash Drive for each day's
complete listings of all podium presentations and posters.

Membership on the World Council on Biomechanics

EXECUTIVE COMMITTEE

(August 2010- July 2014)

Chair

Geert W. Schmid-Schönbein, USA

Vice-Chair

Dominique Barthes-Biesel, France

Secretary-General

Peter Hunter, New Zealand

Treasurer

Mian Long, China

Immediate Past Chair

Roger D. Kamm, USA

CURRENT MEMBERS

Ending - 2014

Joan Bechtold, USA

Cheng-Kung Cheng, Taipei

David Elad, Israel

Yu-Bo Fan, China

James Goh, Singapore

Steve Goldstein, USA

Walter Herzog, Canada

Dieter Liepsch, Germany

Carol Lucas, USA

Jean-Jacques Meister, Switzerland

Alexander Rachev, Bulgaria

Lori Setton, USA

Present - 2018

Dan Bader, United Kingdom

Ross Ethier, USA

Edward Guo, USA

Marie Hobatho, France

Jay Humphrey, USA

Gon Khang, South Korea

Johan Van Leeuwen, The Netherlands

Arthur Mak, Hong Kong China

Erich Müller, Austria

Andrey Tsaturyan, Russia

Jennifer S. Wayne, USA

Present - 2022

Taiji Adachi, Japan

Lynne Bilston, Australia

David Butler, USA

Manuel Doblare, Spain

Daniel Isabey, France

Keita Ito, The Netherlands

Oliver Jensen, United Kingdom

Zong-Lai Jiang, China

Chwee Teck Lim, Singapore

Frantisek Marsik, Czech Republic

Takeo Matsumoto, Japan

Tim McGloughlin, Ireland

Nikos Stergiopoulos, Switzerland

Takashi Ushida, Japan

Marco Vaz, Brazil

Honorary Member

Yuan C. Fung, USA

NEW MEMBERS

Present - 2026

Amit Gefen, Israel

Gerhard Holzapfel, Austria

Takuji Ishikawa, Japan

Sung Jae Lee, Korea

Susan Margulies, USA

Andrew McCulloch, USA

Marjoelein van der Meulen, USA

Julie Steele, Australia

Fong-Chin Su, Taiwan

Merryn Tawha, New Zealand

David A. Vorp, USA

Shigeo Wada, Japan

Ming Zhang, China



7th World Congress of Biomechanics

Boston, Massachusetts
July 6-11, 2014

DAILY SCHEDULE AT A GLANCE

<p>Sunday July 6, 2014</p> <p>12:00 – 2:15 Motor Control Workshop 2:30 – 4:00 20 Parallel Podium Sessions 4:00 – 4:30 Coffee Break 4:30 – 6:00 20 Parallel Podium Sessions</p>	<p>Wednesday July 9, 2014</p> <p>8:00 – 9:30 20 Parallel Podium Sessions 9:30 – 9:45 Move to Plenary 9:45 – 10:30 Plenary Lectures (2 Parallel) 10:30 – 11:00 Coffee Break 11:00 – 12:30 20 Parallel Podium Sessions 12:30 – 2:00 Poster Presentations 2:00 – 2:45 Plenary Lectures (2 Parallel) 3:00 – 4:30 20 Parallel Podium Sessions 4:30 – 5:00 Coffee Break 5:00 – 6:30 20 Parallel Podium Sessions 7:00 – 10:00 BANQUET</p> <p>Poster Set-up by 8:00 am, Take Down between 6:00 and 7:00 pm</p>
<p>Monday July 7, 2014</p> <p>8:00 – 9:30 20 Parallel Podium Sessions 9:30 – 9:45 Move to Plenary 9:45 – 10:30 Plenary Lectures (2 Parallel) 10:30 – 11:00 Coffee Break 11:00 – 12:30 20 Parallel Podium Sessions 12:30 – 2:00 Lunch on Own 2:00 – 2:45 Plenary Lectures (2 Parallel) 3:00 – 4:30 20 Parallel Podium Sessions 4:30 – 5:00 Coffee Break 5:00 – 6:30 20 Parallel Podium Sessions 7:00 – 9:00 Reception with Poster Presentations</p> <p>Poster Set-up by 11:00 am, Take Down by 9:30 pm</p>	<p>Thursday July 10, 2014</p> <p>8:00 – 9:30 20 Parallel Podium Sessions 9:30 – 9:45 Move to Plenary 9:45 – 10:30 Plenary Lectures (2 Parallel) 10:30 – 11:00 Coffee Break 11:00 – 12:30 20 Parallel Podium Sessions 12:30 – 2:30 Lunch and Poster Presentations 2:30 – 4:00 20 Parallel Podium Sessions 4:00 – 4:30 Coffee Break 4:30 – 6:00 20 Parallel Podium Sessions 6:30 – 7:30 Parallel Workshops/Roundtables</p> <p>Poster Set-up by 8:00 am, Take Down between 6:00 and 7:00 pm</p>
<p>Tuesday July 8, 2014</p> <p>8:00 – 9:30 20 Parallel Podium Sessions 9:30 – 9:45 Move to Plenary 9:45 – 10:30 Plenary Lectures (2 Parallel) 10:30 – 11:00 Coffee Break 11:00 – 12:30 20 Parallel Podium Sessions 12:30 – 2:30 Lunch and Poster Presentations 2:30 – 4:00 20 Parallel Podium Sessions 4:00 – 4:30 Coffee Break 4:30 – 6:00 20 Parallel Podium Sessions 6:30 – 7:30 Parallel Workshops</p> <p>Poster Set-up by 8:00 am, Take Down between 6:00 and 7:00 pm</p>	<p>Friday July 11, 2014</p> <p>8:00 – 9:30 20 Parallel Podium Sessions 9:30 – 9:45 Move to Plenary 9:45 – 10:30 Plenary Lectures (2 Parallel) 10:30 – 11:00 Coffee Break 11:00 – 12:30 20 Parallel Podium Sessions 12:30 – 2:00 Poster Presentations 2:00 – 2:45 Plenary (2 Parallel) 3:00 – 4:30 20 Parallel Podium Sessions 4:30 – 5:00 Coffee Break 5:00 – 6:30 20 Parallel Podium Sessions</p> <p>Poster Set-up by 8:00 am, Take Down between 6:00 and 7:00 pm</p>

IMPORTANT INSTRUCTIONS FOR PODIUM SESSION CHAIRS AND SPEAKERS

General

In order to accommodate as many presentations as possible, the schedule has necessarily been designed with little margin for presentations going over time. Hence, we ask that both presenters and chairs to be respectful of the time limits. In particular:

Speakers

Please arrive 10 to 15 minutes prior to the beginning of your session to introduce yourself to the session chair(s) and to ensure that your presentation will project properly. Also, please respect the specific time limits for your presentation and keep answers to questions brief. Specifically,

Plenary Podium – 45 minutes + 0 minutes for formal questions and answers. Each Plenary presentation is followed by a 15 to 30 minute break, during which time questions can be asked and answered personally. Please remain available for such questions for 15 minutes following your presentation.

Keynote Podium – 32 minutes + 4 minutes for brief questions and answers.

Regular Podium – 15 minutes + 3 minutes for brief questions and answers.

Special Podium – in most cases (e.g., student paper or awards), 12 minutes + 3 minutes for questions and answers.

All Podium - Please execute the change-over in presenter computer during the question and answer period. Finally, remember that the allocation for each talk includes any time required for set-up. If it takes time to get the presentation to project, this time is deducted from the total allotted time to keep the parallel sessions on time.

Audience

Please keep questions or comments brief. In cases where an extended question or answer would be expected, please wait for the session to end and ask the author personally.

Session Chairs

Please arrive 10 to 15 minutes early to your session to ensure that everything is in place and that you can meet the presenters. Please keep introductions to a minimum to allow the speakers to use all of their intended time. The presentation title will be in the program and probably on the first slide, so just introduce the presentation by the author's name. Also, please help the presenter respect the presentation times indicated above. You may want to stand up at the time the question and answer period begins as a signal to the presenter to make final remarks; if the presenter goes over the indicated time, the question and answer period can be omitted. Finally, if a presenter experiences technical difficulties, the presentation must be shortened accordingly in order that the next presentation can start on time. With 20 parallel sessions, it is essential that we keep to a strict schedule.

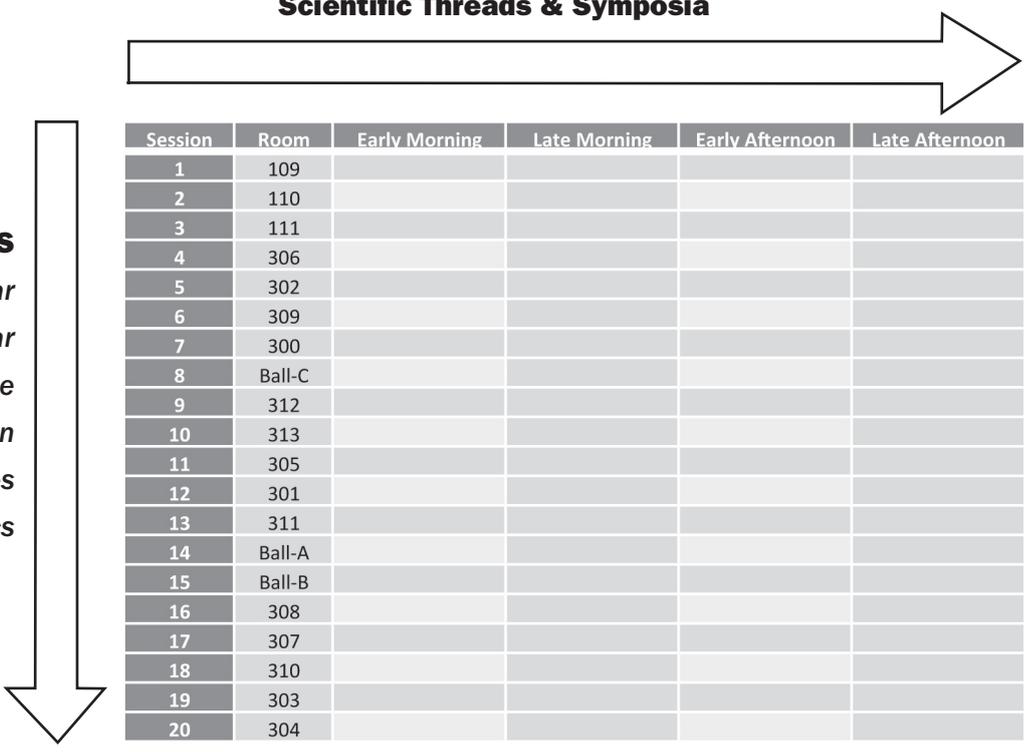
Special Instructions for Chairs of Parallel Sessions 4, 5, and 20 in Rooms 302, 304, and 306: The walls to these rooms will be removed just prior to the Plenary Lectures, so if your session immediately precedes a Plenary, take extra care to end the session promptly at the indicated time. Thank you.

HOW TO NAVIGATE THE TECHNICAL PROGRAM

The Technical Program of the 7th World Congress of Biomechanics is organized into 4 primary components: Plenary Lectures (Monday-Friday), Podium Sessions (Sunday-Friday), Poster Presentations (Monday-Friday), and Workshops (Sunday afternoon and Tuesday & Thursday Evenings).

The 20 parallel podium and 5 poster sessions are organized via 6 tracks ranging from Molecular Biomechanics to Special Topics, as seen below for a typical daily schedule. Specific times on Monday, Wednesday, Friday are similar; those on Tuesday, Thursday are similar; Sunday is different. Consult the program for specific times.

Scientific Threads & Symposia



Session	Room	Early Morning	Late Morning	Early Afternoon	Late Afternoon
1	109				
2	110				
3	111				
4	306				
5	302				
6	309				
7	300				
8	Ball-C				
9	312				
10	313				
11	305				
12	301				
13	311				
14	Ball-A				
15	Ball-B				
16	308				
17	307				
18	310				
19	303				
20	304				

TRACKS

Molecular

Cellular

Tissue

Organ

Materials/Devices

Special Topics

WCB2014 PODIUM SESSION SCHEDULE – SUNDAY JULY 6, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 2-18 is a session index of 2 (which is Sunday 4:30-6pm) and a room index of 18 (which is Hynes 310). This session title is “Biomechanics of Running.” Session chairs are listed in parentheses, after the session title.

Room Index	Room Number	(Session Index 1) 2:30 – 4:00 pm	(Session Index 2) 4:30 – 6:00 pm
1	109	Protein Mechanics (Chair TBA)	Molecular & Cellular Experimental Tools (McGarry)
2	110	Mechanics of Adhesion & Contractility (Billiar & McGarry)	Extracellular Matrix Mechanics (Billiar)
3	111	Cell Responses to Stress (Chair TBA)	Cell Mechanics & Function (Chair TBA)
4	306*	Cell & Tissue Mechanics (Chair TBA)	Cell-Matrix Interactions (Clyne & Meininger)
5	302*	Biomechanics of Cancer I (Fabry)	Biomechanics of Cancer II (Fabry)
6	309	Point-of-Care Microfluidics Based Diagnostics (LeDuc & Kim)	Organ on Chip Systems (LeDuc & Kim)
7	300	Carotid and Cerebral Fluid Mechanics (Loth)	Model & Regulatory Affairs (McGloughlin & Baxter)
8	Ball-C	Tissue Engineering I (Gaudette)	Tissue Engineering II (van Donkelaar & Aggarwal)
9	312	Tendon-Ligament-Cartilage (Thomopoulos & Yamamoto)	Ligament & Tendon I (Thomopoulos & Kuo)
10	313	Cartilage Mechanics I (Hung)	Cartilage Mechanics II (Hung)
11	305	Biomechanics of Morphogenesis I (J. Lee)	Biomechanics of Morphogenesis II (Lee)
12	301	Microstructural Modeling (Zhang)	Pulmonary Hypertension (Finol)
13	311	Imaging for Tissue Biomechanics (Sinkus & Moerman)	Ultrasound Techniques in Cardiovascular Dynamics (Hasegawa)
14	Ball-A	Mechanics of Cartilage and Intervertebral Disc (W. Gu)	Mechanics of the Inter- vertebral Disc (Gu)
15	Ball-B	Mechanobiology of Bone (Robling)	Mechanoregulation of Bone (Tanaka)
16	308	Computational Methods (S. Sastry)	Biomechanical Instrumentation (Moreno)
17	307	Knee Grand Challenge (Fregly) *Continued in Tuesday Session 8-15	Biomechanics of Wheelchair Locomotion (Kuxhaus)
18	310	Biomechanics of Running (Ferguson)	Biomechanics of Shod & Unshod Running (Rubenson)
19	303	Biomechanics and Martial Arts (Pain)	Biomechanics of Head Impact (Cripton & Schmitt)
20	304*	Biomechanics for Under-Body Blast Environment – Warrior Injury Assessment I (Coates)	Biomechanics for Under-Body Blast Environment – Warrior Injury Assessment II (Coates)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 PODIUM SESSION SCHEDULE – MONDAY JULY 7, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 4-1 is a session index of 4 (which is Monday 11am-12:30pm) and a room index of 1 (which is Hynes 109). This session title is “DNA Mechanics & Assembly.” Session chairs are listed in parentheses, after the session title.

Room Index	Room Number	(Session Index 3) 8:00 – 9:30 am	(Session Index 4) 11:00 am – 12:30 pm	(Session Index 5) 3:00 – 4:30 pm	(Session Index 6) 5:00 – 6:30 pm
1	109	Nucleic Acid Nanostructures (Bathe & Castro)	DNA Mechanics & Assembly (Liang)	Mechanics of the Nuclear Pore & Nucleocytoplasmic Transport (Mofrad)	Mechanics of Biomolecular Complexes (Purohit)
2	110	Molecular Mechanisms of Biological Lubrication I (Klein)	Molecular Mechanisms of Biological Lubrication II (Klein)	Duling Memorial Symposium on Glycocalyx I (Dewey)	Duling Memorial Symposium on Glycocalyx II (Dewey)
3	111	Mechanosensitive Signaling Pathways I (Engler & Cooper-White)	Mechanosensitive Signaling Pathways II (Engler & Cooper-White)	Cellular Mechanotransduction (Low & Leckband)	Cell-Substrate Interactions I (Vogel & Schwarz)
4	306*	Theoretical & Computational Modeling of Cells (Vernerey)	Continuum Approaches in Cell Mechanics (Kas & Merkel)	Nano- and Micro-mechanics of Collagen I (Bennink & Snedeker)	Nano- and Micro-mechanics of Collagen II (Bennink & Snedeker)
5	302*	Energy-Based Cancer Therapies: Challenges & Strategies (He & Wang)	Energy-Based Cancer Therapies: Mechanisms Across Scales (He & Zhao)	USNCB Biomechanics in Oncology I (Dong & Swartz)	USNCB Biomechanics in Oncology II (Nagahara & Dong)
6	309	Biological Flow at the Cellular Level I (Ishikawa)	Biological Flow at the Cellular Level II (Ishikawa)	Biological Flow at the Cellular Level III (Ishikawa)	P. Ayyaswamy 70 th Birthday Tribute I: Interfacial Fluid Dynamics and Thin Film Flows (Kieweg & Ghadiali)
7	300	Engineering Advances in Pediatric Cardiology I (Marsden & Feinstein)	Engineering Advances in Pediatric Cardiology II (Marsden & Feinstein)	Pediatric Biomechanics (Yoganathan & Manning)	Pediatric Clinical Challenges (Yoganathan & Manning)
8	Ball-C	Mechanobiology & Atherosclerotic Plaque Composition (Ohayon & Schwartz)	Atherosclerotic Plaque Properties (Gijssen & Walsh)	Atherosclerotic Plaque Strength (Speelman & Holzapfel)	Clinical Applications of Plaque Modeling (Tang & Migliavacca)
9	312	Ligament & Tendon II: Mechanoregulation of Regeneration & Homeostasis (Kuo)	Ligament & Tendon III: Mechanoregulation of Regulation & Homeostasis (Kuo)	Ligament & Tendon IV: Functional Adaptation to Mechanical Stimulation (Tohyama)	Joint & Soft Tissue Mechanics (Bevill)
10	313	Tribology of Articular Cartilage (Nakanishi)	Tribology I: Cartilage, Tissue & Biomaterial (Nakanishi)	Tribology II: Cartilage, Tissue & Biomaterial (Nakanishi)	Musculoskeletal Tissue Engineering I (Akkus)
11	305	Force Generation & Sensing in Organisms I (Fratzl & Weinkamer)	Force Generation & Sensing in Organisms II (Fratzl & Weinkamer)	Matrix and Mechanical Environment (Chan)	USNCB Mechanics of Tissue & Organ Development I: Cardio-vascular (Taber & Wagenseil)
12	301	Multiscale/Multiphase Tissue Computational Modeling (Hatami-Marbini)	Biodesign & Multiscale Architecture of Bone (Vashishth)	Multiscale Techniques in Biomechanics & Mechanobiology I (Pivonka & Hellmich)	Multiscale Techniques in Biomechanics & Mechanobiology II (Mueller, Pivonka, Hellmich, & van Rietbergen)
13	311	Biomechanics of Soft Tissues – Magnetic Resonance Elastography (Bensamoun, Setton)	Ultrasonic Elastography (Nightingale)	Imaging Tissue Biomechanics I (Konofagou & Segers)	Imaging Tissue Biomechanics II: Orthopedic & Rehabilitation (Zheng)
14	Ball-A	ASME V.C. Mow Award & Cellular Mechanotransduction (Grimm)	Biothermomechanics (Wright)	Undergraduate Design Competition in Rehabilitation & Assistive Devices (Bush & Siston)	Clinical Gait Analysis (Galli & Leardini)
15	Ball-B	From Total Joint Replacement to Tissue Engineering: Present & Future (Maher & Wright)	Advances in Intramedullary Nailing Systems for Long Bones (Bottlang & Augat)	Implants for Mechanical Stimulation of Fracture Healing (Augat & Bottlang)	Mechanical Biocompatibility of Implants & Biomaterials (Mazza)
16	308	ASME Y.C. Fung Young Award & Cardiovascular Mechano-biology (Vorp)	Cell Mechanics (Holzapfel)	NSF Symposium: Muscle Synergy Analysis: From Descriptive to Predictive (Fregly & Patten)	Biomechanics of Brain Formation & Injury (Chair TBA)
17	307	Elastic Mechanisms I (Lichtwark)	Elastic Mechanisms II (Lichtwark)	PhD Student Competition: Cell Mechanics (Boerckel & Hutcheson) *Six talks per session	PhD Student Competition: Cardiovascular (Finol & Di Martino) *Six talks per session
18	310	Improving Performance in Sport I (McNitt-Gray)	Improving Performance in Sport II (McNitt-Gray)	ASB Computer Simulation of Sports & Exercise I (Challis & Pain)	ASB Computer Simulation of Sports & Exercise II (Challis & Pain)
19	303	Traumatic Brain Injury I (Camarillo & Siegmund)	Traumatic Brain Injury II (Camarillo & Siegmund)	Brain Injury Mechanics I (Monson)	Brain Injury Mechanics II (Shrivastava & Coats)
20	304*	Foot & Ankle Biomechanics I (Rosenbaum)	Foot & Ankle Biomechanics I (Leardini & Galli)	Biomechanics of the Foot & Ankle (Bishoff & Ledoux)	ISB – Footwear Biomechanics I: Force (Nigg & Arndt)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus, sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 PODIUM SESSION SCHEDULE – TUESDAY JULY 8, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 8-1 is a session index of 8 (which is Tuesday 11am-12:30pm) and a room index of 1 (which is Hynes 109). This session title is “Bio-Inspired Manufacturing.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 7) 8:00 – 9:30 am	(Session Index 8) 11:00 – 12:30	(Session Index 9) 2:30 – 4:00	(Session Index 10) 4:30 – 6:00 pm
1	109	Design, Fabrication, Analysis of Hierarchical Biomaterials (Buehler & Qin)	Bio-Inspired Manufacturing (Ye & Dong)	Bio-inspired Materials from Nanostructures I (Xu)	Bio-inspired Materials from Nanostructures II (Xu)
2	110	Actomyosin Mechanobiology I (Yingxiao & Gardel)	Actomyosin Mechanobiology II (Yingxiao & Gardel)	Engineering Molecular Mechanics with Synthetic Biology I (Ruder & LeDuc)	Engineering Molecular Mechanics with Synthetic Biology II (Ruder & LeDuc)
3	111	Cell-Substrate Interaction II (Vogel & Schwarz)	Cell-Substrate Interaction III (Vogel & Schwarz)	Biophysical Aspects of Cell/Cell Adhesion (Julicher)	Cell-Cell Adhesion & Cell Rheology (Heisenberg)
4	306*	Micromechanical Tools (Kas & Merkel)	Optical & Magnetic Cell Manipulation (Kas & Merkel)	Physical Properties of a Membrane CSK Coupled System (Gov & Bassereau)	Force Generation by the Cytoskeleton on the Membrane I (Gov & Bassereau)
5	302*	Cell and ECM Rheology (Weitz & Navajas)	Whole Cells & Collective Behaviors (Genin & Kaunas)	Whole Cell Biomechanics I (Sato & Wang)	Whole Cell Biomechanics II (Sato & Wang)
6	309	Biomaterial Gradients for Directed Cell Migration (Sundararaghavan)	Engineered Cellular Environments (Kim & Simmons)	Modeling Multiphysics and Complex Phenomena in Soft Tissues (Noailly)	GEM4 (Hsi)
7	300	Mechanical Circulatory Support I: Future Pediatric Devices (Manning & Baldwin)	Mechanical Circulatory Support II: Improving Adult VADs (Manning)	Mechanical Circulatory Support Devices (Cook & Koenig)	Heart Valve Fluid Mechanics: The Chandran Impact (Manning & Yoganathan)
8	Ball-C	Vulnerable Plaque I: Data, Modeling, Mechanisms (Ku & Tang)	Vulnerable Plaque II: Data, Modeling, Mechanisms (Gijssen & Bluestein)	Abdominal Aortic Aneurysm I (Finol & Papaharilaou)	Abdominal Aortic Aneurysm II (Finol & Papaharilaou)
9	312	Vascular Growth & Remodeling Mechanics I (Gleason & Figueroa)	Vascular Growth & Remodeling Mechanics II (Gleason & Figueroa)	Vascular Growth & Remodeling Mechanics III (Gleason & Figueroa)	Cardiac Growth and Remodeling Mechanics (Nash & Holmes)
10	313	Musculoskeletal Tissue Engineering II (Akkus)	Passive Skeletal Muscle: Experiments & Modeling I (Simms)	Passive Skeletal Muscle: Experiments & Modeling II (Simms)	Connective Tissue Mechanical Behavior: Experiments & Modeling (Simms)
11	305	USNCB Mechanics of Tissue & Organ Development II: Force Generation (Taber & Davidson)	USNCB Mechanics of Tissue & Organ Development III: Multi-scale Methods (Taber & Nelson)	Lymphatics & Interstitial Fluid I: Biomechanics and Modeling (Dixon & Moore)	Lymphatics & Interstitial Fluid II: Cancer and Immunity (Dixon & Moore)
12	301	Multiscale Techniques in Biomechanics & Mechanobiology III (Mueller & Pivonka)	Respiratory Biomechanics: Linking Structure & Function in the Lung (Suki & Wada)	Respiratory Biomechanics: Remodeling & Regeneration (Maksym & Niklason)	Respiratory Biomechanics: Transport & Disease (Bates & Filoche)
13	311	Imaging Tissue Biomechanics III (Konofagou)	Reproductive & Women’s Health I: Uterine Peristalsis & Myometrial Contractility (House & Own)	Reproductive & Women’s Health II: Biomechanics of the Cervix (Shmygol & Eswaran)	Reproductive & Women’s Health III: Biomechanics of Pregnancy & Delivery 1 (Myers & Feltovich)
14	Ball-A	PhD Student Competition: Cartilage & Menisci (Hung & Fisher) <small>*Six talks per session</small>	Spine Loading & Stabilization (Hurschler)	Intervertebral Disc Mechanobiology I (Ito)	Intervertebral Disc Mechanobiology II (Ito & Elliott)
15	Ball-B	Orthopedic Implant Design (Rullkoetter & Taylor)	Knee Grand Challenge (Fregly) <small>*Continued from Sunday Session 1-17</small>	DGfB Awards Session (Muendermann) <small>*Seven shorter talks</small>	Patellofemoral Mechanics & Pain (Pal)
16	308	Rehabilitation Dynamics (Miller & Bush)	CSB Promising Young Investigator & Masters Awards (Andrews)	CSB Doctoral Awards (Andrews)	State of the Art in Motion Capture & Analysis (Tanaka)
17	307	PhD Student Competition: Human Locomotion (Chaudhari & Morrow) <small>*Six talks per session</small>	PhD Student Competition: Orthopedics (Wang & Li) <small>*Six talks per session</small>	ASB New Approaches to Biomechanics in Ergonomics & Human Factors I (Hughes & Cham)	ASB New Approaches to Biomechanics in Ergonomics & Human Factors II (Hughes & Cham)
18	310	ANZSB Student Awards (Barrett & Creswell)	ANZSB Student Awards (Barrett & Creswell)	ESB Awards* (Ziopoulos) <small>*Session will start 18 min early</small>	ANZSB Young Investigator & Student Awards (Barrett & Creswell)
19	303	NSF Symposium: Virtual Reality & Rehabilitation (Patterson & Wilson)	PhD Student Competition: Image-Based Measurements (Pekkan & VandeGeest) <small>*Six talks per session</small>	ISB Motor Control I (De Luca)	ISB Motor Control II (P Rowe)
20	304*	ISB – Footwear Biomechanics II: Muscle (Davis, Mickle, & Arndt)	ISB – Footwear Biomechanics III: Movement (Arndt & Nigg)	ISB – Footwear Biomechanics IV: Foot & Ankle (Bus, Gruber, Arndt)	Physical Activity Assessment with Body Worn Sensors (Rosenbaum)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus, sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 PODIUM SESSION SCHEDULE – WEDNESDAY JULY 9, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 13-1 is a session index of 13 (which is Wednesday 3-4:30pm) and a room index of 1 (which is Hynes 109). This session title is “Nanostructured Biomaterials.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 11) 8:00 – 9:30 am	(Session Index 12) 11:00 am – 12:30 pm	(Session Index 13) 3:00 – 4:30 pm	(Session Index 14) 5:00 – 6:30 pm
1	109	Nanomechanics of the Cellular Environment (Bourne & Reinhart-King)	Molecular Brushes: Models & Experiments (Vesentini)	Nanostructured Biomaterials (Ramakrishna & Yang)	NSF Symposium: Quantifying a Dynamic Picture of the Brain in Action (Genin)
2	110	Single Molecule Mechanics of Motor Proteins I (Lang & Hwang)	Single Molecule Mechanics of Motor Proteins II (Lang & Hwang)	Mechanics of Weak Protein-Ligand Interaction I (Ji & Li)	Mechanics of Weak Protein-Ligand Interaction II (Ji & Li)
3	111	Mechanotransduction at Focal Adhesions (Mofrad)	Molecular Adhesion (Viasnoff)	Sub-Cellular Biophysics & Mechanosensing (Genin & Kaunas)	Measurements & Models for Cell-ECM Interactions (Genin & Kaunas)
4	306*	Force Generation by the Cytoskeleton on the Membrane II (Gov & Bassereau)	Semi-flexible Cytoskeletal Filaments–Basis of Cell Mechanics (Kas)	Multiscale Modeling of Semi-flexible Polymers (Schieber)	Molecular Mechanics of Micro-tubules I (Sept & Ross)
5	302*	Whole Cell Biomechanics III (Sato & Wang)	Emergent Behaviors of Integrated Cellular Systems I (Bashir, Nerem, & Kamm)	Emergent Behaviors of Integrated Cellular Systems II (Bashir, Nerem, & Kamm)	Emergent Behaviors of Integrated Cellular Systems III (Bashir, Nerem, & Kamm)
6	309	Advancements in Tissue Engineering Bioreactor Design (Moretti & Marsano)	Molecular Mechanisms of Tissues & Scaffolds (Akkus)	Functional Tissue Engineering I (Costa & Hung)	Functional Tissue Engineering II (Hung & Costa)
7	300	Imaging in Vascular Biomechanics (Gounis, Vorp, & vande Geest)	Hemodynamics & Medical Imaging (Moore & Gounis)	Intraventricular Blood Flow Dynamics I (Shadden & del Alamo)	Intraventricular Blood Flow Dynamics II (Shadden & del Alamo)
8	Ball-C	Abdominal Aortic Aneurysm III (Finol & Papaharilaou)	Abdominal and Thoracic Aortic Aneurysm (Yamada & Leask)	Thoracic Aortic Aneurysm & Dissection (Yamada)	Cerebral Aneurysms I: Clinical & Industrial Perspectives (Steinman & Raghavan)
9	312	Mechanics of Myocardial Infarction & Post-Infarction Therapies (Holmes & Wenk)	Biomechanics of Heart Valves (Sacks)	Micromechanics of Cardiovascular Tissues I (Lanir & Kassab)	Micromechanics of Cardiovascular Tissues II (Lanir & Kassab)
10	313	Biomechanical Evaluation of Tissue Engineered Cartilage (Detamore)	Muscle Mechanics I (Herzog)	Muscle Mechanics II (Herzog)	Muscle Mechanics III (Herzog)
11	305	Lymphatics and Interstitial Fluid III: Lymphatic Physiology (Dixon & Moore)	Cell-Biomaterial Interface I (Leong & Hoffman)	Cell-Biomaterial Interface II (Leong & Hoffman)	Cell-Biomaterial Interface III (Leong & Hoffman)
12	301	Multiscale Modeling I: Orthopaedics (Erdemir)	Multiscale Modeling II: Cardiovascular (Pierce)	Computational Challenges in Multiscale Modeling I (Viceconti)	Computational Challenges in Multiscale Modeling II (Viceconti)
13	311	Reproductive & Women’s Health IV: Biomechanics of Pregnancy & Delivery 2 (Mazza & Oczeretko)	Reproductive & Women’s Health V: Biomechanics of the Placenta & Embryology (Ferguson & Gargett)	Reproductive & Women’s Health VI: Biomechanics of the Pelvic Floor 1 (Damaser & Jorge)	Reproductive & Women’s Health VII: Biomechanics of the Pelvic Floor 2 (DeLancy & Hoyte)
14	Ball-A	Robotics: Lower Limb Exoskeletons I (Sawicki)	Robotics: Lower Limb Exoskeletons II (Sawicki)	Degenerative Spine (Oxland)	Biomechanics of the Spine (Wang)
15	Ball-B	Multiscale Techniques in Biomechanics & Mechanobiology IV (Mueller & Pivonka)	Multiscale Techniques in Biomechanics & Mechanobiology V (Mueller & Pivonka)	Structure-Function in Soft Tissue – Bone (Morgan)	Mechanobiology of Bone Healing (Morgan)
16	308	CSB Soft Tissue Mechanics (Federico)	CSB Career Awards (Robinovitch)	CSB Occupational Biomechanics: Upper Extremity Analysis Tools (Dickerson)	Mechanics and Mechanobiology of Soft and Hard Tissues (Donahue & Masen)
17	307	Evolutionary Biomechanics of Animal Locomotion I (Hutchinson)	Evolutionary Biomechanics of Animal Locomotion II (Hutchinson)	Role of Spasticity in Locomotion: Experiments & Simulations (Jonkers & DeGroot)	Evolutionary Biomechanics of Animal Locomotion III (Hutchinson)
18	310	ASB Subject- & Patient-Specific Musculoskeletal Modeling I (Anderson)	ASB Subject- & Patient-Specific Musculoskeletal Modeling II (Anderson)	ISB Presidential Symposium I (Challis & van den Bogert)	ISB Presidential Symposium II (Challis, & van den Bogert)
19	303	Aging of the Neuromuscular System I (Power)	Aging of the Neuromuscular System II (Power & Dalton)	Mechanical Loading as In Vivo Anabolic Agent for Bone Tissue Engineering (Pioletti)	ANZSB Young Investigator Awards (Barrett)
20	304*	Design of Feet in Relation to Locomotion (Biewener & Full)	Maneuvering on Challenging Terrain (Biewener & Full)	Comparative Biomechanics of Bipedal Locomotion (Blickhan & Ogihara)	How & Why to Couple Soft-Tissue - Rigid Body Simulations (Blemker & van den Bogert)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 PODIUM SESSION SCHEDULE – THURSDAY JULY 10, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 15-6 is a session index of 15 (which is Thursday 8-9:30am) and a room index of 6 (which is Hynes 309). This session title is “Cell Motility.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 15) 8:00 – 9:30 am	(Session Index 16) 11:00 am – 12:30 pm	(Session Index 17) 2:30 – 4:00 pm	(Session Index 18) 4:30 – 6:00 pm
1	109	Enhanced Imaging & Treatment with Nanoparticles (Rylander & West)	Micro/Nano Technology in Cryopreservation (Zhang & Bhowmick)	P. Ayyaswamy 70 th Birthday Tribute II: Devices & Modeling Nanoparticles (Liu & Rylander)	Functional Micro/Nanodevices for Quantitative Cell and Tissue Mechanics (Bashir & Fu)
2	110	Implications for Flow on Cell Adhesion & Drug Delivery (Thomas)	CNS Transport & Drug Delivery I: Experimental (Sarntinoranont & Smith)	CNS Transport & Drug Delivery II: Modeling (Sarntinoranont & Smith)	Molecular Imaging & Therapeutic Approaches (Bao & Gounis)
3	111	Cytoskeletal Mechanics & Physics of Adhesion I (Bershadsky & Schwarz)	Cytoskeletal Mechanics & Physics of Adhesion II (Bershadsky & Schwarz)	Cytoskeletal Mechanics & Physics of Adhesion III (Bershadsky & Schwarz)	Prenatal Skeletal Development: Mechanobiology & Mechano-transduction (Nowlan)
4	306*	Intermediate Filaments (MacKintosh & Schmidt)	Active Cytoskeletal Networks I (MacKintosh & Schmidt)	Active Cytoskeletal Networks II (MacKintosh & Schmidt)	Cytoskeletal Rheology In Vivo (MacKintosh & Schmidt)
5	302*	Stem Cell Nucleus I (Discher & McDevitt)	Stem Cell Nucleus II (Discher & McDevitt)	Stem Cell Nucleus III (Discher & McDevitt)	Stem Cell Nucleus IV (Discher & McDevitt)
6	309	Cell Motility (Pathak)	High Resolution Imaging in Mechanobiology I (Muller)	High Resolution Imaging in Mechanobiology II (Muller)	High Resolution Imaging in Mechanobiology III (Muller)
7	300	Cardiovascular Fluid Mechanics I (Michler & Figueroa)	Cardiovascular Fluid Mechanics II (Nordsletten & Figueroa)	New Frontiers in 1-D Cardiovascular Modeling (Chesler)	Biomechanics of the Coronary Circulation (Kassab)
8	Ball-C	Cerebral Aneurysms II: Tissue Mechanics & Mechanobiology (Watton & Robertson)	Cerebral Aneurysms III (Raghavan)	Cerebral Aneurysms IV: Hemodynamics (Cebal & Steinman)	Cerebral Aneurysms V: Risk Assessment & Modeling (Meng & Raghavan)
9	312	Arterial Stiffness & Disease I (Greenwald)	Arterial Stiffness & Disease II (Greenwald)	Arterial Stiffness & Disease III (Greenwald)	Tissue & Vascular Cell Mechanics (Janmey & Matsumoto)
10	313	Soft Tissues Mechanics I (Vena & Nguyen)	Soft Tissue Mechanics II (Zadpoor & Federico)	Meniscus Tissue Engineering and Mechanics (Donahue)	Mechanobiology & Inflammation of Cartilage (Chen & Fredberg)
11	305	Human Whole Body Thermal Modeling (Diller & Shrivastava)	Cryotherapy & Mechanisms of Action (Diller & Khoshemivis)	Skin Biomechanics I (Limbert) *More Skin Talks Session 14-16	Skin Biomechanics II (Limbert & Corr)
12	301	Multiscale Mechanobiology in the Respiratory System I (Brook)	Multiscale Mechanobiology in the Respiratory System II (Brook)	Multiscale Mechanobiology in Respiratory System III (Ghadiali & Gaver)	Multiscale Mechanobiology in Respiratory System IV (Wall & Ghadiali)
13	311	Reproductive & Women's Health VIII: Biomechanics of the Pelvic Floor 3 (Ashton-Miller & Abramowitch)	Reproductive & Women's Health IX: Penile & Sperm Biomechanics (Smith & Kieweg)	Reproductive & Women's Health X: Microfluidic Devices & Assisted Reproduction (Griffith & Eisenbach)	Reproductive & Women's Health XI: Women's Health (Olson & Le Gac) *see Evening Workshop
14	Ball-A	Cervical Spinal Manipulations & Cerebrovascular Accidents (Herzog & Feipel)	Spine Musculoskeletal Modeling (Vasavada)	Spinal Facet Biomechanics (Winkelstein & Nightingale)	Spine Biomechanics Modeling (Winkelstein & June)
15	Ball-B	Bone Mechanics & Quality (van der Meulen)	Bone Mechanics (Vena & Perilli)	Whole Bone Computations I (Guo & Keaveny)	Whole Bone Computations II (Guo, van Rietbergen, and Zysset)
16	308	Biomechanics of Osteoarthritis (Troy & Lerner)	Computational Joint Mechanics (Wayne)	Biomechanics of Elbow & Shoulder Arthroplasty I (Bishoff & Henninger)	Biomechanics of Elbow & Shoulder Arthroplasty II (Bishoff & Henninger)
17	307	Biomechanics of Flight I: Aerodynamics (van Leeuwen & Taylor)	Biomechanics of Flight II: Muscle Function & Control (Taylor, Combs, & van Leeuwen)	Biomechanics of Flight III: Maneuverability & Stability (van Leeuwen & Liu)	Biomechanics of Flight IV: Coping with Environmental Challenges (van Leeuwen & Liu)
18	310	Lower Extremity Rehabilitation (Dhafer)	Upper Extremity Rehab (Dhafer & Huang)	Gait Modification I (Shull & Davis)	Gait Modification II (Shull & Davis)
19	303	OpenSim Showcase I: New Modeling Tools & Applications (Hicks & Seth)	OpenSim Showcase II: New Modeling Tools & Applications (Hicks & Seth)	FEBio Symposium I (Ellis & Weiss)	FEBio Symposium II (Ellis & Weiss) *see Evening Workshop
20	304*	EMG-informed Estimates of Muscle Forces (Besier & Neptune)	ASB Technology & Rehabilitation - Technology (Rodgers & Davis)	ASB Technology & Rehabilitation – Retraining Session (Rodgers & Davis)	ASB Award Session, Including Recognition of ASB Fellows (Challis)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 PODIUM SESSION SCHEDULE – FRIDAY JULY 11, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 19-2 is a session index of 19 (which is Friday 8-9:30am) and a room index of 2 (which is Hynes 110). This session title is “Biofilm Ecomechanics.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 19) 8:00 – 9:30 am	(Session Index 20) 11:00 am – 12:30 pm	(Session Index 21) 3:00 – 4:30 pm	(Session Index 22) 5:00 – 6:30 pm
1	109	Biophysical Regulation of Cell Reprogramming & Directed Differentiation (Bashir & Fu)	Nano & Mesoscale Behavior of Biomolecular Materials I (Ketan & Barone)	Nano & Mesoscale Behavior of Biomolecular Materials II (Ketan & Cranford)	Molecular Design & Nanomechanics of Biomimetic Materials (Miserez)
2	110	Biofilm Ecomechanics (Van Vliet & Han)	Progenitor & Stem Cell Chemomechanics I (Van Vliet & Han)	Progenitor & Stem Cell Chemomechanics II (Van Vliet & Han)	Cancer Anti-Metastasis (Van Vliet & Han)
3	111	Computational Modeling of Cells & Cytoskeleton I (Stamenovic & Adachi)	Computational Modeling of Cells & Cytoskeleton II (Kim & Stamenovic)	Computational Modeling of Cells & Cytoskeleton III (Adachi & Kim)	Computational Modeling of Cells & Cytoskeleton IV (Adachi & Kim)
4	306*	Human Disease Mechanics (Popescu & Lim)	Altered Cell Mechanics in Diseased Environments (Meyer)	Cell Biomechanics & Mechano-biology in Inflammation (Chahine)	Biomechanics of Inflammation & Infection (Chair TBA)
5	302*	Mechanobiology of Development & Stem Cell Differentiation (Dai)	Receptor-Ligand Bindings in Blood Cells (Long & Zaman)	Biomechanical Meet Molecular Cues: Impact on Tissue (Duda)	Scanning Probe Techniques in Cellular & Subcellular Biomechanics (Singamaneni)
6	309	Jamming & Junctions in Collective Cell Migration I (Fredberg & Trepap)	Jamming & Junctions in Collective Cell Migration II (Fredberg & Trepap)	Collective Cell Migration: Bridging Theory and Exp I (Fredberg & Trepap)	Collective Cell Migration: Bridging Theory and Exp II (Fredberg & Trepap)
7	300	Thrombosis & Hemodynamics I (Ku & Bluestein)	Thrombosis & Hemodynamics II: Multiscale Modeling 1 (D. Bluestein, M. King)	Thrombosis & Hemodynamics III: Multiscale Modeling 2 (Bluestein)	Thrombosis & Hemodynamics IV (Ku & Bluestein)
8	Ball-C	Cerebrospinal Fluid Dynamics (Loth & Martin)	Mechanical Factors Affecting Arterial Pathophysiology (Morbiducci & Anayiotos)	Device-Tissue Interactions I: Stents, DES, & Angioplasty Balloons (Mongrain & Walsh)	Device-Tissue Interactions II: Heart Valves, Grafts, & Shunts (Mongrain & Leask)
9	312	Multiscale Cardiac Electromechanics I (Hurtado & Goktepe)	Multiscale Cardiac Electromechanics II (Hurtado & Goktepe)	In Vitro Systems for Studying Organ Biomechanics (Sanders)	In Vitro Models of Organ Biomechanics (Winkelstein & June)
10	313	Inverse Methods in Soft Tissue Biomechanics I (Lu & Evans)	Inverse Methods in Soft Tissue Biomechanics II (Ohayon & Oomens)	Inverse Methods in Soft Tissue Biomechanics III (Avil & Genovese)	Inverse Methods in Soft Tissue Biomechanics IV (Moerman & Bol)
11	305	Biomechanics of the Anterior Eye I (Grytz & Pandolfi)	Biomechanics of the Anterior Eye II (Amini & Downs)	Biomechanics of the Posterior Eye I (Nguyen & Sigal)	Biomechanics of the Posterior Eye II (vande Geest & Pinsky)
12	301	Lung Biomechanics and Therapy (Evrensel & Al-Jumaily)	Role of Airway Smooth Muscle in Lung Therapy (Al-Jumaily & Evrensel)	Therapeutic Lung Performance (Al-Jumaily & Evrensel)	Artificial Lungs (Cook)
13	311	Vascular Mechanics (Zadpoor & Bellini)	Micromechanical Modeling of Fibrous Tissue (Nguyen & Sanders)	Innovations in Teaching Biomechanics (Karduna)	Nouveau Biomechanics: Big Data, Community Involvement, Open Science (Erdemir)
14	Ball-A	Spine Biomechanics I (Shirazi-Adl & Lacroix)	Spine Biomechanics II (El-Rich & Rohlmann)	Spine Biomechanics III (van Dieen & Reeves)	Spine Biomechanics IV: Patient-Specific Modeling (Noailly & Arjmand)
15	Ball-B	Micromechanics of Bone & Biomaterials (van Lenthe)	Interface Mechanics in Orthopedics (Eberhardt, Cortes, & van Lenthe)	Bone Mechanics I (Dall'Ara & Taddei)	Bone Mechanics II (Dall'Ara & Pahr)
16	308	Understanding the Multi-Faceted Upper Extremity (Murray & Peterson)	Mechanics of the Shoulder (Karduna & Debski)	Dental Mechanics I (Inou)	Dental Mechanics II (Inou and Morton)
17	307	How Swimmers Generate & Use Flow (Muller & Tytell)	How Undulatory Swimmers Generate & Use Flow (Muller & Tytell)	Control of Swimming – Sensing & Using Flow (Muller & Tytell)	Control of Swimming – From External to Internal Mechanics (Muller & Tytell)
18	310	ASB Metabolic Energy Use in Movement I: Basic Principles (Umberger & Rubenson)	ASB Metabolic Energy Use in Movement II: Basic Principles (Umberger & Rubenson)	Innovative Techniques for Improving Gait: Stroke & Cerebral Palsy I (Steele & Higginson)	Innovative Techniques for Improving Gait: Stroke & Cerebral Palsy II (Steele & Higginson)
19	303	Simulation of Human Movement I: Emerging Challenges (Reinbolt & Piazza)	Simulation of Human Movement II: Emerging Challenges (Reinbolt & Piazza)	Skeletal Muscle Mechanics in 3D (Rohrle & Bol)	Motion Synthesis & Planning (Dorn)
20	304*	Dynamic Walking I (Collins)	Dynamic Walking II (Collins)	Running I (Kram)	Running II (Kram)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

AFFILIATED ASSOCIATION & ORGANIZATION EVENTS

	Meeting	Time	Location	Room
Saturday, July 5				
International Society for Biomechanics	ISB Executive Council Meeting 1	9:00am-5:00pm	Sheraton	Arnold Arboretum, 5th Floor
Sunday, July 6				
ASME Bioengineering Division Committee Meetings	BED Executive	7:00-9:30am	Sheraton	Beacon A, 3rd Floor
European Society of Biomechanics	ESB Council Meeting	9:00am-5:00pm	Sheraton	Beacon F, 3rd Floor
International Society for Biomechanics	ISB Executive Council Meeting 2	9:00am-5:00pm	Sheraton	Arnold Arboretum, 5th Floor
ASME Bioengineering Division Committee Meetings	SBC Oversight Organizing	9:30-10:20am	Hynes	102
ASME Bioengineering Division Committee Meetings	Design Dynamics and Rehab	10:30-11:20am	Sheraton	Beacon C, 3rd Floor
ASME Bioengineering Division Committee Meetings	New Directions	10:30-11:20am	Hynes	102
ASME Bioengineering Division Committee Meetings	Cell and Tissue Engineering	10:30-11:20am	Sheraton	Beacon A, 3rd Floor
World Council of Biomechanics	World Council of Biomechanics	11:00am-2:00pm	Hynes	103
ASME Bioengineering Division Committee Meetings	Honors	11:30am-12:20pm	Sheraton	Beacon C, 3rd Floor
ASME Bioengineering Division Committee Meetings	Education	11:30am-12:20pm	Sheraton	Beacon A, 3rd Floor
ASME Bioengineering Division Committee Meetings	Fluid Mechanics	11:30am-12:20pm	Hynes	102
ASME Bioengineering Division Committee Meetings	Industry Advisory	12:30-1:20pm	Hynes	102
ASME Bioengineering Division Committee Meetings	Solid Mechanics	12:30-1:20pm	Hynes	104
ASME Bioengineering Division Committee Meetings	BED Open Executive Committee	1:30-2:20pm	Hynes	102
Monday, July 7				
ASME Bioengineering Division Committee Meetings	Student Advisory	12:00-2:00pm	Sheraton	Beacon A, 3rd Floor
ASME Journal	JBME AE's (Associate Editor's) Meeting	12:30-2:00pm	Sheraton	Fairfax, 3rd Floor
Biomechanics and Modeling in Mechanobiology	BMMB Editorial Meeting	12:30-2:00pm	Sheraton	Gardner, 3rd Floor
Tuesday, July 8				
American Society of Biomechanics	ASB Past-Presidents/Fellows Meeting	7:00-8:00am	Boston Marriott	Wellesley, 3rd Floor
European Society of Biomechanics	ESB General Assembly	12:30-2:00pm	Hynes	309
US National Committee on Biomechanics	US National Committee on Biomechanics	12:45-2:30pm	Hynes	305
Canadian Society for Biomechanics	Canadian Society for Biomechanics	12:45-2:15pm	Hynes	306
Bioengineering Division: Student Leadership Committee	Student Panel Session - Life in Academia	1:00-2:00pm	Hynes	310
ASME Bioengineering Division Inclusion and Diversity Committee	Women in WCB Mixer	6:00-7:00pm	Sheraton	Fairfax, 3rd Floor
Northeastern University	Northeastern Bioengineering Reception	6:00-8:00 pm	Sheraton	Gardner, 3rd Floor
Bioengineering Division: Student Leadership Committee	Student Panel Session - Life in Industry	6:30-7:30pm	Hynes	300
International Society for Biomechanics	International Society of Biomechanics Trainee Mixer	6:00-9:00pm	Boston Marriott	Champions, 2nd Floor
ASME BED Student Leadership Committee	Graduate Students Social	8pm-close	The Lir Pub	903 Boylston St. (across from Hynes)
Wednesday, July 9				
American Society of Biomechanics	ASB Diversity Meeting	7:00-8:00 am	Boston Marriott	Wellesley, 3rd Floor
American Society of Biomechanics	ASB Executive Board Meeting	12:30-3:00pm	Boston Marriott	Wellesley, 3rd Floor
German Society of Biomechanics	German Society of Biomechanics	12:45-1:45pm	Hynes	301

	Meeting	Time	Location	Room
Thursday, July 10				
American Society of Biomechanics	ASB Women in Science Meeting	7:00-8:00 am	Boston Marriott	Wellesley, 3rd Floor
American Society of Biomechanics	ASB Business Meeting	12:45-1:45pm	Hynes	313
Asian-Pacific Association for Biomechanics	Asian-Pacific Association for Biomechanics	12:45-2:15pm	Hynes	307
ASME Bioengineering Division Committee Meetings	The Biotransport Committee	1:00-2:00pm	Hynes	105
ASME BED Student Leadership Committee	Effective Grant Strategies for Students and New Investigators	6:30-7:30pm	Hynes	306
Friday, July 11				
Journal of Biomechanics	Journal of Biomechanics	12:45-2:15pm	Sheraton	Commonwealth, 3rd Floor

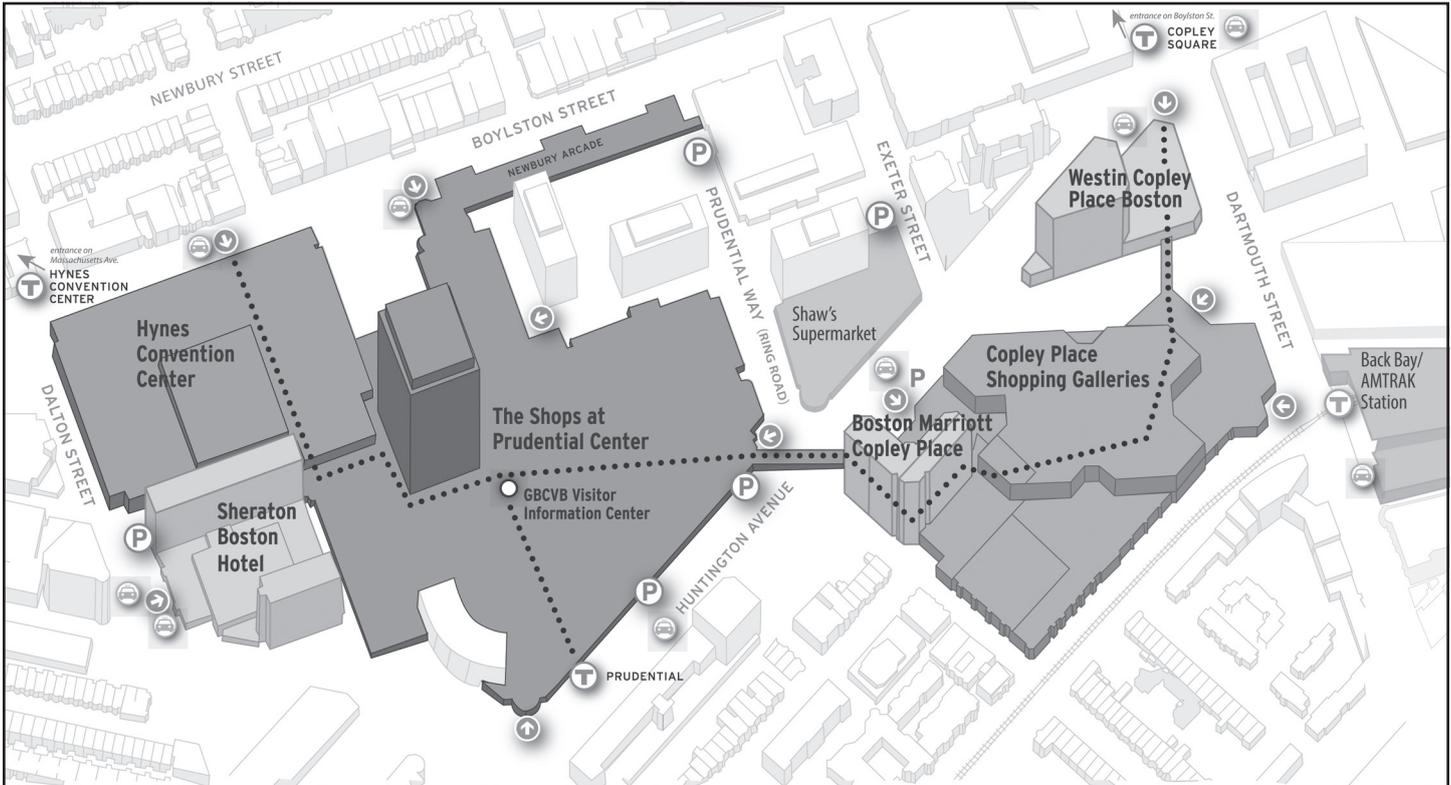
Plan your time wisely at WCB 2014!

Our online Program Planner allows you to browse and search for presentations within WCB 2014, build a personalized itinerary, export that itinerary to your calendar or mobile device and post presentations and sessions of interest to social media devices.

Don't Miss Out! Access this information whenever you need it!

**Access the itinerary builder here:
<http://wcb2014.com/event-info/technicalprogram/>**

CONGRESS COMPLEX AND NEIGHBORHOOD



Public Transportation
 Street Entrance
 Taxi Stand
 Access to Parking Garage
 Walking Connector Path

3-2-1 Connect Advantages:

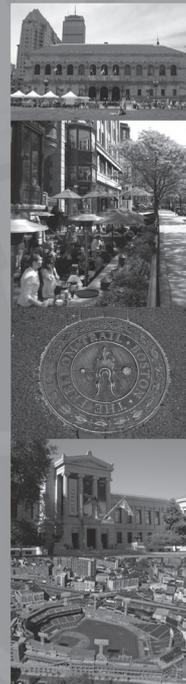


Here are just a few examples of the many unique advantages of 3-2-1 Connect:

- Climate-controlled, 72-degrees year-round
- Indoor walkways provide seamless transition within complex
- Access to hotel business center services
- Retail store discounts
- Complimentary Wi-Fi access in the 3 hotel public spaces; throughout the 2 shopping malls; and the entire Hynes Convention Center
- Phone calls connected between hotels
- Health club access at all hotels

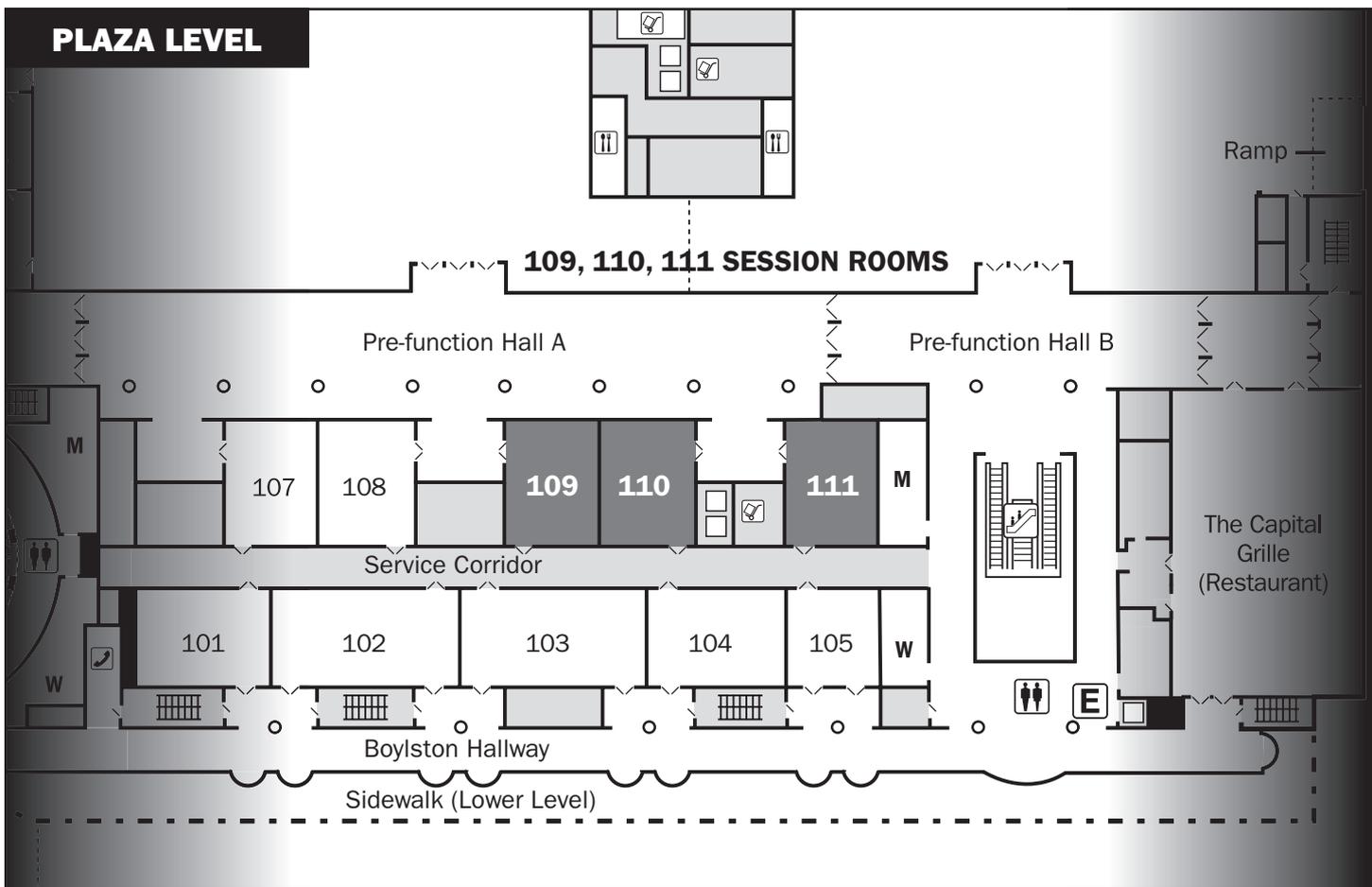
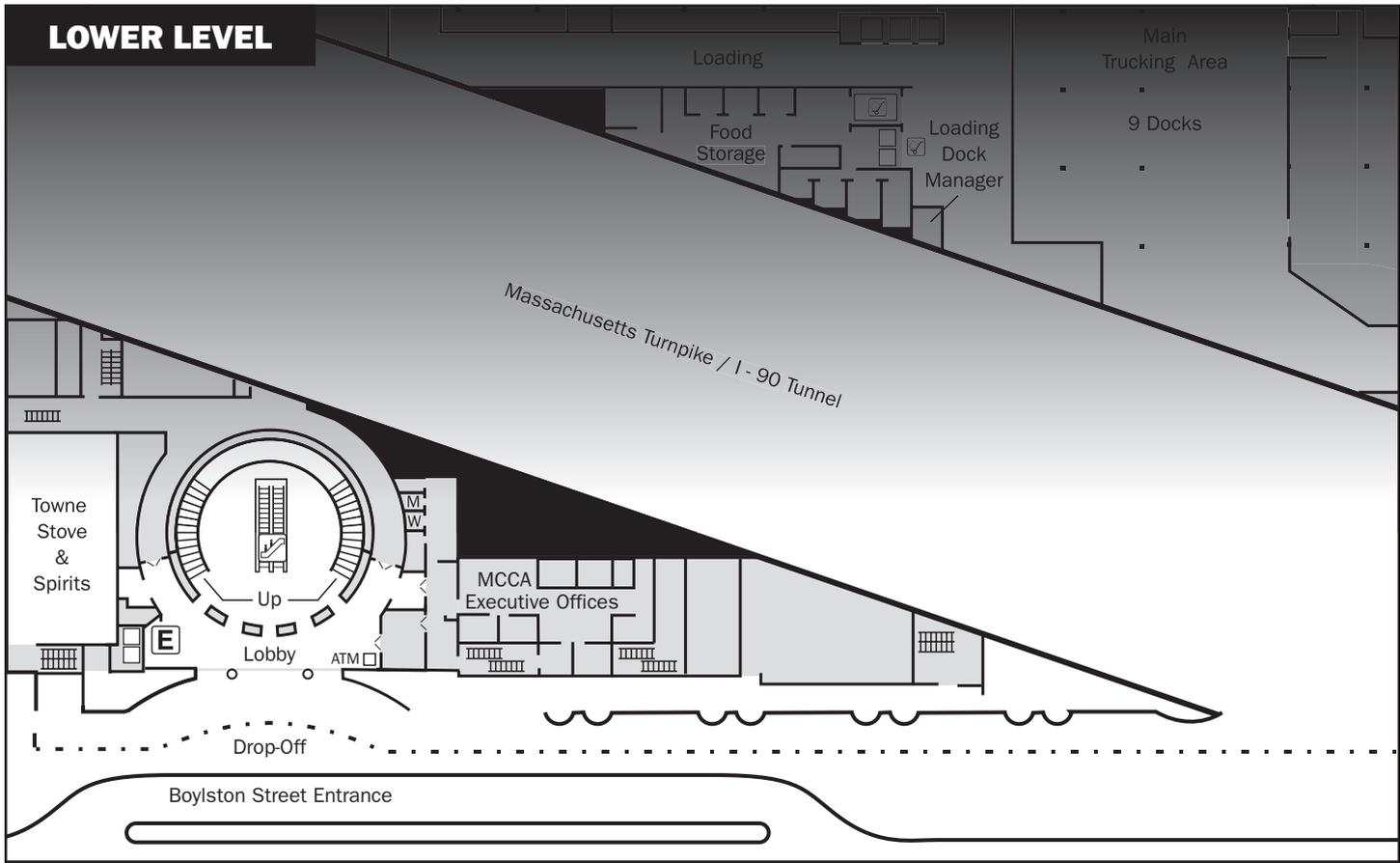
See more at www.3-2-1Connect.com

What's Nearby:

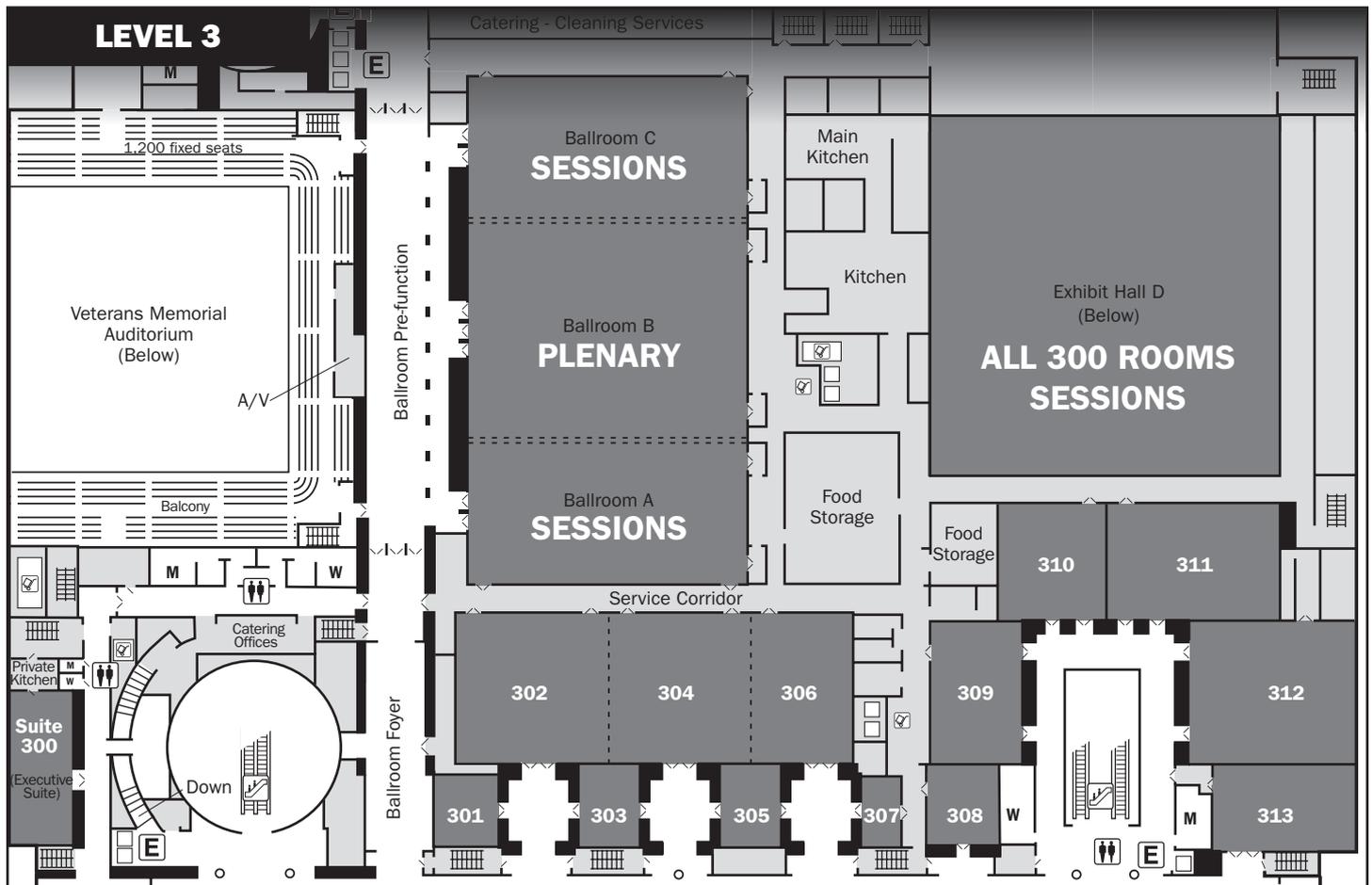
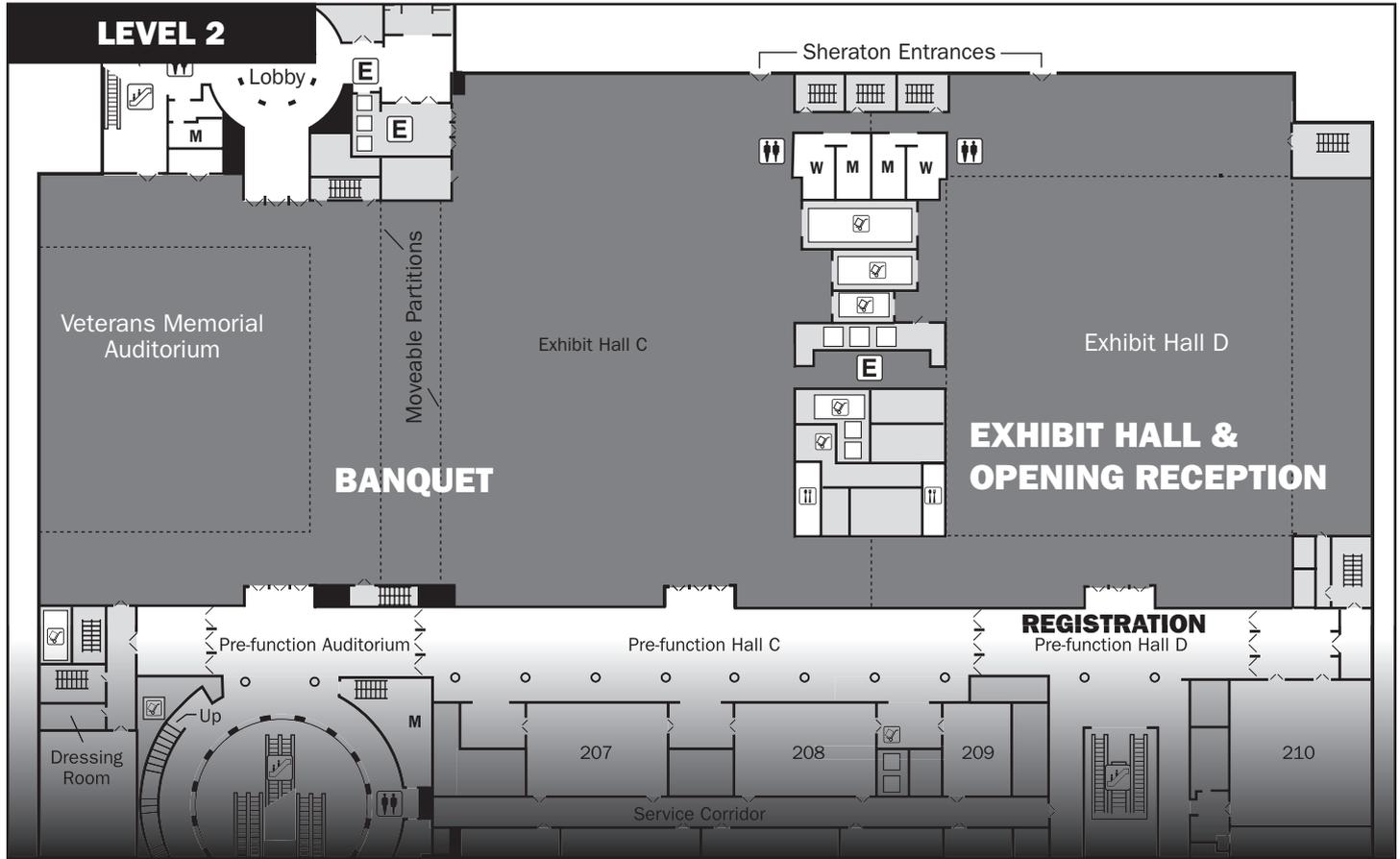


- Boston Public Library - 10 minute walk
- Copley Square - 10 minute walk
- Newbury Street shopping district - 5 minute walk
- Esplanade & Charles River jogging path - 20 minute walk
- Trinity Church - 10 minute walk
- Boston Public Garden - 15 minute walk
- Boston Common - 20 minute walk
- Freedom Trail start - 20 minute walk
- Cheers - 20 minute walk
- Theater District - 20 minute walk
- Symphony Hall - 5 minute walk
- Isabella Stewart Gardner Museum - 20 minute walk
- Museum of Fine Arts - 20 minute walk
- Christian Science Center - 2 minute walk
- Fenway Park - 12 minute walk

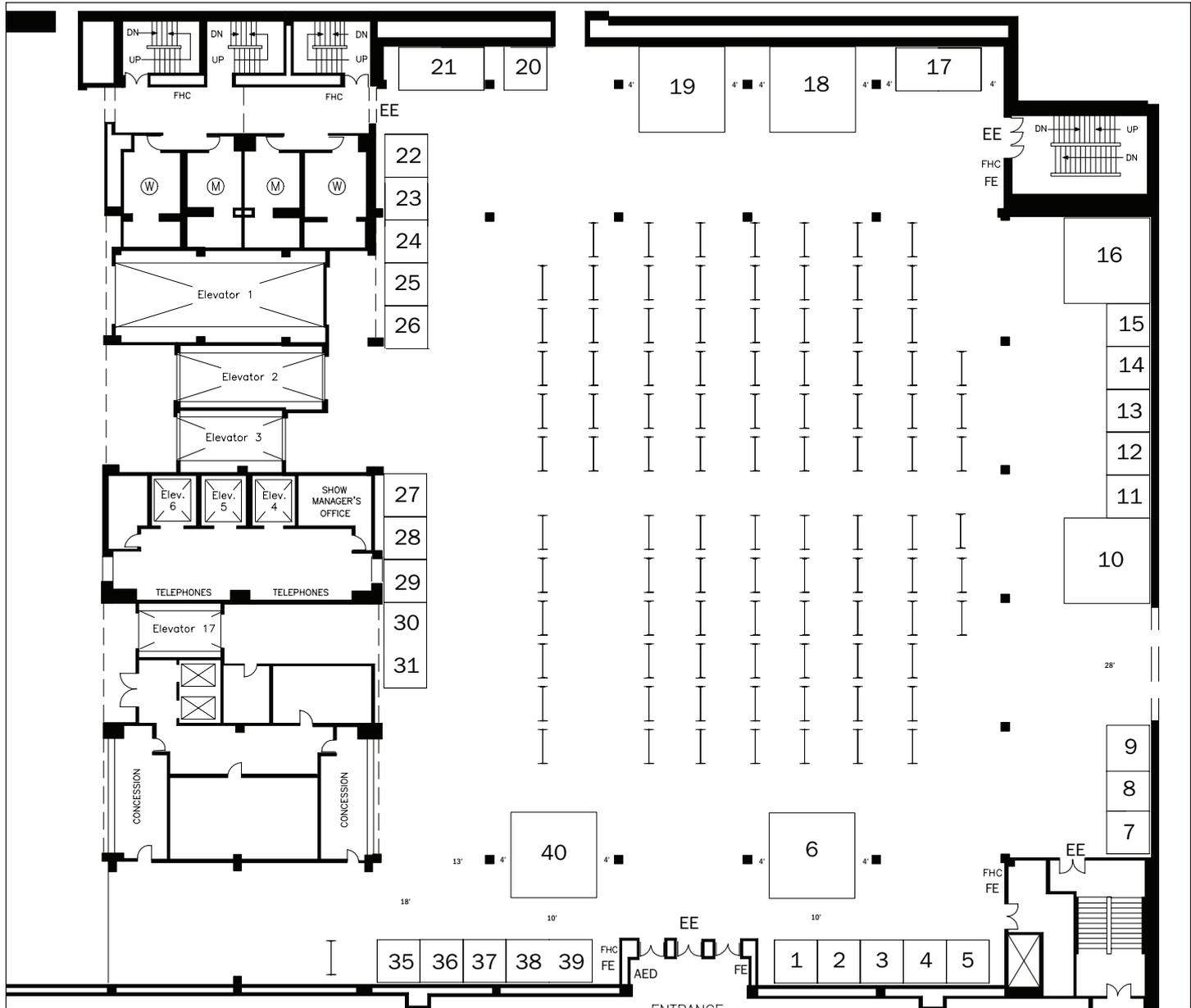
WORLD CONGRESS OF BIOMECHANICS EVENT MAP: HYNES CONVENTION CENTER



HYNES CONVENTION CENTER



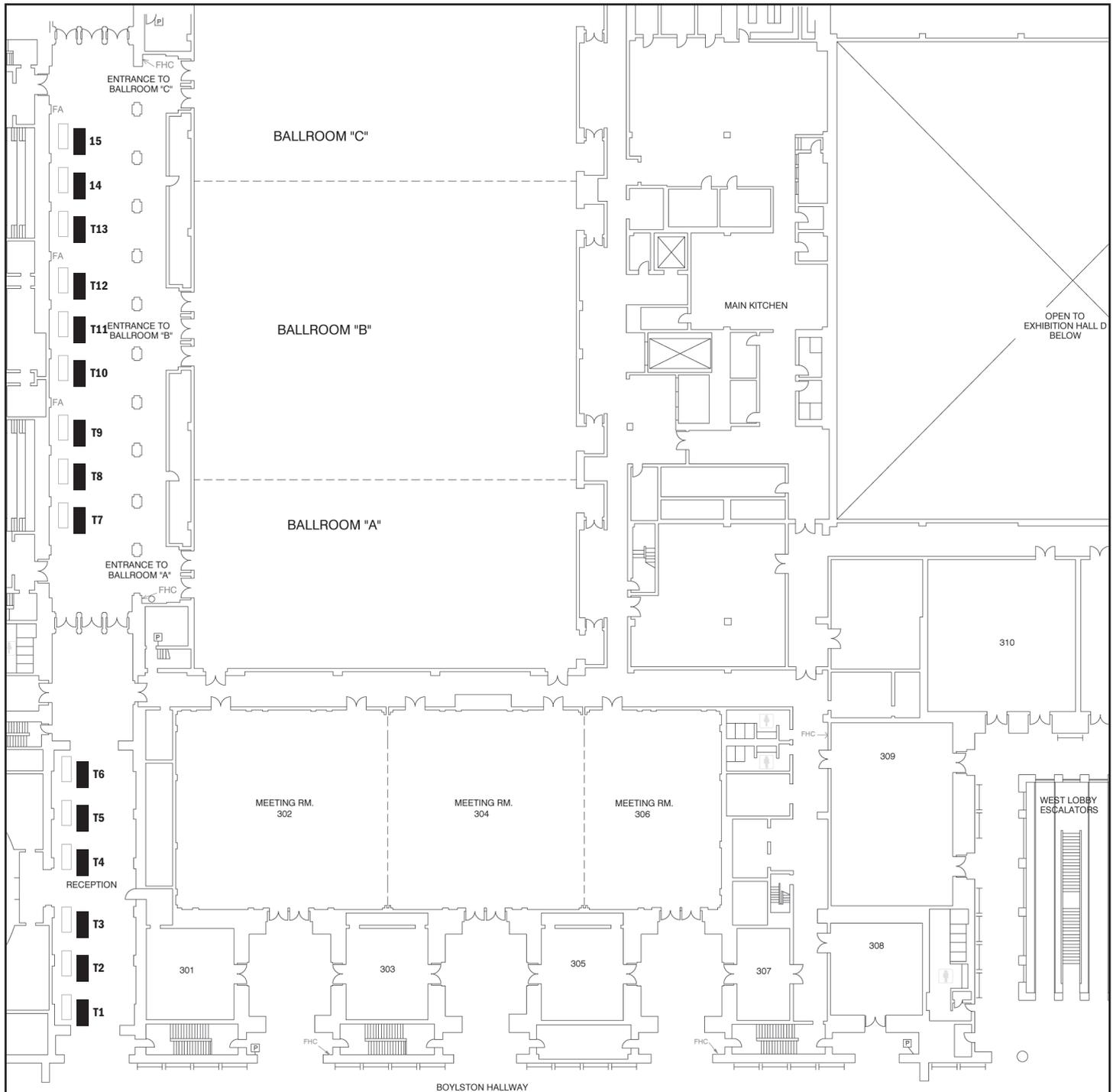
EXHIBITOR LOCATIONS • HYNES 2ND FLOOR EXHIBIT HALL



EXHIBITORS

- | | | |
|-------------------------------------|-------------------------------|-----------------------------------|
| 1 Biomedical Engineering Society | 13 Simulia | 26 Northern Digital Inc. (NDI) |
| 2 Anybody Technology | 14 Orobix SRL | 27 CellScale Biomaterials Testing |
| 3 Sawbones Worldwide | 15 NexGen Ergonomics Inc. | 28 Kistler Instrument Corporation |
| 4 Delsys Inc. | 17 Xcitex | 29 BETA CAE Systems USA, INC |
| 5 Vicon | 18 Contemplas | 30, 31 Novel inc |
| 6 AMTI | 19 Qualisys Motion Systems | 35 Royal Society Publishing |
| 7 Admet | 20 The MotionMonitor | 36 Scanco |
| 8 Motion Analysis Corporation | 21 Bertec Corporation | 37 Simpleware LTD |
| 9 CIR Systems/GAITrite | 22 Polhemus | 38, 39 Tekscan Inc |
| 10 Materialise | 23 Cambridge University Press | 40 Bose Corporation |
| 11 Wayne State University | 24 TestResources, Inc. | |
| 12 Simi Reality Motion Systems GmbH | 25 CSMi | |

TABLE TOP EXHIBITS • HYNES 3RD FLOOR HALLWAY



- T2 Solidscape®, a Stratasys® Company
- T3 ATI Industrial Automation
- T4 Protokinetics
- T5 Cleveland Clinic BioRobotics Core
- T6 Elsevier
- T7 Noraxon
- T8 Motek Medical

- T9 Biomomentum
- T10 C Motion
- T11 Nanosurf
- T12 IOP Publishing
- T13 Optics11
- T14 Metria Innovation
- T15 Applied Science Laboratories (ASL Eye Tracking)

POSTER SESSION INFORMATION FOR ALL CONGRESS ATTENDEES

Poster Sessions are a key part of the 7th World Congress of Biomechanics!
Please plan to join us daily in the Exhibit Hall, Monday to Friday!

General

Poster sessions will be a lively point of exchange during WCB, with most conference attendees sharing their latest results at the conference through these detailed results and one-on-one discussions. WCB is organized to give ample time for conference attendees to browse the posters, and then plan to engage and meet the poster authors each afternoon. The topics covered by these posters span the range of conference symposia each day, so you will find a great selection of posters and presenters every day!

For Poster Viewing

- Mon: Open for viewing at 11:30am. Poster presenters available at posters 7-9pm, as part of the Student Poster Competition.
- Tues: Open for viewing 8am-6pm. Poster presenters available at posters 12:30-2:30pm, with lunch provided in the Exhibit Hall.
- Wed: Open for viewing 8am-6pm. Poster presenters available at posters 12:30-2:00pm, with lunch on your own.
- Thurs: Open for viewing 8am-6pm. Poster presenters available at posters 12:30-2:30pm, with lunch provided in the Exhibit Hall.
- Fri: Open for viewing 8am-6pm. Poster presenters available at posters 12:30-2:00pm, with snack provided in the Exhibit Hall.

FOR POSTER PRESENTERS

Posters (42”H x 44”W) will be attached to the assigned board with provided thumb tacks/push pins. Please identify the day for your poster session and the assigned poster number.

Posters will be up for a single day in order to accommodate the large volume of submissions to this year’s WCB. Poster set-up will take place at the times listed below for each day, and posters must be taken down at the end of the day.

Authors are encouraged to leave their posters up throughout the day (both before and after the identified poster session) to allow congress delegates more time to visit the posters.

Each Poster Session will be divided into two 45-minute periods for authors to be stationed at their posters to answer questions. On each day, Author Group A will consist of the even-numbered posters (0, 2, 4, etc.) and Author Group B will consist of the odd-numbered posters (1, 3, 5, etc.).

- * Students presenting as part of the Student Paper Competition on Monday evening will be visited by judges during their assigned period.

Poster presenters on Monday, Tuesday, and Thursday are encouraged to pick up their lunch during the first ½ hour of the Poster and Lunch session, before either presentation group begins. On Wednesday and Friday, lunch is “on your own.”

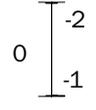
POSTER AUTHORS AT POSTERS

Day	Poster Set-Up	Author Group A	Author Group B	Poster Removal
Monday*	10:00 - 11:00 am	7:30 - 8:15 pm	8:15 - 9:00 pm	9:00 - 9:30 pm
Tuesday	7:00 - 8:00 am	1:00 - 1:45 pm	1:45 - 2:30 pm	6:00 - 7:00 pm
Wednesday	7:00 - 8:00 am	12:30 - 1:15 pm	1:15 - 2:00 pm	6:00 - 7:00 pm
Thursday	7:00 - 8:00 am	1:00 - 1:45 pm	1:45 - 2:30 pm	6:00 - 7:00 pm
Friday	7:00 - 8:00 am	12:30 - 1:15pm	1:15 - 2:00 pm	6:00 - 7:00 pm

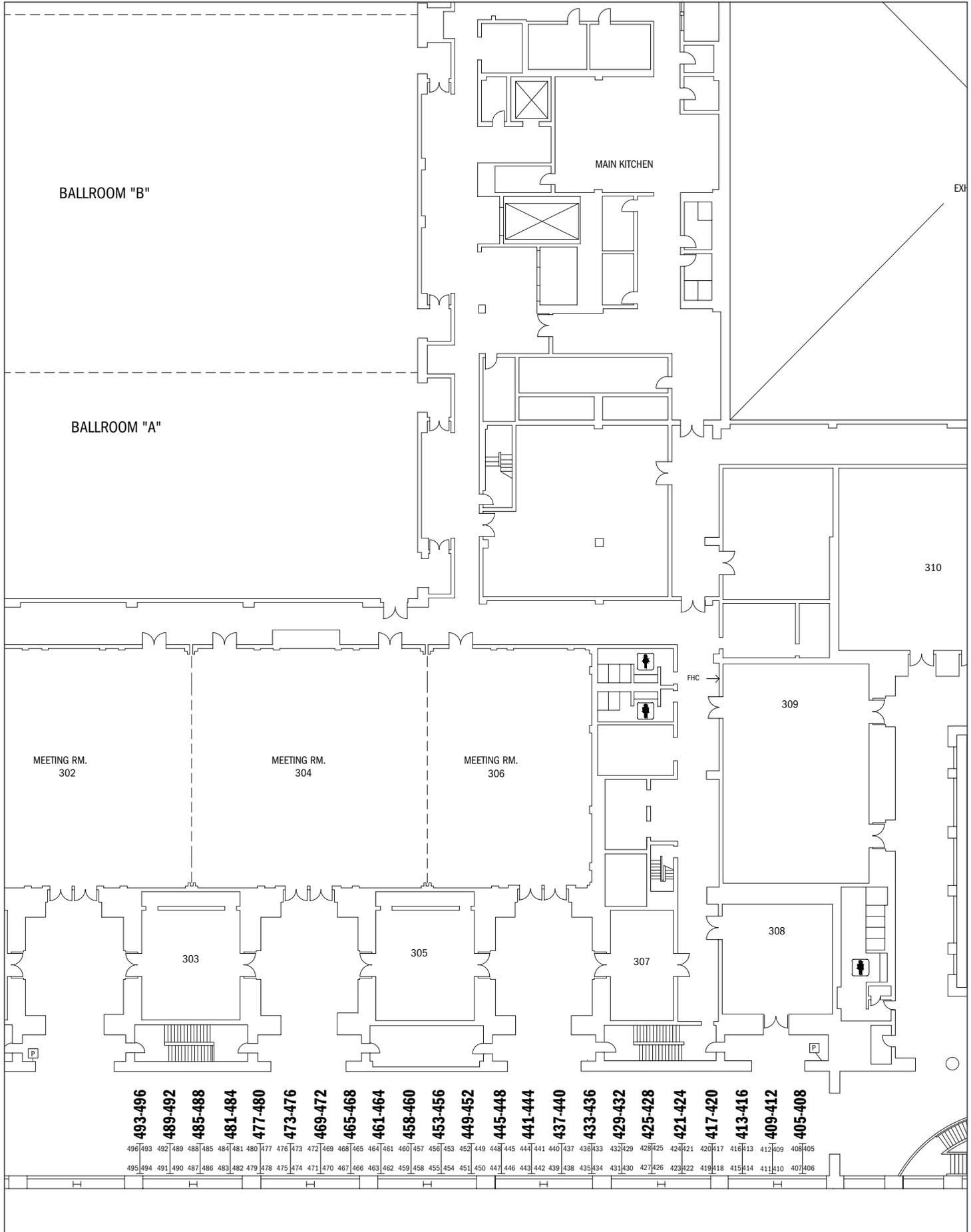
POSTER LOCATIONS • HYNES 2ND FLOOR EXHIBIT HALL

	68	69	116	117	164	165	212	213	260	261	308	309	356	357			
	67	70	115	118	163	166	211	214	259	262	307	310	355	358			
22	23	66	71	114	119	162	167	210	215	258	263	306	311	354	359		
21	24	65	72	113	120	161	168	209	216	257	264	305	312	353	360		
20	25	64	73	112	121	160	169	208	217	256	265	304	313	352	361		
19	26	63	74	111	122	159	170	207	218	255	266	303	314	351	362		
18	27	62	75	110	123	158	171	206	219	254	267	302	315	350	363	392	393
17	28	61	76	109	124	157	172	205	220	253	268	301	316	349	364	391	394
16	29	60	77	108	125	156	173	204	221	252	269	300	317	348	365	390	395
15	30	59	78	107	126	155	174	203	222	251	270	299	318	347	366	389	396
14	31	58	79	106	127	154	175	202	223	250	271	298	319	346	367	388	397
13	32	57	80	105	128	153	176	201	224	249	272	297	320	345	368	387	398

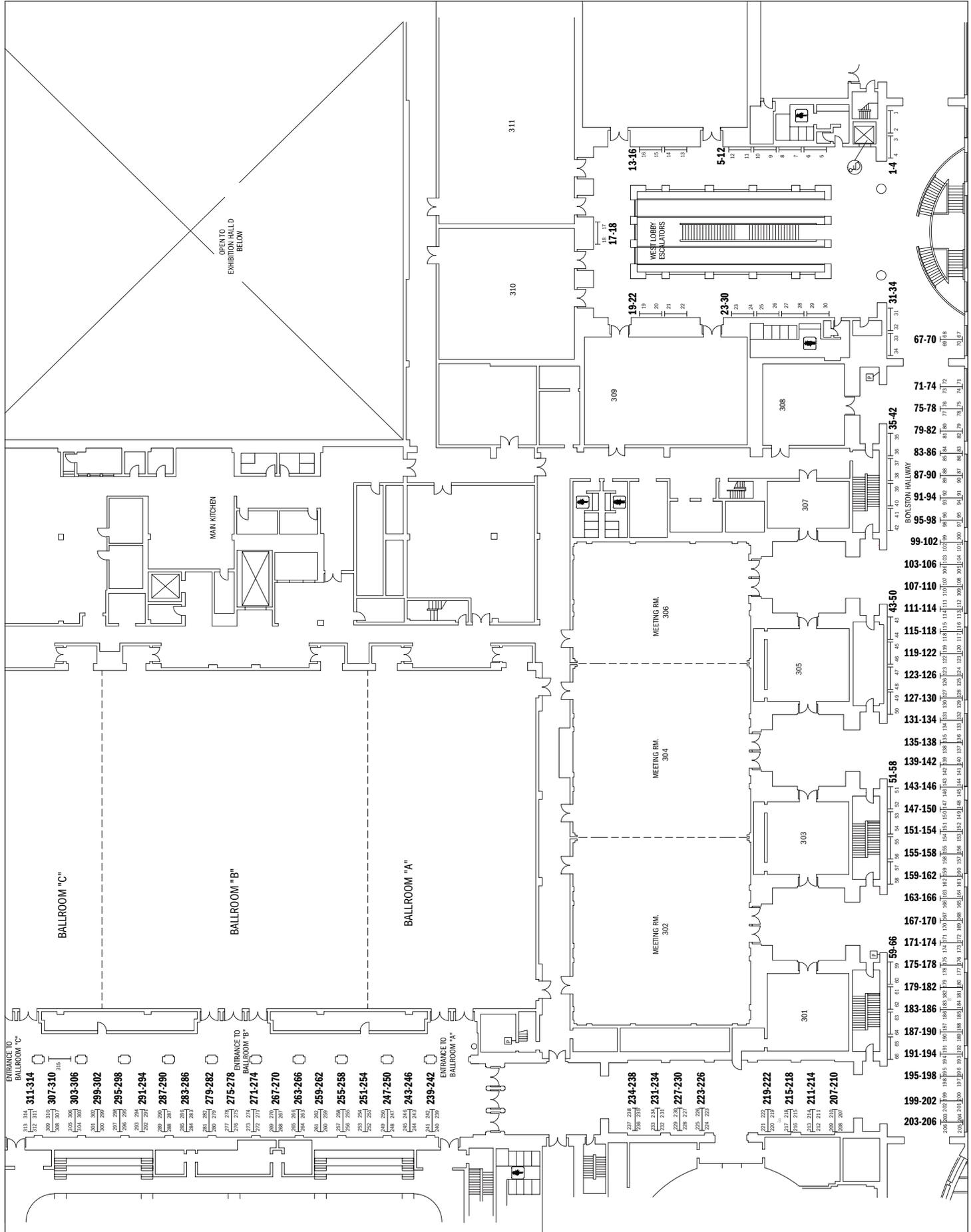
12	33	56	81	104	129	152	177	200	225	248	273	296	321	344	369	386	399
11	34	55	82	103	130	151	178	199	226	247	274	295	322	343	370	385	400
10	35	54	83	102	131	150	179	198	227	246	275	294	323	342	371	384	401
9	36	53	84	101	132	149	180	197	228	245	276	293	324	341	372	383	402
8	37	52	85	100	133	148	181	196	229	244	277	292	325	340	373	382	403
7	38	51	86	99	134	147	182	195	230	243	278	291	326	339	374	381	404
6	39	50	87	98	135	146	183	194	231	242	279	290	327	338	375		
5	40	49	88	97	136	145	184	193	232	241	280	289	328	337	376		
4	41	48	89	96	137	144	185	192	233	240	281	288	329	336	377		
3	42	47	90	95	138	143	186	191	234	239	282	287	330	335	378		
2	43	46	91	94	139	142	187	190	235	238	283	286	331	334	379		
1	44	45	92	93	140	141	188	189	236	237	284	285	332	333	380		



POSTER LOCATIONS • HYNES 3RD FLOOR • MONDAY - THURSDAY



POSTER LOCATIONS • HYNES 3RD FLOOR • FRIDAY





ASME H.R. LISSNER MEDAL

The H.R. Lissner Medal recognizes outstanding achievements in the field of bioengineering. These achievements may be in the form of (1) significant research contributions in bioengineering; (2) development of new methods of measuring in bioengineering; (3) design of new equipment and instrumentation in bioengineering; (4) educational impact in the training of bioengineers; and/or (5) service to the bioengineering community, in general, and to the Bioengineering Division of ASME, in particular. The Bioengineering Division of ASME established the H. R. Lissner Award as a divisional award in 1977. It was upgraded to a society award in 1987, made possible by a donation from Wayne State University and is named in honor of Professor H. R. Lissner of Wayne State University for his pioneering work in biomechanics that began in 1939.

Previous Awardees

1977	Robert W. Mann
1978	Y.C. Fung
1979	Robert F. Rushmer
1980	F. Gaynor Evans
1981	Max Anliker
1982	R.M. Kenedi
1983	Henning E. von Gierke
1984	Perry L. Blackshear
1985	Richard Skalak
1986	Albert H. Burstein
1987	Van C. Mow
1988	Alf Louis Nachemson
1989	Robert M. Nerem
1990	Albert B. Schultz
1991	Savio Lau-Yuen Woo
1992	John C. Chato
1993	Don P. Giddens
1994	Sheldon Weinbaum
1995	Robert E. Mates
1996	Albert I. King
1997	Ajit P. Yoganathan
1998	Malcolm H. Pope
1999	Stephen C. Cowin
2000	Morton H. Friedman
2001	W. Michael Lai
2002	Kenneth R. Diller
2003	Vijay K. Goel
2004	John M. Tarbell
2005	Steven A. Goldstein
2006	Peter A. Torzilli
2007	Maury L. Hull
2008	Noshir A. Langrana
2009	Thomas P. Andriacchi
2010	Roger D. Kamm
2011	Jay D. Humphrey
2012	David Butler
2013	Mehmet Toner

2014

Kyriacos A. Athanasiou

Kyriacos A. Athanasiou, is a Distinguished Professor of Biomedical Engineering and Orthopaedic Surgery, the Child Family Professor of Engineering, and the Chair of Biomedical Engineering at the University of California Davis. He obtained his PhD in Bioengineering (Mechanical Engineering) from Columbia University in 1989. He has published



approximately 300 peer-reviewed papers, five authored books, 12 edited books or journal special issues, and 30 patents. He has also served as president of the Biomedical Engineering Society. Additionally, he is the Editor-in-Chief of the Annals of Biomedical Engineering, the flagship journal of BMES. His list of awards includes the Nemitsas Prize (Cyprus' largest award presented by the President of Cyprus), the Distinguished Service Award

from BMES, Wall Street Journal's 2008 Innovation Award, Thomas A. Edison Patent Award from ASME, Hershel Rich Outstanding Invention Award, Marshal Urist Award for Excellence in Tissue Regeneration Research from the Orthopaedic Research Society, and the Van Mow Medal from ASME. He is a Fellow of BMES, AAAS, AIMBE, and ASME. In addition to his academic interests, he has been involved with effecting the translation of devices and instruments into clinical use and commercialization.



Previous Awardees

2005	Kyriacos A. Athanasiou
2006	Robert Lie-Yuan Sah
2007	Lori A. Setton
2008	Scott L. Delp
2009	Michael Sacks
2010	Tony M. Keaveny
2011	David A. Vorp
2012	John Bischof
2013	Jeffrey A. Weiss

ASME VAN C. MOW MEDAL

The Van C. Mow Medal is bestowed upon an individual who has made significant contributions to the field of bioengineering through research, education, professional development, leadership in the development of the profession, as a mentor to young bioengineers, and with service to the bioengineering community. The individual must have earned a PhD or equivalent degree between ten and twenty years prior to June 1 of the year of the award. The award was established by the Bioengineering Division in 2004.

2014

Christopher R. Jacobs

Chris Jacobs received in PhD in Mechanical Engineering in 1994 from Stanford University. His first faculty position was in Orthopaedic Surgery at Penn State. In 2001 he returned to Stanford as an Associate Professor of Mechanical Engineering. In 2008 he joined the Biomedical Engineering Department at Columbia University, where he



is pursuing a vision of the future of biomechanics and mechanobiology at the cell and molecular levels. The goal of his lab, the Cell and Molecular Biomechanics Lab, is to investigate cellular mechanosensing, particularly in the skeleton, with tightly coupled integration of advanced theoretical mechanics and modern molecular biology. He has made discoveries in terms of the mechanical

signals that bone cells sense and respond to and how these responses are communicated and integrated between cells. To date he has been awarded over \$7.5 million from federal and state agencies including for individual investigator projects as well as \$9.5 million in center grants. He has published over 100 peer-reviewed papers, 2 books, and 9 book chapters. He is the senior author of the innovative textbook "Introduction to Cell Mechanics and Mechanobiology", which has been adopted in 35 courses with an enrollment of over 850 students worldwide since its publication in 2013. He has received research awards from the American and European Societies of Biomechanics, and the Yasuda Award from the Society for Physical Regulation in Medicine and Biology.



ASME Y.C. FUNG YOUNG INVESTIGATOR AWARD

The Y.C. Fung Young Investigator Award is given to a young investigator who is under age 36 on or before June 1 of the year of the nomination, and has received a PhD or equivalent bioengineering degree within seven years prior to their nomination. The individual must be committed to pursuing research in and have demonstrated significant potential to make substantial contributions to the field of bioengineering. Such accomplishments may take the form of, but are not limited to, design or development of new methods, equipment or instrumentation in bioengineering, and research publications in peer-reviewed journals. The award was established by the Bioengineering Division in 1985 and operated as a division award until 1998 when it was elevated to a Society award.

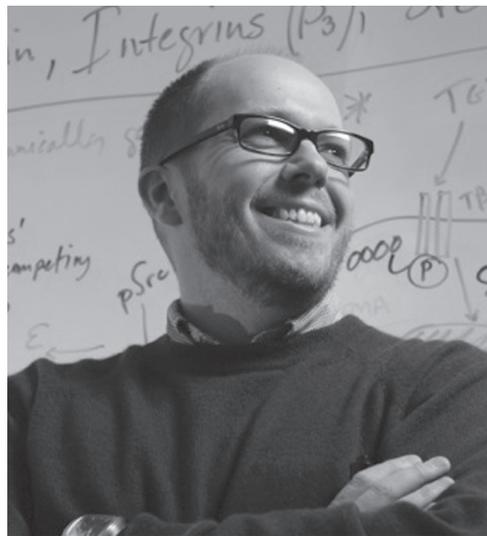
Previous Awardees

1986	Mark H. Holmes
1987	Steven A. Goldstein
1989	David N. Ku
1990	Jay D. Humphrey
1991	Michael Kwan
1992	Cheng Zhu
1993	John A. Frangos
1994	Mehmet Toner
1995	Cheng Dong
1996	Antony Keaveny
1997	Gerard A. Ateshian
1998	Louis J. Soslowsky
1999	Rebecca Richards-Kortum
2000	Farshid Guilak
2001	David F. Meaney
2002	Jeffrey A. Weiss
2003	Sangeeta N. Bhatia
2004	Richard E. Debski
2005	Jeffrey W. Holmes
2006	Beth A. Winkelstein
2007	Stavros Thomopoulos
2008	Gabriel A. Silva
2009	Robert Mauck
2010	Matthew J. Gounis
2011	Ali Khademhosseini
2012	Marissa Nichole Rylander
2013	Jonathan P. Vande Geest

2014

W. David Merryman

W. David Merryman, PhD is an Assistant Professor of Biomedical Engineering, Pharmacology, Medicine, and Pediatrics at Vanderbilt



University. His research interests are cardiovascular mechanobiology, cell and soft tissue biomechanics, tissue engineering, and bioengineering ethics. Prior to his arrival at Vanderbilt, Dave was an Assistant Professor of Biomedical Engineering at the University of Alabama at Birmingham. He received his PhD in Bioengineering from the University of Pittsburgh and conducted his doctoral

research within the McGowan Institute for Regenerative Medicine as an American Heart Association Pre-doctoral Fellow. Dave completed his BS and MS in Engineering Science at the University of Tennessee and was awarded the Alumni Promise award from UT in 2011, which recognizes outstanding alumni under 40 years of age. Dave has been awarded the Early Career Award from the Wallace H. Coulter Foundation, the Scientist Development Grant from the American Heart Association, the NSF CAREER Award, and the K Award from the National Institutes of Health (NHLBI). An internationally known expert in heart valve research with over 40 peer-reviewed publications in the field, Dave has given over 20 invited talks at conferences and at some of the most prestigious universities. In 2014, he delivered an invited talk on “Technologies for the Heart” at the National Academy of Engineering’s Frontiers of Engineering annual meeting for a select group of the nation’s outstanding young engineers between the ages of 30 and 45.



ASB BORELLI AWARD

The Borelli Award, the most prestigious honor given by the ASB, recognizes outstanding career accomplishment and is awarded annually to an investigator who has conducted exemplary research in any area of biomechanics. The award is named after Giovanni Alfonso Borelli (1608-1679). Borelli, a mid-17th century Professor of Mathematics from Naples, Italy, is considered to be the father of modern biomechanics. Borelli's novel contribution, the treatise "On the Movement of Animals" (Translated by Paul Maquet and published by Springer-Verlag), puts forth numerous propositions on the movements and displacements of the limbs of man and animals.

2014

Vijay K. Goel

Professor Vijay K. Goel, Ph.D. received his basic engineering education



(B.S. and M.S. degrees) in India. He started his career in the United States of America in 1979 as a Research Associate at Yale University after having earned his doctorate from the University of New South Wales, Sydney, Australia in 1978. He joined Biomedical Engineering at the University of Iowa in 1982 as an Assistant Professor, becoming Chair in 1990. In December 2000, Prof. Goel moved to the University of Toledo as Professor and Chairman of Bioengineering. He also served as Co-Director of the Spine Research Center, a

joint undertaking of the schools of Engineering and Medicine. At present he is the Endowed Chair & McMaster Gardner Professor, Co-Director, Engineering Center for Orthopaedic Research Excellence (E-CORE), with a joint appointment in the departments of Bioengineering and Orthopaedic Surgery. Professor Goel has made noteworthy contributions in the area of spinal biomechanics. He has over 260 full-length peer-reviewed publications and over 450 conference presentations to his credit. His research has been funded by grants from NIH, OREF, DoD, NSF, Whitaker and other private foundations, industry and State of Ohio's Technology Action Fund Program. He has been recognized for his innovative research by various professional societies, including the International Society for the Study of the Lumbar Spine (Volvo Award 3 times) and North American Spine Society Research Award (4 times). Professor Goel received the 2003 H. R. Lissner Medal for his contributions to the mission of the ASME Bioengineering Division, for the growth of the industry, and for his internationally renowned work on spinal implants using the finite element modeling and innovative experimental techniques.

Previous Awardees

- 1984 Tom Brown
- 1985 A.E. Engin
- 1986 M.R. Yeadon
- 1987 Alan Grodzinsky
- 1988 Krishnan Chandran
- 1989 Maury L. Hull
- 1990 Rik Huiskes
- 1991 Van C. Mow
- 1992 Y.C. Fung
- 1993 Savio L-Y Woo
- 1994 Peter R. Cavanagh
- 1995 Wilson C. Hayes
- 1996 Albert Schultz
- 1997 Manohar Panjabi
- 1998 Malcolm Pope
- 1999 Don Chaffin
- 2000 Clinton Rubin
- 2001 Felix Zajac
- 2002 Mimi Koehl
- 2003 R. McNeil Alexander
- 2004 Tom Andriacchi
- 2005 Kai-Nan An
- 2006 Walter Herzog
- 2007 Rick Lieber
- 2008 David Burr
- 2009 James Ashton-Miller
- 2010 Farshid Guilak
- 2011 Scott Delp
- 2012 Carlo DeLuca
- 2013 Kenton Kaufman

James Gordon Hay
5th November 1936 - 1st August 2002



Previous Awardees

- 2004 Blake Ashby
- 2005 Mont Hubbard
- 2006 Peter Cavanagh
- 2007 Benno Nigg
- 2008 Vladimir Zatsiorsky
- 2009 Doris Miller
- 2010 Darren Stefanyshyn
- 2011 Joseph Hamill
- 2012 Jesus Dapena
- 2013 Glenn Fleisig

ASB JIM HAY MEMORIAL AWARD

The Jim Hay Memorial Award for Research in Sports and Exercise Biomechanics is presented each year by the American Society of Biomechanics. It was established in 2004 through the support of the Hay family and additional donors to recognize outstanding career accomplishment and is awarded annually to an investigator who has conducted exemplary research in the area of sports and exercise science biomechanics. The Hay Award selection is based on originality, quality and depth of the research and the relevance of this work to the field of Sports and Exercise biomechanics.

2014

Fred Yeadon

This year's winner is Fred Yeadon from Loughborough University in the United Kingdom. Fred Yeadon graduated in Mathematics from the



University of Cambridge in 1968 and after a number of years teaching mathematics obtained his PhD in Biomechanics from Loughborough University in 1985. He then took up a faculty position at the University of Calgary, and in 1990 returned to Loughborough University where he is currently Professor of Computer Simulation in Sport. His research on the computer simulation of twisting somersaults has provided new and important insights to these

skills; he continues to research in this area and to provide practical advice to gymnasts, divers, trampolinists, and freestyle aerial skiers. His other research interests include the computer simulation of gymnastics, high jumping, diving, and the control of sports movements. The quality of his work in sports biomechanics has been recognized by numerous awards including the New Investigator's Award from International Society of Biomechanics (1983), and the Dyson Award from the International Society of Biomechanics in Sports (2008). In addition he is a fellow of the British Association of Sport and Exercise Sciences and the European College of Sport Science, and a honorary membership of the International Society of Biomechanics.

Previous Awardees

1990 - Dr. David A. Winter,
Kinesiology Department,
University of Waterloo

1996 - Dr. Robert W. Norman,
Kinesiology Department,
University of Waterloo

1998 - Dr. Gavin Reid,
Department of Physical Education,
Queen's University

2000 - Dr. Micheline Gagnon,
Département de Kinésiologie,
Université de Montréal

2002 - Dr. Benno Nigg,
Faculty of Kinesiology,
University of Calgary

2004 - Dr. Stuart McGill,
Kinesiology Department,
University of Waterloo

2006 - Dr. Walter Herzog,
Faculty of Kinesiology,
University of Calgary

2006 - Dr. Doris Miller,
Kinesiology Department,
University of Western Ontario

2008 - Dr. Aftab Patla,
Department of Kinesiology,
University of Waterloo

2008 - Dr. Ronald Zernicke,
School of Kinesiology,
University of Michigan

2012 - Dr. Joan Stevenson,
School of Kinesiology and Health Studies,
Queen's University

CANADIAN SOCIETY FOR BIOMECHANICS

CAREER AWARD

The Canadian Society for Biomechanics Career Award is the top award of the Society and honours individuals who have been active in promoting the field of biomechanics in Canada. Career awardees are recognized leaders in their field and have been active in advancing, promoting, and publishing knowledge in the area of biomechanics, in Canada in particular. The executive committee of the CSB, in conjunction with past presidents of the Society selects awardees. However, awards will not necessarily be given at every conference. This year, two awardees were selected.

2014

Jack P. Callaghan

Jack P. Callaghan holds the rank of Professor at the University of Waterloo. He received his PhD from the Faculty of Applied Health Sciences at the



University of Waterloo in 1999. From 1998 to 2003 he was a faculty member in the Department of Human Biology at the University of Guelph. In 2003, he was awarded a Canada Research Chair in Spine Biomechanics and Injury Prevention (Tier 2, Natural Sciences and Engineering Research Council of Canada) and returned to the Kinesiology department at the University of Waterloo. He has also received an Ontario Distinguished Researcher Award and Canada Foundation for Innovation

infrastructure grants. His Tier 2 Canada Research Chair was renewed for a second term from 2008-2013 and in 2012 he was advanced to a Tier 1 NSERC Canada Research chair. He has acted as a project leader in the AUTO21 Network of Centres of Excellence and holds NSERC, CIHR and WSIB research funding. Dr. Callaghan is a Canadian Certified Professional Ergonomist (CCPE), is cross-appointed to Mechanical and Mechatronics Engineering, and sits on the steering committee of the Waterloo Centre for Automotive Research (WATCAR). He is currently the Associate Director of The Ontario Ministry of Labour funded Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD). Jack has also served as president of the Canadian Society for Biomechanics and is currently on the editorial boards of 7 journals. He has collaborated and consulted with a wide range of industrial partners including automotive and office furniture manufacturing companies on design and component testing projects resulting in over 20 technical reports. His main research interest is injury mechanisms in the intervertebral disc and lumbar spine from exposure to cumulative loading exposure including the development of low back pain. He is an author on over 160 peer reviewed journal articles, has over 350 conference abstracts and has supervised more than 35 graduate students.

CANADIAN SOCIETY FOR BIOMECHANICS CAREER AWARD, CONTINUED

2014

Dr. Geoff Fernie

Dr. Geoff Fernie is a professional engineer and Institute Director for research at Toronto Rehabilitation Institute-UHN. He has a primary appointment at the University of Toronto as Professor in the Department of Surgery with cross appointments that include the Institute of Biomaterials and Biomedical Engineering, Departments of Mechanical and Industrial Engineering, Physical Therapy, and Occupational Science and Occupational Therapy.



Dr. Fernie is recognized as a world leader in the application of engineering to create solutions for

problems commonly encountered by people with disabilities. He is the principal investigator on a major infrastructure award from CFI which funded the most advanced design, prototyping and testing facilities for rehabilitation technology and assistive devices in the world. Toronto Rehabilitation Institute has grown quickly over its last decade under his leadership and now has 240 graduate students and fellows from a mix of engineering, clinical and business disciplines. He is focused on the development of technology to help people continue to live in their own homes. He has 9 commercialized products and several currently in clinical trials. He has helped launch 4 successful companies. He has published over 141 peer reviewed journal papers and book chapters and has 22 awarded patents and an additional 13 filings.

Dr. Fernie's achievements have been recognized by the Jonas Salk Award, MEDEC Award, the Mickey Milner Award, Queen Elizabeth II Diamond Jubilee Medal, by admission to the Terry Fox Hall of Fame and the Canadian Academy of Health Sciences. Most recently he was awarded the inaugural 2014 Honourable David C. Onley Award by the Canadian Foundation for Physically Disabled Persons in recognition of his enormous contribution to the disability movement.

Previous Awardees

2010 - Dr. Clark Dickerson,
Department of Kinesiology,
University of Waterloo

2012 - Dr. Appaji Panchangam,
Faculty of Kinesiology,
University of Calgary

CANADIAN SOCIETY FOR BIOMECHANICS DAVID WINTER PROMISING YOUNG INVESTIGATOR AWARD

David Winter came to Waterloo in 1974 from his post as Director of Biomedical Engineering at the Shriners' Hospital in Winnipeg with appointment in Surgery at the University of Manitoba. There he had developed one of the world's first automated video-based methods of measuring and analyzing normal and abnormal walking (gait) patterns. He brought his significant engineering skills and his "Gait" laboratory, also one of only two or three in the world, to broaden and strengthen the biomechanics teaching and research program in the then quite new Department of Kinesiology. He authored four iconic books on the measurement, biomechanics and motor control of normal, elderly and pathological balance, posture and walking and contributed numerous scientific publications and invited addresses. He remains a recognized international scholar in biomechanics despite his retirement in 1994. In recognition of Dr. Winter's career and his enduring passion for mentoring young scientists, The Canadian Society for Biomechanics David Winter Promising Young Investigator Award is made for high quality biomechanics research, and specifically targets post-doctoral researchers who are 6 years or less from their PhD graduation year. This includes individuals in PDF positions and new faculty members who will typically be at the pre-tenure stage of their career. This early career award was established in 2010.

2014

Stephen Brown

Stephen Brown is an Assistant Professor in the Department of Human Health and Nutritional Sciences at the University of Guelph. He received his PhD in spine biomechanics from the University of Waterloo (2008),



and Masters (2003) and Bachelors (2000) degrees in Human Kinetics from the University of Windsor. After graduating from Waterloo he carried out a post-doctoral fellowship in the Department of Orthopaedic Surgery at the University of California San Diego (2008-2010). His research focuses on progressing the understanding of integrated spine and muscle function, injury, adaptation and rehabilitation. He has published over 40 peer-reviewed academic papers along

with two book chapters, and has (co-) authored more than 50 papers presented at academic conferences. Stephen was awarded the 2011 ISSLS Prize (International Society for the Study of the Lumbar Spine) for biomechanics research related to the low back.

STUDENT COMPETITIONS AT THE WORLD CONGRESS OF BIOMECHANICS

A number of our participating organizations are conducting student competitions at this year's World Congress of Biomechanics, either for their members or for the broad student community. We encourage congress delegates to attend these competition presentations and see some of the top work by the next generation of biomechanical engineers. Please see the schedule matrix for the time and location of each of these judged sessions.

ASME – Bioengineering Division

The BED is sponsoring the Student Paper Competition, open to all students. This competition, which received over 1000 submissions, is divided into three levels. 30 finalists were selected at the BS-level and 60 finalists were selected at the MS-level. These students will be judged in a Poster Competition on Monday evening. 36 PhD-level finalists will present their research in six themed podium sessions divided between Monday and Tuesday. All presentations will be assessed by a panel of judges. Awards for all categories will be announced at Wednesday's banquet.

The BED is also hosting the NSF-sponsored Undergraduate Design Competition in Rehabilitation and Assistive Devices. Six teams of undergraduate students were selected as finalists and have received cash awards to support prototyping and team travel to the WCB. The designs will be assessed by a panel of judges on Monday afternoon at 3 pm. Awards will be announced at Wednesday's banquet.

Australian and New Zealand Society of Biomechanics

Finalists for the ANZSB student paper awards will present their research at one of three sessions on Tuesday.

Canadian Society for Biomechanics

Student members of the CSB were eligible to submit abstracts for consideration for the Master's and Doctoral Student Awards, with judging of finalists taking place based on podium presentations on Tuesday at the WCB.

European Society for Biomechanics

Student members of ESB could request consideration for the ESB Student Paper Award. Four finalists were selected based on abstract submission for a judged podium session on Tuesday afternoon.

In addition to student awards, ANZSB, CSB, and DGfB (German Society for Biomechanics) will highlight presentations by young investigator award winners in designated awards sessions.

**The 7th World Congress of Biomechanics Organizing Committee
would like to thank the following US Federal Funding Organizations
for their support of this World Congress,
as awarded through a collaboration with the
American Society of Mechanical Engineers Bioengineering Division:**



**General and Age-Related Disabilities Engineering (GARDE)
Biomedical Engineering and Engineering Healthcare (ENG/CBET)**



**National Institutes
of Health**

**National Institute for Biomedical Imaging
and Bioengineering (NIBIB)**

PLENARY LECTURES AND SOCIETY AWARD LECTURES

MONDAY

- 9:45 am WCB Plenary 1 – Room Ballroom B –
M. Koehl, Ph.D., University of California, Berkeley
“Locomoting in an Unsteady World”
- 9:45 am WCB Plenary 2 – Room 302-304-306 –
D. Discher, Ph.D., University of Pennsylvania
“From matrix mechanics to nuclear mechanics”
- 2:00 pm WCB Plenary 3 – Room Ballroom B –
C. Taylor, Ph.D., HeartFlow, Inc.
*“Noninvasive Functional Assessment of
Coronary Artery Disease using Cardiac CT
Imaging and Computational”*
- 2:00 pm WCB Plenary 4 – Room 302-304-306 –
M. Swartz, Ph.D., EPFL and University of Chicago
*“Lymphatic and interstitial flow in inflammation
and cancer: linking mechanobiology
with immune regulation”*

TUESDAY

- 9:45 am WCB Plenary 5 – Room Ballroom B –
B. Fabry, Ph.D., University of Erlangen
“Microrheology of living cells”
- 9:45 am WCB Plenary 6 – Room 302-304-306 –
M. Viceconti, Ph.D., University of Sheffield
*“To Infinity and Beyond: Musculoskeletal
Biomechanics in the Age of the Virtual
Physiological Human”*

WEDNESDAY

- 9:45 am ANZSB Plenary - Room Ballroom B –
M. Pearcy, Ph.D., Queensland University of
Technology
*“Translating Biomechanics Research into
Clinical Practice”*
- 9:45 am ESB Award Lectures – Room 302-304-306 –
Two Awards
The winners of the S.M. Perren Research
Award are Fulvia Taddei, Ilaria Palmadori,
William R. Taylor, Markus O. Heller, Barbara
Bordini, Aldo Toni, Enrico Schileo, for their
contribution entitled
*“Safety factor of the proximal femur during
gait: a population-based finite element study”*.
- The winner of the ESB Best Doctoral Thesis
in Biomechanics Award is Carlos Borau
Zamora for his thesis entitled *“Multiscale
computational modeling of single cell
migration in 3D”*. Dr. Borau Zamora performed
his research at the University of Zaragoza,
Spain (Supervisors: José Manuel García-Aznar
& Roger D. Kamm).
- 2:00 pm WCB Plenary 7 – Room Ballroom B –
M. Sokabe, Ph.D., Nagoya University
*“Variety of Molecular and Biophysical
Mechanisms Underlying Cell Mechanosensing”*
- 2:00 pm ASME Lissner Award – Room 302-304-306 –
K. Athanasiou, Ph.D., University of California, Davis
*“Establishing a Translational Pathway in
Biomechanics”*

THURSDAY

- 9:45 am ASB Borelli Lecture - Room Ballroom B –
V.J. Goel, Ph.D., University of Toledo
*“Design, Development and Evaluation of
Innovative Fusion Augmenting Spinal
Hardware”*
- 9:45 am CSB Plenary – Room 302-304-306 –
K. Englehart, Ph.D., University of New
Brunswick
*“Powered Upper Limb Prostheses:
State-of-the-Art and Clinical Challenges”*

FRIDAY

- 9:45 am WCB Plenary 8 - Room Ballroom B –
J. Bechtold, Ph.D., Minneapolis Medical
Research Foundation
*“Combined Mechanical and Biologic
approach to Improve Integrity of Bone-Implant
interface and increase longevity of Orthopaedic
Joint Replacement Implants”*
- 9:45 am WCB Plenary 9 – Room 302-304-306 –
F. Guilak, Ph.D. Duke University
*“Biomechanics and mechanobiology in the
development of new therapies for
osteoarthritis”*
- 2:00 pm WCB Plenary 10 – Room Ballroom B –
N. Broom, Ph.D., University of Auckland
*“Unraveling large-strain structure-function
relationships in the joint and spine tissues”*
- 2:00 pm USNCB Plenary – Room 302-304-306 –
J. Fernandez, Ph.D., Columbia University
“Titin: A giant mechanical computer”

Note: Plenary Lectures will be 45 minutes in duration,
with 0 minutes for formal questions and answers.
Plenary speakers are asked to remain for 15 minutes
following the lecture to address questions personally.

Note: WCB = World Congress of Biomechanics, ANZSB
= Australian and New Zealand Society of Biomechanics,
ESB = European Society of Biomechanics, ASME
= American Society of Mechanical Engineering –
Bioengineering Division, ASB = American Society
of Biomechanics, CSB = Canadian Society of
Biomechanics, and USNCB = United States National
Committee on Biomechanics

WCB2014 WORKSHOPS, TUTORIALS, AND ROUNDTABLE DISCUSSIONS

(These events are included in the regular registration fee.)

Sponsored Workshop by Delsys

Sunday 12:00 - 2:15 PM, Room 306 (Prof. Carlo J. De Luca, PhD, Boston University & Delsys Inc. Boston, USA; Prof. Serge H. Roy, ScD, PT, Boston University & Delsys Inc. Boston, USA; Prof. Paola Contessa, PhD, Boston University & Delsys Inc. Boston, USA; Shey-Sheen Chang, PhD, Delsys Inc. Boston, USA; Gianluca De Luca, MS, Delsys Inc. Boston, USA)

Bridging Motor Control & Biomechanics-What Can Advances in Sensor Technology Offer?

The goal of this workshop is to present current advances in sensor technology that offer new possibilities for extending biomechanical investigations into new areas of investigation. Specifically, the workshop will emphasize how sensor technology can be used for biomechanical applications that require *high signal fidelity* during vigorous activities (sport/exercise), *high precision and reliability* (robotics/prosthetics), or that bridge the gap between *biomechanics and motor control* (neural control). The format will include brief didactic presentations and demonstrations of the technology. See related sessions 19 on Tuesday afternoon.

Life in Academia Panel - Organized by the ASME BED Student Leadership Committee

Tuesday 1:30 - 2:30 PM, Room 310

Q&A session for students that focuses on life after graduate studies. The panel session will shed light on the application and interview process within academia. Panelists include Drs. Mark Buckley (U Rochester), Pat Alford (U Minnesota), Spencer Lake (Washington U St Louis), and Grace O'Connell (Columbia U).

Life in Industry Panel - Organized by the ASME BED Student Leadership Committee

Tuesday 6:30 - 7:30 PM, Room 300

Q&A session for students that focuses on life after graduate studies. The panel session will shed light on the employment opportunities in the biomedical industry. Panelists include Dr. Jeff Bishcoff (Zimmer), Dr. Jenni Buckley (The Taylor Collaboration for Orthopaedic Research), Dr. Eran Linder-Ganz (Active Implants Group), and a representative from Bose.

NIH Grant Application and Funding Opportunities Workshop

Tuesday 6:30 - 7:30 PM, Ballroom A (Dr. Craig Giroux, CSR, and Dr. Grace Peng, NIBIB)

NIH Review and Program Officers will present guidance on the submission of research grant applications to current funding opportunities in computational biology and bioengineering at NIH. Review: The workshop will introduce New Investigators to the NIH peer review system and update Established Investigators on current submission and review policies. Program: The workshop will discuss current funding opportunities in biomechanics, robotics, computational modeling, and multiscale modeling. Issues related to model reproducibility, reuse, and model sharing will be highlighted.

ASB Tutorial on Uncertainty in Musculoskeletal Modeling: What's in your toolbox?

Tuesday 6:30 - 7:30 PM, Room 310 (Prof. Bradley Davidson, University of Denver)

When implementing musculoskeletal models of any complexity (inverse kinematics, inverse dynamics, muscle force prediction), the confidence we have in the outputs are linked to the uncertainty of our inputs (measurement error, parameter estimation). However, this is often ignored and rarely reported. In this tutorial, we will introduce probabilistic-based analyses that should be in the toolbox of every researcher who uses musculoskeletal modeling for their research or clinical decision-making.

Sponsored workshop by Advanced Mechanical Technology Inc. (AMTI)

Thursday 12:30-2:15 PM, Room 313 (Dr. Markus Wimmer, Rush University Chicago, Dr. Darryl DLima, Scripps Clinic San Diego, Dr. Hani Haider, University of Nebraska Medical Center Omaha)

Revolutionizing Knee Research Methods

Review the latest innovations in knee measurements and simulation. The faculty will discuss the state-of-the-art in in-vivo kinematics and inverse dynamics approaches, the applications of in-vivo knee load measurements, and clinically relevant testing to assess the performance of knee implants. The workshop will end with a round table discussion about the future directions of implant testing.

Sponsored workshop by Bose®

Thursday 12:30-2:15 PM, Room 312 (Ed Moriarty - Bose Corporation, Gwen Reilly – Sheffield University, Tannin Schmidt – University of Calgary, Barbara Chan – The University of Hong Kong)

Bose Symposium on Advances in Biomechanics Research

Join Bose® for a technical session featuring key researchers in the area of biomechanics. Following a brief introduction to Bose by ElectroForce Systems Group General Manager Ed Moriarty, researchers from around the world will discuss their research and highlight the use of Bose testing instruments in a variety of applications and areas of study. Dr. Gwen Reilly, Senior Lecturer at the University of Sheffield, will discuss the characterization of mechanical properties of polymer scaffolds for bone cell mechanobiology and tissue engineering. Dr. Tannin Schmidt, Associate Professor at the University of Calgary, will present his ongoing research into the friction reducing effects of PRG4 (lubricin) on articular cartilage, the ocular surface, and other biomaterials. The complexities of tissue engineering a three-dimensional multicomponent spinal motion segment will be addressed by Dr. Barbara Chan, Associate Professor at The University of Hong Kong. Makensley Lordeus, graduate student at Florida International University, will discuss research on a reinforced elastomeric valve prostheses as well as engineered cartilage interface applications.

ASB Tutorial on Writing Grants

Thursday 6:30 - 7:30 PM, Room 310 (Prof. Andrew Biewener, Harvard University)

This tutorial will review the key elements of NIH grants from an investigator's perspective, focusing on a comparison of R21 and R01 award mechanisms. The tutorial will present some "do's" and "don'ts", and highlight the most important elements and strategies for writing a successful application. Ample time will be made available for questions and answers.

Effective Grant Strategies for Students and New Investigators - Organized by the ASME BED Student Leadership Committee

Thursday 6:30 - 7:30 PM, Room 306

A professional development opportunity on effective strategies for obtaining research funding. An open forum for graduate students and new investigators.

FEBio Workshop (see related Session 19, Thursday afternoon)

Thursday 6:30 - 7:30 PM, Room 303 (Prof. Jeff Weiss, University of Utah)

This third session in the FEBio Symposium will begin with an invited talk and will continue with an open panel discussion on FEBio. The invited talk will be delivered by Professor Dawn Elliott (University of Delaware) entitled, "Validation and Application of a Disc Finite Element Model Utilizing Independently Constructed Nonlinear, Anisotropic, and Time-Dependent Tissue-Level Material Properties", by authors D. Elliott, N. Jacobs, D. Cortes, J. Peloquin, and E. Vresilovic. We encourage you to join us for this third session in the FEBio Symposium and to participate in the open discussion on the use and future development of FEBio.

Reproductive & Women's Health Roundtable Discussion (See related Session 13, Tuesday – Thursday)

Thursday 6:30 - 7:30 PM, Room 311 (Prof. David Elad, Tel Aviv University)

Human reproduction is the outcome of synchronized activation of molecular and biochemical procedures that are integrated with transport phenomena and dynamic equilibrium of physical forces from cell to organ levels. *Reproductive Bioengineering* stands for any physical component, either structural or functional, involved in the reproduction process from molecular to tissue to organ levels. Naturally, the majority of the reproduction processes takes place in the woman. In view of the progress in research over the past decade, we will discuss future directions.

Biomedical and Nanomedical Technology Publications

ASME Press Concise Monograph Series

- **Ultrasonic Methods for Measurement of Small Motion and Deformation of Biological Tissues for Assessment of Viscoelasticity**
by Hideyuki Hasegawa and Hiroshi Kanai
- **Photodynamic Therapy Mediated by Fullerenes and their Derivatives**
by Michael R. Hamblin et al.
- **GFP Whole Cell Microbial Biosensors: Scale-up and Scale-Down Effects on Biopharmaceutical Processes**
by Frank Delvigne et al.
- **Biocompatible Nanomaterials for Targeted and Controlled Delivery of Biomacromolecules**
by D. Kapoor and S. Dhawan
- **Impedimetric Biosensors for Medical Applications Current Progress and Challenges**
by Jo V. Rushworth, et al.
- **Nanomaterials in Glucose Sensing**
by K. Burugapalli, N. Wang, J. Trzebinski, W. Song and A. Cass
- **Chitosan and Its Derivatives as Promising Drug Delivery Carriers**
by M. Prabakaran
- **Silica Nanoparticles as Drug Delivery System for Immunomodulator GMDP**
by E.V. Parfenyuk, N.A. Alyoshina, Yu.S. Antsiferova, N.Yu. Sotnikova
- **Nanoparticles and Brain Tumor Treatment**
by Gerardo Caruso, M.D., et al.
- **Mobile Wearable Nano-Bio Health Monitoring Systems with Smartphones as Base Stations**
by Vijay K. Varadan and Linfeng Chen



ASME Journals

- Journal of Biomechanical Engineering
- Journal of Fluids Engineering
- Journal of Materials and Technology
- Journal of Medical Devices
- Journal of Micro and Nano-Manufacturing
- Journal of Nanotechnology in Engineering and Medicine

ASME Conference Proceedings

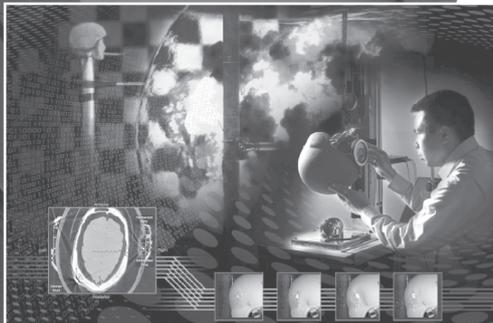
- International Mechanical Engineering Congress and Exposition (IMECE)
- Frontiers in Medical Devices (BIOMED)
- International Conference on Nanochannels, Microchannels, and Minichannels (ICNMM)
- International Manufacturing Science and Engineering Conference (MSEC)
- Global Congress on NanoEngineering for Medicine and Biology (NEMB)
- Summer Bioengineering Conference (SBC)
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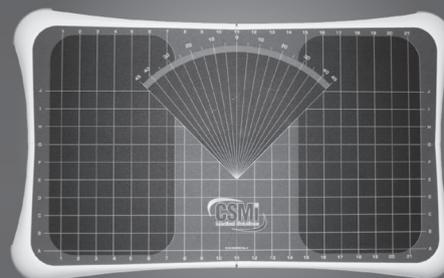
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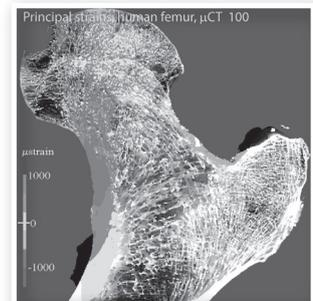
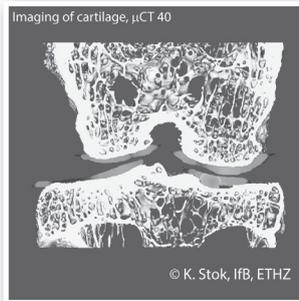
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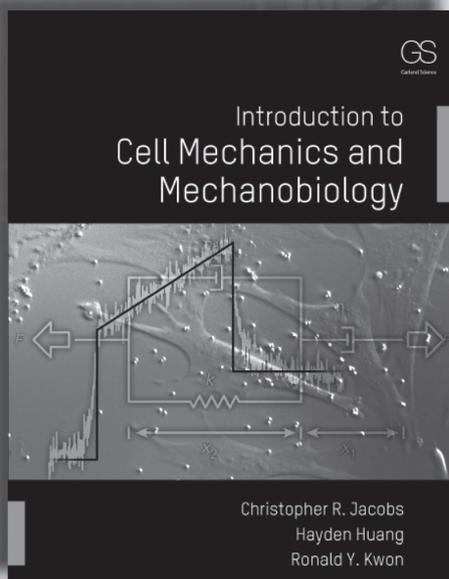
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Introduction to Cell Mechanics and Mechanobiology by Christopher R. Jacobs, Hayden Huang, and Ronald Y. Kwon



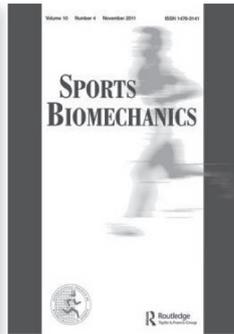
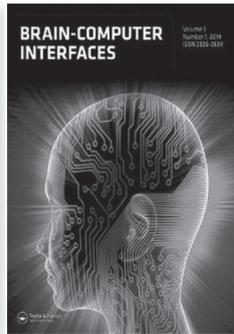
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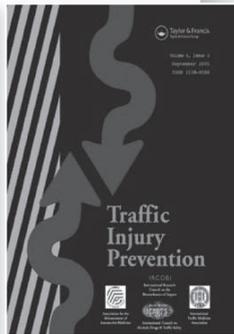
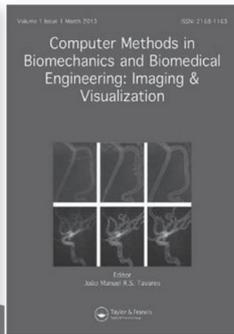
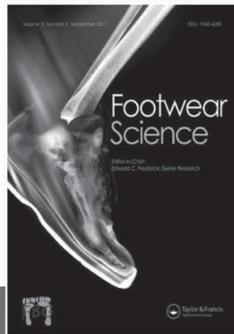
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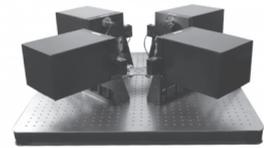
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NOTES

WCB2014 Podium Session Schedule – SUNDAY July 6, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 2-18 is a session index of 2 (which is Sunday 4:30-6pm) and a room index of 18 (which is Hynes 310). This session title is “Biomechanics of Running.” Session chairs are listed in parentheses, after the session title.

Room Index	Room Number	(Session Index 1) 2:30 – 4:00 pm	(Session Index 2) 4:30 – 6:00 pm
1	109	Protein Mechanics (Chair TBA)	Molecular & Cellular Experimental Tools (McGarry)
2	110	Mechanics of Adhesion & Contractility (Billiar & McGarry)	Extracellular Matrix Mechanics (Billiar)
3	111	Cell Responses to Stress (Chair TBA)	Cell Mechanics & Function (Chair TBA)
4	306*	Cell & Tissue Mechanics (Chair TBA)	Cell-Matrix Interactions (Clyne & Meininger)
5	302*	Biomechanics of Cancer I (Fabry)	Biomechanics of Cancer II (Fabry)
6	309	Point-of-Care Microfluidics Based Diagnostics (LeDuc & Kim)	Organ on Chip Systems (LeDuc & Kim)
7	300	Carotid and Cerebral Fluid Mechanics (Loth)	Model & Regulatory Affairs (McGloughlin & Baxter)
8	Ball-C	Tissue Engineering I (Gaudette)	Tissue Engineering II (van Donkelaar & Aggarwal)
9	312	Tendon-Ligament-Cartilage (Thomopoulos & Yamamoto)	Ligament & Tendon I (Thomopoulos & Kuo)
10	313	Cartilage Mechanics I (Hung)	Cartilage Mechanics II (Hung)
11	305	Biomechanics of Morphogenesis I (J. Lee)	Biomechanics of Morphogenesis II (Lee)
12	301	Microstructural Modeling (Zhang)	Pulmonary Hypertension (Finol)
13	311	Imaging for Tissue Biomechanics (Sinkus & Moerman)	Ultrasound Techniques in Cardiovascular Dynamics (Hasegawa)
14	Ball-A	Mechanics of Cartilage and Intervertebral Disc (W. Gu)	Mechanics of the Inter- vertebral Disc (Gu)
15	Ball-B	Mechanobiology of Bone (Robling)	Mechanoregulation of Bone (Tanaka)
16	308	Computational Methods (S. Sastry)	Biomechanical Instrumentation (Moreno)
17	307	Knee Grand Challenge (Fregly) *Continued in Tuesday Session 8-15	Biomechanics of Wheelchair Locomotion (Kuxhaus)
18	310	Biomechanics of Running (Ferguson)	Biomechanics of Shod & Unshod Running (Rubenson)
19	303	Biomechanics and Martial Arts (Pain)	Biomechanics of Head Impact (Cripton & Schmitt)
20	304*	Biomechanics for Under-Body Blast Environment – Warrior Injury Assessment I (Coates)	Biomechanics for Under-Body Blast Environment – Warrior Injury Assessment II (Coates)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 Podium Session Schedule – MONDAY July 7, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 4-1 is a session index of 4 (which is Monday 11am-12:30pm) and a room index of 1 (which is Hynes 109). This session title is “DNA Mechanics & Assembly.” Session chairs are listed in parentheses, after the session title.

Room Index	Room Number	(Session Index 3) 8:00 – 9:30 am	(Session Index 4) 11:00 am – 12:30 pm	(Session Index 5) 3:00 – 4:30 pm	(Session Index 6) 5:00 – 6:30 pm
1	109	Nucleic Acid Nanostructures (Bathe & Castro)	DNA Mechanics & Assembly (Liang)	Mechanics of the Nuclear Pore & Nucleocytoplasmic Transport (Mofrad)	Mechanics of Biomolecular Complexes (Purohit)
2	110	Molecular Mechanisms of Biological Lubrication I (Klein)	Molecular Mechanisms of Biological Lubrication II (Klein)	Duling Memorial Symposium on Glycocalyx I (Dewey)	Duling Memorial Symposium on Glycocalyx II (Dewey)
3	111	Mechanosensitive Signaling Pathways I (Engler & Cooper-White)	Mechanosensitive Signaling Pathways II (Engler & Cooper-White)	Cellular Mechanotransduction (Low & Leckband)	Cell-Substrate Interactions I (Vogel & Schwarz)
4	306*	Theoretical & Computational Modeling of Cells (Vernerey)	Continuum Approaches in Cell Mechanics (Kas & Merkel)	Nano- and Micro-mechanics of Collagen I (Bennink & Snedeker)	Nano- and Micro-mechanics of Collagen II (Bennink & Snedeker)
5	302*	Energy-Based Cancer Therapies: Challenges & Strategies (He & Wang)	Energy-Based Cancer Therapies: Mechanisms Across Scales (He & Zhao)	USNCB Biomechanics in Oncology I (Dong & Swartz)	USNCB Biomechanics in Oncology II (Nagahara & Dong)
6	309	Biological Flow at the Cellular Level I (Ishikawa)	Biological Flow at the Cellular Level II (Ishikawa)	Biological Flow at the Cellular Level III (Ishikawa)	P. Ayyaswamy 70 th Birthday Tribute I: Interfacial Fluid Dynamics and Thin Film Flows (Kieweg & Ghadiali)
7	300	Engineering Advances in Pediatric Cardiology I (Marsden & Feinstein)	Engineering Advances in Pediatric Cardiology II (Marsden & Feinstein)	Pediatric Biomechanics (Yoganathan & Manning)	Pediatric Clinical Challenges (Yoganathan & Manning)
8	Ball-C	Mechanobiology & Atherosclerotic Plaque Composition (Ohayon & Schwartz)	Atherosclerotic Plaque Properties (Gijsen & Walsh)	Atherosclerotic Plaque Strength (Speelman & Holzapfel)	Clinical Applications of Plaque Modeling (Tang & Migliavacca)
9	312	Ligament & Tendon II: Mechanoregulation of Regeneration & Homeostasis (Kuo)	Ligament & Tendon III: Mechanoregulation of Regulation & Homeostasis (Kuo)	Ligament & Tendon IV: Functional Adaptation to Mechanical Stimulation (Tohyama)	Joint & Soft Tissue Mechanics (Bevill)
10	313	Tribology of Articular Cartilage (Nakanishi)	Tribology I: Cartilage, Tissue & Biomaterial (Nakanishi)	Tribology II: Cartilage, Tissue & Biomaterial (Nakanishi)	Musculoskeletal Tissue Engineering I (Akkus)
11	305	Force Generation & Sensing in Organisms I (Fratzl & Weinkamer)	Force Generation & Sensing in Organisms II (Fratzl & Weinkamer)	Matrix and Mechanical Environment (Chan)	USNCB Mechanics of Tissue & Organ Development I: Cardiovascular (Taber & Wagenseil)
12	301	Multiscale/Multiphase Tissue Computational Modeling (Hatami-Marbini)	Biodesign & Multiscale Architecture of Bone (Vashishth)	Multiscale Techniques in Biomechanics & Mechanobiology I (Pivonka & Hellmich)	Multiscale Techniques in Biomechanics & Mechanobiology II (Mueller, Pivonka, Hellmich, & van Rietbergen)
13	311	Biomechanics of Soft Tissues – Magnetic Resonance Elastography (Bensamoun, Setton)	Ultrasonic Elastography (Nightingale)	Imaging Tissue Biomechanics I (Konofagou & Segers)	Imaging Tissue Biomechanics II: Orthopedic & Rehabilitation (Zheng)
14	Ball-A	ASME V.C. Mow Award & Cellular Mechanotransduction (Grimm)	Biothermomechanics (Wright)	Undergraduate Design Competition in Rehabilitation & Assistive Devices (Bush & Siston)	Clinical Gait Analysis (Galli & Leardini)
15	Ball-B	From Total Joint Replacement to Tissue Engineering: Present & Future (Maher & Wright)	Advances in Intramedullary Nailing Systems for Long Bones (Bottlang & Augat)	Implants for Mechanical Stimulation of Fracture Healing (Augat & Bottlang)	Mechanical Biocompatibility of Implants & Biomaterials (Mazza)
16	308	ASME Y.C. Fung Young Award & Cardiovascular Mechanobiology (Vorp)	Cell Mechanics (Holzapfel)	NSF Symposium: Muscle Synergy Analysis: From Descriptive to Predictive (Fregly & Patten)	Biomechanics of Brain Formation & Injury (Chair TBA)
17	307	Elastic Mechanisms I (Lichtwark)	Elastic Mechanisms II (Lichtwark)	PhD Student Competition: Cell Mechanics (Boerckel & Hutcheson) *Six talks per session	PhD Student Competition: Cardiovascular (Finol & Di Martino) *Six talks per session
18	310	Improving Performance in Sport I (McNitt-Gray)	Improving Performance in Sport II (McNitt-Gray)	ASB Computer Simulation of Sports & Exercise I (Challis & Pain)	ASB Computer Simulation of Sports & Exercise II (Challis & Pain)
19	303	Traumatic Brain Injury I (Camarillo & Siegmund)	Traumatic Brain Injury II (Camarillo & Siegmund)	Brain Injury Mechanics I (Monson)	Brain Injury Mechanics II (Shrivastava & Coats)
20	304*	Foot & Ankle Biomechanics I (Rosenbaum)	Foot & Ankle Biomechanics I (Leardini & Galli)	Biomechanics of the Foot & Ankle (Bishoff & Ledoux)	ISB – Footwear Biomechanics I: Force (Nigg & Arndt)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus, sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 Podium Session Schedule – TUESDAY July 8, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 8-1 is a session index of 8 (which is Tuesday 11am-12:30pm) and a room index of 1 (which is Hynes 109). This session title is “Bio-Inspired Manufacturing.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 7) 8:00 – 9:30 am	(Session Index 8) 11:00 – 12:30	(Session Index 9) 2:30 – 4:00	(Session Index 10) 4:30 – 6:00 pm
1	109	Design, Fabrication, Analysis of Hierarchical Biomaterials (Buehler & Qin)	Bio-Inspired Manufacturing (Ye & Dong)	Bio-inspired Materials from Nanostructures I (Xu)	Bio-inspired Materials from Nanostructures II (Xu)
2	110	Actomyosin Mechanobiology I (Yingxiao & Gardel)	Actomyosin Mechanobiology II (Yingxiao & Gardel)	Engineering Molecular Mechanics with Synthetic Biology I (Ruder & LeDuc)	Engineering Molecular Mechanics with Synthetic Biology II (Ruder & LeDuc)
3	111	Cell-Substrate Interaction II (Vogel & Schwarz)	Cell-Substrate Interaction III (Vogel & Schwarz)	Biophysical Aspects of Cell/Cell Adhesion (Julicher)	Cell-Cell Adhesion & Cell Rheology (Heisenberg)
4	306*	Micromechanical Tools (Kas & Merkel)	Optical & Magnetic Cell Manipulation (Kas & Merkel)	Physical Properties of a Membrane CSK Coupled System (Gov & Bassereau)	Force Generation by the Cytoskeleton on the Membrane I (Gov & Bassereau)
5	302*	Cell and ECM Rheology (Weitz & Navajas)	Whole Cells & Collective Behaviors (Genin & Kaunas)	Whole Cell Biomechanics I (Sato & Wang)	Whole Cell Biomechanics II (Sato & Wang)
6	309	Biomaterial Gradients for Directed Cell Migration (Sundararaghavan)	Engineered Cellular Environments (Kim & Simmons)	Modeling Multiphysics and Complex Phenomena in Soft Tissues (Noailly)	GEM4 (Hsi)
7	300	Mechanical Circulatory Support I: Future Pediatric Devices (Manning & Baldwin)	Mechanical Circulatory Support II: Improving Adult VADs (Manning)	Mechanical Circulatory Support Devices (Cook & Koenig)	Heart Valve Fluid Mechanics: The Chandran Impact (Manning & Yoganathan)
8	Ball-C	Vulnerable Plaque I: Data, Modeling, Mechanisms (Ku & Tang)	Vulnerable Plaque II: Data, Modeling, Mechanisms (Gijsen & Bluestein)	Abdominal Aortic Aneurysm I (Finol & Papaharilaou)	Abdominal Aortic Aneurysm II (Finol & Papaharilaou)
9	312	Vascular Growth & Remodeling Mechanics I (Gleason & Figueroa)	Vascular Growth & Remodeling Mechanics II (Gleason & Figueroa)	Vascular Growth & Remodeling Mechanics III (Gleason & Figueroa)	Cardiac Growth and Remodeling Mechanics (Nash & Holmes)
10	313	Musculoskeletal Tissue Engineering II (Akkus)	Passive Skeletal Muscle: Experiments & Modeling I (Simms)	Passive Skeletal Muscle: Experiments & Modeling II (Simms)	Connective Tissue Mechanical Behavior: Experiments & Modeling (Simms)
11	305	USNCB Mechanics of Tissue & Organ Development II: Force Generation (Taber & Davidson)	USNCB Mechanics of Tissue & Organ Development III: Multi-scale Methods (Taber & Nelson)	Lymphatics & Interstitial Fluid I: Biomechanics and Modeling (Dixon & Moore)	Lymphatics & Interstitial Fluid II: Cancer and Immunity (Dixon & Moore)
12	301	Multiscale Techniques in Biomechanics & Mechanobiology III (Mueller & Pivonka)	Respiratory Biomechanics: Linking Structure & Function in the Lung (Suki & Wada)	Respiratory Biomechanics: Remodeling & Regeneration (Maksym & Niklason)	Respiratory Biomechanics: Transport & Disease (Bates & Filoche)
13	311	Imaging Tissue Biomechanics III (Konofagou)	Reproductive & Women's Health I: Uterine Peristalsis & Myometrial Contractility (House & Own)	Reproductive & Women's Health II: Biomechanics of the Cervix (Shmygol & Eswaran)	Reproductive & Women's Health III: Biomechanics of Pregnancy & Delivery 1 (Myers & Feltoch)
14	Ball-A	PhD Student Competition: Cartilage & Menisci (Hung & Fisher) <small>*Six talks per session</small>	Spine Loading & Stabilization (Hurschler)	Intervertebral Disc Mechanobiology I (Ito)	Intervertebral Disc Mechanobiology II (Ito & Elliott)
15	Ball-B	Orthopedic Implant Design (Rullkoetter & Taylor)	Knee Grand Challenge (Fregly) <small>*Continued from Sunday Session 1-17</small>	DGFb Awards Session (Muendemann) <small>*Seven shorter talks</small>	Patellofemoral Mechanics & Pain (Pal)
16	308	Rehabilitation Dynamics (Miller & Bush)	CSB Promising Young Investigator & Masters Awards (Andrews)	CSB Doctoral Awards (Andrews)	State of the Art in Motion Capture & Analysis (Tanaka)
17	307	PhD Student Competition: Human Locomotion (Chaudhari & Morrow) <small>*Six talks per session</small>	PhD Student Competition: Orthopedics (Wang & Li) <small>*Six talks per session</small>	ASB New Approaches to Biomechanics in Ergonomics & Human Factors I (Hughes & Cham)	ASB New Approaches to Biomechanics in Ergonomics & Human Factors II (Hughes & Cham)
18	310	ANZSB Student Awards (Barrett & Creswell)	ANZSB Student Awards (Barrett & Creswell)	ESB Awards (Zioupou) <small>*Session will start 18 min early</small>	ANZSB Young Investigator & Student Awards (Barrett & Creswell)
19	303	NSF Symposium: Virtual Reality & Rehabilitation (Patterson & Wilson)	PhD Student Competition: Image-Based Measurements (Pekkan & VandeGeest) <small>*Six talks per session</small>	ISB Motor Control I (De Luca)	ISB Motor Control II (P Rowe)
20	304*	ISB – Footwear Biomechanics II: Muscle (Davis, Mickle, & Arndt)	ISB – Footwear Biomechanics III: Movement (Arndt & Nigg)	ISB – Footwear Biomechanics IV: Foot & Ankle (Bus, Gruber, Arndt)	Physical Activity Assessment with Body Worn Sensors (Rosenbaum)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus, sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 Podium Session Schedule – WEDNESDAY July 9, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 13-1 is a session index of 13 (which is Wednesday 3-4:30pm) and a room index of 1 (which is Hynes 109). This session title is “Nanostructured Biomaterials.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 11) 8:00 – 9:30 am	(Session Index 12) 11:00 am – 12:30 pm	(Session Index 13) 3:00 – 4:30 pm	(Session Index 14) 5:00 – 6:30 pm
1	109	Nanomechanics of the Cellular Environment (Bourne & Reinhart-King)	Molecular Brushes: Models & Experiments (Vesentini)	Nanostructured Biomaterials (Ramakrishna & Yang)	NSF Symposium: Quantifying a Dynamic Picture of the Brain in Action (Genin)
2	110	Single Molecule Mechanics of Motor Proteins I (Lang & Hwang)	Single Molecule Mechanics of Motor Proteins II (Lang & Hwang)	Mechanics of Weak Protein-Ligand Interaction I (Ji & Li)	Mechanics of Weak Protein-Ligand Interaction II (Ji & Li)
3	111	Mechanotransduction at Focal Adhesions (Mofrad)	Molecular Adhesion (Viasnoff)	Sub-Cellular Biophysics & Mechanosensing (Genin & Kaunas)	Measurements & Models for Cell-ECM Interactions (Genin & Kaunas)
4	306*	Force Generation by the Cytoskeleton on the Membrane II (Gov & Bassereau)	Semi-flexible Cytoskeletal Filaments—Basis of Cell Mechanics (Kas)	Multiscale Modeling of Semi-flexible Polymers (Schieber)	Molecular Mechanics of Micro-tubules I (Sept & Ross)
5	302*	Whole Cell Biomechanics III (Sato & Wang)	Emergent Behaviors of Integrated Cellular Systems I (Bashir, Nerem, & Kamm)	Emergent Behaviors of Integrated Cellular Systems II (Bashir, Nerem, & Kamm)	Emergent Behaviors of Integrated Cellular Systems III (Bashir, Nerem, & Kamm)
6	309	Advancements in Tissue Engineering Bioreactor Design (Moretti & Marsano)	Molecular Mechanisms of Tissues & Scaffolds (Akkus)	Functional Tissue Engineering I (Costa & Hung)	Functional Tissue Engineering II (Hung & Costa)
7	300	Imaging in Vascular Biomechanics (Gounis, Vorp, & vande Geest)	Hemodynamics & Medical Imaging (Moore & Gounis)	Intraventricular Blood Flow Dynamics I (Shadden & del Alamo)	Intraventricular Blood Flow Dynamics II (Shadden & del Alamo)
8	Ball-C	Abdominal Aortic Aneurysm III (Finol & Papaharilaou)	Abdominal and Thoracic Aortic Aneurysm (Yamada & Leask)	Thoracic Aortic Aneurysm & Dissection (Yamada)	Cerebral Aneurysms I: Clinical & Industrial Perspectives (Steinman & Raghavan)
9	312	Mechanics of Myocardial Infarction & Post-Infarction Therapies (Holmes & Wenk)	Biomechanics of Heart Valves (Sacks)	Micromechanics of Cardiovascular Tissues I (Lanir & Kassab)	Micromechanics of Cardiovascular Tissues II (Lanir & Kassab)
10	313	Biomechanical Evaluation of Tissue Engineered Cartilage (Detamore)	Muscle Mechanics I (Herzog)	Muscle Mechanics II (Herzog)	Muscle Mechanics III (Herzog)
11	305	Lymphatics and Interstitial Fluid III: Lymphatic Physiology (Dixon & Moore)	Cell-Biomaterial Interface I (Leong & Hoffman)	Cell-Biomaterial Interface II (Leong & Hoffman)	Cell-Biomaterial Interface III (Leong & Hoffman)
12	301	Multiscale Modeling I: Orthopaedics (Erdemir)	Multiscale Modeling II: Cardiovascular (Pierce)	Computational Challenges in Multiscale Modeling I (Viceconti)	Computational Challenges in Multiscale Modeling II (Viceconti)
13	311	Reproductive & Women’s Health IV: Biomechanics of Pregnancy & Delivery 2 (Mazza & Oczeretko)	Reproductive & Women’s Health V: Biomechanics of the Placenta & Embryology (Ferguson & Gargett)	Reproductive & Women’s Health VI: Biomechanics of the Pelvic Floor 1 (Damaser & Jorge)	Reproductive & Women’s Health VII: Biomechanics of the Pelvic Floor 2 (DeLancy & Hoyte)
14	Ball-A	Robotics: Lower Limb Exoskeletons I (Sawicki)	Robotics: Lower Limb Exoskeletons II (Sawicki)	Degenerative Spine (Oxland)	Biomechanics of the Spine (Wang)
15	Ball-B	Multiscale Techniques in Biomechanics & Mechanobiology IV (Mueller & Pivonka)	Multiscale Techniques in Biomechanics & Mechanobiology V (Mueller & Pivonka)	Structure-Function in Soft Tissue – Bone (Morgan)	Mechanobiology of Bone Healing (Morgan)
16	308	CSB Soft Tissue Mechanics (Federico)	CSB Career Awards (Robinovitch)	CSB Occupational Biomechanics: Upper Extremity Analysis Tools (Dickerson)	Mechanics and Mechanobiology of Soft and Hard Tissues (Donahue & Masen)
17	307	Evolutionary Biomechanics of Animal Locomotion I (Hutchinson)	Evolutionary Biomechanics of Animal Locomotion II (Hutchinson)	Role of Spasticity in Locomotion: Experiments & Simulations (Jonkers & DeGroot)	Evolutionary Biomechanics of Animal Locomotion III (Hutchinson)
18	310	ASB Subject- & Patient-Specific Musculoskeletal Modeling I (Anderson)	ASB Subject- & Patient-Specific Musculoskeletal Modeling II (Anderson)	ISB Presidential Symposium I (Challis & van den Bogert)	ISB Presidential Symposium II (Challis, & van den Bogert)
19	303	Aging of the Neuromuscular System I (Power)	Aging of the Neuromuscular System II (Power & Dalton)	Mechanical Loading as In Vivo Anabolic Agent for Bone Tissue Engineering (Pioletti)	ANZSB Young Investigator Awards (Barrett)
20	304*	Design of Feet in Relation to Locomotion (Biewener & Full)	Maneuvering on Challenging Terrain (Biewener & Full)	Comparative Biomechanics of Bipedal Locomotion (Blickhan & Ogihara)	How & Why to Couple Soft-Tissue - Rigid Body Simulations (Blemker & van den Bogert)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 Podium Session Schedule – THURSDAY July 10, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 15-6 is a session index of 15 (which is Thursday 8-9:30am) and a room index of 6 (which is Hynes 309). This session title is “Cell Motility.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 15) 8:00 – 9:30 am	(Session Index 16) 11:00 am – 12:30 pm	(Session Index 17) 2:30 – 4:00 pm	(Session Index 18) 4:30 – 6:00 pm
1	109	Enhanced Imaging & Treatment with Nanoparticles (Rylander & West)	Micro/Nano Technology in Cryopreservation (Zhang & Bhowmick)	P. Ayyaswamy 70 th Birthday Tribute II: Devices & Modeling Nanoparticles (Liu & Rylander)	Functional Micro/Nanodevices for Quantitative Cell and Tissue Mechanics (Bashir & Fu)
2	110	Implications for Flow on Cell Adhesion & Drug Delivery (Thomas)	CNS Transport & Drug Delivery I: Experimental (Sarntinoranont & Smith)	CNS Transport & Drug Delivery II: Modeling (Sarntinoranont & Smith)	Molecular Imaging & Therapeutic Approaches (Bao & Gounis)
3	111	Cytoskeletal Mechanics & Physics of Adhesion I (Bershadsky & Schwarz)	Cytoskeletal Mechanics & Physics of Adhesion II (Bershadsky & Schwarz)	Cytoskeletal Mechanics & Physics of Adhesion III (Bershadsky & Schwarz)	Prenatal Skeletal Development: Mechanobiology & Mechano-transduction (Nowlan)
4	306*	Intermediate Filaments (MacKintosh & Schmidt)	Active Cytoskeletal Networks I (MacKintosh & Schmidt)	Active Cytoskeletal Networks II (MacKintosh & Schmidt)	Cytoskeletal Rheology In Vivo (MacKintosh & Schmidt)
5	302*	Stem Cell Nucleus I (Discher & McDevitt)	Stem Cell Nucleus II (Discher & McDevitt)	Stem Cell Nucleus III (Discher & McDevitt)	Stem Cell Nucleus IV (Discher & McDevitt)
6	309	Cell Motility (Pathak)	High Resolution Imaging in Mechanobiology I (Muller)	High Resolution Imaging in Mechanobiology II (Muller)	High Resolution Imaging in Mechanobiology III (Muller)
7	300	Cardiovascular Fluid Mechanics I (Michler & Figueroa)	Cardiovascular Fluid Mechanics II (Nordsletten & Figueroa)	New Frontiers in 1-D Cardiovascular Modeling (Chesler)	Biomechanics of the Coronary Circulation (Kassab)
8	Ball-C	Cerebral Aneurysms II: Tissue Mechanics & Mechanobiology (Watton & Robertson)	Cerebral Aneurysms III (Raghavan)	Cerebral Aneurysms IV: Hemodynamics (Cebra & Steinman)	Cerebral Aneurysms V: Risk Assessment & Modeling (Meng & Raghavan)
9	312	Arterial Stiffness & Disease I (Greenwald)	Arterial Stiffness & Disease II (Greenwald)	Arterial Stiffness & Disease III (Greenwald)	Tissue & Vascular Cell Mechanics (Janmey & Matsumoto)
10	313	Soft Tissues Mechanics I (Vena & Nguyen)	Soft Tissue Mechanics II (Zadpoor & Federico)	Meniscus Tissue Engineering and Mechanics (Donahue)	Mechanobiology & Inflammation of Cartilage (Chen & Fredberg)
11	305	Human Whole Body Thermal Modeling (Diller & Shrivastava)	Cryotherapy & Mechanisms of Action (Diller & Khoshemivis)	Skin Biomechanics I (Limbirt) *More Skin Talks Session 14-16	Skin Biomechanics II (Limbirt & Corr)
12	301	Multiscale Mechanobiology in the Respiratory System I (Brook)	Multiscale Mechanobiology in the Respiratory System II (Brook)	Multiscale Mechanobiology in Respiratory System III (Ghadiali & Gaver)	Multiscale Mechanobiology in Respiratory System IV (Wall & Ghadiali)
13	311	Reproductive & Women’s Health VIII: Biomechanics of the Pelvic Floor 3 (Ashton-Miller & Abramowitch)	Reproductive & Women’s Health IX: Penile & Sperm Biomechanics (Smith & Kieweg)	Reproductive & Women’s Health X: Microfluidic Devices & Assisted Reproduction (Griffith & Eisenbach)	Reproductive & Women’s Health XI: Women’s Health (Olson & Le Gac) *see Evening Workshop
14	Ball-A	Cervical Spinal Manipulations & Cerebrovascular Accidents (Herzog & Feipel)	Spine Musculoskeletal Modeling (Vasavada)	Spinal Facet Biomechanics (Winkelstein & Nightingale)	Spine Biomechanics Modeling (Winkelstein & June)
15	Ball-B	Bone Mechanics & Quality (van der Meulen)	Bone Mechanics (Vena & Perilli)	Whole Bone Computations I (Guo & Keaveny)	Whole Bone Computations II (Guo, van Rietbergen, and Zysset)
16	308	Biomechanics of Osteoarthritis (Troy & Lerner)	Computational Joint Mechanics (Wayne)	Biomechanics of Elbow & Shoulder Arthroplasty I (Bishoff & Henninger)	Biomechanics of Elbow & Shoulder Arthroplasty II (Bishoff & Henninger)
17	307	Biomechanics of Flight I: Aerodynamics (van Leeuwen & Taylor)	Biomechanics of Flight II: Muscle Function & Control (Taylor, Combs, & van Leeuwen)	Biomechanics of Flight III: Maneuverability & Stability (van Leeuwen & Liu)	Biomechanics of Flight IV: Coping with Environmental Challenges (van Leeuwen & Liu)
18	310	Lower Extremity Rehabilitation (Dhaer)	Upper Extremity Rehab (Dhaer & Huang)	Gait Modification I (Shull & Davis)	Gait Modification II (Shull & Davis)
19	303	OpenSim Showcase I: New Modeling Tools & Applications (Hicks & Seth)	OpenSim Showcase II: New Modeling Tools & Applications (Hicks & Seth)	FEBio Symposium I (Ellis & Weiss)	FEBio Symposium II (Ellis & Weiss) *see Evening Workshop
20	304*	EMG-Informed Estimates of Muscle Forces (Besier & Neptune)	ASB Technology & Rehabilitation - Technology (Rodgers & Davis)	ASB Technology & Rehabilitation – Retraining Session (Rodgers & Davis)	ASB Award Session, Including Recognition of ASB Fellows (Challis)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.

WCB2014 Podium Session Schedule – FRIDAY July 11, 2014

All podium sessions are located in the Hynes Convention Center, with Hynes room numbers indicated below and in the podium presentation listings that follow. The WCB online itinerary builder and printed index refer to sessions by a two-index “Session Number” such as Session 2-18. This indicates the session index and location index, respectively, as shown in the table below. For example, Session 19-2 is a session index of 19 (which is Friday 8-9:30am) and a room index of 2 (which is Hynes 110). This session title is “Biofilm Ecomechanics.” Session chairs are listed in parentheses, after the session title.

Room Index	Room	(Session Index 19) 8:00 – 9:30 am	(Session Index 20) 11:00 am – 12:30 pm	(Session Index 21) 3:00 – 4:30 pm	(Session Index 22) 5:00 – 6:30 pm
1	109	Biophysical Regulation of Cell Reprogramming & Directed Differentiation (Bashir & Fu)	Nano & Mesoscale Behavior of Biomolecular Materials I (Ketan & Barone)	Nano & Mesoscale Behavior of Biomolecular Materials II (Ketan & Cranford)	Molecular Design & Nanomechanics of Biomimetic Materials (Miserez)
2	110	Biofilm Ecomechanics (Van Vliet & Han)	Progenitor & Stem Cell Chemomechanics I (Van Vliet & Han)	Progenitor & Stem Cell Chemomechanics II (Van Vliet & Han)	Cancer Anti-Metastasis (Van Vliet & Han)
3	111	Computational Modeling of Cells & Cytoskeleton I (Stamenovic & Adachi)	Computational Modeling of Cells & Cytoskeleton II (Kim & Stamenovic)	Computational Modeling of Cells & Cytoskeleton III (Adachi & Kim)	Computational Modeling of Cells & Cytoskeleton IV (Adachi & Kim)
4	306*	Human Disease Mechanics (Popescu & Lim)	Altered Cell Mechanics in Diseased Environments (Meyer)	Cell Biomechanics & Mechanobiology in Inflammation (Chahine)	Biomechanics of Inflammation & Infection (Chair TBA)
5	302*	Mechanobiology of Development & Stem Cell Differentiation (Dai)	Receptor-Ligand Bindings in Blood Cells (Long & Zaman)	Biomechanical Meet Molecular Cues: Impact on Tissue (Duda)	Scanning Probe Techniques in Cellular & Subcellular Biomechanics (Singamaneni)
6	309	Jamming & Junctions in Collective Cell Migration I (Fredberg & Trepap)	Jamming & Junctions in Collective Cell Migration II (Fredberg & Trepap)	Collective Cell Migration: Bridging Theory and Exp I (Fredberg & Trepap)	Collective Cell Migration: Bridging Theory and Exp II (Fredberg & Trepap)
7	300	Thrombosis & Hemodynamics I (Ku & Bluestein)	Thrombosis & Hemodynamics II: Multiscale Modeling 1 (D. Bluestein, M. King)	Thrombosis & Hemodynamics III: Multiscale Modeling 2 (Bluestein)	Thrombosis & Hemodynamics IV (Ku & Bluestein)
8	Ball-C	Cerebrospinal Fluid Dynamics (Loth & Martin)	Mechanical Factors Affecting Arterial Pathophysiology (Morbiducci & Anayiotos)	Device-Tissue Interactions I: Stents, DES, & Angioplasty Balloons (Mongrain & Walsh)	Device-Tissue Interactions II: Heart Valves, Grafts, & Shunts (Mongrain & Leask)
9	312	Multiscale Cardiac Electromechanics I (Hurtado & Goktepe)	Multiscale Cardiac Electromechanics II (Hurtado & Goktepe)	In Vitro Systems for Studying Organ Biomechanics (Sanders)	In Vitro Models of Organ Biomechanics (Winkelstein & June)
10	313	Inverse Methods in Soft Tissue Biomechanics I (Lu & Evans)	Inverse Methods in Soft Tissue Biomechanics II (Ohayon & Oomens)	Inverse Methods in Soft Tissue Biomechanics III (Avil & Genovese)	Inverse Methods in Soft Tissue Biomechanics IV (Moerman & Bol)
11	305	Biomechanics of the Anterior Eye I (Grytz & Pandolfi)	Biomechanics of the Anterior Eye II (Amini & Downs)	Biomechanics of the Posterior Eye I (Nguyen & Sigal)	Biomechanics of the Posterior Eye II (vande Geest & Pinsky)
12	301	Lung Biomechanics and Therapy (Evrensel & Al-Jumaily)	Role of Airway Smooth Muscle in Lung Therapy (Al-Jumaily & Evrensel)	Therapeutic Lung Performance (Al-Jumaily & Evrensel)	Artificial Lungs (Cook)
13	311	Vascular Mechanics (Zadpoor & Bellini)	Micromechanical Modeling of Fibrous Tissue (Nguyen & Sanders)	Innovations in Teaching Biomechanics (Karduna)	Nouveau Biomechanics: Big Data, Community Involvement, Open Science (Erdemir)
14	Ball-A	Spine Biomechanics I (Shirazi-Adl & Lacroix)	Spine Biomechanics II (El-Rich & Rohlmann)	Spine Biomechanics III (van Dieen & Reeves)	Spine Biomechanics IV: Patient-Specific Modeling (Noailly & Arjmand)
15	Ball-B	Micromechanics of Bone & Biomaterials (van Lenthe)	Interface Mechanics in Orthopedics (Eberhardt, Cortes, & van Lenthe)	Bone Mechanics I (Dall'Ara & Taddei)	Bone Mechanics II (Dall'Ara & Pahr)
16	308	Understanding the Multi-Faceted Upper Extremity (Murray & Peterson)	Mechanics of the Shoulder (Karduna & Debski)	Dental Mechanics I (Inou)	Dental Mechanics II (Inou and Morton)
17	307	How Swimmers Generate & Use Flow (Muller & Tytell)	How Undulatory Swimmers Generate & Use Flow (Muller & Tytell)	Control of Swimming – Sensing & Using Flow (Muller & Tytell)	Control of Swimming – From External to Internal Mechanics (Muller & Tytell)
18	310	ASB Metabolic Energy Use in Movement I: Basic Principles (Umberger & Rubenson)	ASB Metabolic Energy Use in Movement II: Basic Principles (Umberger & Rubenson)	Innovative Techniques for Improving Gait: Stroke & Cerebral Palsy I (Steele & Higginson)	Innovative Techniques for Improving Gait: Stroke & Cerebral Palsy II (Steele & Higginson)
19	303	Simulation of Human Movement I: Emerging Challenges (Reinbolt & Piazza)	Simulation of Human Movement II: Emerging Challenges (Reinbolt & Piazza)	Skeletal Muscle Mechanics in 3D (Rohrle & Bol)	Motion Synthesis & Planning (Dorn)
20	304*	Dynamic Walking I (Collins)	Dynamic Walking II (Collins)	Running I (Kram)	Running II (Kram)

*Rooms 302, 304, and 306 will be combined for one of the Plenary Lectures. Thus sessions preceding Plenary Lectures in these rooms must end on time. Ball-A,B,C are ballrooms.



7th World Congress of Biomechanics

July 6-11, 2014
Boston, MA

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SUNDAY Podium Sessions

Sunday, 6 July 2014
2:30 – 4:00 PM

Protein Mechanics

Session Number 1-1 Room: 109
Session Chair(s): J. Ruberti

2:30 PM - 2:48 PM

Enamel Matrix Derivative Proteins: Conformational Behavior and Molecular Modelling

A. Apicella¹, M. G. M. Marascio², A. Gautieri², V. Colangelo², P. Heunemann³, C. J. G. Plummer¹, **M. Soncini**²;

¹Laboratoire des Technologie des Composites et Polymères (LTC), Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, SWITZERLAND, ²Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, ITALY, ³Laboratory of Food Process Engineering (FPE), Institute of Food, Nutrition and Health (IFNH), Swiss Federal Institute of Technology Zurich (ETHZ), Zurich, SWITZERLAND.

2:48 PM - 3:06 PM

Force induced protein unfolding: Combining the Gaussian network model with bond rupture events
R. Granek;

Ben-Gurion University of The Negev, Beer-Sheva, ISRAEL.

3:06 PM - 3:24 PM

A Quasilinear Viscoelastic Model for Collagen Molecule Based on in Silico Creep Tests

H. Ghodsi, K. Darvish;

Temple University, Philadelphia, PA.

3:24 PM - 3:42 PM

Viscoelasticity of Tau Proteins Leads to Strain Rate Dependent Breaking of Microtubules During Axonal Stretch Injury: Predictions from a Mathematical Model

H. Ahmadzadeh, D. H. Smith, V. B. Shenoy;
University of Pennsylvania, Philadelphia, PA.

3:42 PM - 4:00 PM

Mesoscale modeling of collagen fibrils: influence of cross-links and mineralization on the fibril mechanics

B. Depalle¹, Z. Qin¹, S. J. Shefelbine², M. J. Buehler¹;

¹Massachusetts Institute of Technology, Cambridge, MA, ²Northeastern University, Boston, MA.

Mechanics of Adhesion & Contractility

Session Number 1-2 Room: 110
Session Chair(s): P. McGarry and K. Billiar

2:30 PM - 2:48 PM

An integrin-activated Wnt expression mediated by β -catenin/Wnt feedback as a mechanism of sensing ECM elasticity

C. Yang¹, J. Du¹, Y. Zu¹, J. Li¹, Y. Xu², S. Chien³;
¹Tsinghua University, Beijing, CHINA, ²School of Stomatology, Lanzhou University, Lanzhou, CHINA, ³Departments of Bioengineering and Medicine, and Institute of Engineering in Medicine, University of California at San Diego, La Jolla, CA.

2:48 PM - 3:06 PM

Spatial organization of the cellular actin cortex during the cell cycle

P. Chugh¹, A. G. Clark¹, K. Dierkes², G. Charras³, G. Salbreux⁴, E. K. Paluch¹;

¹MRC-LMCB, University College London, London, UNITED KINGDOM, ²CRG, Barcelona, SPAIN, ³LCN, University College London, London, UNITED KINGDOM, ⁴Max Planck Institute for Physics of complex systems, Dresden, GERMANY.

3:06 PM - 3:24 PM

Dynamics of Actin Stress Fibers and Focal Adhesions during Slow Cell Migration in Swiss 3T3 Fibroblasts

M. Sugawara¹, T. Miura¹, H. Miyoshi², K. Tsubota¹, H. Liu¹;

¹Chiba University, Chiba, JAPAN, ²RIKEN Center for Advanced Photonics, Wako, JAPAN.

3:24 PM - 3:42 PM

Substrate Modulus Influences Vascular Smooth Muscle Cell Functional Contractility

K. E. Steucke, P. A. Voigt, E. S. Hald, **P. W. Alford**;
University of Minnesota, Minneapolis, MN.

3:42 PM - 4:00 PM

The Origin of Strain-Stiffening in Fibrin Networks and its Alterations by Platelets

L. Jawerth¹, S. Münster², D. A. Weitz, IV³;
¹Max Planck Institute for the Cell Biology and Genetics, Dresden, GERMANY, ²Max Planck Institute for the Physics of Complex Systems, Dresden, GERMANY, ³Harvard University, Cambridge, MA.

SUNDAY Podium Sessions

Cell Responses to Stress

Session Number 1-3 Room: 111

Session Chair(s): S. Agarwal and H. Parameswaran

2:30 PM - 2:48 PM

Effects of static mechanical strain on vascular endothelial cells: Considering pericyte-induced contraction

A. S. Zeiger, F. D. Liu, K. J. Van Vliet
MIT, Cambridge, MA.

2:48 PM - 3:06 PM

Modelling Force Transmission of Fluid Shear Stress in Endothelial Cells

Y. Lim, M. T. Cooling, S. R. McGlashan, D. S. Long
The University of Auckland, Auckland, NEW ZEALAND

3:06 PM - 3:24 PM

Measurement of Shear Stress-Mediated Intracellular Calcium Dynamics in Lymphatic Endothelial Cells

M. Jafarnejad¹, W. E. Cromer², R. Kaunas³, S. Zhang², D. C. Zawieja², J. E. Moore, Jr.¹;
¹Imperial College, London, UNITED KINGDOM,
²Texas A&M Health Science Center, Temple, TX,
³Texas A&M University, College station, TX.

3:24 PM - 3:42 PM

The role of matrix stiffness and cell seeding density on mesenchymal stem cell differentiation in 3D culture

B. H. McGowan, J. Nagatomi
Clemson University, Clemson, SC.

3:42 PM - 4:00 PM

See Program Supplement and Errata Sheet for possible additions

Cell and Tissue Mechanics

Session Number 1-4 Room: 306

Session Chair(s): C. Chen and E. Azeloglu

2:30 PM - 2:48 PM

Ultrasound Induced Intramembrane Cavitation Dynamics Can Change the Electrical Behavior Properties of Excitable Tissues

M. Plaksin, S. Shoham, E. Kimmel;
Technion - Israel Institute of Technology, Haifa, ISRAEL.

2:48 PM - 3:06 PM

Mechanical properties of syncytial Drosophila embryos by high-speed video microrheology

A. D. Wessel, C. F. Schmidt;
Third Physical Institute, Goettingen, GERMANY.

3:06 PM - 3:24 PM

Design Concept of Micro-grooved Surfaces for Cancer Cell Screening

H. Miyoshi¹, J. S. Ko², T. Adachi³, Y. Yamagata¹;
¹RIKEN Center for Advanced Photonics, Saitama, JAPAN, ²Pusan National University, Busan, REP OF KOREA, ³Kyoto University, Kyoto, JAPAN.

3:24 PM - 3:42 PM

Exposure to Extracellular Sugars alter Chondrocyte Morphology via Cytoskeletal Rearrangement and Subsequent Whole-cell Biomechanical Behavior

J. Liu, S. Tang;
Washington University in St Louis, Saint Louis, MO.

3:42 PM - 4:00 PM

Mechanotargeting of Nanoparticles to Vascular Endothelium

P. J. Butler, C. Huang, H. Muddana, S. Zhang;
Penn State University, University Park, PA.

Biomechanics of Cancer I

Session Number 1-5 Room: 302

Session Chair(s): B. Fabry and G. O'Neill

2:30 PM - 2:48 PM

Tumor-host Tissue Interactions Determine the Growth and Stress Generation in Solid Tumors

C. Voutouri¹, F. Mpekris¹, P. Papageorgis¹, A. D. Odysseos², **T. Stylianopoulos**¹;
¹University of Cyprus, Nicosia, CYPRUS, ²Epos-lasis R&D, Nicosia, CYPRUS.

2:48 PM - 3:06 PM

Numerical analysis of hydrodynamic behavior of circulating tumor cells in microchannels

N. Takeishi, Y. Imai, T. Yamaguchi, T. Ishikawa
Tohoku University, Sendai, JAPAN.

3:06 PM - 3:24 PM

An Organ-Specific Microfluidic Model for Breast Cancer Cell Extravasation and Metastases to Bone

S. Bersini¹, J. S. Jeon², G. Dubini¹, C. Arrigoni⁴, M. Moretti⁵, R. D. Kamm²;
¹Politecnico di Milano & IRCCS Istituto Ortopedico Galeazzi, Milano, ITALY, ²Massachusetts Institute of Technology, Cambridge, MA, ⁴Gruppo Ospedaliero San Donato Foundation, Milano, ITALY, ⁵IRCCS Istituto Ortopedico Galeazzi, Milano, ITALY.

SUNDAY Podium Sessions

3:24 PM - 3:42 PM

Investigating the response of cancer cells to fluid shear stress using a micropipette aspiration technique

V. Chivukula, J. T. Nauseef, M. Henry, S. C. Vigmostad
The University of Iowa, Iowa City, IA.

3:42 PM - 4:00 PM

See Program Supplement and Errata Sheet for possible additions

Point-of-Care Microfluidics Based Diagnostics

Session Number 1-6 Room: 309
Session Chair(s): LeDuc and Kim

2:30 PM - 3:06 PM

High-throughput Blood Microfluidics to Isolate Rare Circulating Tumor Cells from Cancer Patients

M. Toner

3:06 PM - 3:24 PM

Paper-Based Fluidic Devices: from Controlling Wicking to On-site Calibration

A. Martinez, K. M. Schilling, C. K. Camplisson, H. T. Mitchell, D. Jauregui, C. A. Chaplan
California Polytechnic State University, San Luis Obispo, CA.

3:24 PM - 3:42 PM

Diffusion Behaviors in Non-uniform Suspensions of Red Blood Cells and Platelets in Channel Flow

J. Kang, C. Aidun, D. Rosen
Georgia Institute of Technology, Atlanta, GA.

3:42 PM - 4:00 PM

Simulation study of binding of liposome to vascular endothelial cell under tumor microcirculation flow conditions

J. Wu¹, J. Chen¹, E. Zhang¹, Y. Fu¹, R. Sun¹, Z. Ding¹, C. Dong², Y. Xu¹;
¹Shanghai Jiao Tong University, Shanghai, CHINA,
²The Pennsylvania State Univ., State College, PA.

Carotid and Cerebral Fluid Mechanics

Session Number 1-7 Room: 300
Session Chair(s): Loth

2:30 PM - 2:48 PM

Characterization of Transition to Turbulence in Blood

F. Loth
University of Akron, Akron, OH.

2:48 PM - 3:06 PM

Geometric vs. Hemodynamic Predictors of Carotid Bifurcation Wall Thickening

P. B. Bijari¹, Y. J. Xie², D. F. Habets¹, B. A. Wasserman², **D. A. Steinman**¹;
¹University of Toronto, Toronto, ON, CANADA,
²Johns Hopkins Hospital, Baltimore, MD.

3:06 PM - 3:24 PM

A Fluid Shear Stress Set Point in Vascular Remodeling

N. Baeyens, T. D. Ross, H. Lauridsen, J. Han, J. D. Humphrey, A. Eichmann, M. A. Schwartz
Yale University, New Haven, CT.

3:24 PM - 3:42 PM

Transmural Differences in Coronary Arterial Branching and their Effect on Scaling Laws Describing Structure and Flow Distribution

J. A. E. Spaan¹, P. van Horsen², J. P. H. M. van den Wijngaard¹, M. Siebes¹;
¹Academic Medical Center, Amsterdam, NETHERLANDS, ²Free University of Amsterdam, Amsterdam, NETHERLANDS.

3:42 PM - 4:00 PM

Accuracy of Computational Cerebral Aneurysm Hemodynamics using Patient-Specific Endovascular Measurements

P. McGah¹, A. Aliseda¹, M. Barbour¹, M. Levitt², L. Kim²;
¹University of Washington, Seattle, WA,
²Harborview Medical Center, Seattle, WA.

Tissue Engineering I

Session Number 1-8 Room: Ball-C
Session Chair(s): G. Gaudette and S. Wang

2:30 PM - 2:48 PM

Effect of unidirectional VEGF supply on the formation of capillary networks with pericytes in a microfluidic device

H. Uwamori;
Keio University, Yokohama, JAPAN.

2:48 PM - 3:06 PM

Biomechanical Characterization of Decellularized Scaffolds for Liver Bioengineering

J. L. Sparks¹, K. Nishii¹, G. Reese¹, D. W. Evans², E. C. Moran³, P. M. Baptista³, S. Soker³;
¹Miami University, Oxford, OH, ²Wake Forest University, Winston Salem, NC, ³Wake Forest Institute for Regenerative Medicine, Winston Salem, NC.

SUNDAY Podium Sessions

3:06 PM - 3:24 PM

Control of Skeletal Muscle Contraction in a Microfluidic 3D Coculture Platform via Optogenetic Excitation of ESC-derived Motor Neurons.

S. Uzel, R. Platt, C. Rowlands, V. Subramanian, P. So, R. Kamm;
MIT, Cambridge, MA.

3:24 PM - 3:42 PM

Recellularization of Vascular and Tubular Compartments of Rat Kidney Scaffolds with Embryonic Stem Cells

B. Bonandrini¹, M. Figliuzzi¹, M. Rosati¹, S. Silvani¹, M. Morigi¹, A. Benigni¹, G. Remuzzi², **A. Remuzzi³;
¹IRCCS - Istituto di Ricerche Farmacologiche Mario Negri, Bergamo, ITALY, ²Unit of Nephrology and Dialysis, Ospedale Giovanni XXIII, Bergamo, ITALY, ³Department of Industrial Engineering, University of Bergamo, Dalmine (Bergamo), ITALY.**

3:42 PM - 4:00 PM

Three Dimensional Microphysiologic Liver Model for Toxicity Testing

L. M. Miller, J. Berry;
Univ.of Alabama at Birmingham, Birmingham, AL.

Tendon-Ligament-Cartilage

Session Number: 1-9 Room: 312

Session Chair(s): Thomopoulos & Yamamoto

2:30 PM - 2:48 PM

The effects of knocking out macrophage migration inhibitory factor (MIF) gene on healing of the tendon and ligament tissues

H. Tohyama¹, E. Kondo¹, H. Fujiki², K. Yasuda¹;
¹Hokkaido University School of Medicine, Sapporo, JAPAN, ²Muroran Institute of Technology, Muroran, JAPAN.

2:48 PM - 3:06 PM

Effect of Frequency on the Dynamic Viscoelastic Properties of Porcine Patellar Tendon

L. N. Williams, S. Patnaik, R. Prabhu, J. Liao;
Mississippi State Univ., Mississippi State, MS.

3:06 PM - 3:24 PM

The Mechanics of Interdigitation at the Tendon to Bone Attachment

V. Birman;
Missouri University of Science and Technology, St. Louis, MO.

3:24 PM - 3:42 PM

Allometry of the Tendon-to-Bone Insertion: How the Rotator Cuffs in Large Animals Adapt to Increased Loading

C. Deymier-Black, J. D. Pasteris, G. M. Genin, S. Thomopoulos;
Washington University in St. Louis, St Louis, MO.

3:42 PM - 4:00 PM

Tendon cell recruitment during development and healing

A. Huang¹, L. Wang², J. Brigande², R. Schweitzer³;
¹Mount Sinai School of Medicine, New York, NY, ²Oregon Health and Science University, Portland, OR, ³Shriners Hospital for Children, Portland, OR

Cartilage Mechanics I

Session Number: 1-10 Room: 313

Session Chair(s): C. Hung

2:30 PM - 3:06 PM

The relationship between loading rate and damage development in articular cartilage

C. C. van Donkelaar, J. M. Parraga Quiroga, L. Henao Murillo, K. Ito
Eindhoven University of Technology, Eindhoven, NETHERLANDS.

3:06 PM - 3:24 PM

Chondrocyte Response to Mechanical Loading in Aging Articular Cartilage

M. R. Huttu, J. M. Fick, **R. K. Korhonen**
University of Eastern Finland, Kuopio, FINLAND.

3:24 PM - 3:42 PM

The Role of Collagen Type VI in Cartilage Pericellular Matrix Mechanics and Mechanotransduction

J. Sanchez-Adams¹, N. A. Zelenski¹, H. A. Leddy¹, J. Zhang¹, P. Bonaldo², W. Liedtke³, F. Guilak¹;
¹Duke University Department of Orthopaedic Surgery, Durham, NC, ²University of Padova, Padova, ITALY, ³Duke University Department of Neurology, Durham, NC.

3:42 PM - 4:00 PM

Fluid-Solid Interactions within Aggrecan Proteoglycan Networks: Molecular Origins of Tissue-Level Biomechanics and Functioning of Cartilage

H. T. Nia¹, L. Han², M. Azadi¹, P. Roughley³, C. Ortiz¹, A. J. Grodzinsky¹;
¹MIT, Cambridge, MA, ²Drexel University, Philadelphia, PA, ³Shriners Hospital, Montreal, QC, CANADA.

SUNDAY Podium Sessions

Biomechanics of Morphogenesis I

Session Number: 1-11 Room: 305

Session Chair(s): J. Lee

2:30 PM - 2:48 PM

Computational Modeling of Biological Growth and Morphogenesis

J. D. Lee, J. Li, L. Zhang

The George Washington Univ., Washington, DC.

2:48 PM - 3:06 PM

A Novel in Vitro Culture System to Study the Influence of Biomechanical Stimulation on Joint Shape

V. V. Chandaria¹, M. A. Brady¹, C. R. Ethier², N. C. Nowlan¹;

¹Imperial College London, UNITED KINGDOM,

²Georgia Institute of Technology & Emory University School of Medicine, Atlanta, GA.

3:06 PM - 3:24 PM

Mapping Biomechanical Properties of the Pericellular Matrix of Cartilage during Embryonic Limb Development in Mice

X. Xu, S. Calve, C. P. Neu;

Purdue University, West Lafayette, IN.

3:24 PM - 3:42 PM

Development of Pipette Aspiration Technique for Measurement of Embryonic Myocardial Material Properties

C. M. Buffinton¹, E. M. Buffinton², N. C.

Diamantides¹, D. M. Ebenstein¹;

¹Bucknell University, Lewisburg, PA, ²Lafayette College, Easton, PA.

3:42 PM - 4:00 PM

See Program Supplement and Errata Sheet for possible additions

Microstructural Modeling

Session Number 1-12 Room: 301

Session Chair(s): K. Zhang and R. Amini

2:30 PM - 2:48 PM

Influencing stiffness and organization of a microtissue by altering extrinsic mechanical conditions during tissue growth

D. Könnig, G. Duda, A. Petersen;

Julius Wolff Institute - Charité-Universitätsmedizin Berlin, Center for Musculoskeletal Surgery - Charité-Universitätsmedizin Berlin, Berlin-Brandenburg Center for Regenerative Therapies, Berlin-Brandenburg School for Regenerative Therapies, GERMANY

2:48 PM - 3:06 PM

Microstructure-Mechanical Property Relationships in the Rabbit OA Meniscus

H. Magoaric¹, A. Levillain¹, C. Boulocher², E. Viguier², T. Hoc¹;

¹LTDS, Ecole Centrale de Lyon, Ecully, FRANCE,

²ICE, VetAgro Sup, Marcy-l'Étoile, FRANCE.

3:06 PM - 3:24 PM

Three Dimensional Anisotropic Hyperelastic Microstructural Material Model for Collagenous Tissues

V. Kaul, J. Yao, J. Hurtado;

Dassault Systemes, Providence, RI.

3:24 PM - 3:42 PM

Connective Tissue Orientation and Microstructure in the Sclera and Optic Nerve Head: Computational Modeling and Implications for Glaucoma

I. C. Campbell¹, B. Coudrillier¹, R. L. Abel², C. R. Ethier¹;

¹Georgia Institute of Technology / Emory University, Atlanta, GA, ²Imperial College London, UNITED KINGDOM.

3:42 PM - 4:00 PM

Understanding in-vivo relationship between brain tissue mechanical properties and microstructure changes in a rat model of hydrocephalus

L. Juge¹, A. Pong¹, A. Bongers², R. Sinkus³, L. E. Bilston⁴, S. Cheng⁵;

¹Neuroscience Research Australia, Randwick NSW, AUSTRALIA, ²Biological Resources Imaging Laboratory, University of New South Wales, Kensington NSW, AUSTRALIA, ³BHF Centre of Excellence, Division of Imaging Sciences and Biomedical Engineering, King's College London, King's Health Partners, St. Thomas' Hospital, London, UNITED KINGDOM, ⁴Neuroscience Research Australia, Prince of Wales Clinical School, University of New South Wales, Randwick NSW, AUSTRALIA, ⁵Neuroscience Research Australia, Macquarie University, Randwick NSW, AUSTRALIA.

SUNDAY Podium Sessions

Imaging for Tissue Biomechanics

Session Number: 1-13 Room: 311
Session Chair(s): Sinkus and Moerman

2:30 PM - 2:48 PM

SPAMM-tagged MRI and Computational Modelling for the Assessment of the Mechanical Behaviour of Ventricular Tissue

L. Axel;

NYU School of Medicine, New York, NY.

2:48 PM - 3:06 PM

High Resolution Human Brain Magnetic Resonance Elastography

L. E. Bilston¹, A. Hatt², R. Sinkus³;

¹Neuroscience Research Australia, Prince of Wales Clinical School, University of New South Wales, Randwick, AUSTRALIA, ²Neuroscience Research Australia, Randwick, AUSTRALIA, ³Imaging Sciences and Biomedical Engineering Division, King's College, London, UNITED KINGDOM.

3:06 PM - 3:24 PM

Magnetic Resonance Elastography: Challenges, Opportunities, and Applications to Alzheimer's Disease

A. Manduca;

Mayo Clinic, Rochester, MN.

3:24 PM - 3:42 PM

A new method for measuring soft palate deformations: MRI-based velum shape clustering

C. Pelland¹, J. Inouye¹, X. Feng¹, C. Meyer¹, K.

Borowitz², K. Lin², S. S. Blemker¹;

¹University of Virginia, Charlottesville, VA,

²University of Virginia Health System, Charlottesville, VA.

3:42 PM - 4:00 PM

MR-Elastography differentiates intracranial tumors non-invasively

M. Simon¹, J. Guo², S. Papazoglou², H. Scholand-Engler¹, C. Erdmann¹, K. Schregel³, U. Melchert¹, M. Bonsanto¹, J. Braun², D. Petersen¹, I. Sack², J.

Wuerfel³;

¹University Luebeck, GERMANY, ²Charité University Medicine Berlin, GERMANY, ³University Medicine Goettingen, GERMANY.

Mechanics of Cartilage and Intervertebral Disc

Session Number: 1-14 Room: Ball- A
Session Chair(s): W. Gu

2:30 PM - 2:48 PM

Controlling Fiber Organization and Anisotropy in Tissue-Engineering Fibrocartilage

L. J. Bonassar

Cornell University, Ithaca, NY.

2:48 PM - 3:06 PM

Trajectory-based Tissue Engineering for Cartilage Repair: Development of In-Vitro and In-Vivo Models

M. B. Fisher¹, R. L. Mauck²;

¹North Carolina State University, Raleigh, NC,

²University of Pennsylvania, Philadelphia, PA.

3:06 PM - 3:24 PM

Biomechanical and Biochemical Characterization of Cartilage Endplate and Its Role in Disc Mechanics and Nutrition

Y. Wu¹, S. Cisewski¹, B. L. Sachs², **H. Yao**¹;

¹Clemson University, Charleston, SC, ²Medical University of South Carolina, Charleston, SC.

3:24 PM - 3:42 PM

Osmotic Loading Environment Alters Intervertebral Disc Mechanical Function

S. E. Bezi, J. M. Felipe, G. D. O'Connell

University of California, Berkeley, Berkeley, CA.

3:42 PM - 4:00 PM

See Program Supplement and Errata Sheet for possible additions

Mechanobiology of Bone

Session Number: 1-15 Room: Ball-B
Session Chair(s): Robling

2:30 PM - 2:48 PM

Neuro-Musculoskeletal Systems Biology in Zebrafish

R. Kwon

University of Washington, Seattle, WA.

2:48 PM - 3:06 PM

Wnt signaling in bone cell mechanobiology

A. Robling

Indiana University, Indianapolis, IN.

3:06 PM - 3:24 PM

Shape and Stress-Response Signatures in Bone Cell Mechanosensing

R. G. Bacabac

University of San Carlos, Medical Biophysics Group, Cebu, PHILIPPINES.

SUNDAY Podium Sessions

3:24 PM - 3:42 PM

Prediction of Bone Remodeling after Total Hip Arthroplasty Using Digital Image Correlation on an Analogue Bone Model.

S. Chanda¹, A. Dickinson², S. Gupta¹, H. Ozturk², M. Browne²;

¹Indian Institute of Technology Kharagpur, Kharagpur, INDIA, ²University of Southampton, Southampton, UNITED KINGDOM.

3:42 PM - 4:00 PM

See Program Supplement and Errata Sheet for possible additions

Computational Methods

Session Number: 1-16 Room: 308

Session Chair(s): S. Sastry

2:30 PM - 2:48 PM

The Contribution of Activity and Loading to Bone Remodelling around Cemented Hip Replacements

A. Dickinson;

University of Southampton, UNITED KINGDOM.

2:48 PM - 3:06 PM

Validation and Calibration of a Real-time Virtual Stenting Algorithm Using Finite Element Analysis and Genetic Algorithms

K. Spranger¹, C. Capelli², G. Bosi², S. Schievano², Y. Ventikos²;

¹University of Oxford, UNITED KINGDOM,

²University College London, UNITED KINGDOM.

3:06 PM - 3:24 PM

Head FE models to evaluate primary response to blast loading and protection

D. Singh, D. S. Cronin;

University of Waterloo, Waterloo, ON, CANADA.

3:24 PM - 3:42 PM

Finite Element Modelling of Porous Metallic Materials: fabrication imperfections should be included in the models

F. Quevedo González, N. Nuño;

École de Technologie Supérieure, Montréal, QC, CANADA.

3:42 PM - 4:00 PM

Finite Element Investigation of Coronary Stent Fatigue Failure

C. Conway¹, K. D. Everett¹, G. J. Desany², E. R. Edelman¹;

¹MIT, Cambridge, MA, ²Winchester Engineering & Analytical Center, US FDA, Winchester, MA.

Knee Grand Challenge

Session Number: 1-17 Room: 307

Session Chair(s): B.J. Fregly

*Continued on Tuesday Session 15-17

2:30 PM - 2:48 PM

A multi-objective optimization procedure for musculoskeletal modeling

F. Moissenet¹, L. Chèze², R. Dumas²;

¹CNRFR - Rehazenter, Luxembourg, LUXEMBOURG,

²Université de Lyon, F-69622, Lyon; IFSTTAR, LBMC, UMR_T9406; Université Lyon 1, Lyon, FRANCE.

2:48 PM - 3:06 PM

Simultaneous Prediction of In-Vivo Knee Loading and Motion of Total Knee Replacement with a Subject-Specific Musculoskeletal Model

Z. Chen, X. Zhang, L. Wang, D. Li, Z. Jin;

State Key Laboratory for Manufacturing System Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi, CHINA.

3:06 PM - 3:24 PM

Estimation of knee intra-articular force using distributed force-reaction elements and inverse dynamics simulation

Y. Jung, S. Koo

Chung-Ang University, Seoul, REP. OF KOREA

3:24 PM - 3:42 PM

Concurrent Prediction of Knee Contact, Ground Reaction, and Muscle Forces During Gait

T. Guess¹, A. Stylianou², H. Jahandar¹;

¹University of Missouri, Columbia, MO, ²University of Missouri - Kansas City, Kansas City, MO.

3:42 PM - 4:00 PM

Minimizing OpenSim State Derivative Computational Cost for Optimal Control Applications

I. Eskinazi, A. V. Rao, B. J. Fregly;

University of Florida, Gainesville, FL.

Biomechanics of Running

Session Number: 1-18 Room: 310

Session Chair(s): S. Ferguson

2:30 PM - 2:48 PM

Is Running Speed Maximized with Spring-Like Stance Mechanics?

K. P. Clark, L. J. Ryan, P. G. Weyand;

Southern Methodist University, Locomotor Performance Laboratory, Department of Applied Physiology and Wellness, Dallas, TX.

SUNDAY Podium Sessions

2:48 PM - 3:06 PM

Relationship Between Hip Strength and Hip, Pelvis, and Trunk Kinematics in Healthy Runners

J. J. Hannigan, J. Becker, L. Chou;
University of Oregon, Eugene, OR.

3:06 PM - 3:24 PM

Kinematic Analysis of Hip and Knee Joints Between Barefoot and Shod Treadmill Running

S. Lloyd, T. Wu, P. Russell, E. Braun;
Bridgewater State University, Bridgewater, MA.

3:24 PM - 3:42 PM

Shoe cushioning effects on internal ankle, knee and hip forces during running

S. A. Meardon¹, J. D. Willson¹, T. W. Kernozek², T. R. Derrick³;

¹East Carolina University, Greenville, NC,
²University of Wisconsin - La Crosse, WI, ³Iowa State University, Ames, IA.

3:42 PM - 4:00 PM

Calf And Foot Muscle Adaptations In Western Shod Runners After A Transition To Barefoot Running

S. D. Samarawickrame¹, R. Hashish¹, S. R. Ward², P. M. Colletti¹, G. J. Salem¹;

¹University of Southern California, Los Angeles, CA,
²University of California, San Diego, CA.

4:00 PM - 4:18 PM

The Effect of Surface on the Running Biomechanics of Orienteering Athletes Captured Outdoors using a 3D Motion Analysis System

K. Hébert-Losier
Swedish Winter Sports Research Centre, Mid Sweden University, Östersund, SWEDEN.

Biomechanics and Martial Arts

Session Number: 1-19 Room: 303

Session Chair(s): M. Pain

2:30 PM - 2:48 PM

Is it possible to estimate a kendo dan grade based on observations of a frontal practice swing?

K. Takahashi¹, K. Muto², M. Kawaguchi¹;

¹Kanto Gakuin University, Yokohama, JAPAN,
²Seikei University, Tokyo, JAPAN.

2:48 PM - 3:06 PM

The study on double roundhouse kick of Taekwondo

T. Su, C. Chiou, T. Chen
National Changhua University of Education, Changhua, TAIWAN.

3:06 PM - 3:24 PM

Effects of Tai Chi Exercise on Movement Strategies during The Stair Ascent in Middle-aged Elderly

H. J. C. H. Min-Hao
National Taiwan Normal University, Tainan City, TAIWAN.

3:24 PM - 3:42 PM

Mechanical Energy Contributions during Gait in Tai-Chi Elders

P. C. Chen, C. F. Huang, B. J. Ko
National Taiwan Normal University, Taipei, TAIWAN.

3:42 PM - 4:00 PM

Performance Indexes for a Gyaku Tsuki Punch: a Pilot Study

P. Feijoo¹, J. C. Briceño¹, **D. R. Suarez**²;
¹Universidad de Los Andes, Bogota, COLOMBIA,
²Pontificia Universidad Javeriana, Bogota, COLOMBIA.

Biomechanics for Under-Body Blast Environment – Warrior Injury Assessment I

Session Number: 1–20 Room: 304

Session Chair(s): R. Coates

2:30 PM - 2:48 PM

An Investigation of the Effects of Personal Protection Equipment on the Response of Vehicle Occupants in Under-Body Blast Scenarios

R. S. Salzar, A. M. Bailey;
University of Virginia, Charlottesville, VA.

2:48 PM - 3:06 PM

Whole-Body Blast-Induced Accelerative Loading Response of PMHS and the Hybrid III ATD

W. N. Hardy¹, J. H. Bolte, IV², K. A. Danelson³, A. R. Kemper¹, M. B. Tegtmeier⁴;

¹Virginia Tech – Wake Forest University Center for Injury Biomechanics, Blacksburg, VA, ²Ohio State University – Injury Biomechanics Research Center, Columbus, OH, ³Virginia Tech – Wake Forest University Center for Injury Biomechanics, Winston Salem, NC, ⁴U.S. Army Research Laboratory, Aberdeen, MD.

SUNDAY Podium Sessions

3:06 PM - 3:24 PM

A Framework for the Development of Biofidelity Response Corridors (BRCs) for Underbody Blast
F. S. Gayzik¹, K. Danelson¹, J. Stitzel¹, J. Rupp², C. Bass³, N. Yoganandan⁴, T. Smith⁵, K. Wiley⁵, C. Foster⁶, J. Zhang⁷, A. Merkle⁷;
¹Wake Forest University School of Medicine, Winston-Salem, NC, ²University of Michigan Transportation Research Institute, Ann Arbor, MI, ³Duke University, Durham, NC, ⁴Medical College of Wisconsin, Milwaukee, WI, ⁵Dynamic Research Inc., Torrance, CA, ⁶Booz Allen Hamilton, Warren, MI, ⁷Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

3:24 PM - 3:42 PM

Foot-Ankle Response with and without Military Boot after Plantar Surface Impact
S. Chirvi, M. B. Schlick, N. Yoganandan, F. A. Pintar;
Medical College of Wisconsin, Milwaukee, WI.

3:42 PM - 4:00 PM

Biomechanics of the Lumbar Spine Response to Underbody Blast Loading
B. Bigler¹, C. A. Cox¹, A. Schmidt¹, J. K. Shridharani¹, J. F. Luck¹, J. Kait¹, J. Zhang², A. Knight¹, A. Alonso¹, C. R. Bass¹;
¹Duke University, Durham, NC, ²Johns Hopkins Applied Research Laboratory, Laurel, MD.

Sunday, 6 July 2014
4:30– 6:00 PM

Molecular & Cellular Experimental Tools

Session Number: 2-1 Room: 109
Session Chair(s): P. McGarry

4:30 PM - 4:48 PM

Development of High Throughput Single Molecule Force Spectroscopy using DNA Nanotechnology
R. Patton, E. Briggs, C. Castro;
The Ohio State University, Columbus, OH

4:48 PM - 5:06 PM

Nanomechanical Behaviors of α -Catenin under Tension as a Mechanotransduction Switch Revealed by AFM Nanofishing
K. Maki, S. Han, T. Adachi;
Institute for Frontier Medical Sciences, Kyoto University, JAPAN

5:06 PM - 5:24 PM

Characterizing Deformability of Cancer Cells with Dielectrophoretic-based Microfluidic Chip
Y. Teng¹, P. Xiao², F. Lin¹, M. Chu², H. Lin³, Y. Wang², C. Xiong¹;
¹Peking University, Beijing, CHINA, ²Peking University Health Science Center, Beijing, CHINA, ³The State University of New Jersey, Rutgers, NJ

5:24 PM - 5:42 PM

3D Traction Force Microscopy Combined with Computer Simulation Models for the Analysis of Filopodia Dynamics
Y. R. Silberberg¹, M. Kim¹, H. H. Asada²;
¹Singapore-MIT Alliance for Research and Technology (SMART), SINGAPORE, ²Massachusetts Institute of Technology, Cambridge, Massachusetts, MA

5:42 PM - 6:00 PM

Dynamic Alterations in Stem Cell Nuclear Architecture and Mechanobiology as a Consequence of Mechanical Perturbation
S. Heo¹, T. D. Driscoll¹, S. D. Thorpe², D. A. Lee², R. L. Mauck¹;
¹University of Pennsylvania, Philadelphia, PA, ²Queen Mary, University of London, UNITED KINGDOM

Extracellular Matrix Mechanics

Session Number: 2-2 Room: 110
Session Chair(s): K. Billiar and W. Richardson

4:30 PM - 4:48 PM

Macromolecular crowding effects on vascular endothelial cells' extracellular matrix production and organization
F. D. Liu, A. S. Zeiger, K. J. Van Vliet;
MIT, Cambridge, MA.

4:48 PM - 5:06 PM

Engineering the Cardiac Microenvironment Using a Tunable Hydrogel Cell Culture Platform.
W. Wan, L. A. Leinwand, K. S. Anseth;
The University of Colorado Boulder, CO.

5:06 PM - 5:24 PM

Observation of Extracellular Collagen Remodeling by Second-harmonic-generation Microscopy
S. Fukushima¹, R. Maehara¹, T. Araki¹, K. Funamoto², R. D. Kamm³;
¹Osaka University, Toyonaka, JAPAN, ²Tohoku University, Sendai, JAPAN, ³Massachusetts Institute of Technology, Cambridge, MA.

SUNDAY Podium Sessions

5:24 PM - 5:42 PM

Gradient Densification of Collagen Matrices

T. Novak, S. L. Voytik-Harbin, C. P. Neu;
Purdue University, Lafayette, IN.

5:42 PM - 6:00 PM

Biohybrid polymer hydrogels for decoupling cell-instructive signals

M. Soncini

Cell Mechanics & Function

Session Number: 2-3 Room: 111

Session Chair(s): C. Neu & T. Angelini

4:30 PM - 4:48 PM

Nuclear Shape Prescribes the Mechanical Properties of Human Stem Cells

O. A. Lozoya, 2011¹, C. L. Gilchrist¹, E. T. O'Brien², R. Superfine², F. Guilak¹;

¹Duke University Medical Center, Durham, NC,

²University of North Carolina at Chapel Hill, Chapel Hill, NC

4:48 PM - 5:06 PM

Mechanical compression of well-differentiated airway epithelial cells causes cellular unjamming

J. Park¹, N. T. Qazvini¹, C. Park¹, J. A. Mitchell¹, J. Kim¹, J. P. Butler¹, E. Israel², S. H. Randell³, S. A. Shore¹, A. Kho⁴, J. M. Drazen¹, J. J. Fredberg¹;

¹Harvard School of Public Health, Boston, MA,

²Brigham and Women's Hospital, Boston, MA,

³University of North Carolina, Chapel Hill, NC,

⁴Children's Hospital Boston, Boston, MA.

5:06 PM - 5:24 PM

Mechanical Coupling of Cardiomyocytes on PDMS Film Enables Synchronization

B. Williams, T. Saif;

University of Illinois at Urbana-Champaign, IL.

5:24 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Cell-Matrix Interactions

Session Number: 2-4 Room: 306

Session Chair(s): A. Clyne & G Meininger

4:30 PM - 4:48 PM

Endothelial Cell Aging Increases Traction Forces and Permeability and Alters Actin Localization

T. M. Cheung, J. B. Yan, J. Huang, F. Yuan, **G. A. Truskey**;

Duke University, Durham, NC

4:48 PM - 5:06 PM

Vasoactive agonists' effects on vascular smooth muscle are associated with coordinated changes in cell elasticity, adhesion and cytoskeletal remodeling

Z. Hong¹, M. Jin¹, F. Bunyak¹, I. Ersoy¹, Z. Sun¹, M. Li¹, Z. Li¹, J. P. Trzeciakowski², M. A. Hill¹, K.

Palaniappan¹, G. A. Meininger¹;

¹University of Missouri, Columbia, MO, ²Texas A&M University, College Station, TX

5:06 PM - 5:24 PM

Nanotopography and Extracellular Matrix Modulate the Mechanotransduction of Stem Cell Differentiation through Focal Adhesion Kinase

B. K. K. Teo, **E. K. F. Yim**;

National University of Singapore, SINGAPORE

5:24 PM - 5:42 PM

SIRT1 Regulates Glycocalyx and VE-cadherin to Modulate Response of Endothelial Cells to Shear Stress

T. M. Cheung, J. J. Fu, G. A. Truskey;

Duke University, Durham, NC.

5:42 PM - 6:00 PM

Mechanical Loading by Fluid Shear Stress of Myotube Glycocalyx Stimulates Nitric Oxide Production and hypertrophic signaling

P. Juffer¹, A. Bakker¹, J. Klein-Nulend¹, **R. T. Jaspers²**;

¹Department of Oral Cell Biology, Academic Centre for Dentistry, Amsterdam, NETHERLANDS,

²Laboratory for Myology, MOVE Research Institute Amsterdam, NETHERLANDS

Biomechanics of Cancer II

Session Number: 2-5 Room: 302

Session Chair(s): P. Ayyaswamy and T. Stylianopoulos

4:30 PM - 4:48 PM

Biomechanical Characterization of Breast Cancer Spheroids

J. I. Rodriguez-Devora, A. Desai, N. Nosoudi, D. Dean;

Clemson University, Clemson, SC

SUNDAY Podium Sessions

4:48 PM - 5:06 PM

Quantification of the Spatial Distribution of Cytoskeletal Proteins and Adhesions of MDA-MB-231 Breast Cancer Cells Embedded inside 3D Collagen Matrices

V. Rajagopal¹, A. Pavesi², W. Polacheck³, R. D. Kamm³;

¹University of Melbourne, AUSTRALIA, ²Singapore-MIT Alliance for Research and Technology Center, SINGAPORE, ³Massachusetts Institute of Technology, Cambridge, MA

5:06 PM - 5:24 PM

Experimental and Computational Intracellular Rheology of Cancer Cells in Tunable 3D Microenvironments

M. Mak¹, M. H. Zaman², R. D. Kamm¹;

¹Massachusetts Institute of Technology, Cambridge, MA, ²Boston University, Boston, MA

5:24 PM - 5:42 PM

Decreased viscoelastic response to substrate stretch in a model of bone cancer metastasis

Á. N. Horváth, G. Bartalena, N. Goedecke, U. Silvan, J. G. Snedeker;

Institute for Biomechanics - ETH Zürich, SWITZERLAND

5:42 PM - 6:00 PM

3-D Model to Decipher Biomechanics of Cancer Metastasis

V. C. Shukla, L. Volakis, N. Higuera-Castro, S. N. Ghadiali;

The Ohio State University, Columbus, OH

Organ on Chip Systems

Session Number: 2-6 Room: 309

Session Chair(s): LeDuc and Kim

4:30 PM - 5:06 PM

Microengineered Physiological Biomimicry: Human Organ-on-Chips

D. Huh;

University of Pennsylvania, Philadelphia, PA.

5:06 PM - 5:24 PM

Force Production in Locally Organized, Globally Disorganized Cardiac Tissues

M. B. Knight, A. Grosberg;

University of California, Irvine, Irvine, CA.

5:24 PM - 5:42 PM

3D Microfluidic Tissue Analogue to Study Blood and Lymphatic Vessel Separation

J. W. Song, C. H. Cui, T. P. Padera, L. L. Munn
Massachusetts General Hospital & Harvard Medical School, Boston, MA.

5:42 PM - 6:00 PM

Mechanisms of tumor cell extravasation in an in vitro microvascular network platform

M. B. Chen, J. Jeon, J. Whisler, R. Kamm;
Massachusetts Institute of Technology, Cambridge, MA.

Model & Regulatory Affairs

Session Number: 2-7 Room: 300

Session Chair(s): T. McGloughlin & W. Baxter

4:30 PM - 4:48 PM

Medical Device Use Conditions Motivating Biomechanics Models: Several Case Studies

W. Baxter¹, M. Schendel², J. Kuhn², M. Campbell², K. Rys², R. Lahm²;

¹Medtronic, Inc., Santa Ana, CA, ²Medtronic, Inc., Mounds View, MN.

4:48 PM - 5:06 PM

A novel multiblock immersed boundary method for large eddy simulation of complex arterial hemodynamics

S. Frankel¹, Y. Delorme¹, K. Anupindi²;

¹Technion, Haifa, ISRAEL, ²Purdue University, West Lafayette, IN.

5:06 PM - 5:24 PM

Computational Fluid Dynamics in the Design of Stent Graft Devices

T. McGloughlin¹, F. Stefanov², **L. G. Morris**²;

¹University of Limerick and Khalifa University of Science Technology and Research, Limerick, IRELAND, ²Galway Mayo Institute of Technology, Galway, IRELAND.

5:24 PM - 5:42 PM

Supplementing FDA submission of medical devices with Finite Element Analysis

X. Liu;

Dassault Systemes Simulia, Providence, RI.

5:42 PM - 6:00 PM

Strategy for Assessing the Credibility of Models and Simulations for Regulatory Decision Making

T. M. Morrison;

US Food and Drug Administration, Silver Spring, MD.

SUNDAY Podium Sessions

Tissue Engineering II

Session Number: 2-8 Room: Ball-C

Session Chair(s): R. van Donkelaar and A. Aggarwal

4:30 PM - 4:48 PM

Developmentally Critical Thyroid Hormones Enhance the Biomechanical Functionality of Tissue Engineered Cartilage

J. K. Lee, C. A. Gegg, J. C. Hu, A. Reddi, K. A. Athanasiou;
University of California, Davis, Davis, CA.

4:48 PM - 5:06 PM

Structure and Function of Tissue Engineered Intervertebral Discs from Human MSCs

K. D. Hudson¹, P. Grunert², S. Towne², R. Härtl², L. J. Bonassar¹;
¹Cornell University, Ithaca, NY, ²Weill Cornell Medical College, New York City, NY.

5:06 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Ligament and Tendon I

Session Number: 2-9 Room: 312

Session Chair(s): Thomopoulos & Kuo

4:30 PM - 4:48 PM

Strategies for Enhancing ACL Graft Healing

B. C. Fleming¹, M. M. Murray²;
¹Warren Alpert Medical School of Brown University, Providence, RI, ²Boston Children's Hospital, Boston, MA

4:48 PM - 5:06 PM

Mechanical Stimulation and ADAMTS5 Pathway Activation Are Required For Healing of Tendinopathy

V. Wang¹, R. Bell², J. Li¹, J. Sandy¹, A. Plaas¹;
¹Rush University Medical Center, Chicago, IL, ²Mount Sinai School of Medicine, New York, NY

5:06 PM - 5:24 PM

Adult Scar-less Tendon Healing

N. Andarawis-Puri
Icahn School of Medicine at Mount Sinai, New York, NY

5:24 PM - 6:00 PM

Disruption of the Rotator Cuff Force Balance Alters Joint Mechanics and Leads to Joint Damage in a Rat Model

L. J. Soslowsky, K. E. Reuther, S. J. Thomas, J. J. Tucker, J. J. Sarver, C. F. Gray, S. I. Rooney, D. L. Glaser;
University of Pennsylvania, Philadelphia, PA

Cartilage Mechanics II

Session Number 2-10 Room: 313

Session Chair: C. Hung

4:30 PM - 5:06 PM

Feasibility in Prediction of Biochemical and Mechanical Properties of Cartilages through Non-invasive Measurement by using Quantitative MRI and Terahertz Spectroscopy

T. Ushida¹, K. Furukawa¹, I. Moritomo¹, T. Kaneko¹, Y. Tsugawa¹, S. Nishizawa²;
¹University of Tokyo, Tokyo, JAPAN, ²University of Fukui, JAPAN.

5:06 PM - 5:24 PM

Mechanical Loading and Degradation of Articular Cartilage can be Assessed by Electrical Potentials Measured Non-Invasively at the Surface of the Knee

P. Savard¹, A. Prévaille¹, P. Lavigne², J. Hardin³, Q. Han¹, L. Djerroud¹, M. Buschmann¹;
¹Ecole Polytechnique de Montreal, QC, CANADA, ²Hopital Maisonneuve-Rosemont, Montreal, QC, CANADA, ³Albert Einstein College of Medicine, Bronx, NY.

5:24 PM - 5:42 PM

The Use of Genipin to Enhance Mechanical Function of Articular Cartilage

B. L. Roach, D. C. Paik, G. Ateshian, C. T. Hung;
Columbia University, New York, NY.

5:42 PM - 6:00 PM

Lamin A and Nesprin 1 Giant Levels Increase with Age in Meniscus Cells and are Distinct from Naïve or Differentiated Mesenchymal Stem Cells

T. P. Driscoll, S. Heo, R. L. Mauck;
University of Pennsylvania, Philadelphia, PA

Biomechanics of Morphogenesis II

Session Number: 2-11 Room: 305

Session Chair(s): J. Lee

4:30 PM - 4:48 PM

Initiation effect of hepatocyte-endothelial cell co-culture on capillary morphogenesis in a microfluidic device

S. Menjo, R. Sudo
Keio University, Yokohama, JAPAN.

4:48 PM - 5:06 PM

Mechanical forces drive torsional morphogenesis in early embryonic chick brain

Z. Chen¹, Q. Guo², E. Dai¹, L. Taber¹;
¹Washington University, Saint Louis, MO, ²Fuzhou University, Fuzhou, CHINA

SUNDAY Podium Sessions

5:06 PM - 5:24 PM

On the Relationship between Heart and Head Morphogenesis

A. Ramasubramanian, S. Bradner, K. Chico, X. Capaldi, M. Carnes, K. Hansson; Union College, Schenectady, NY.

5:24 PM - 5:42 PM

Airway Branching Morphogenesis Driven by a Growth-Induced Mechanical Instability

V. D. Varner, J. P. Gleghorn, C. M. Nelson; Princeton University, Princeton, NJ

5:42 PM - 6:00 PM

Inverse and 3D Forward Modeling of Epithelial Morphogenesis during Germ Band Retraction

W. T. McCleery¹, S. M. Crews¹, D. N. Mashburn¹, J. Veldhuis², G. W. Brodland², M. S. Hutson¹; ¹Vanderbilt University, Nashville, TN, ²University of Waterloo, Waterloo, ON, CANADA

Pulmonary Hypertension

Session Number: 2-12 Room: 301

Session Chair(s): Finol

4:30 PM - 4:48 PM

A Comparison of Novel Shape Analysis Methods for Assessment of Organ-Level Functional Changes in the Human Right Ventricle

J. Wu¹, M. A. Simon², **J. C. Brigham**²; ¹University of Pennsylvania, Philadelphia, PA, ²University of Pittsburgh, Pittsburgh, PA

4:48 PM - 5:06 PM

Elevated pulmonary vascular resistance may impact exercise capacity via pulmonary artery stiffening and impaired right ventricular performance

A. Bellofiore¹, S. J. Shah², M. J. Cuttica², J. E. Dematte², R. Sweis², H. Mkrdichian², L. Beussink-Nelson², J. R. Runo¹, J. G. Keevil¹, C. J. Francois¹, **N. C. Chesler**¹; ¹University of Wisconsin, Madison, WI, ²Northwestern University, Chicago, IL

5:06 PM - 5:24 PM

Estrogen Alters Mechanical Property Changes in Conduit Pulmonary Arteries with Pulmonary Artery Hypertension

A. Liu, L. Tian, M. Golob, N. C. Chesler; University of Wisconsin-Madison, WI

5:24 PM - 5:42 PM

Smooth muscle cells in proximal pulmonary artery respond differently to vasoconstrictor in static and dynamic states in both healthy and pulmonary hypertensive female mice

L. Tian, A. Liu, M. Golob, N. C. Chesler; University of Wisconsin-Madison, WI

5:42 PM - 6:00 PM

A simple model of the pulmonary vasculature to link structure, function and hemodynamic changes with pulmonary hypertension progression

D. A. Schreier¹, S. Tewari², T. Hacker¹, D. Beard², N. Chesler¹; ¹University of Wisconsin-Madison, WI, ²University of Michigan, Ann Arbor, MI

Ultrasound Techniques in Cardiovascular Dynamics

Session Number: 2-13 Room: 311

Session Chair(s): Hasegawa

4:30 PM - 4:48 PM

Real-Time Vector Doppler Method for Accurate Hemodynamic Assessments

S. Ricci, L. Bassi, P. Tortoli; University of Florence, Firenze, ITALY.

4:48 PM - 5:06 PM

An imaging platform for non-invasive ultrasound elastography of carotid plaques for stroke prevention

G. Cloutier¹, M. Roy Cardinal¹, F. Destrempe¹, M. Heusinkveld², Z. Keshavarz-Motamed¹, J. Ohayon³, G. Soulez¹; ¹University of Montreal Hospital Research Center, QC, CANADA, ²Eindhoven University of Technology, NETHERLANDS, ³University of Savoie and Laboratory TIMC-UJF-CNRS, Grenoble, FRANCE.

5:06 PM - 5:24 PM

On different phases of longitudinal movement of the carotid artery wall in healthy humans

M. Cinthio, T. Nilsson, H. W. Persson, K. Lindström, Å. R. Ahlgren; Lund University, SWEDEN.

5:24 PM - 5:42 PM

Cardiovascular Elasticity Imaging: From Theory to Clinical Applications

E. Konofagou; Columbia University, New York, NY.

SUNDAY Podium Sessions

5:42 PM - 6:00 PM

High Frame Rate Ultrasound for Measurement of Cardiovascular Dynamics

H. Hasegawa, H. Kanai;

Tohoku University, Sendai, JAPAN.

Mechanics of the Intervertebral Disc

Session Number: 2-14 Room: Ball-A

Session Chair(s): Gu

4:30 PM - 4:48 PM

Human Disc 3D Strains Under Axial Compression Quantified Non-invasively with MRI and Image Registration

D. M. Elliott¹, J. H. Yoder², J. M. Peloquin², G. Song², N. J. Tustison³, S. M. Moon⁴, A. C. Wright², E. J. Vresilovic⁵, J. C. Gee²;

¹University of Delaware, Newark, DE, ²University of Pennsylvania, Philadelphia, PA, ³University of Virginia, Charlottesville, VA, ⁴MR Systems, GE Healthcare, Florence, SC, ⁵Pennsylvania State University, Hershey, PA

4:48 PM - 5:06 PM

Prolonged Testing of the Annulus Fibrosus to Represent In-Vivo Injury Mechanics

J. P. Callaghan¹, C. E. Gooyers², D. E. Gregory³, K. M. Gruevski¹, T. Karakolis¹, R. J. Parkinson²;

¹University of Waterloo, ON, CANADA, ²Giffin Koerth Forensic Engineering, Toronto, ON, CANADA, ³Wilfrid Laurier University, Waterloo, ON, CANADA

5:06 PM - 5:24 PM

The Challenges of Annulus Repair

H. Wilke;

University of Ulm, GERMANY

5:24 PM - 5:42 PM

Quantitative Predictions of Proteoglycan and Water Distributions in the Intervertebral Disc

W. Gu, Q. Zhu, X. Gao;

University of Miami, Coral Gables, FL

5:42 PM - 6:00 PM

Adjacent Segment Disc Disease- A Finite Element Analysis

R. Natarajan, G. B. J. Andersson;

Rush University Medical Center, Chicago, IL

Mechanoregulation of Bone

Session Number: 2-15 Room: Ball- B

Session Chair(s): S. Tanaka

4:30 PM - 4:48 PM

Microdamage Induced Extracellular Calcium Efflux Triggers Intracellular Calcium Signaling

H. Jung¹, X. Sun², **O. Akkus**¹;

¹Case Western Reserve University, Cleveland, OH,

²University of Connecticut, Storrs, CT

4:48 PM - 5:06 PM

Frequency dependence of the osteogenic response of osteoblasts to mechanical loading *in vitro*

S. Tanaka;

Kanazawa University, Kanazawa, JAPAN

5:06 PM - 5:24 PM

Interaction of Mechanical Forces on the Cell: Occam's Razor is a Double Edge.

R. L. Duncan;

University of Delaware, Newark, DE

5:24 PM - 5:42 PM

Mechanoregulation of orthopaedic tissue differentiation agrees with the distribution of cartilage and fibrous tissue in the healthy IVD: an ECM constitutive-based adaptive finite element analysis

M. M. van Rijsbergen, V. Barthelemy, W. Wilson, K. Ito

Eindhoven University of Technology, Eindhoven, NETHERLANDS

5:42 PM - 6:00 PM

In Silico Mechano-chemical Model for

Regeneration of Critical Bone Defects: the Effect of Bone Morphogenetic Protein-2

F. O. Ribeiro¹, M. Gómez-Benito², J. Folgado¹, P. R. Fernandes¹, J. García-Aznar²;

¹Instituto Superior Técnico - University of Lisbon, PORTUGAL, ²University of Zaragoza, SPAIN

Biomechanical Instrumentation

Session Number: 2-16 Room: 308

Session Chair(s): M. Moreno and R. Okamoto

4:30 PM - 4:48 PM

Inertial Compensation in Moving Force Plates

S. K. Hnat, A. J. van den Bogert;

Cleveland State University, Cleveland, OH

SUNDAY Podium Sessions

4:48 PM - 5:06 PM

Triaxial Experimental Analysis and Simulation (TEXAS) system for full 3D modeling of soft biological tissues

M. R. Hill, S. S. Raut, A. Rodriguez, T. V. Weber, III, D. Chen, C. Placeres, D. Cheang, M. S. Sacks; University of Texas at Austin, Austin, TX

5:06 PM - 5:24 PM

Can Inertial Measurement Units Accurately Quantify Lumbar Posture in Prolonged Tasks?

D. Viggiani, J. P. Callaghan; University of Waterloo, ON, CANADA

5:24 PM - 5:42 PM

Combining 3D Ultrasound Speckle Tracking with Biaxial Mechanical Test Yields Both the Mechanical Properties and Spatially Varying Fiber Orientations

C. Yap, D. Park, D. Dutta, M. Simon, K. Kim; University of Pittsburgh, Pittsburgh, PA

5:42 PM - 6:00 PM

Development of an in vitro thrombogenicity test method for continuous hemofiltration devices

Y. Matsuhashi, K. Iwasaki, A. Takahashi, M. Hirata, M. Umezu

Center for Advanced Biomedical Sciences, TWIns, Waseda University, Tokyo, JAPAN

Biomechanics of Wheelchair Locomotion

Session Number: 2-17 Room: 307

Session Chair(s): L. Kuxhaus and E. DeBartolo

4:30 PM - 4:48 PM

The effect of different size of wheelchair rims during propulsion on hand pressure and upper-limb movement

C. Kabra, R. Jaiswal, G. Arnold, R. Abboud, **W. Wang**;

Dundee University, UNITED KINGDOM

4:48 PM - 5:06 PM

Advancing the Design of Powered Wheelchair Seating Systems

J. Lynne, J. Martin, H. Ploeg;

UW-Madison, WI

5:06 PM - 5:24 PM

Shoulder Complex Joint Kinematics during Pediatric Manual Wheelchair Propulsion

A. J. Schnorenberg¹, B. A. Slavens¹, J. Krzak², A. Graf², L. C. Vogel², G. F. Harris³;

¹University of Wisconsin Milwaukee, WI, ²Shriners Hospitals for Children - Chicago, IL, ³Marquette University, Milwaukee, WI

5:24 PM - 5:42 PM

Monitoring Mechanical Demand Imposed on the Upper Extremity During Manual Wheelchair Propulsion Under Realistic Conditions

I. M. Russell¹, K. Brown¹, E. Wagner¹, J. Furumasa², P. S. Requejo², H. Flashner¹, M. M. Rodgers³, J. L. McNitt-Gray¹;

¹University of Southern California, Los Angeles, CA, ²Rancho Los Amigos National Rehabilitation Center, Downey, CA, ³University of Maryland School of Medicine, Baltimore, MD

5:42 PM - 6:00 PM

Compensatory Strategies During Manual Wheelchair Propulsion in Response to Muscle Fatigue

J. Slowik¹, J. McNitt-Gray², P. Requejo³, S. Mulroy³, R. Neptune¹;

¹The University of Texas at Austin, TX, ²University of Southern California, Los Angeles, CA, ³Rancho Los Amigos National Rehabilitation Center, Downey, CA

Biomechanics of Shod & Unshod Running

Session Number: 2-18 Room: 310

Session Chair(s): J. Rubenson

4:30 PM - 4:48 PM

Do Western Shoe Runners Inherently Adopt the Barefoot Pattern?

R. Hashish, S. D. Samarawickrame, K. Gaur, G. Salem

University of Southern California, Los Angeles, CA

4:48 PM - 5:06 PM

Gait Cycle Fluctuations Change during Novel Foot Strike and Barefoot Running Conditions

E. R. Boyer¹, S. Meardon², T. R. Derrick¹;

¹Iowa State University, Ames, IA, ²East Carolina University, Greenville, NC

5:06 PM - 5:24 PM

Running movement coordination patterns between barefoot and minimalist shoe

T. Wu, S. Lloyd, J. Kim;

Bridgewater State University, Bridgewater, MA

SUNDAY Podium Sessions

5:24 PM - 6:00 PM

Kinetics of shod and barefoot running for incline, decline and level running conditions

E. Kowalski, J. Li

University of Ottawa, Ottawa, ON, CANADA

Biomechanics of Head Impact

Session Number: 2-19 Room: 303

Session Chair(s): P. Cripton & K. Schmitt

4:30 PM - 4:48 PM

Objective Validation Framework for a Human Head Finite Element Model During High Rate Loading

A. Golman, R. Armiger, A. Iwaskiw, T. Harrigan, J. Roberts, A. Merkle;

The Johns Hopkins University Applied Physics Laboratory, Laurel, MD

4:48 PM - 5:06 PM

Industrial Helmet Effectiveness in Mitigating Head Accelerations in Impacts with Rigid Surfaces

E. R. Serina, C. Y. Chang;

Talas Engineering, Inc., Hayward, CA

5:06 PM - 5:24 PM

Motorcycle Helmet Crush and Impact Behavior Depends on Impact Surface Shape

D. D. Chimich, A. L. DeMarco, G. P. Siegmund; MEA Forensic Engineers and Scientists, Richmond, BC, CANADA

5:24 PM - 5:42 PM

Impact Location affects Brain Strain in Football Helmet Impacts

B. S. Elkin¹, K. M. Guskiewicz², G. P. Siegmund³;

¹MEA Forensic Engineers & Scientists, Mississauga, ON, CANADA, ²University of North Carolina at Chapel Hill, NC, ³MEA Forensic Engineers & Scientists, Richmond, BC, CANADA

5:42 PM - 6:00 PM

Quantify Fractures at Head-Neck Junction in Helmet-Protected Blunt Impact

L. Voo, K. Ott, C. Dooley, A. Merkle

Johns Hopkins University Applied Physics Laboratory, Laurel, MD

Biomechanics for Under-Body Blast Environment – Warrior Injury Assessment II

Session Number: 2-20 Room: 304

Session Chair(s): R. Coates

4:30 PM - 4:48 PM

An Investigation of the Effects of Personal Protection Equipment on the Response of Vehicle Occupants in Under-Body Blast Scenarios

R. Salazar

4:48 PM - 5:06 PM

Initial Characterization of the Human Response to Vertical Accelerative Loading

K. Ott, C. Dooley, A. Wickwire, A. Iwaskiw, A. Merkle, R. Armiger;

Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

5:06 PM - 5:24 PM

Comprehensive Normalization and Scaling Framework for Underbody Blast Biomechanics

C. D. Bass¹, K. Danelson², N. Yoganandan³, L. Voo⁴, A. Agnew⁵, J. Rupp⁶, H. Cutcliffe¹, J. Stitzel², F. S. Gayzik², A. Merkle⁴;

¹Duke University, Durham, NC, ²Wake Forest University School of Medicine, Winston-Salem, NC, ³Medical College of Wisconsin, Milwaukee, MI, ⁴Johns Hopkins University Applied Physics Laboratory, Laurel, MD, ⁵The Ohio State University, Columbus, OH, ⁶University of Michigan Transportation Research Institute, Ann Arbor, MI.

5:24 PM - 5:42 PM

Design Considerations for an Under-Body Blast Dummy

Z. Wang¹, **H. Pietsch**², T. Smith³, K. Wiley³, R. Scherer², K. Bosch⁴;

¹Humanetics Innovative Systems, Plymouth, MI, ²USARMY, Warren, MI, ³Dynamic Research, Inc., Torrance, CA, ⁴Booz Allen Hamilton, Warren, MI.

5:42 PM - 6:00 PM

Helmeted Head-Neck Response With and Without Roof Interaction after Vertical Acceleration

J. R. Humm, N. Yoganandan, F. A. Pintar; Medical College of Wisconsin, Milwaukee, WI.

MONDAY Podium Sessions

Monday, 7 July 2014
8:00 – 9:30 AM

Nucleic Acid Nanostructures

Session Number: 3-1 Room: 109
Session Chair(s): Bathe and Castro

8:00 AM - 8:18 AM

Programmable Molecular Instruments with DNA/RNA

P. Yin;
Harvard, Boston, MA.

8:18 AM - 8:36 AM

Mechanically Functional DNA Origami Nanostructures

A. Marras, L. Zhou, H. Su, **C. E. Castro**;
The Ohio State University, Columbus, OH.

8:36 AM - 8:54 AM

Hierarchical self-assembly of large DNA polyhedra and two-dimensional lattices

Y. Ke, P. Yin, W. M. Shih;
Harvard University, Boston, MA.

8:54 AM - 9:12 AM

In Situ Structure, Dynamics and Transport Properties of DNA Origami Determined through All-Atom Molecular Dynamics Simulations

J. Yoo, **A. Aksimentiev**;
University of Illinois at Urbana-Champaign, IL.

9:12 AM - 9:30 AM

Computational investigation of DNA motifs for structural nucleic acid nanotechnology

K. Pan¹, M. Adendorff¹, D. Kim², M. Bathe¹;
¹MIT, Cambridge, MA, ²Seoul National University, Seoul, REPUBLIC OF KOREA

Molecular Mechanisms of Biological Lubrication I

Session Number: 3-2 Room: 110
Session Chair(s): J. Klein

8:00 AM - 8:36 AM

Molecular Mechanisms of Biological Lubrication

J. Klein;
Weizmann Institute, Rehovot, ISRAEL.

8:36 AM - 8:54 AM

Biomechanical Rationale of Lubricin in Tribosupplementation: A Tribologic Strategy to Mitigate Early Arthritic Disease.

G. Jay¹, L. Zhang², K. A. Waller²;
¹Brown University, Providence, RI, ²Rhode Island Hospital, Providence, RI.

8:54 AM - 9:12 AM

Lubrication of Bovine Articular Cartilage by a Bio-Inspired Phosphorylcholine-Containing Polymer Network.

B. G. Cooper¹, B. D. Snyder², M. W. Grinstaff¹;
¹Boston University, Boston, MA, ²Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA.

9:12 AM - 9:30 AM

Molecular Origins of Synovial Joint Lubrication

J. Seror, L. Zhu, J. Klein;
Weizmann Institute of Science, Rehovot, ISRAEL.

Mechanosensitive Signaling Pathways I

Session Number: 3-3 Room: 111
Session Chair(s): Engler and Cooper-White

8:00 AM - 8:36 AM

Membrane Tension as a Simple Mechanism for Controlling Functions

M. Sheetz, N. Gauthier;
Mechanobiology Institute, SINGAPORE.

8:36 AM - 8:54 AM

Contractile stress and morphogen diffusion in developing cell assemblies

K. Dasbiswas, S. A. Safran;
Weizmann Institute of Science, Rehovot, ISRAEL.

8:54 AM - 9:12 AM

MicroTsunamis: A method for high-throughput screening of cellular mechanotransduction using laser microbeam generated cavitation bubbles

E. Botvinick;

9:12 AM - 9:30 AM

The Adhesion Docking Protein NEDD9 Mediates Force Sensing in High Grade Glioma Brain Tumours.

P. Bradbury¹, J. Zhong¹, M. Shum¹, K. Turner¹, G. Lim¹, E. de Leon¹, J. Cooper-White², B. Fabry³, **G. O'Neill**¹;
¹The Kids Research Institute, Sydney, AUSTRALIA, ²Australian Institute for Bioengineering and Nanotechnology, Brisbane, AUSTRALIA, ³University of Erlangen-Nuremberg, Erlangen, GERMANY

MONDAY Podium Sessions

Theoretical & Computational Modeling of Cells

Session Number: 3-4 Room: 306

Session Chair(s): Vernerey

8:00 AM - 8:18 AM

Signatures of protein structure in the organization and cooperative function of mechanosensitive membrane proteins

O. Kahraman¹, **W. S. Klug**², C. A. Haselwandter¹;

¹USC, Los Angeles, CA, ²UCLA, Los Angeles, CA.

8:18 AM - 8:36 AM

Numerical and analytic computation of elastic interactions between membrane proteins

O. Kahraman¹, P. D. Koch², W. S. Klug³, C. A. Haselwandter¹;

¹University of Southern California, Los Angeles, CA,

²Harvard Medical School, Boston, MA, ³University of California Los Angeles, Los Angeles, CA.

8:36 AM - 8:54 AM

Simulations of Adhesion and Spreading of Cells

S. Li;

University of California-Berkeley, Berkeley, CA.

8:54 AM - 9:12 AM

Catch-Bonds and Cell Mechano-Sensitivity

F. Vernerey;

University of Colorado at Boulder, CO.

9:12 AM - 9:30 AM

Hydraulic fracturing and healing of epithelial clusters supported on hydrogels

M. Arroyo¹, L. Casares², R. Vincent², D. Navajas³, X. Trepat³;

¹Universitat Politècnica de Catalunya, Barcelona, SPAIN, ²Institute for Bioengineering of Catalonia (IBEC), Barcelona, SPAIN, ³Institute for Bioengineering of Catalonia (IBEC), Universitat de Barcelona, Barcelona, SPAIN

Energy-Based Cancer Therapies: Challenges & Strategies

Session Number: 3-5 Room: 302

Session Chair(s): X. He and G. Zhao

8:00 AM - 8:36 AM

Challenges and Future Directions in Energy Based Therapies for Cancer

J. C. Bischof;

University of Minnesota, Minneapolis, MN.

8:36 AM - 8:54 AM

Fiberoptic Microneedles for Nanoparticle Targeted Photothermal Therapy of Invasive Bladder Cancer

C. Rylander, R. Andriani, Jr., R. Hood, M. DeWitt, A. Pekkanen, J. Robertson, M. Rylander;

Virginia Tech, BLACKSBURG, VA.

8:54 AM - 9:12 AM

Acoustic Droplets Vaporization Enhanced HIFU Treatment of Tumor

A. Zhang;

Shanghai Jiaotong University, Shanghai, CHINA.

9:12 AM - 9:30 AM

Nanostructure-Enhanced Hyperthermia

L. Zhu;

University of Maryland Baltimore County, Baltimore, MD

Biological Flow at the Cellular Level I

Session Number: 3-6 Room: 309

Session Chair(s): T. Ishikawa

8:00 AM - 8:36 AM

Spherical Squirmers

T. J. Pedley;

University of Cambridge, UNITED KINGDOM.

8:36 AM - 8:54 AM

Flagellar Synchronisation Through Direct Hydrodynamic Interactions

D. R. Brumley¹, K. Y. Wan², M. Polin³, R. E. Goldstein²;

¹Massachusetts Institute of Technology, Cambridge, MA, ²University of Cambridge, UNITED KINGDOM, ³University of Warwick, Coventry, UNITED KINGDOM.

8:54 AM - 9:12 AM

Cell-wall hydrodynamic interaction at low Reynolds number

K. Ishimoto;

Kyoto University, Kyoto, JAPAN.

9:12 AM - 9:30 AM

Two types of localized bioconvection patterns in *Euglena gracilis* suspensions in an annular container

M. Lima, E. Shoji, A. Awazu, S. Izumi, H. Nishimori; Hiroshima University, Higashi-Hiroshima, JAPAN

MONDAY Podium Sessions

Engineering Advances in Pediatric Cardiology I

Session Number: 3-7 Room: 300

Session Chair(s): A. Marsden and J. Feinstein

8:00 AM - 8:18 AM

In Vitro Multi-domain Models to the Study Hemodynamics of Single Ventricle Circulations
R. S. Figliola¹, M. Vukicevic¹, T. Conover¹, T. Hang¹, J. Zhou¹, A. Giardini², T. Hsia²;
¹Clemson University, Clemson, SC, ²Great Ormond Street Hospital, London, UNITED KINGDOM.

8:18 AM - 8:36 AM

An accurate lumped parameter model of the heart for the simulation of surgical procedures in single ventricle circulation
G. Pennati¹, C. Corsini¹, A. Baretta¹, F. Migliavacca¹, G. Dubini¹, C. Baker², A. Dorfman³, A. Hlavacek⁴, T. Hsia²;
¹Politecnico di Milano, Milan, ITALY, ²Great Ormond Street Hospital for Children and UCL Institute of Cardiovascular Science, London, UNITED KINGDOM, ³University of Michigan Medical School, Ann Arbor, MI, ⁴Medical University of South Carolina, Charleston, SC.

8:36 AM - 8:54 AM

Pulmonary Insufficiency: Energy-based Assessment using 4D Phase Contrast MRI
N. Lee¹, M. D. Taylor¹, K. N. Hor², R. K. Banerjee³;
¹Cincinnati Children's Hospital Medical Center, Cincinnati, OH, ²Nationwide Children's Hospital, Columbus, OH, ³University of Cincinnati, OH.

8:54 AM - 9:12 AM

Image Based Surgical Planning in Congenital Aortic Valve Disease
P. J. del Nido;
Boston Children's Hospital, Boston, MA.

9:12 AM - 9:30 AM

Assisted Bidirectional Glenn: an Alternative for the Systemic-to-Pulmonary Shunt Physiology
M. Esmaily-Moghadam¹, T. Hsia², A. Marsden¹;
¹University of California San Diego, San Diego, CA, ²Great Ormond Street Hospital, London, UNITED KINGDOM

Mechanobiology & Atherosclerotic Plaque Composition

Session Number: 3-8 Room: Ball-C

Session Chair(s): Ohayon and Schwartz

8:00 AM - 8:18 AM

Biomechanics of Atherosclerotic Plaque Erosion.
W. Taylor;
Emory University School of Medicine, Atlanta, GA.

8:18 AM - 8:36 AM

Mechanosensitive signalling pathways adapt during TCFA formation
R. Krams;
Imperial College, London, UNITED KINGDOM

8:36 AM - 8:54 AM

Extracellular Matrix Regulation of Endothelial Fluid Shear Stress Responses
S. Youn, M. Budatha, **M. A. Schwartz**;
Yale Cardiovascular Research Center, Dept of Medicine (Cardiology) and Dept of Cell Biology, New Haven, CT.

8:54 AM - 9:12 AM

Shear stress and plaque composition
L. Winkel, Z. Kassab, R. Xing, F. Gijssen, K. van der Heiden, L. Speelman, M. Cibis, A. van der Steen, **J. Wentzel**;
ErasmusMC, Rotterdam, NETHERLANDS.

9:12 AM - 9:30 AM

Atherosclerotic Plaque Rupture - Mouse versus Human
J. Ohayon¹, L. Riou², G. Finet³, R. I. Pettigrew⁴;
¹University of Savoie, Polytech Annecy-Chambéry & Laboratory, Grenoble, FRANCE, ²INSERM, Radiopharmaceutiques Biocliniques, Faculté de Médecine de Grenoble, FRANCE, ³Department of Hemodynamics and Interventional Cardiology, Hospices Civils de Lyon and Claude Bernard University Lyon1, FRANCE, ⁴Laboratory of Integrative Cardiovascular Imaging Science, National Institute of Diabetes Digestive and Kidney Diseases, NIH, Bethesda, MD

MONDAY Podium Sessions

Ligament & Tendon II: Mechanoregulation of Regeneration & Homeostasis

Session Number: 3-9 Room: 312

Session Chair(s): C. Kuo

8:00 AM - 8:36 AM

Mechanical and Biological Influences in Tendon Tissue Engineering, Regeneration, and Healing

D. L. Butler¹, J. Shearn¹, S. D. Gilday¹, A.

Breidenbach¹, A. Lalley¹, N. A. Dymant²;

¹University of Cincinnati, OH, ²University of Connecticut Health Center, Farmington, CT.

8:36 AM - 8:54 AM

Effect of Mechanical Loading on MSC Differentiation and Tendon Repair

J. Temenoff;

Georgia Tech/Emory University, Atlanta, GA.

8:54 AM - 9:12 AM

Cytoskeletal integration of matrix mechanics, topology, and chemistry - Implications for tendon to bone regeneration.

J. G. Snedeker;

University and ETH Zurich, SWITZERLAND.

9:12 AM - 9:30 AM

Directing Stem Cell Differentiation for Ligament Tissue Engineering

H. H. Lu;

Columbia University, New York, NY

Tribology of Articular Cartilage

Session Number: 3-10 Room: 313

Session Chair(s): Y. Nakanishi

8:00 AM - 8:36 AM

Tribology of Articular Cartilage

J. Fisher, CBE;

University of Leeds, UNITED KINGDOM.

8:36 AM - 8:54 AM

Computational Modeling of Articular Cartilage and Applications in the Natural Hip Joint

Z. Jin;

Xian Jiaotong University and University of Leeds, Xian, CHINA.

8:54 AM - 9:12 AM

Intracellular Mechanostress Response Evaluation by in-situ Observation Using a Microfluidic Device

Y. Nakashima¹, Y. Yang², K. Minami², Y.

Nakanishi¹;

¹Kumamoto University, Kumamoto, JAPAN,

²Yamaguchi University, Yamaguchi, JAPAN.

9:12 AM - 9:30 AM

Superior Lubrication Mechanism in Articular Cartilage and Artificial Hydrogel Cartilage

T. Murakami¹, S. Yarimitsu¹, K. Nakashima¹, T.

Yamaguchi¹, Y. Sawae¹, N. Sakai², A. Suzuki³;

¹Kyushu University, Fukuoka, JAPAN, ²Kyushu

Institute of Technology, Kitakyushu, JAPAN,

³Yokohama National University, Yokohama, JAPAN

Force Generation and Sensing in Organisms I

Session Number: 3-11 Room: 305

Session Chair(s): P. Fratzl and R. Weinkamer

8:00 AM - 8:36 AM

Sensing Medium Flow - The clever biomechanics of arthropod hairs

F. G. Barth;

University of Vienna, AUSTRIA.

8:36 AM - 8:54 AM

Air flow sensing in crickets: from physical ecology to MEMS design

J. Casas¹, G. Krijnen²;

¹University Tours/CNRS, Tours, FRANCE,

²University Twente, Enschede, NETHERLANDS.

8:54 AM - 9:12 AM

Molecular Chemotaxis via Enzymatic Force Generation

P. J. Butler, S. Sengupta, K. Dey, A. Sen;

Penn State University, University Park, PA.

9:12 AM - 9:30 AM

Computational Modeling of Remodeling and Force Transmission in Cell-Populated Collagen Matrices

A. Nair, V. Shenoy;

University of Pennsylvania, Philadelphia, PA

Multiscale/Multiphase Tissue Computational Modeling

Session Number: 3-12 Room: 301

Session Chair(s): Hatami-Marbini

8:00 AM - 8:18 AM

Microstructural Mechanical Models of Fiber-Matrix Interactions in Soft Tissues

S. P. Lake¹, L. Zhang², V. K. Lai³, C. P. Picu², M. S.

Shephard², V. H. Barocas³;

¹Washington University in St. Louis, St. Louis, MO,

²Rensselaer Polytechnic Institute, Troy, NY,

³University of Minnesota, Minneapolis, MN.

MONDAY Podium Sessions

8:18 AM - 8:36 AM

A new experimental and computational method to characterize mechanical properties of the stromal extracellular matrix

H. Hatami-Marbini, E. Etebu;
Oklahoma State University, Stillwater, OK.

8:36 AM - 8:54 AM

What is bone remodeling for?

R. Shahar;

8:54 AM - 9:12 AM

Multiscale Modeling of the Cervical Facet Capsular Ligament During Tensile Joint Loading

J. L. Zitnay¹, S. P. Lake², K. P. Quinn³, D. J. Lee³, B. A. Winkelstein³, V. H. Barocas¹;
¹University of Minnesota, Minneapolis, MN,
²Washington University in St. Louis, St. Louis, MO,
³University of Pennsylvania, Philadelphia, PA.

9:12 AM - 9:30 AM

Nanoscale Origin of Toughness in a Hierarchically Structured Natural Material: From Dilatational Bands to Bridged Cracks in Bone

D. Vashishth¹, A. Poudarik¹, T. Diab¹, O. Nickel¹, A. Ural², A. Boskey³, C. Gundberg⁴;
¹Rensselaer Polytechnic Institute, Troy, NY,
²Villanova University, Villanova, PA, ³Hospital of Special Surgery, New York, NY, ⁴Yale University, New Haven, CT

Biomechanics of Soft Tissues - Magnetic Resonance Elastography

Session Number: 3-13 Room: 311

Session Chair(s): S. Bensamoun and L. Setton

8:00 AM - 8:18 AM

Cardiac elastography - towards noninvasive measurement of cardiac pressure

I. Sack;

Charité - Universitätsmedizin Berlin, Berlin, GERMANY.

8:18 AM - 8:36 AM

Movement Magnetic Resonance Imaging (MMRI)

N. Roberts, E. Barnhill, P. Kennedy, E. van Beek;
University of Edinburgh, UNITED KINGDOM.

8:36 AM - 8:54 AM

Challenges in Reconstructing Biomechanical Parameters in Elastography

R. Sinkus;

King's College London, UNITED KINGDOM.

8:54 AM - 9:12 AM

MR Elastography: A New Quantitative Imaging Toolkit for Mechanobiology

R. L. Ehman;
Mayo Clinic, Rochester, MN.

9:12 AM - 9:30 AM

What are the future challenges of the MRE technique for the characterization of the skeletal muscle tissue?

S. F. Bensamoun¹, L. Robert², F. Charleux²;
¹Université de Technologie de Compiègne (UTC), Compiègne, FRANCE, ²ACRIM-Polyclinique Saint Côme, Compiègne, FRANCE

ASME Mow Award - Cellular Mechanotransduction

Session Number: 3-14 Room: Ball-A

Session Chair(s): M. Grimm

8:00 AM - 8:36 AM

Integrative Cellular Mechanobiology and Biomechanics and the Emergence of Primary Cilia as Mechanosensors (Mow Award Lecture)

C. Jacobs;

Columbia University, New York, NY.

8:36 AM - 8:54 AM

Effect of rheological properties on ciliary flow in the airway

T. Haga;

Tohoku University, Sendai, JAPAN.

8:54 AM - 9:12 AM

The primary cilia mediates flow induced mineralised matrix production by mesenchymal progenitors

Y. Huo¹, R. Delaine-Smith², **G. C. Reilly**¹;
¹University of Sheffield, UNITED KINGDOM, ²Queen Mary University of London, UNITED KINGDOM.

9:12 AM - 9:30 AM

Effect of Cyclic Compressive Loading Magnitude on Cytosolic and Mitochondrial Antioxidant Protein Expression and Antioxidant Capacity in Articular Cartilage

M. Boeving, R. Issa, M. Kinter, T. Griffin;
Oklahoma Medical Research Foundation, Oklahoma City, OK

MONDAY Podium Sessions

From Total Joint Replacement to Tissue Engineering: Present & Future

Session Number: 3-15 Room: Ball-B
Session Chair(s): S. Maher and T. Wright

8:00 AM - 8:18 AM

Fixation of joint replacement implants; New materials, opportunities, and challenges
N. Verdonshot, D. Janssen, G. Hannink, P. Tomaszewski, P. Buma;
Radboud University Nijmegen Medical Centre, Nijmegen, NETHERLANDS.

8:18 AM - 8:36 AM

New Generation Joint Replacement Bearing Surfaces
E. Oral;
Harvard Medical School/Massachusetts General Hospital, Boston, MA.

8:36 AM - 8:54 AM

3D Biofabrication for Biological Joint Replacement
D. D'Lima;
Scripps Health, La Jolla, CA.

8:54 AM - 9:12 AM

Multi-Functional Dynamic Fibrous Scaffolds to Promote Dense Connective Tissue Repair
R. Mauck;
University of Pennsylvania, Philadelphia, PA.

9:12 AM - 9:30 AM

Collagen-based biomaterials for cell, drug and gene delivery in tissue engineering
F. J. O'Brien;
Royal College of Surgeons in Ireland, Dublin, IRELAND

ASME Y.C. Fung Award: Cardiovascular Mechanobiology

Session Number: 3-16 Room: 308
Session Chair(s): D. Vorp

8:00 AM - 8:18 AM

Mechanoregulatory Control of Aortic Valve Interstitial Phenotype: Towards Smarter Engineered Valve Replacements
J. Butcher, B. Duan, L. Hockaday, L. Pagnozzi, J. Richards;
Cornell University, Ithaca, NY.

8:18 AM - 8:36 AM

Biomechanical insights into aortic valve pathobiology
C. Simmons;
University of Toronto

8:36 AM - 8:54 AM

A Parametric Study of the Effects of BAV Morphology on Aortic Hemodynamics and Wall Stress
V. Govindarajan, J. Mousel, J. Burken, L. Shrestha, K. B. Chandran, **S. Vigmstad**;
The Univ. of Iowa, Iowa City, IA.

8:54 AM - 9:30 AM

Heart Valve Mechanobiology: Development, Disease, and Intervention (Fund Award Lecture)
W. Merryman;
Vanderbilt University, Nashville, TN

Elastic Mechanisms I

Session Number: 3-17 Room: 307
Session Chair(s): G. Lichtwark

8:00 AM - 8:18 AM

Exploring the Spring in the Muscle: Does Extracellular Matrix Provide an Important Elastic Mechanism?
T. J. Roberts¹, N. J. Gidmark¹, N. Konow¹, E. Azizi²;
¹Brown University, Providence, RI, ²University of California, Irvine, CA.

8:18 AM - 8:36 AM

The Evolutionary Dynamics of Ultrafast Movement
S. Patek¹, T. Claverie², M. Rosario¹;
¹Duke University, Durham, NC, ²Université Montpellier, FRANCE.

8:36 AM - 8:54 AM

Determinants of Tendon Recoil Rate During Energy Dissipating Tasks
E. Azizi, E. Abbott;
University of California, Irvine, CA.

8:54 AM - 9:12 AM

Utilization of tendon elastic energy among elite African runners
M. Ishikawa¹, K. Sano¹, Y. Kunimasa¹, C. Nicol², T. Oda³, A. Ito¹, M. Akiyama¹, A. Nobue¹, Y. Danno¹, P. V. Komi⁴;
¹Osaka University of Health and Sport Sciences, JAPAN, ²Aix-Marseille University, Marseille, FRANCE, ³Hyogo University of Teacher Education, JAPAN, ⁴Likes Research Center, University of Jyväskylä, FINLAND.

MONDAY Podium Sessions

9:12 AM - 9:30 AM

Tendon elastic strain energy in the human ankle plantar-flexors and its role with increased running speed

A. Lai, A. G. Schache, Y. Lin, M. Pandy;
University of Melbourne, AUSTRALIA

Improving Performance in Sport I

Session Number: 3-18 Room: 310

Session Chair(s): J. McNitt-Gray

8:00 AM - 8:36 AM

Biomechanical Innovations in Sport: Have We Really Made Any Difference to Sports Performance?

J. R. Steele;
University of Wollongong, AUSTRALIA.

8:36 AM - 8:54 AM

Successful ambulatory 3D analysis of movement in sports performance through wearable sensing

C. Baten;
Roessingh Research Developemnt, Enschede, NETHERLANDS.

8:54 AM - 9:12 AM

Effects of Soccer Cleats on Player Performance

A. L. Sheets, D. A. Hatfield, B. Unfried;
Nike, Inc., Portland, OR.

9:12 AM - 9:30 AM

Is translational science needed to sustain and grow sports; Biomechanics research

M. T. G. Pain
Loughborough University, UNITED KINGDOM

Traumatic Brain Injury I

Session Number: 3-19 Room: 303

Session Chair(s): D. Camarillo and G. Seigmund

8:00 AM - 8:18 AM

Blast Traumatic Brain Injury: Insights from In Vitro Models

B. Morrison, III¹, G. B. Effgen¹, C. D. Hue¹, E. W. Vogel, III¹, C. R. Bass², D. F. Meaney³;
¹Columbia University, New York, NY, ²Duke University, Durham, NC, ³University of Pennsylvania, Philadelphia, PA.

8:18 AM - 8:36 AM

DASHR: A System for Measuring Head Acceleration for Impact Biomechanics

J. F. Luck, J. K. Shridharani, K. A. Matthews, J. R. Kait, **C. R. Bass**;
Duke University, Durham, NC.

8:36 AM - 8:54 AM

Computational Modeling of TBI

S. Kleiven, C. Giordano, M. Fahlstedt, V. S. Alvarez, X. Li;
KTH - Royal Inst. Technology, Huddinge, SWEDEN.

8:54 AM - 9:12 AM

The effects of rotational acceleration characteristics on TBI outcomes

B. D. Stemper, M. D. Budde, M. McCrea, A. Shah, S. N. Kurpad, F. A. Pintar;
Medical College of Wisconsin, Milwaukee, WI.

9:12 AM - 9:30 AM

See Program Supplement and Errata Sheet for possible additions

Foot & Ankle Biomechanics I

Session Number: 3-20 Room: 304

Session Chair(s): D. Rosenbaum

8:00 AM - 8:36 AM

The morphology of the talar dome and its relationship to ankle kinematics

S. Siegler¹, J. Toy¹, D. Pedowitz²;
¹Drexel University, Philadelphia, PA, ²Rothman Institute, Philadelphia, PA.

8:36 AM - 8:54 AM

Development of a Comprehensive Multi-Segmented Foot Model and it's Clinical Application

K. Meijer, Sr.;
Maastricht University, NETHERLANDS.

8:54 AM - 9:12AM

Individual joint contribution to the kinematics of the medial longitudinal arch

T. Arndt¹, C. Nester², A. Liu², R. Jones², A. Lundberg³, P. Wolf⁴;
¹The Swedish School of Sport and Health Sciences, Stockholm, SWEDEN, ²University of Salford, Manchester, UNITED KINGDOM, ³Karolinska Institute, Stockholm, SWEDEN, ⁴ETH, Zurich, SWITZERLAND

9:12 AM - 9:30 AM

From Crisp to Fuzzy Logic: Implications for the Rehabilitation of the Diabetic Foot

I. C. N. Sacco;
University of Sao Paulo, School of Medicine, Sao Paulo, BRAZIL.

MONDAY Podium Sessions

Monday, 7 July 2014
11:00– 12:30 PM

DNA Mechanics and Assembly
Session Number: 4-1 Room: 109
Session Chair(s): Liang

11:00 AM - 11:18 AM
Digital fabrication with DNA
P. Yin;
Harvard, Boston, MA.

11:18 AM - 11:36 AM
Kinetics of Single DNA Compaction by Multivalent Cations: Effect of Twist Constraint
M. Li, W. Li;
Institute of Physics Chinese Academy of Sciences, Beijing, CHINA.

11:36 AM - 11:54 PM
DNA Inserts Enhance The Elasticity of Alginate Gels
M. A. Ruelan, V. C. Agulto, J. T. Billones, F. S. Bustamante, A. M. Santoya, **R. G. Bacabac;**
University of San Carlos, Medical Biophysics Group, Cebu, PHILIPPINES.

11:54 AM – 12:30 PM
See Program Supplement and Errata Sheet for possible additions

Molecular Mechanisms biological lubrication II
Session Number: 4-2 Room: 110
Session Chair(s): J. Klein

11:00 AM - 11:36 AM
Nanomechanics Applications to Cartilage Tissue Regeneration
C. Ortiz;
Department of Materials Science and Engineering, MIT, Cambridge, MA.

11:36 AM - 11:54 AM
Characterization of Lubrication in the Temporomandibular Joint
B. K. Zimmerman, D. L. Burris, X. Lu;
University of Delaware, Newark, DE.

11:54 AM - 12:12 PM
Extracellular Matrix-mediated Lubrication of Artificial Joints
J. Ryu;
The University of Texas at Tyler, TX.

12:12 PM - 12:30 PM
Biomimetic Hyaluronic Acid Delivery and Fluid Lubrication on Material and Tissue Surfaces
A. Singh¹, M. Corvelli¹, **J. Elisseff**²;
¹Johns Hopkins University, Baltimore, MD,
²Translational Tissue Engineering Center, Wilmer Eye Institute & Dept of Biomedical Engineering, Johns Hopkins University, Baltimore, MD.

Mechanosensitive Signaling Pathways II
Session Number: 4-3 Room: 111
Session Chair(s): Engler and Cooper-White

11:00 AM - 11:18 AM
Biohybrid polymer hydrogels for decoupling cell-instructive signals
C. Werner;

11:18 AM - 11:36 AM
Control Of Invadopodia Activity By Adhesion Signaling
A. M. Weaver;
Vanderbilt University Medical Center, Nashville, TN.

11:36 AM - 11:54 AM
Junctional mechanotransduction coordinates a collective cell response to local tissue injury
G. A. Gomez¹, R. W. McLachlan¹, L. Coburn², R. Priya¹, S. Wu¹, T. Hall¹, D. Conway³, J. Sap⁴, M. Schwartz⁵, R. Parton¹, Z. Neufeld⁶, A. Yap¹;
¹Institute for Molecular Bioscience, The University of Queensland, Brisbane, AUSTRALIA, ²University College Dublin, IRELAND, ³Department of Biomedical Engineering, Virginia Commonwealth University, VA, ⁴Université Paris Diderot, Sorbonne Paris Cité, FRANCE, ⁵Yale University, New Haven, CT, ⁶School of Mathematics and Physics, The University of Queensland, Brisbane, AUSTRALIA.

11:54 AM - 12:12 PM
Mechanical Signaling During Cancer Progression
P. Provenzano;
University of Minnesota, Minneapolis, MN.

12:12 PM - 12:30 PM
Dynamics of Mechanical Signal Transmission through a Network of Prestressed Actin Stress Fibers: Role of Cytoskeletal Organization.
C. L. M. Gouget¹, Y. Hwang², A. I. Barakat¹;
¹Ecole Polytechnique, Palaiseau, FRANCE, ²Imperial College, London, UNITED KINGDOM.

MONDAY Podium Sessions

Continuum Approaches in Cell Mechanics

Session Number: 4-4 Room: 306

Session Chair(s): J. Kas and R. Merkel

11:00 AM - 11:18 AM

Deformability Cytometry: Hydrodynamic Stretching of Heterogenous Cellular Samples in Microflows

D. Di Carlo;

University of California, Los Angeles, CA.

11:18 AM - 11:36 AM

Mechanical Stretching of Cells

R. Merkel;

Forschungszentrum Jülich, Juelich, GERMANY.

11:36 AM - 11:54 AM

Analyzing intracellular force transduction using genetically encoded tension sensors

C. Grashoff;

Max-Planck-Institute of Biochemistry, Martinsried, GERMANY.

11:54 AM - 12:12 PM

Simultaneous Control of Substrate Stiffness and Fluid Shear Stress Reveals Interactions of Mechanosensing by Apical and Basal Cell Surfaces

P. Galie, A. vanOosten, P. Janmey;

Univ. Pennsylvania, Philadelphia, PA.

12:12 PM - 12:30 PM

Mechanical signaling in neuronal guidance

K. Franze;

University of Cambridge, UNITED KINGDOM.

Energy-Based Cancer Therapies: Mechanisms Across Scales

Session Number: 4-5 Room: 302

Session Chair(s): X. He and S. Wang

11:00 AM - 11:36 AM

Thermally Induced Immune Synergy for Metastatic Cancer Therapy

L. X. Xu;

Shanghai Jiao Tong University, Shanghai, CHINA.

11:36 AM - 11:54 AM

Tumor Engineering and Nanotheranostics

M. N. Rylander, M. DeWitt, A. Pekkanen, B.

Balhouse, J. Robertson, E. Voigt;

Virginia Tech, Blacksburg, VA.

11:54 AM - 12:12 PM

Nanodrugs enhance energy-based therapy of cancer stem-like cells

W. Rao, X. He;

The Ohio State University, Columbus, OH.

12:12 PM - 12:30 PM

In-vivo MR thermometry of HIFU induced temperature rise in porcine liver

S. A. R. Dibaji¹, J. Wansapura², M. Myers³, **R. K. Banerjee¹;**

¹University of Cincinnati, OH, ²Cincinnati Childrens Hospital Medical Center, Cincinnati, OH, ³US Food and Drug Administration, Silver Spring, MD

Biological Flow at the Cellular Level II

Session Number: 4-6 Room: 309

Session Chair(s): T. Ishikawa

11:00 AM - 11:18 AM

Analysis of Velocity Correlation in the Collective Motion of Bacteria

T. Nakai, Y. Mouri, T. Goto;

Tottori University, Tottori, JAPAN.

11:18 AM - 11:36 AM

Collective motions of ellipsoidal squirmers in a dense suspension

T. Ishikawa, K. Kyoya, D. Matsunaga, Y. Imai, T. Omori;

Tohoku University, Sendai, JAPAN.

11:36 AM - 11:54 AM

Shear and shape guide sperm on upstream spirals

V. Kantsler;

Skolkovo Institute of Science and Technology, Moscow, RUSSIAN FEDERATION.

11:54 AM - 12:12 AM

Shear trapping of motile cells

R. Rusconi¹, M. Barry¹, J. S. Guasto², R. Stocker¹

¹Massachusetts Institute of Technology, Cambridge, MA, ²Tufts University, Medford, MA.

12:12 PM - 12:30 PM

Probing the Cytoadherence of Malaria Infected Red Blood Cells under Flow

X. Xu¹, A. K. Efremov², A. Li², L. Lai³, M. Dao⁴, J. Cao⁴, C. T. Lim¹;

¹National University of Singapore, SINGAPORE,

²Singapore-MIT for Research and Technology,

SINGAPORE, ³MIT-SUTD Collaboration, MIT,

Cambridge, MA, ⁴Massachusetts Institute of Technology, Cambridge, MA.

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

MONDAY Podium Sessions

Engineering Advances in Pediatric Cardiology II

Session Number: 4-7 Room: 300

Session Chair(s): A. Marsden and J. Feinstein

11:00 AM - 11:18 AM

Bioengineering advances in circulatory support for the univentricular Fontan circulation.

M. Rodefeld;

Indiana University School of Medicine, Indianapolis, IN.

11:18 AM - 11:36 AM

Virtual Implantation of Mechanical Circulatory Support Devices to Assess Goodness of Fit

J. Ryan¹, S. Pophal², **D. Frakes**¹;

¹Arizona State University, Tempe, AZ, ²Phoenix Children's Hospital, Phoenix, AZ.

11:36 AM - 11:54 AM

Multiblock High Order Large Eddy Simulation of Powered Fontan Hemodynamics: Towards Computational Surgery

Y. T. Delorme¹, A. M. Kerlo², M. D. Rodefeld², S. H. Frankel¹;

¹Technion Institute of Technology, Haifa, ISRAEL, ²Indiana University School of Medicine, Indianapolis, IN.

11:54 AM - 12:12 PM

Applying Image-Based Hemodynamic Simulations to Surgical Interventions for Peripheral Pulmonary Artery Stenosis (PPAS)

W. Yang, F. P. Chan, F. L. Hanley, J. A. Feinstein; Stanford University, Stanford, CA.

12:12 PM - 12:30 PM

Leducq Transatlantic Network of Excellence in Multi-Scale Modeling of Single Ventricle Hearts for Clinical Decision Support

T. Hsia¹, R. Figliola², & MOCHA Investigators¹;

¹Great Ormond Street Hospital for Children, NHS Trust, London, UNITED KINGDOM, ²Clemson University, Clemson, SC.

Atherosclerotic Plaque Properties

Session Number: 4-8 Room: Ball-C

Session Chair(s): F. Gijssen and Walsh

11:00 AM - 11:18 AM

Mechanical Properties of Human Atherosclerotic Intima Tissue

A. C. Akyildiz;

Erasmus Medical Center, Rotterdam, NETHERLANDS.

11:18 AM - 11:36 AM

Global 3D Collagen Architecture of Human Atherosclerotic Carotid plaques

C. Chai¹, G. Strijkers¹, L. Speelman², F. Gijssen², **C. Oomens**¹, M. Sambeek van³, A. Lucht van der⁴, F. Baaijens¹;

¹Eindhoven Univ. of Technology, NETHERLANDS,

²Thoraxcentre, Erasmus Medical Centre, Rotterdam, NETHERLANDS, ³Catharina Hospital, Eindhoven, NETHERLANDS, ⁴Department of Radiology, Erasmus Medical Centre, Rotterdam, NETHERLANDS.

11:36 AM - 11:54 AM

Uniaxial Tensile Testing Approaches for Characterisation of Atherosclerotic Plaques

M. T. Walsh¹, E. M. Cunnane¹, J. J. Mulvihill¹, A. C. Akyildiz², F. J. H. Gijssen², G. A. Holzapfel³;

¹University of Limerick, IRELAND, ²Erasmus Medical Centre, Rotterdam, NETHERLANDS, ³Graz University of Technology, Graz, AUSTRIA.

11:54 AM - 12:12 PM

Towards Mechanical Characterization of Intact Endarterectomy Samples of Carotid Arteries During Inflation using Echo-CT

R. W. Boekhoven¹, M. C. M. Rutten¹, M. R. H. M. van Sambeek², F. N. van de Vosse¹, R. G. P. Lopata¹;

¹Eindhoven Univ. of Technology, NETHERLANDS, ²Catharina Hospital, Eindhoven, NETHERLANDS.

12:12 PM - 12:30 PM

Recent advances in noninvasive strain imaging for *in vivo* vulnerable plaque detection

H. H. G. Hansen, A. E. C. M. Saris, M. M. Nillesen, C. L. de Korte;

Radboud University Medical Center, Nijmegen, NETHERLANDS.

Ligament & Tendon III: Mechanoregulation of Regeneration & Homeostasis

Session Number: 4-9 Room: 312

Session Chair(s): C. Kuo

11:00 AM - 11:18 AM

Scaffold-Free Engineering of Single Tendon-Like Fibers using Directed Cellular Self-Assembly

N. R. Schiele, K. Mubyana, A. K. Mason, **D. T. Corr**;

Rensselaer Polytechnic Institute, Troy, NY.

MONDAY Podium Sessions

11:18 AM - 11:36 AM

Tenocyte Biomarkers: Tenomodulin vs the Others-
"What Makes a Tenocyte
Do What and When?"

A. J. Banes;
UNC, Hillsborough, NC.

11:36 AM - 11:54 AM

Understanding the Tenocyte Microenvironmental
Niche

S. J. Bryant¹, C. Schnatwinkel¹, D. Patel², H.
Screen²;
¹University of Colorado, Boulder, CO, ²Queen Mary
University of London, UNITED KINGDOM.

11:54 AM - 12:12 PM

Mechanical influence on human tendon
homeostasis and function

M. Kjaer;
Bispebjerg Hospital, Univ of Copenhagen,
DENMARK.

12:12 PM - 12:30 PM

Biomechanical Considerations in Tissue
Engineering of Ligaments and Tendons

J. Goh;

Tribology I: Cartilage, Tissue, & Biomaterial

Session Number: 4-10 Room: 313

Session Chair(s): Y. Nakanishi

11:00 AM - 11:18 AM

Tribological behaviour and biological analysis of
scaffold for articular cartilage regeneration

X. Zeng¹, W. J. Hendrikson², L. Moroni², E. van der
Heide¹, E. van der Heide³;
¹Laboratory for Surface Technology and Tribology,
Faculty of Engineering Technology, University of
Twente, Enschede, NETHERLANDS, ²Department of
Tissue Engineering, University of Twente,
Enschede, NETHERLANDS, ³TNO, Eindhoven,
NETHERLANDS.

11:18 AM - 11:36 AM

Role of mucus in the lubrication of synovial joints

K. Mabuchi, Y. Misawa, M. Honna, M. Nakao, R.
Sakai;
Kitasato University, Kanagawa, JAPAN.

11:36 AM - 11:54 AM

Frictional and Viscoelastic Properties of Synovial
Joint by Pendulum Test

M. Todoh, S. Tadano, N. Iwasaki;
Hokkaido University, Sapporo, JAPAN.

11:54 AM - 12:12 PM

Protein adsorption behavior on hydrophilic surface
for joint prosthesis under rubbing condition

K. Nakashima, Y. Sawae, S. Kudo, T. Murakami;
Kyushu University, Fukuoka, JAPAN.

12:12 PM - 12:30 PM

Tribology in human gait: prevention of slips and
falls

T. Yamaguchi, K. Hokkirigawa;
Tohoku University, Sendai, JAPAN

Force Generation and Sensing in Organisms II

Session Number: 4-11 Room: 305

Session Chair(s): P. Fratzl and R. Weinkamer

11:00 AM - 11:18 AM

Bio-inspired wooden elements for autonomous
movements

I. Burgert¹, M. Ruedgeberg¹, K. Razghandi²;
¹ETH Zurich & Empa, Zurich, SWITZERLAND, ²Max
Planck Institute of Colloids & Interfaces, Potsdam,
GERMANY.

11:18 AM - 11:36 AM

Optimal Motion of Flagella and Cilia: A Mechanical
Point of View

C. Eloy¹, E. Lauga²;
¹Aix-Marseille University, Marseille, FRANCE,
²University of Cambridge, UNITED KINGDOM.

11:36 AM - 11:54 AM

Dynamic remodeling of epithelia

F. Julicher;
Max Planck Institute for the Physics of Complex
Systems, Dresden, GERMANY.

11:54 AM - 12:12 PM

Extracellular matrix mechanics and cell traction
forces as important regulators of cellular
organization

S. Checa¹, M. K. Rausch², A. Petersen¹, E. Kuhl², G.
N. Duda¹;
¹Charité-Universitätsmedizin Berlin, GERMANY,
²Stanford University, CA.

12:12 PM - 12:30 PM

Understanding the Mechanisms of Bone Cell
Mechanosensation under In Vitro and In Vivo Fluid
Flow Stimulation

T. J. Vaughan, S. W. Verbruggen, M. G. Haugh, C. A.
Mullen, L. M. McNamara;
National University of Ireland, Galway, IRELAND.

MONDAY Podium Sessions

Biodesign and Multiscale Architecture of Bone

Session Number: 4-12 Room: 301

Session Chair(s): Vashishth

11:00 AM - 11:36 AM

Microcrack Detection and Repair: a Multiscale Analysis

D. Taylor¹, C. Dooley¹, S. Mulargia², L. Cristofolini²;
¹Trinity College Dublin, IRELAND, ²University of Bologna, ITALY.

11:36 AM - 11:54 AM

How is structural hierarchy in bone tissue reflected on its mechanical properties?

N. Sasaki;

Hokkaido University, Sapporo, JAPAN.

11:54 AM - 12:12 PM

Lacuna and Microcrack Strain Measurements Using Digital Image Correlation of Second Harmonic Generation Microscopy Images

S. A. Wentzell, R. S. Nesbitt, S. P. Kotha;
Rensselaer Polytechnic Institute, Troy, NY.

12:12 PM - 12:30 PM

Investigations of Fracture Mechanisms in Cortical Bone Using Advanced Nondestructive Imaging Methods and Two-Point Correlation Functions

R. K. Roeder, T. L. Turnbull;

University of Notre Dame, Notre Dame, IN

Ultrasonic Elastography

Session Number:4-13 Room:311

Session Chair(s): K. Nightingale

11:00 AM - 11:18 AM

Liver Stiffness Measurements using Vibration-Controlled Transient Elastography

L. Sandrin¹, S. Mueller²;

¹Echosens, Paris, FRANCE, ²University of Heidelberg, GERMANY.

11:18 AM - 11:36 AM

Developments in Single Tracking Location ARFI for Quantification of Tissue Mechanical Properties

S. McAleavey, J. Langdon;

University of Rochester, NY.

11:36 AM - 11:54 AM

MR-Elastography

R. Sinkus;

King's College London, UNITED KINGDOM.

11:54 AM - 12:12 PM

In-Vivo Contrast-Free Ultrasonic Perpendicular Blood Flow Measurement

G. G. Koutsouridis, F. N. van de Vosse, M. C. M. Rutten;

Eindhoven Univ. of Technology, NETHERLANDS.

12:12 PM - 12:30 PM

Shear wave elastography in anisotropic viscoelastic medium: a description of elastic wave propagation in fibrous tissue

S. Chatelin¹, C. Papadacci¹, M. Bernal¹, P. Flaud², J. Gennisson¹, M. Tanter¹, M. Pernot¹;

¹Institut Langevin - ESPCI ParisTech - INSERM, Paris, FRANCE, ²Matière et systèmes complexes - Université Paris, FRANCE

Biothermomechanics

Session Number: 4-14 Room: Ball-A

Session Chair(s): Wright

11:00 AM - 11:18 AM

Non-invasive assessment of the body core temperature using personalized numerical simulation of human heat transfer and temperature regulation

D. Fiala¹, G. Havenith²;

¹Ergosim - Comfort Energy Efficiency, Stuttgart, GERMANY, ²Environmental Ergonomics Research Centre, Loughborough University, UNITED KINGDOM.

11:18 AM - 11:36 AM

Parameter Estimation Applied to Models of Apoptosis Induced by Heat Shock

N. T. Wright;

Michigan State University, East Lansing, MI.

11:36 AM - 11:54 AM

Biothermomechanics of Thermal Tissue Fusion: A Multi-Faceted Interaction

E. A. Kramer, V. L. Ferguson, M. E. Rentschler;
University of Colorado Boulder, CO.

11:54 AM - 12:12 PM

Finite Element Modeling of Balloon Angioplasty with a Combined Thermal Treatment System

S. Zhao, Q. Zhu, A. Zhang, L. Xu;

School of Biomedical Engineering, Shanghai Jiao Tong University, Shanghai, CHINA.

12:12 PM - 12:30 PM

Effects of Realistic Thermal and Humid Environments for Sub-micron-sized Inhaled Aerosol in Simplified Mouth-Throat Airway Models

S. Hyun, E. Childress;

Mercer University, Macon, GA

MONDAY Podium Sessions

Advancements in Intramedullary Nailing Systems for Long Bone Fractures

Session Number: 4-15 Room: Ball-B
Session Chair(s): M. Bottlang and P. Augat

11:00 AM - 11:18 AM

Biomechanical aspects of intramedullary nailing in long bone fractures

E. Schemitsch

University of Toronto, CANADA

11:18 AM - 11:36 AM

Advantages of angular stable locking screws in intramedullary nailing.

D. Wähnert¹, Y. Stolarczyk², M. J. Rachke¹, G. O. Hofmann², T. Mückley²;

¹Universital Hospital Muenster, GERMANY,

²Universital Hospital Jena, GERMANY.

11:36 AM - 11:54 AM

Effect of locking modes on the mechanical stability of intramedullary nails

P. Augat, S. Hoffmann, F. Hoegel;

Institute of Biomechanics, Murnau, GERMANY.

11:54 AM - 12:12 PM

Benefit and harm of cerclages for osteosynthesis augmentation

B. Gueorguiev¹, M. Lenz¹, S. M. Perren², R. G. Richards¹, A. Fernandez dell'Occa³, D. Höntzsch⁴, M. Windolf¹;

¹AO Research Institute Davos, SWITZERLAND, ²AO Foundation, Davos, SWITZERLAND, ³British Hospital, Montevideo, URUGUAY, ⁴BG Trauma Hospital, Tübingen, GERMANY.

12:12 PM - 12:30 PM

Computational strategies for modeling bone fracture healing: a tool for the design of osteosynthesis implants

J. Garcia-Aznar, Sr.¹, F. Ribeiro², J. Alierta³, M. Pérez¹, M. Gómez-Benito¹;

¹Universidad de Zaragoza, SPAIN, ²Instituto Superior Técnico, Lisbon, PORTUGAL, ³Escuela Politécnica Superior del Ejército, Madrid, SPAIN

Cell Mechanics

Session Number: 4-16 Room: 308
Session Chair(s): G. Holzapfel

11:00 AM - 11:18 AM

Fourier Traction Force Microscopy: To 3D and Beyond

J. del Alamo;

U C San Diego, La Jolla, CA.

11:18 AM - 11:36 AM

A Mechanochemical Model of Cell Reorientation on Substrates under Cyclic Stretch

H. Liu¹, J. Qian², **Y. Lin**¹;

¹The University of Hong Kong, HONG KONG,

²Zhejiang University, Hangzhou, CHINA.

11:36 AM - 11:54 AM

Elucidating the Mechanics of Clathrin-Mediated Endocytosis

N. Walani, J. Torres, **A. Agrawal**;

University of Houston, TX.

11:54 AM - 12:12 PM

Shear stress-induced proinflammatory responses require av integrins but not a5

A. W. Orr;

Pathology, LSU Health Sciences Center - Shreveport, Shreveport, LA.

12:12 PM - 12:30 PM

Cross-Linked F-Actin Networks with Compliant Linker Proteins:

Continuum Formulation and Numerical Analysis

G. A. Holzapfel¹, M. J. Unterberger¹, R. W. Ogden²;

¹Institute of Biomechanics, Graz University of Technology, AUSTRIA, ²School of Mathematics and Statistics, University of Glasgow, UNITED KINGDOM

Elastic Mechanisms II

Session Number: 4-17 Room: 307
Session Chair(s): G. Lichtwark

11:00 AM - 11:18 AM

Bipedal Hopping: Bouncing With and Without Springs

C. P. McGowan;

University of Idaho, Moscow, ID.

11:18 AM - 11:36 AM

Comparison of Elastic Energy Storage in the Human Iliotibial Band and Chimp Fascia Lata During Locomotion

C. M. Eng, A. S. Arnold, D. E. Lieberman, A. A. Biewener;

Harvard University, Cambridge, MA.

11:36 AM - 11:54 AM

Paradoxical effects of elastic ankle exoskeletons on plantar-flexor muscle mechanics and energetics

D. J. Farris¹, G. S. Sawicki²;

¹The University of Queensland, St Lucia, QLD, AUSTRALIA, ²North Carolina State University, Raleigh, NC.

MONDAY Podium Sessions

11:54 AM - 12:12 PM

Muscle Tendon Unit Mechanics during Energy Absorbing Activities

N. Konow, T. J. Roberts;
Brown University, Providence, RI.

12:12 PM - 12:30 PM

Might Elastic Energy Play a Role During Limb Recovery in Toad Hopping?

M. Gallardo¹, A. Schnyer¹, S. Cox², **G. Gillis**¹;
¹Mount Holyoke College, South Hadley, MA,
²University of Massachusetts, Amherst, MA

Improving Performance in Sport II

Session Number: 4-18 Room: 310

Session Chair(s): J. McNitt-Gray

11:00 AM - 11:18 AM

Biomechanics and technology as it relates to performance

G. Brüggemann;

11:18 AM - 11:36 AM

Design Innovation versus Game Integrity: Our Approach to Measuring Product Performance

J. Crisco, M. Rainbow, B. Wilcox, J. Schwartz, J. Gilberg;
Brown University/RIH, Providence, RI.

11:36 AM - 11:54 AM

Standard and individuality of sports techniques

M. Ae;
University of Tsukuba, Tsukuba City, JAPAN.

11:54 AM - 12:12 PM

Improving Performance by Identifying Control Strategies Involved in Regulating Linear and Angular Momentum in Goal-Directed Tasks

J. McNitt-Gray¹, W. Mathiyakom², P. S. Requejo³, C. Ramos¹, H. Flashner¹;
¹University of Southern California, Los Angeles, CA,
²California State University- Northridge, CA,
³Rancho Los Amigos National Rehabilitation Center, Downey, CA

12:12 PM - 12:30 PM

Improving Performance in Sport

G-P Brüggemann

Traumatic Brain Injury II

Session Number: 4-19 Room: 303

Session Chair(s): D.Camarillo and G. Siegmund

11:00 AM - 11:18 AM

Mechanical Response and Brain Injury in Swine Subjected to Free-Field Blast

J. M. Cavanaugh, K. Feng, L. Zhang, S. Kallakuri, C. Chen, A. I. King;
Wayne State University, Detroit, MI.

11:18 AM - 11:36 AM

Neurophysiological Consequences of Repetitive Sub-Concussive Trauma.

E. Nauman;

11:36 AM - 11:54 AM

Abnormal Cerebrovascular Reactivity in Mild Traumatic Brain Injury: A Functional Magnetic Resonance Imaging and Functional Transcranial Doppler Sonography

S. Chan¹, K. C. Evans¹, Y. Zheng², B. R. Rosen¹, T. Song¹, K. K. Kwong¹;
¹Massachusetts General Hospital, Charlestown, MA, ²The Hong Kong Polytechnic University, Kowloon, HONG KONG.

11:54 AM - 12:12 PM

Understanding Why Head Rotation Matters

S. Margulies;
University of Pennsylvania, Philadelphia, PA

12:12 PM - 12:30 PM

3-D Microkinematic Model for Axons undergoing Tissue-Level Stretch

S. Singh, A. Pelegri, D. I. Shreiber;
Rutgers, The State University of New Jersey, Piscataway, NJ

Foot & Ankle Biomechanics II

Session Number: 4-20 Room: 304

Session Chair(s): M. Galli

11:00 AM - 11:18 AM

Clinical relevance for foot and ankle biomechanical analyses

M. Galli¹, G. Albertini²;
¹Politecnico di Milano, Milano, ITALY, ²IRCCS San Raffaele Pisana, Rome, ITALY.

MONDAY Podium Sessions

11:18 AM - 11:36 AM

Foot Disorders, Foot Structure, and Foot Function
H. J. Hillstrom¹, J. Song², A. Kraszewski¹, J. Hafer³,
R. Mootanah⁴, A. B. Dufour⁵, B. Chow¹, M.
Lenhoff¹, S. I. Backus¹, S. Rao⁶, M. T. Hannan⁵, J.
Deland¹;

¹Hospital for Special Surgery, New York, NY,
²Temple University School of Podiatric Medicine,
Philadelphia, PA, ³University of Massachusetts,
Amherst, MA, ⁴Anglia Ruskin University,
Chelmsford, UNITED KINGDOM, ⁵Hebrew Senior
Life, Boston, MA, ⁶NYU, New York, NY.

11:36 AM - 11:54 AM

Multi-segment kinematic models for the shank and
foot

D. Thewlis, J. Arnold, C. Bishop;
University of South Australia, Adelaide, AUSTRALIA.

11:54 AM - 12:12 PM

Integration of Baropodometric and Kinematics
Measurements

C. Giacomozzi¹, J. A. Stebbins², P. Caravaggi³, L.
Way², A. Leardini³;

¹Istituto Superiore di Sanità, Rome, ITALY, ²Oxford
University Hospitals NHS Trust, UNITED KINGDOM,
³Istituto Ortopedico Rizzoli, Bologna, ITALY.

12:12 PM - 12:30 PM

Biomechanics of footwear and orthoses

C. J. Nester;
University of Salford, UNITED KINGDOM

Monday, 7 July 2014

3:00 - 4:30 PM

Mechanics of the Nuclear Pore and Nucleocytoplasmic Transport

Session Number: 5-1 Room: 109

Session Chair(s): M. Mofrad

3:00 PM - 3:18 PM

The molecular basis of selective transport control
by the nuclear pore complex

R. Y. H. Lim;
University of Basel, SWITZERLAND.

3:18 PM - 3:36 PM

High-resolution Three-Dimensional Mapping of
Macromolecules Transport through Live Nanopores

W. Yang;
Temple University, Philadelphia, PA.

3:36 PM - 3:54 PM

Transport through the Nuclear Pore Complex:
Simple Physics of a Complex Biomachine.
M. Opferman¹, A. Vovk², R. Coalson¹, D. Jasnow¹, **A.
Zilman**²;

¹University of Pittsburgh, PA, ²University of Toronto,
ON, CANADA.

3:54 PM - 4:12 PM

Unfolded Proteins: Gatekeepers of the Nuclear
Pore Complex

A. Ghavami, E. Van der Giessen, **P. R. Onck**;
University of Groningen, NETHERLANDS.

4:12 PM - 4:30 PM

Biomechanics of the Nuclear Pore Complex

M. R. K. Mofrad;
University of California Berkeley, CA

Duling Memorial Symposium on Glycocalyx I

Session Number: 5-2 Room: 110

Session Chair(s): F. Dewey

3:00 PM - 3:18 PM

Cancer Metastasis and the Cellular Glycocalyx

C. Dewey;

3:18 PM - 3:36 PM

Shear Dependent Deformation of the Endothelial
Glycocalyx and the Resistance to Flow in
Microvessels

H. H. Lipowsky;
Penn State University, University Park, PA.

3:36 PM - 3:54 PM

The role of the glycocalyx and heparan sulfates
within the basement membrane of human
microvasculature in transendothelial migration

S. Beyer¹, Q. Liu¹, G. Adriani¹, A. M. Blocki², J.
Yang³, J. Chan⁴, R. D. Kamm⁵;

¹Singapore MIT Alliance for Research and
Technology (SMART) Center, SINGAPORE,
²Singapore Bio-Imaging Consortium (SBIC), Agency
for Science, Technology and Research (A-Star),
SINGAPORE, ³NUS Graduate School for Integrative
Sciences and Engineering (NGS), SINGAPORE,
⁴Duke-NUS Graduate Medical School & Division of
Obstetrics & Gynaecology KK Women's and
Children's Hospital, SINGAPORE, ⁵Department of
Mechanical & Department of Biological
Engineering, Massachusetts Institute of
Technology, Boston, MA.

MONDAY Podium Sessions

3:54 PM - 4:12 PM

Evaluation of the Endothelial Glycocalyx Layer as a Barrier to Leukocyte Adhesion

G. Marsh, R. Waugh;
University of Rochester, NY.

4:12 PM - 4:30 PM

Tumor cell interactions with lymphatic endothelium

M. Swartz

Cellular Mechanotransduction

Session Number: 5-3 Room: 111

Session Chair(s): B.C. Low and D. Leckband

3:00 PM - 3:36 PM

Control of Vascular Remodeling by Fluid Shear Stress

N. Baeyens¹, B. Coon¹, J. Han¹, A. Eichmann¹, H. Lauridsen², J. Humphrey², **M. A. Schwartz**^{1,3};
¹Yale Cardiovascular Research Center, Dept of Medicine (Cardiology), ²Yale Biomedical Engineering, ³Dept of Cell Biology, New Haven, CT.

3:36 PM - 3:54 PM

The role of mechanical tension on lipid raft dependent PDGF-induced TRPC6 activation

Y. Wang, L. Lei;
UCSD, La Jolla, CA.

3:54 PM - 4:12 PM

Topographical control of multiple cell adhesion molecules for traction force microscopy

M. L. Smith, S. Polio, H. Parameswaran, E. Canovic, D. Stamenovic;
Boston University, Boston, MA.

4:12 PM - 4:30 PM

Mechanochemistry from Atoms to the Clinic

D. Leckband, A. Barry, N. Wang;
University of Illinois, Urbana, IL

Nano and Micromechanics of Collagen I

Session Number: 5-4 Room: 306

Session Chair(s): M. Bennink and J. Snedeker

3:00 PM - 3:36 PM

Collagen micromechanics studied with synchrotron radiation scattering

P. Fratzl, L. Bertinetti, R. Schuetz, H. Metzger, A. Masic;
Max Planck Institute of Colloids and Interfaces, Potsdam, GERMANY.

3:36 PM - 3:54 PM

Collageing: Understanding Age- and Diabetes-related Glycation in Connective Tissues

A. Gautieri¹, L. Bernardi¹, F. Crippa¹, J. Snedeker², S. Vesentini¹;
¹Politecnico di Milano, Milan, ITALY, ²University and ETH Zurich, SWITZERLAND.

3:54 PM - 4:12 PM

Effect of Cyclic Tensile Loading to Dense Disorganized Collagen Substrate Properties

M. Susilo, J. Paten, J. Ruberti;
Northeastern University, Boston, MA.

4:12 PM - 4:30 PM

Influence of Lysyl Oxidase-Mediated Crosslinking on Mechanical Properties of Developing Tendon

C. Kuo

USNCB Biomechanics in Oncology I

Session Number: 5-5 Room: 302

Session Chair(s): C. Dong and M. Swartz

3:00 PM - 3:18 PM

Adipose Tissue and Its Relevance to Tumor-associated ECM Mechanics

C. Fischbach;
Cornell University, Ithaca, NY.

3:18 PM - 3:36 PM

Unnatural Killer Cells: TRAIL-coated leukocytes that kill cancer cells in the circulation

M. J. Mitchell, E. Wayne, K. Rana, C. B. Schaffer, **M. R. King**;
Cornell University, Ithaca, NY.

3:36 PM - 3:54 PM

In Vitro Models of Metastatic Cancer

R. D. Kamm;
M.I.T., Cambridge, MA.

3:54 PM - 4:12 PM

Citrate Considerations in Biomaterial Designs for Tissue Engineering and Cancer Management

R. T. Tran, J. Guo, Z. Xie, C. Dong, **J. Yang**;
The Pennsylvania State Univ., University Park, PA.

4:12 PM - 4:30 PM

Microvascularization of Three-Dimensional Breast Cancer Constructs for Drug Testing and Development

L. Marshall¹, K. Goliwas¹, A. Frost¹, A. Penman², J. Murphy-Ullrich¹, T. Wick¹, J. Berry¹;
¹University of Alabama at Birmingham, AL, ²Southern Research Institute, Birmingham, AL

MONDAY Podium Sessions

Biological Flow at the Cellular Level III

Session Number: 5-6 Room: 309

Session Chair(s): T. Ishikawa

3:00 PM - 3:18 PM

Visualization and Measurement of Red Blood Cells Flowing in Microfluidic Devices

R. O. Rodrigues¹, D. Pinho², V. Faustino¹, T. Yaginuma¹, D. Bento², C. Fernandes¹, V. Garcia¹, R. Lima²;

¹Polytechnic Institute of Bragança, PORTUGAL,

²Polytechnic Institute of Bragança/ CEFT, Faculty of Engineering, University of Porto, PORTUGAL.

3:18 PM - 3:36 PM

Rheology of a red blood cell suspension in a simple shear flow

T. Omori, Y. Imai, D. Matsunaga, T. Yamaguchi, T. Ishikawa;

Tohoku University, Sendai, JAPAN.

3:36 PM - 3:54 PM

Multiscale Modeling of the Initial Stage of Thrombosis for Massively Parallel Computing

S. Tagaki;

3:54 PM - 4:12 PM

A numerical simulation on the motion of malaria-infected cells in microcirculatory blood flow

Y. Imai, A. Ami, T. Yamaguchi, T. Ishikawa;

Tohoku University, Sendai, JAPAN.

4:12 PM - 4:30 PM

Transient response of a capsule flowing through a sudden expansion

B. Nosengo, A. Salsac, E. Leclerc, **D. Barthes-Biesel**;

Universite de Technologie de Compiègne, FRANCE

Pediatric Biomechanics

Session Number: 5-7 Room: 300

Session Chair(s): A. Yoganathan and K. Manning

3:00 PM - 3:18 PM

The Penn State 12cc Pediatric Ventricular Assist Device: Understanding the Importance of Fluid Dynamics in Design

K. Manning, S. Deutsch;

The Pennsylvania State Univ., University Park, PA.

3:18 PM - 3:36 PM

"Stressing" the Fontan Circulation

E. Tang¹, R. Khiabani¹, M. Restrepo¹, L. Mirabella¹, K. Whitehead², J. Bethel³, S. Paridon², M. Fogel², A. Yoganathan¹;

¹Georgia Institute of Technology, Atlanta, GA,

²Children's Hospital of Philadelphia, PA, ³Westat, Rockville, MD.

3:36 PM - 3:54 PM

Computational models to study hemodynamics in univentricular circulations: a 'transatlantic' experience

F. Migliavacca¹, G. Pennati¹, A. L. Dorfman², A. M. Hlavacek³, A. L. Marsden⁴, A. M. Taylor⁵, I. E. Vignon-Clementel⁶, R. S. Figliola⁷, T. Y. Hsia⁸;

¹Politecnico di Milano, ITALY, ²The University of

Michigan Medical School, Ann Arbor, MI, ³Medical University of South Carolina, Charleston, SC,

⁴University of California San Diego, CA, ⁵UCL

Institute of Cardiovascular Sciences & Great Ormond Street Hospital for Children, London,

UNITED KINGDOM, ⁶INRIA Paris-Rocquencourt,

Paris, FRANCE, ⁷Clemson University, Clemson, SC,

⁸Great Ormond Street Hospital for Children, London, UNITED KINGDOM.

3:54 PM - 4:12 PM

MRI-based CFD of Aortic Coarctations: Ready for Clinic?

L. Goubergrits, T. Kuehne;

Charité & German Heart Institute Berlin, GERMANY.

4:12 PM - 4:30 PM

Emerging Predictive Tools and Hemodynamic Performance Parameters in Pediatric Cardiovascular Bioengineering

S. Piskin¹, T. Sarioglu², K. Pekkan³;

¹Mechanical Engineering Department, Koc

University, Istanbul, TURKEY, ²Cardiovascular

Surgery, Acibadem University, Istanbul, TURKEY,

³Biomedical Engineering Department, Carnegie

Mellon University, Pittsburgh, PA

Atherosclerotic Plaque Strength

Session Number: 5-8 Room: Ball-C

Session Chair(s): Speelmand and Holzapel

3:00 PM - 3:18 PM

Local mechanical properties assessment of carotid plaques

M. Rutten;

Eindhoven University of Technology, NETHERLANDS.

MONDAY Podium Sessions

3:18 PM - 3:36 PM

Numerical Simulation of Arterial Dissection during Balloon Angioplasty of Atherosclerotic Coronary Arteries

P. Badel¹, S. Avril¹, M. A. Sutton², **S. M. Lessner**²;
¹Ecole Nationale Supérieure des Mines de St.-Etienne, St. Etienne, FRANCE, ²University of South Carolina, Columbia, SC.

3:36 PM - 3:54 PM

New Perspectives In Vulnerable Plaque Rupture From Imaging To Analysis

L. Cardoso, S. Weinbaum;
The City College of New York, NY.

3:54 PM - 4:12 PM

Rupture risk map: an image based approach to assess plaque cap strength

L. Speelman¹, M. C. M. Rutten², A. van der Lugt¹, F. N. van der Vosse², A. F. W. van der Steen¹, M. A. van Buchem³, F. J. H. Gijsen¹;
¹Erasmus MC Rotterdam, NETHERLANDS,
²Eindhoven University of Technology, Eindhoven, NETHERLANDS, ³Leiden University Medical Center, Leiden, NETHERLANDS.

4:12 PM - 4:30 PM

Shear Deformation in Rupture of the Bovine Descending Aorta

H. W. Haslach, Jr., L. N. Leahy, Y. Ekrami, A. E. Heyes, J. M. Barrett, T. A. Dumsha, P. Fathi;
University of Maryland, College Park, MD

Ligament & Tendon IV: Functional Adaptation to Mechanical Stimulation

Session Number: 5-9 Room: 312

Session Chair(s): H. Tohyama

3:00 PM - 3:36 PM

Function Drives Wide Variations in Tendon Structure and Mechanical Behaviour

H. R. C. Screen;
Queen Mary, University of London, UNITED KINGDOM.

3:36 PM - 3:54 PM

Overuse and Altered Loading are Independently Detrimental to Shoulder Tendon Properties in a Rat Model

K. E. Reuther, J. J. Tucker, S. J. Thomas, J. A. Gordon, R. P. Vafa, S. M. Yannascoli, A. C. Caro, S. S. Liu, A. F. Kuntz, L. J. Soslowsky;
University of Pennsylvania, Philadelphia, PA.

3:54 PM - 4:12 PM

Quantitative analysis of tenocyte adaptation to its mechanical environment using micropillars

E. Maeda¹, M. Sugimoto¹, Y. Kosato¹, C. Poon², B. Pinguang-Murphy², T. Ohashi¹;
¹Hokkaido University, Sapporo, JAPAN, ²University of Malaya, Kuala Lumpur, MALAYSIA.

4:12 PM - 4:30 PM

The Effects of Static and Dynamic Stretching on Ankle Plantar Flexor Muscle-Tendon Properties.

M. Samukawa;
Hokkaido University, Sapporo, JAPAN

Tribology II: Cartilage, Tissue, & Biomaterial

Session Number: 5-10 Room: 313

Session Chair(s): Y. Nakanishi

3:00 PM - 3:18 PM

Artificial skin for tribological testing based on polydimethylsiloxane (PDMS) with a polyvinyl alcohol (PVA) hydrogel coating

M. Morales Hurtado;
Laboratory for Surface Technology and Tribology, Faculty of Engineering Technology, University of Twente, Enschede, NETHERLANDS.

3:18 PM - 3:36 PM

Frictional property for sliding motion control of grasped object

T. Yamaguchi, T. Kawasaki, S. Kajiwara, K. Hokkirigawa;
Tohoku University, Sendai, JAPAN.

3:36 PM - 3:54 PM

Finite element analysis of the implant interfacial fracture progression at a micron level

K. Murase¹, P. Stenlund², A. Palmquist²;
¹Nagoya University, JAPAN, ²BIOMATCELL VINN Excellence Center of Biomaterials and Cell Therapy, Gothenburg, SWEDEN.

3:54 PM - 4:12 PM

Bearing Surface with Nanometer-scale Geometry Inhibits Tissue Reaction in Joint Prosthesis

Y. Nakanishi¹, Y. Nakashima¹, N. Nishi¹, H. Chikaura¹, T. Matsubara², H. Higaki³;
¹Kumamoto University, JAPAN, ²Palmeso Co.,Ltd., Niigata, JAPAN, ³Kyushu Sangyo University, Fukuoka, JAPAN.

MONDAY Podium Sessions

4:12 PM - 4:30 PM

A statistically augmented computational platform for designing and optimizing meniscal replacements

S. A. Maher¹, P. Chen², H. Guo¹, S. Gilbert¹, A. L. Lerner³, T. J. Santner²;

¹Hospital for Special Surgery, New York, NY, ²The Ohio State University, Columbus, OH, ³University of Rochester, Rochester, NY

Matrix and Mechanical Environment

Session Number: 5-11 Room: 305

Session Chair(s): B. Chan

3:00 PM - 3:18 PM

TNF α Exposure Permanently Alters Intervertebral Disc Biomechanics and Mechanobiology: An Organ Culture Model

B. A. Walter, M. Likhitpanichkul, P. Nasser, A. C. Hecht, **J. C. Iatridis**;

Icahn School of Medicine at Mount Sinai, New York, NY.

3:18 PM - 3:36 PM

Integrins and Cell-Matrix Interactions in the Nucleus Pulposus of the Intervertebral Disc

L. A. Setton, D. T. Bridgen, C. L. Gilchrist, K. L. Yang, J. Chen;

Duke University, Durham, NC.

3:36 PM - 3:54 PM

Mechano Biology of the Intervertebral Disk - Where do we stand?

B. Gantenbein-Ritter¹, S. C. W. Chan¹, S. J. Ferguson²;

¹University of Bern, SWITZERLAND, ²ETH Zürich, Institute for Biomechanics, SWITZERLAND.

3:54 PM - 4:12 PM

Mechanical loading regulates cytoskeleton remodeling and cell matrix interactions of human mesenchymal stem cells (hMSCs)

microencapsulated in 3D collagen meshwork

B. Chan, F. Ho;

The University of Hong Kong, CHINA.

4:12 PM - 4:30 PM

Permeability in Bone and Cartilage: The Role of Fluid Flow in Mechanotransduction

S. J. Shefelbine¹, J. Berteau¹, A. Periera², N. Rodriguez-Florez², M. Syx³, I. Jonkers³, M. Oyen⁴;

¹Northeastern University, Boston, MA, ²Imperial College, London, UNITED KINGDOM, ³KU Leuven, BELGIUM, ⁴Cambridge University, UNITED KINGDOM

Multiscale Techniques in Biomechanics & Mechanobiology I

Session Number: 5-12 Room: 301

Session Chair(s): P. Pivonka, and C. Hellmich

3:00 PM - 3:36 PM

Multi-scale Characterization of Bone Mechanics: What Makes Bone Tough?

S. J. Shefelbine¹, A. Carriero², M. Vanleene², N. Rodriguez-Florez², B. Depalle³, S. Chang³, R. Ritchie⁴;

¹Northeastern University, Boston, MA, ²Imperial College, London, UNITED KINGDOM, ³Massachusetts Institute of Technology, Cambridge, MA, ⁴University of California Berkeley, Lawrence Berkeley National Laboratory, CA.

3:36 PM - 3:54 PM

Resonant Ultrasound Spectroscopy to Measure Millimeter-Scale Anisotropic Elastic and

Viscoelastic Properties of Mineralized Tissues

S. Bernard, **Q. Grimal**, P. Laugier;

UPMC, Paris, FRANCE.

3:54 PM - 4:12 PM

Modeling Spatiotemporal Regulation of Trabecular and Osteonal Bone Remodeling

T. Adachi, K. Takenaka, Y. Inoue;

Kyoto University, Kyoto, JAPAN.

4:12 PM - 4:30 PM

Particle-Based Models For Cell Mechanics And Mechanobiology: Applications To Cell Spreading, Growth And Migration

H. Van Oosterwyck, T. Odenthal, B. Smeets, T. Heck, H. Ramon;

KU Leuven, BELGIUM

Imaging Tissue Biomechanics I

Session Number: 5-13 Room: 311

Session Chair(s): E. Konofagou and P. Segers

3:00 PM - 3:18 PM

Quantifying Tissue Biomechanics with Shear Wave: Methods and Examples

J. Greenleaf, **S. Chen**;

Mayo Clinic, Rochester, MN.

3:18 PM - 3:36 PM

Overview of the state of the art in breast strain imaging

T. Shiina;

Kyoto University, Kyoto, JAPAN.

MONDAY Podium Sessions

3:36 PM - 3:54 PM

Quantitative imaging of myocardial viscoelastic properties using Shear Wave Elastography
M. Pernot¹, W. Lee¹, M. Couade², C. Papadacci¹, S. Chatelin¹, M. Fink¹, M. Tanter¹;
¹Institut Langevin, ESPCI, Inserm, Paris, FRANCE, ²Supersonic Imagine, Aix en Provence, FRANCE.

3:54 PM - 4:12 PM

Ultrasound Backscatter Tensor Imaging (BTI): A new tool to map the fiber architecture in fibrous soft tissues
C. Papadacci, M. Tanter, M. Pernot, M. Fink;
Institut Langevin, ESPCI ParisTech, Paris, FRANCE.

4:12 PM - 4:30 PM

On different phases of longitudinal movement of the carotid artery wall in healthy humans
M. Cinthio

Undergraduate Design Competition in Rehabilitation and Assistive Devices

Session Number: 5-14 Room: Ball-A
Session Chair(s): T. Bush and R. Siston

3:00 PM - 3:15 PM

An Inexpensive Mechanically Powered Laryngopharynx Excitation Device
K. T. Creager, P. K. Goss, **A. K. Landauer**, M. R. Lipinski, A. R. Westervelt, B. D. Erath, K. B. Fite, L. Kuxhaus;
Clarkson University, Potsdam, NY.

3:15 PM - 3:30 PM

Jib Transfer System
N. I. Conway, K. Wurman, M. Brunelle, M. Kennedy;
Rochester Institute of Technology, Rochester, NY.

3:30 PM - 3:45 PM

Design of an Automated Pressure Sore Reducer
L. Cross, P. Mathews, S. Montelepre, A. Pinner;
Louisiana State University, Baton Rouge, LA.

3:45 PM - 4:00 PM

Prevention of Falls among the Elderly: A Novel Design for a Mobility Enhancing Walking Assistive Device
R. Parrish, G. Kim, N. Goldman, A. Dickey;
University of California, Berkeley, Berkeley, CA.

4:00 PM - 4:15 PM

Child Electric Vehicle Control Modification Adaptor Kit for Mobility Impaired Children
B. A. Bomar, **M. Mullins**, M. Rawson;
University of Memphis, Memphis, TN.

4:15 PM - 4:30 PM

Skin-Stretch Proprioceptive Feedback for a Prosthetic Hand
M. Schubert, B. Solomon, C. Makatura, J. Walker, H. Liang;
Rice University, Houston, TX

Implants for Mechanical Stimulation of Fracture Healing

Session Number: 5-15 Room: Ball-B
Session Chair(s): P. Augat and M. Bottlang

3:00 PM - 3:36 PM

Implants for Fracture Fixation, Current Requirements and Future Perspectives
P. Augat¹, M. Bottlang²;
¹Institute of Biomechanics, Murnau, GERMANY, ²Legacy Research Institute, Portland, OR.

3:36 PM - 3:54 PM

DLS 5.0 - The Biomechanical Effects of Dynamic Locking Screws.
S. Doebele;
GERMANY.

3:54 PM - 4:12 PM

Patient-Specific Modelling of Bone and Bone-Implant Systems: The Challenges
P. Pankaj;
The University of Edinburgh, UNITED KINGDOM.

4:12 PM - 4:30 PM

Impact damping of axially dynamic osteosyntheses
F. Capanni¹, K. Hansen², D. Fitzpatrick³, S. Madey², M. Bottlang²;
¹Ulm University of Applied Sciences, Laboratory for Biomechanics, Product Development and Simulation, Ulm, GERMANY, ²Biomechanics Laboratory, Legacy Research Institute, Portland, OR, ³Slocum Center for Orthopedics, Eugene, OR

Muscle Synergy Analysis: From Descriptive to Predictive Applications;

NSF Symposium on Neurofunctionality Failure Analysis and Augmentation:

Session Number: 5-16 Room: 308
Session Chair(s): B.J. Fregly and C. Patten

3:00 PM - 3:18 PM

Identifying feasible ranges of muscle activation as a way to quantify musculoskeletal redundancy: implications for muscle synergies
H. Sohn, L. H. Ting;
Georgia Institute of Technology and Emory University, Atlanta, GA.

MONDAY Podium Sessions

3:18 PM - 3:36 PM

Structuring Impulsive Controllers of Human Locomotion

M. Sartori¹, S. Došen¹, J. González², J. L. Pons², D. G. Lloyd³, D. Farina¹;

¹University Medical Center Goettingen, GERMANY,

²Consejo Superior de Investigaciones Científicas, Madrid, SPAIN, ³Centre for Musculoskeletal Research, Gold Coast, AUSTRALIA.

3:36 PM - 3:54 PM

Predicting biomechanical deficits from impaired module coordination after stroke

S. A. Kautz¹, R. L. Routson², R. R. Neptune²;

¹Medical University of South Carolina, Charleston, SC, ²The University of Texas, Austin, TX.

3:54 PM - 4:12 PM

Synergy-based Inverse Dynamic Simulation of Gait

F. De Groote, I. Jonkers, J. De Schutter, J. Duysens; KU Leuven, BELGIUM.

4:12 PM - 4:30 PM

Synergy Analysis of Pre-treatment EMG Differentiates Responders and Non-responders to Stroke Rehabilitation

M. Pai, C. Patten, **B. J. Fregly**; University of Florida, Gainesville, FL

PhD Student Competition - Cellular Biomechanics Sponsored by the Bioengineering Division, ASME

Session Number: 5-17 Room: 307

Session Chair(s): Boerckel and Hutcheson

3:00 PM - 3:15 PM

Effect of Viscosity on Flagellar Waveform: Experiment and Theory

K. Wilson, S. Dutcher, P. Bayly; Washington University in St. Louis, St. Louis, MO.

3:15 PM - 3:30 PM

Enabling Methods for High Resolution Quantitative Cell Biomechanics - a Novel Simulation Framework for Improved Calibration

C. N. Holenstein, U. Silvan, J. G. Snedeker; ETH Zürich, SWITZERLAND.

3:30 PM - 3:45 PM

Investigation of the Biomechanical Behavior of Stress Fibers and Nucleus Deformation in Spread Cells using a Novel Micropipette Aspiration Technique

N. H. Reynolds, W. Ronan, E. P. Dowling, P. Owens, P. McGarry; National University of Ireland Galway, IRELAND.

3:45 PM - 4:00 PM

Skeletal Muscle Satellite Cell Populations, Compromised by Estrogen Deficiency, are Protected by Low Intensity Vibration through Reduced Local Adipogenic Gene Expression

D. M. Frechette, D. Krishnamoorthy, B. J. Adler, M. E. Chan, C. T. Rubin; Stony Brook University, Stony Brook, NY.

4:00 PM - 4:15 PM

Initial Cell Seeding Conditions Influence Engineered Tissue Contractility

Z. Win, G. D. Vrla, E. N. Sevcik, P. W. Alford; University of Minnesota, Minneapolis, MN.

4:15 PM - 4:30 PM

Mechanoregulation of epithelial to mesenchymal transformation in endocardial cells

M. Sewell-Loftin, D. DeLaughter, J. Barnett, W. Merryman; Vanderbilt University, Nashville, TN

ASB Computer Simulation of Sport & Exercise I

Session Number: 5-18 Room: 310

Session Chair(s): J. H. Challis and M. Pain

3:00 PM - 3:36 PM

Sports Biomechanics Research: Ideas and Investigation

F. Yeadon; Loughborough University, UNITED KINGDOM.

3:36 PM - 3:54 PM

Investigating Optimal Technique and Solution Space in a Noisy Environment

M. J. Hiley; Loughborough University, UNITED KINGDOM.

3:54 PM - 4:12 PM

The Influence of Minimizing Movement Time on Maximum Vertical Jump Height.

Z. J. Domire¹, J. H. Challis²; ¹East Carolina University, Greenville, NC, ²The Pennsylvania State University, State College, PA.

4:12 PM - 4:30 PM

Possibilities and Limitations of Computer Simulation of Jumping in Sports and Exercise

M. F. Bobbert, R. Casius; MOVE Research Institute Amsterdam, NETHERLANDS

MONDAY Podium Sessions

Brain Injury Mechanics I

Session Number: 5-19 Room: 303

Session Chair(s): K. Monson

3:00 PM - 3:18 PM

A Novel Therapy for Traumatic Brain Injury with a Biomechanical Basis

B. Morrison, III¹, J. D. Finan¹, B. S. Elkin²;

¹Columbia University, New York, NY, ²MEA Forensic Engineers & Scientists, Mississauga, ON, CANADA.

3:18 PM - 3:36 PM

Numerical aspects in the modelling of brain response to head impacts

J. Vander Sloten, Sr., K. Baeck, B. Depreitere; KU Leuven, Leuven, BELGIUM.

3:36 PM - 3:54 PM

Quantitative Analysis of Biomechanical Response, Neuropathology and Biomarker Expression in an Experimental Model of Traumatic Brain Injury

L. Zhang, J. Cavanaugh, Y. Li, S. Kallakuri; Wayne State University, Detroit, MI.

3:54 PM - 4:12 PM

The Effect of Regional Arachnoid Trabeculae Density on Brain Injury Biomechanics

G. G. Scott, **B. Coats**;

University of Utah, Salt Lake City, UT.

4:12 PM - 4:30 PM

Dynamic Mechanical Properties of the Brain: Results from Magnetic Resonance Elastography and Direct Mechanical Testing

R. J. Okamoto¹, C. L. Johnson², J. G. Georgiadis², Y. Feng¹, P. V. Bayly¹;

¹Washington University in St. Louis, MO, ²University of Illinois, Urbana, IL

Biomechanics of the Foot and Ankle

Session Number: 5-20 Room: 304

Session Chair(s): J. Bishoff and W. Ledoux

3:00 PM - 3:18 PM

Joint kinematics of the normal and reconstructed ankle

A. Leardini¹, F. Cenni¹, C. Belvedere¹, J. J. O'Connor², M. Romagnoli¹, S. Giannini¹;

¹Istituto Ortopedico Rizzoli, Bologna, ITALY,

²University of Oxford, UNITED KINGDOM.

3:18 PM - 3:36 PM

Making A-FOOTPRINT: A Musculoskeletal Foot/Ankle Model with 50 Degrees-of-Freedom for Arthroplasty and Orthotics

A. Al-Munajjed¹, J. Rasmussen²;

¹AnyBody Technology, Aalborg, DENMARK, ²Aalborg University, Aalborg, DENMARK.

3:36 PM - 3:54 PM

Using fluoroscopy to track three-dimensional kinematics

of total ankle arthroplasty

S. Yamaguchi¹, S. Banks², Y. Tanaka³, S. Kosugi³, K. Takahashi¹, Y. Takakura³;

¹Graduate School of Medicine, Chiba University, Chiba, JAPAN, ²University of Florida, Gainesville, FL, ³Nara Medical University, Nara, JAPAN.

3:54 PM - 4:12 PM

A Three-year Prospective Trial Comparing Ankle Arthrodesis to Arthroplasty

W. R. Ledoux, M. E. Hahn, E. C. Whittaker, A. D. Segal, M. S. Orendurff, M. R. Benich, B. J. Sangeorzan;

VA Puget Sound, Seattle, WA.

4:12 PM - 4:30 PM

Biomechanical Evaluation of Total Ankle Arthroplasty

M. A. Dharia, J. E. Bischoff;

Zimmer, Warsaw, IN

Monday, 7 July 2014

5:00 - 6:30 PM

Mechanics of Biomolecular Complexes

Session Number: 6-1 Room: 109

Session Chair(s): P. Purohit

5:00 PM - 5:18 PM

Force-dependent binding of vinculin to talin

M. Yao¹, B. Goult², H. Chen³, P. Cong¹, M. Sheetz⁴, **J. Yan**¹;

¹National University of Singapore, SINGAPORE,

²University of Leicester, UNITED KINGDOM,

³Xiamen University, CHINA, ⁴Columbia University,

New York, NY.

5:18 PM - 5:36 PM

Volume regulation and shape bifurcation in the eukaryotic nucleus

B. Li, D. Kim, F. Si, D. Wirtz, **S. Sun**;

Johns Hopkins University, Baltimore, MD.

MONDAY Podium Sessions

5:36 PM - 5:54 PM

DNA Phase Transitions in Combined Tension and Torsion

P. Purohit;

University of Pennsylvania, Philadelphia, PA.

5:54 PM - 6:12 PM

Multiscale Physical Behavior of DNA From Basepair to Chromosome

A. J. Spakowitz;

6:12 PM - 6:30 PM

The dynamics of E. coli ultra-structure.

P. Wiggins

Duling Memorial Symposium on Glycocalyx II

Session Number: 6-2 Room: 110

Session Chair(s): Dewey

5:00 PM - 5:18 PM

Cancer cell glycocalyx mediates mechanotransduction and flow-regulated invasion.

J. M. Tarbell¹, H. Qazi¹, Z. Shi², L. L. Munn³;

¹The City College of New York, NY, ²Sloan-Kettering Institute, New York, NY, ³Massachusetts General Hospital and Harvard Medical School, Charlestown, MA.

5:18 PM - 5:36 PM

Emerging concepts in the treatment of metastasis: Insights from Intravital Microscopy

R. Jain;

5:36 PM - 5:54 PM

Dissecting Contributions of the Extracellular Matrix to Cancer Progression

R. Hynes;

5:54 PM - 6:12 PM

Computational Modeling of Cancer Cell Migration and Detachment during Oncogenic Epithelial-to-Mesenchymal Transition

R. Zielinski, S. N. Ghadiali;

The Ohio State University, Columbus, OH.

6:12 PM - 6:30 PM

Endothelial Surface Glycocalyx Regulates flow-induced endothelial NO production in the microvessel

W. Yen, J. Yang, M. Zeng, J. Tarbell, **B. Fu;**

The City College of the City Univ. of New York, NY

Cell-Substrate Interactions I

Session Number: 6-3 Room: 111

Session Chair(s): V. Vogel and U. Schwarz

5:00 PM - 5:18 PM

Some Aspects of Cell-Substrate Interactions Can Be Explained by Molecular Mechanics

S. Walcott;

UC Davis, CA.

5:18 PM - 5:36 PM

Distribution of Stress at Dynamic Focal Adhesions

B. Sabass;

Princeton University, Princeton, NJ.

5:36 PM - 5:54 PM

Visualizing and manipulating molecular forces at the cell surface with light

K. Salaita, Y. Liu, Y. Zhang, Y. Yang, Z. Liu, C. Jurchenko;

Emory University, Atlanta, GA.

5:54 PM - 6:12 PM

Biomateriomics: Discovery, Innovation and Manufacturing Advanced Materials

M. Buehler;

6:12 PM - 6:30 PM

Surface-Free Hydrodynamic Trapping of Actin for Single-Molecule Force Spectroscopy

T. C. Feldman¹, Y. Jiang², H. Kang³, M. J. Lang⁴, R. D. Kamm⁵, E. M. De La Cruz³, W. P. Wong²;

¹Harvard University, Cambridge, MA, ²Harvard Medical School, Boston, MA, ³Yale University, New Haven, CT, ⁴Vanderbilt University, Nashville, TN, ⁵Massachusetts Institute of Technology, Cambridge, MA

Nano and Micromechanics of Collagen II

Session Number: 6-4 Room: 306

Session Chair(s): M. Bennisink and J. Snedeker

5:00 PM - 5:18 PM

Micromechanical bending and tensile testing of single collagen fibrils using AFM

M. Bennisink;

University of Twente, Enschede, NETHERLANDS.

5:18 PM - 5:36 PM

Collagen Crosslinking: an Unexpected Interconnection of Mechanics and Degradation

J. W. Bourne, P. A. Torzilli;

Hospital for Special Surgery, New York, NY.

MONDAY Podium Sessions

5:36 PM - 5:54 PM

Cross-linking by Advanced Glycation End-Products Increases Collagen Fibril Strength by Reducing Molecular Sliding

G. Fessel, J. G. Snedeker;

University and ETH Zurich, SWITZERLAND.

5:54 PM - 6:12 PM

Micromechanics in Functionally Distinct Tendons, Tendon Injury and Repair

H. R. C. Screen¹, C. T. Thorpe¹, J. H. Shepherd¹, K. Legerotz¹, H. L. Birch², P. D. Clegg³, G. P. Riley⁴, S. J. Bryant⁵;

¹Queen Mary, University of London, UNITED KINGDOM, ²University College London, UNITED KINGDOM, ³University of Liverpool, UNITED KINGDOM, ⁴University of East Anglia, Norwich, UNITED KINGDOM, ⁵University of Colorado, Boulder, CO.

6:12 PM - 6:30 PM

Tensile Measurements on Human Tendon Collagen Fibrils

R. B. Svensson, S. P. Magnusson;

University of Copenhagen, DENMARK

USNCB Biomechanics in Oncology II

Session Number: 6-5 Room: 302

Session Chair(s): L. Nagahara and C. Dong

5:00 PM - 5:18 PM

Micro-PIV Side-view Imaging Techniques for Studying Cancer Cell Adhesion in a Flow and Tumor Microenvironment

Y. Fu, R. F. Kunz, C. Dong;

Penn State University, University Park, PA.

5:18 PM - 5:36 PM

Biomechanical control of vessel morphogenesis, adaptation and function

L. L. Munn;

Massachusetts General Hospital, Charlestown, MA.

5:36 PM - 5:54 PM

Mechanosensing and Response to Hyaluronic Acid by Human Glioma Cells

K. Pogoda¹, C. Marcinkiewicz², P. Janmey¹;

¹Univ. Pennsylvania, Philadelphia, PA, ²Temple University, Philadelphia, PA.

5:54 PM - 6:12 PM

Interplay of Genes and Mechanics in the Disorganization of Multicellular Structures

J. Liphardt;

Stanford University, Stanford, CA.

6:12 PM - 6:30 PM

Cancer cell migration in 3D

D. Wirtz;

Johns Hopkins University, Baltimore, MD

Interfacial Fluid Dynamics and Thin Film Flows in Biomechanical Applications - Portonovo

Ayyaswamy 70th Birthday Tribute Special I

Session Number: 6-6 Room: 309

Session Chair(s): S. Kieweg and S. Ghadiali

5:00 PM - 5:18 PM

Adhesion of Functionalized Nanocarriers to Endothelium in Targeted Drug Delivery: Role of Cell Membrane Undulations

N. Ramakrishnan, R. Radhakrishnan, D. M. Eckmann, V. Muzykantov, P. S. Ayyaswamy; University of Pennsylvania, Philadelphia, PA.

5:18 PM - 5:36 PM

Acoustic droplet vaporization in gas embolotherapy: interfacial dynamics and bioeffects

D. S. Li, R. Seda, J. Fowlkes, J. L. Bull;

University of Michigan, Ann Arbor, MI.

5:36 PM - 5:54 PM

Finite Element Modeling of Interfacial Flows and Adhesion Dynamics in the Eustachian Tube

S. Ghadiali¹, J. Malik¹, J. Swarts²;

¹The Ohio State University, Columbus, OH, ²University of Pittsburgh, Pittsburgh, PA.

5:54 PM - 6:12 PM

Thin Film Dynamics of Human Tear Films

R. Braun¹, T. Driscoll¹, P. E. King-Smith², C. Begley³;

¹University of Delaware, Newark, DE, ²The Ohio State University, Columbus, OH, ³Indiana University, Bloomington, IN.

6:12 PM - 6:30 PM

Thin Film Coating Flows in Vaginal Drug Delivery

M. Anwar, H. M. Clever, J. Fleenor, B. Hu, V. O.

Kheifets, H. Sis, S. L. Kieweg;

University of Kansas, Lawrence, KS

Pediatric Clinical Challenges

Session Number: 6-7 Room: 300

Session Chair(s): A. Yoganathan and K. Manning

5:00 PM - 5:36 PM

Tissue Substitutes: Understanding what is Needed for Valve Reconstruction in Children

P. Del Nido;

MONDAY Podium Sessions

5:36 PM - 5:54 PM

Flow profiles and power loss in congenital heart disease: A tale of two circulations

M. Fogel;

5:54 PM - 6:12 PM

Promoting Flow in Fontan Circuits: From Bedside to Bench and Back Again

T. Slesnick;

Emory University School of Medicine, Atlanta, GA

6:12 PM - 6:30 PM

Clinical Results with Computational Modeling

K. Kanter

Children's Healthcare of Atlanta, Emory University

Clinical Applications of Plaque Modeling

Session Number: 6-8 Room: Ball-C

Session Chair(s): Tang and Migliavacca

5:00 PM - 5:18 PM

Plaque hemorrhage in carotid artery disease; pathogenesis, clinical and biomechanical considerations

Z. Teng¹, U. Sadat², A. J. Brown¹, J. H. Gillard¹;

¹University of Cambridge, UNITED KINGDOM,

²Cambridge University Hospitals NHS Foundation Trust, Cambridge, UNITED KINGDOM.

5:18 PM - 5:36 PM

Image-Based Modeling for Better Understanding and Assessment of Atherosclerotic Plaque Progression and Vulnerability: Data, Modeling, Validation, Uncertainty and Predictions

D. Tang¹, R. D. Kamm², C. Yang³, J. Zheng⁴, G. Canton⁵, R. Bach⁴, X. Huang⁶, T. S. Hatsukami⁵, J. Zhu¹, G. Ma¹, A. Maehara⁷, G. Mintz⁷, C. Yuan⁵;

¹Southeast University, Nanjing, CHINA,

²Massachusetts Institute of Technology, Cambridge, MA, ³China Information Tech.

Designing & Consulting Institute Co., Ltd., Beijing, CHINA, ⁴Washington University, St. Louis, MO,

⁵University of Washington, Seattle, WA, ⁶Xiamen University, CHINA, ⁷Columbia Univ., New York, NY.

5:36 PM - 5:54 PM

Predicting Response to Endovascular Therapies: Dissecting the Roles of Local Lesion Complexity, Systemic Comorbidity, and Clinical Uncertainty

K. Kolandaivelu, B. B. Leiden, E. R. Edelman;

Massachusetts Inst of Technology, Cambridge, MA.

5:54 PM - 6:12 PM

Numerical models of coronary stent fracture: influence of plaque calcifications and cardiac wall movement

S. Morlacchi, G. Pennati, L. Petrini, G. Dubini, **F. Migliavacca;**

Politecnico di Milano, ITALY.

6:12 PM - 6:30 PM

The Influence of Vascular Anatomy on Carotid Artery Stenting : A Parametric Study for Damage Assessment

F. Iannaccone¹, N. Debusschere¹, S. De Bock¹, M. De Beule¹, D. Van Loo², F. Vermassen³, P. Segers¹, **B. Verheghe**¹;

¹IbiTech-bioMMeda, Department of Electronics and Information Systems, iMinds Future Health Department, BELGIUM, ²Centre for X-ray Tomography, BELGIUM, ³Department of Thoracic and Vascular Surgery, Ghent University, BELGIUM

Joint and Soft Tissue Mechanics

Session Number: 6-9 Room: 312

Session Chair(s): S. Bevill

5:00 PM - 5:18 PM

Two New Experimental Models of Post-Traumatic Knee Joint Injury

T. L. Haut Donahue¹, K. M. Fischenich¹, H. M.

Pauly¹, G. C. Coatney¹, K. D. Button², B. Larson¹, C. E. DeCamp², R. S. Fajardo², R. C. Haut²;

¹Colorado State University, Fort Collins, CO,

²Michigan State University, East Lansing, MI.

5:18 PM - 5:36 PM

Changes in Knee Joint Mechanics in Response to Osteoarthritis Pain and its Treatment.

K. Boyer;

University of Massachusetts-Amherst, MA.

5:36 PM - 5:54 PM

Multi-scale mechanics of the tendon-to-bone attachment

S. Thomopoulos¹, V. Birman², G. Genin¹;

¹Washington University, St. Louis, MO, ²Missouri Univ. of Science and Technology, St. Louis, MO.

5:54 PM - 6:12 PM

Deconstructing the osteochondral interface using structure-composition-property relationships at micrometer length scales

V. L. Ferguson;

University of Colorado, Boulder, CO.

MONDAY Podium Sessions

6:12 PM - 6:30 PM

The Vertebral Endplate: Managing a strength/porosity balance

J. C. Lotz

Musculoskeletal Tissue Engineering I

Session Number: 6-10 Room: 313

Session Chair(s): O. Akkus

5:00 PM - 5:36 PM

Osteochondral Tissue Engineering by Attachment of Cartilage to Bone with a Double Diffusion Bioreactor

R. Sah;

UCSD

5:36 PM - 5:54 PM

Investigation of Chondrogenic and Vascular Priming of MSCs to Enhance Osteogenic Differentiation In Vitro as a Bone Tissue Engineering Strategy.

F. E. Freeman, M. G. Haugh, L. M. McNamara; National University of Ireland Galway, IRELAND.

5:54 PM - 6:12 PM

A New Biomaterial System for Spatiotemporal Control over Physical and Biochemical Signal Presentation to Cells for Tissue Engineering

E. Alsberg;

Case Western Reserve University, Cleveland, OH.

6:12 PM - 6:30 PM

Do Self-determined Interactions of Bone Marrow Stromal Cells in a Self-assembling Hydrogel Improve Tissue Engineering of Articular Cartilage?

L. M. Kock¹, Y. C. F. van Leuven², E. Potier², D. Gawlitta¹, P. Y. Dankers², P. López-Chicón³, C. E. Semino³, **K. Ito**²;

¹University Medical Center Utrecht, NETHERLANDS,

²Eindhoven University of Technology, Eindhoven, NETHERLANDS, ³Universitat Ramon Llull, Barcelona, SPAIN

USNCB Mechanics of Tissue & Organi Development I: Cardiovascular

Session Number: 6-11 Room: 305

Session Chair(s): L. Taber and J. Wagenseil

5:00 PM - 5:18 PM

Extracellular Matrix and the Mechanics of Developing Aorta

J. Kim¹, J. D. Procknow¹, H. Yanagisawa², **J. E.**

Wagenseil¹;

¹Washington University, Saint Louis, MO,

²University of Texas, Southwestern Medical Center, Dallas, TX.

5:18 PM - 5:36 PM

Hemodynamic regulation of vascular growth and remodeling in the chick embryo: a time-lapse imaging and RT-PCR analysis

W. J. Kowalski¹, S. Goktas², **K. Pekkan**¹;

¹Carnegie Mellon University, Pittsburgh, PA, ²Koc University, Istanbul, TURKEY.

5:36 PM - 5:54 PM

Remodeling of Early Embryonic Cardiac Tissues in Response to Altered Blood Flow

M. Midgett¹, M. Rennie², **S. Rugonyi**¹;

¹Oregon Health & Science University, Portland, OR,

²Hospital for Sick Children and University of Toronto, ON, CANADA.

5:54 PM - 6:12 PM

Heart stiffening in early embryos parallels matrix and myosin levels to optimize beating

D. E. Discher;

University of Pennsylvania, Philadelphia, PA.

6:12 PM - 6:30 PM

Distinct roles of RhoA and Rac1 during hemodynamic remodeling of embryonic heart valves

R. Gould, **J. Butcher;**

Cornell University, Ithaca, NY

Multiscale Techniques in Biomechanics & Mechanobiology II

Session Number: 6-12 Room: 301

Session Chair(s): R. Mueller, P. Pivonka, C. Hellmich and B. van Rietbergen

5:00 PM - 5:18 PM

Micromechanical Modelling of Bone Marrow: Understanding the in vivo Mechanical Environment of Mesenchymal Stem Cells

T. J. Vaughan¹, G. L. Niebur², M. Voisin¹, L. M. McNamara¹;

¹National University of Ireland, Galway, IRELAND,

²University of Notre Dame, South Bend, IN.

5:18 PM - 5:36 PM

A Multiscale Bone Remodeling Model to Predict Organ Level Changes in Bone Density

M. Colloca¹, M. M. van Rijsbergen¹, C. Hellmich², R. Blanchard², K. Ito¹, B. van Rietbergen¹;

¹Department of Biomedical Engineering, Eindhoven

University of Technology, NETHERLANDS, ²Institute

for Mechanics of Materials and Structures, Vienna

University of Technology, AUSTRIA.

MONDAY Podium Sessions

5:36 PM - 5:54 PM

Bone (re)modeling: a spatial game of stochastic nature

M. D. Ryser;

Duke University, Durham, NC

5:54 PM - 6:30 PM

See Program Supplement and Errata Sheet for possible additions

Imaging Tissue Biomechanics II: Orthopaedic & Rehabilitation

Session Number: 6-13 Room:311

Session Chair(s): Y.-P. Zheng

5:00 PM - 5:18 PM

Ultrasound Imaging for Movement of the Transverse Carpal Ligament

Z. Li;

Cleveland Clinic, Cleveland, OH.

5:18 PM - 5:36 PM

Dynamic Changes of Elasticity and Cross-Sectional Area of Multifidus at Different Postures in Men with Chronic Low Back Pain

S. Chan¹, T. Ngan², M. Chong², J. He², P. Fung², N. Ng², C. Tang², Y. Zheng²;

¹Massachusetts General Hospital, Charlestown, MA, ²The Hong Kong Polytechnic University, Kowloon, HONG KONG.

5:36 PM - 5:54 PM

Shear Wave Ultrasound Elastography - What We Can Measure in Stroke-impaired Muscle

S. S. M. Lee¹, S. Spear², W. Z. Rymer²;

¹Northwestern University, Chicago, IL,

²Rehabilitation Institute of Chicago, IL.

5:54 PM - 6:12 PM

Direct Measurement of Muscle Forces Using Supersonic Shear Wave Elastography

T. K. Koo¹, J. Guo¹, J. H. Cohen², K. J. Parker³;

¹New York Chiropractic College, Seneca Falls, NY,

²Nimmo Educational Foundation, Pittsburgh, PA,

³University of Rochester, NY.

6:12 PM - 6:30 PM

Factors Affecting Measurement of Young's Modulus of Tissue Using Vibration-based Ultrasound Methods

T. Li¹, **Y. Zheng**¹, Y. Wang²;

¹The Hong Kong Polytechnic University, Hong Kong, CHINA, ²Fudan University, Shanghai, CHINA

Clinical Gait Analysis

Session Number: 6-14 Room: Ball-A

Session Chair(s): Galli and A. Leardini

5:00 PM - 5:18 PM

On the design of protocols for gait analysis tests

A. Leardini, C. Belvedere, P. Caravaggi, V. D'Angeli, L. Berti, S. Giannini;

Istituto Ortopedico Rizzoli, Bologna, ITALY.

5:18 PM - 5:36 PM

Robotic-assisted Gait Training and Restoration

A. Esquenazi;

MossRehab, Elkins Park, PA.

5:36 PM - 5:54 PM

Can Biomechanical Analyses Influence the Treatment of Knee Osteoarthritis?

K. J. Deluzio, S. C. E. Brandon;

Queen's University, Kingston, ON, CANADA.

5:54 PM - 6:12 PM

Exploring the underlying dynamics of gait pathologies

with musculoskeletal simulation

K. M. Steele;

University of Washington, Seattle, WA

6:12 PM - 6:30 PM

Assessment of Muscle Activity and Kinematics During a Controlled Descent on Outstretched Arms in Young Women

L.J. Lattimer, J.L. Lanovaz, T.T. Treen, C. M. Arnold

University of Saskatchewan, Saskatoon, CANADA.

Mechanical Biocompatibility of Implants & Biomaterials

Session Number: 6-15 Room: Ball-B

Session Chair(s): E. Mazza

5:00 PM - 5:18 PM

A Microarchitected Lattice Material for Isoelastic Hip Endoprosthesis

D. Pasini;

McGill University, Montreal, QC, CANADA.

5:18 PM - 5:36 PM

Towards Mechanical Biocompatibility of Mesh Implants: An Extensive Multiscale Mechanical Characterization

M. Maurer¹, B. Röhrnbauer¹, A. Feola², J. Deprest², E. Mazza¹;

¹ETH Zurich, SWITZERLAND, ²KU Leuven, BELGIUM.

MONDAY Podium Sessions

5:36 PM - 5:54 PM

Failure Behaviour and Reliability of Dental Bio-ceramics

C. Fleck¹, R. Zehbe¹, A. Maerten¹, J. Forien², A. Rack³, C. Mochales², W. Mueller², W. Mueller², P. Fratzl⁴, P. Zaslansky²;

¹Technische Universität Berlin, GERMANY, ²Charité Berlin, GERMANY, ³European Synchrotron Radiation Facility ESRF, Grenoble, FRANCE, ⁴Max-Planck-Institute of Colloids and Interfaces, Potsdam-Golm, GERMANY.

5:54 PM - 6:12 PM

Computational prediction of abdominal aortic endografting

D. Perrin¹, **P. Badel**¹, S. Avril¹, J. Albertini², L. Orgéas³, C. Geindreau³, A. Dumenil⁴, C. Goksu⁴, A. Gupta⁵;

¹Ecole des Mines - St-Etienne, FRANCE, ²University Hospital of Saint-Etienne, FRANCE, ³CNRS - Université de Grenoble, FRANCE, ⁴Therenva, Rennes, FRANCE, ⁵Medtronic Inc., Santa Rosa, CA.

6:12 PM - 6:30 PM

Biocompatibility of Force Patterns at the Aortic Valve Stent

R. Hopf¹, M. Gessat², V. Falk², **E. Mazza**¹;

¹ETH Zurich, SWITZERLAND, ²University Hospital Zurich, SWITZERLAND

Biomechanics of Brain Formation & Injury

Session Number: 6-16 Room: 308

Session Chair(s): S. Duma and P. Nielsen

5:00 PM - 5:18 PM

Investigating the effects of the infant fontanelle on brain biomechanics during shaking

N. T. Puhulwelle Gamage, T. O. Lintern, M. C. Finch, A. J. Taberner, M. P. Nash, P. M. F. Nielsen; The University of Auckland, NEW ZEALAND.

5:18 PM - 5:36 PM

Morphomechanics of Sulci Formation in the Early Embryonic Brain

K. A. Ellspermann, L. A. Taber;

Washington University in St. Louis, MO.

5:36 PM - 5:54 PM

An Anisotropic Model of the Biaxial Mechanics of Brain White Matter

K. M. Labus¹, G. A. Orozco², J. J. García², C. M. Puttlitz¹;

¹Colorado State University, Fort Collins, CO, ²Universidad del Valle, Cali, COLOMBIA.

5:54 PM - 6:12 PM

Changes in Brain Mechanical Properties during Early Postnatal Development

A. C. Pong¹, L. Juge², L. E. Bilston³, S. Cheng⁴;

¹School of Medical Sciences, University of New South Wales, Sydney, AUSTRALIA, ²Neuroscience Research Australia, Sydney, AUSTRALIA, ³Prince of Wales Clinical School, University of New South Wales, Neuroscience Research Australia, Sydney, AUSTRALIA, ⁴Department of Engineering, Macquarie University, Sydney, AUSTRALIA.

6:12 PM - 6:30 PM

See Program Supplement and Errata Sheet for possible additions

PhD Student Competition – Cardiovascular Sponsored by the Bioengineering Division, ASME

Session Number: 6-17 Room: 307

Session Chair(s): Finol and DiMartino

5:00 PM - 5:15 PM

Coronary plaque structural stresses are determined by plaque composition and increased in patients experiencing an acute coronary syndrome

A. J. Brown¹, Z. Teng¹, P. A. Calvert¹, D. R. Obaid¹, Y. Huang¹, S. P. Hoole², N. E. J. West², J. H. Gillard¹, M. R. Bennett¹;

¹University of Cambridge, UNITED KINGDOM, ²Papworth Hospital NHS Trust, Cambridge, UNITED KINGDOM.

5:15 PM - 5:30 PM

Simulation of Self Expanding Transcatheter Aortic Valve in a Realistic Aortic Root: Implications of Deployment Geometry on Leaflet Deformation

P. S. Gunning, T. J. Vaughan, L. M. McNamara; National University of Ireland Galway, IRELAND.

5:30 PM - 5:45 PM

Patient-specific CT Image-Based Engineering Analysis of Transcatheter Aortic Valve Replacement

Q. Wang¹, S. Kodali², C. Primiano³, W. Sun¹;

¹Georgia Institute of Technology, Atlanta, GA, ²Columbia University College of Physicians and Surgeons, New York, NY, ³The Hartford Hospital, Hartford, CT.

MONDAY Podium Sessions

5:45 PM - 6:00 PM

Patient-specific Analysis of Drag Forces in Fenestrated Stent Graft for Abdominal Aortic Aneurysm: Effect of Exercise and Hypertension
H. S. Kandail¹, M. S. Hamady², X. Y. Xu¹;
¹Department of Chemical Engineering, Imperial College London, UNITED KINGDOM, ²Department of Interventional Radiology, Imperial College Healthcare NHS Trust, St Mary's Hospital, London, UNITED KINGDOM.

6:00 PM - 6:15 PM

In Situ Estimation of Aortic Valve Interstitial Cell Mechanical State from Tissue Level Measurements
R. M. Buchanan, R. J. Fagan, M. S. Sacks;
The University of Texas at Austin, TX.

6:15 PM - 6:30 PM

Intracranial Aneurysm Rupture Stratification Based on Flow Stability Analysis of High Resolution CFD
N. A. Varble¹, J. Xiang¹, N. Lin², K. Snyder², H. Meng¹;
¹University at Buffalo, The State University of New York, Buffalo, NY, ²Neurosurgery, University at Buffalo, Buffalo, NY

ASB Computer Simulation of Sport & Exercise II

Session Number: 6-18 Room: 310
Session Chair(s): J. H. Challis and M. Pain

5:00 PM - 5:18 PM

Linking Musculoskeletal Structure and Function Using Simulations of Optimal Human Performance
S. J. Piazza, H. Celik, H. van Werkhoven;
Penn State University, University Park, PA.

5:18 PM - 5:36 PM

Emulating the Ground Contact Phase of Human Gait using a 6 DoF Industrial Robot
S. Forrester, J. Jones, P. Leaney, A. Harland;
Loughborough University, UNITED KINGDOM.

5:36 PM - 5:54 PM

Dynamic Simulation of Patellofemoral Contact Loading while Running at Varied Step Rates
D. G. Thelen, R. L. Lenhart, J. Kaiser, B. C. Heiderscheit;
University of Wisconsin-Madison, WI.

5:54 PM - 5:12 PM

Modelling, Simulation and Optimisation of the Coupled Musculoskeletal / Exercise Machine System
J. Shippen;
Coventry University, UNITED KINGDOM.

6:12 PM - 6:30 PM

Optimal Footfall Patterns for Cost Minimization in Running
R. H. Miller¹, J. Hamill²;
¹University of Maryland, College Park, MD, ²University of Massachusetts, Amherst, MA

Brain Injury Mechanics II

Session Number: 6-19 Room: 303
Session Chair(s): D. Shrivastava and B. Coats

5:00 PM - 5:18 PM

Material Properties of Brain Tissue for Blast Rate Loadings and their Implication in Formation of Shock Waves
K. Laksari, **K. Darvish**;
Temple University, Philadelphia, PA.

5:18 PM - 5:36 PM

Prediction of Human Mild Traumatic Brain Injury in Multiple Dimensions
L. C. Wu*, M. C. Yip*, F. Hernandez, J. Schooler, K. Bui, B. Hammor, E. Ortega, G. Yock, J. Lopez, A. Hoffman, G. Grant, D. Camarillo;
Stanford University, Stanford, CA.

5:36 PM - 5:54 PM

Differences of the Brain Injury Mechanism between Violent Shaking and Low Height Fall Scenario
Y. Miyazaki¹, M. Yamasaki², M. Nonaka², H. Iwase³, Y. Nishida⁴, T. Yamanaka⁴;
¹Tokyo Institute of Technology, Meguro-ku, JAPAN, ²Osaka National Hospital, Osaka, JAPAN, ³Chiba University, Chiba, JAPAN, ⁴National Institute of Advanced Industrial Science and Technology, Meguro-ku, Tokyo, JAPAN.

5:54 PM - 6:12 PM

Modeling and Validation of Shearing Deformations in Human Brain Subjected to Mild Angular Accelerations
S. G. Ganpule¹, N. Daphalapurkar¹, A. Knutsen², D. L. Pham², P. Bayly³, K. T. Ramesh¹;
¹Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD, ²Center for Neuroscience and Regenerative Medicine, Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, MD, ³Department of Mechanical Engineering and Materials Science, Washington University in St. Louis, MO.

6:12 PM - 6:30 PM

Influence of Brain Anisotropy on Prediction of Traumatic Injuries
C. Giordano, S. Kleiven;
Royal Institute of Technology, Huddinge, SWEDEN

MONDAY Podium Sessions

ISB - Footwear Biomechanics I: Force

Session Number: 6-20 Room: 304

Session Chair(s): B. Nigg and T. Arndt

5:00 PM - 5:36 PM

Force, Pressure and Impact: Myths and Maths.

M. Shorten;

BioMechanica, LLC, Portland, OR.

5:36 PM - 5:54 PM

Do standard running shoes minimize tensile load in the Achilles tendon during treadmill walking?

S. J. Bartold;

The University of Melbourne, Norwood, AUSTRALIA.

5:54 PM - 6:12 PM

Understanding Player Response to Changes in Shoe-Surface Friction during Tennis-Specific Movements

S. J. Dixon¹, L. Damm², C. Starbuck³, J. Clarke⁴, M. Carré⁴;

¹University of Exeter, UNITED KINGDOM,

²University of Montpellier, FRANCE, ³University of St Mark and St John, Plymouth, UNITED KINGDOM,

⁴University of Sheffield, UNITED KINGDOM.

6:12 PM - 6:30 PM

Reduction in Forces in Barefoot Running

I. S. Davis, C. D. Samaan;

Harvard Medical School, Boston, MA

TUESDAY Podium Sessions

Tuesday, 8 July 2014
8:00– 9:30 AM

Design, Fabrication and Analysis of Hierarchical Biomaterials

Session Number: 7-1 Room: 109
Session Chair(s): Buehler and Qin

8:00 AM - 8:18 AM

Making a Hydrogel Very Sick: Fibrotic Cardiomyopathy Reconstituted in Engineered Tissue Constructs

G. Genin¹, T. M. Abney¹, K. M. Pryse¹, T. Wakatsuki², B. Babaei¹, N. Pittore¹, D. Gao¹, W. McConaughy¹, F. Xu³, E. L. Elson¹;
¹Washington University in St. Louis, MO, ²In Vivo Sciences, LLC, Madison, WI, ³Xi'an Jiaotong, Xi'an, CHINA.

8:18 AM - 8:36 AM

Computational design principles for nanoscale DNA-based materials
K. Pan, E. Boulais, M. Adendorff, **M. Bathe**;
MIT, Cambridge, MA.

8:36 AM - 8:54 AM

Non-invasive, non-contact measurement of mechanical properties of spider silk
K. J. Koski;
Brown University, Providence, RI.

8:54 AM - 9:12 AM

Building bioinspired hierarchy into carbon nanomaterials
Z. Xu;
Tsinghua University, Beijing, CHINA.

9:12 AM - 9:30 AM

Design & analysis of hierarchical polymeric materials as tissue simulants
K. J. Van Vliet;
MIT, Cambridge, MA.

Actomyosin Mechanobiology I

Session Number: 7-2 Room: 110
Session Chair(s): P. Yingxiao and M. Gardel

8:00 AM - 8:36 AM

A molecular force reporter to study forces at cell-matrix adhesions
C. S. Chen;
Boston University and the Harvard Wyss Institute for Biologically Inspired Engineering, Boston, MA.

8:36 AM - 8:54 AM

Photodissecting and Genetically Rewiring Cell Contractility
S. Kumar;
University of California, Berkeley, CA.

8:54 AM - 9:12 AM

Stochastic force generation by myosin II minifilaments
P.J. Albert, T. Erdmann, **U. S. Schwarz**;
Heidelberg University, GERMANY.

9:12 AM - 9:30 AM

Effect of Cell Tension on Vimentin Network Structure and Dynamics
M. Murray, M. Mendez, **P. Janmey**;
Univ. Pennsylvania, Philadelphia, PA

Cell-Substrate Interactions II

Session Number: 7-3 Room: 111
Session Chair(s): V. Vogel and U. Schwarz

8:00 AM - 8:36 AM

Nuclear lamin regulation of cell trafficking: from marrow-blood partitioning to tumor growth
D. E. Discher;
University of Pennsylvania, Philadelphia, PA.

8:36 AM - 8:54 AM

Noise and Kinetics in the Substrate Dependent Registry of Cardiac Muscle Fibers
K. Dasbiswas, **S. Safran**;
Weizmann Institute of Science, Rehovot, ISRAEL.

8:54 AM - 9:12 AM

Optical lattice light sheet microscopy: from single molecules to small embryos
W. R. Legant, B. Chen, K. Wang, L. Shao, L. Gao, E. Betzig;
HHMI Janelia Farm Research Campus, Ashburn, VA.

9:12 AM - 9:30 AM

Deciphering the Physical Mechanism of Durotaxis in Highly Motile Cells
S. Gabriele;
University of Mons, BELGIUM

TUESDAY Podium Sessions

Micromechanical Tools

Session Number: 7-4 Room: 306

Session Chair(s): J. Käs and R. Merkel

8:00 AM - 8:18 AM

Geometric and Mechanical Material Constraints
Guide Collective Cell Migration

J. P. Spatz;

Max Planck Institute for Intelligent Systems &
University of Heidelberg, Stuttgart, GERMANY.

8:18 AM - 8:36 AM

The nanomechanical signature of breast cancer

R. Y. H. Lim;

University of Basel, SWITZERLAND.

8:36 AM - 8:54 AM

Engineered environments to study cell migration

F. Lautenschläger;

University of the Saarland, Saarbrücken,
GERMANY.

8:54 AM - 9:12 AM

Shear microrheology of intracellular medium using
magnetic wires

L. Chevy, R. Colin, B. Abou, **J. F. Berret;**

Matière et Systèmes Complexes, , Paris, FRANCE.

9:12 AM - 9:30 AM

Spatially-defined, functional nanodomain
substrates for mechanocontrol of stem cell fate

J. Frith, H. Li, R. Mills, **J. Cooper-White;**

The University of Queensland, Brisbane,
AUSTRALIA

Cell and Extracellular Matrix Rheology

Session Number: 7-5 Room: 302

Session Chair(s): D. Weitz and D. Navajas

8:00 AM - 8:18 AM

Soft Glassy Dynamics of the Cell.

J. Fredberg;

Harvard University, Boston, MA.

8:18 AM - 8:36 AM

The Mechanics of Cultured Cell Monolayers

A. Harris¹, T. Wyatt¹, N. Khalilgharibi¹, L. Peter², J.
Bellis³, B. Baum¹, A. Kabla⁴, **G. Charras¹;**

¹University College London, UNITED KINGDOM, ²TU
München, Munich, GERMANY, ³Centre de
Recherche de Biochimie Macromoléculaire,
Montpellier, FRANCE, ⁴University of Cambridge,
UNITED KINGDOM.

8:36 AM - 8:54 AM

Passive and active rheology in living cells

M. Guo;

Harvard University, Cambridge, MA.

8:54 AM - 9:12 AM

Microrheology of the Extracellular Matrix Probed
with Atomic Force Microscopy.

D. Navajas;

University of Barcelona, Institute for
Bioengineering of Catalonia, and CIBER of
Respiratory Diseases, Barcelona, SPAIN.

9:12 AM - 9:30 AM

Microrheology of collagen networks

S. Münster¹, J. Steinwachs², D. A. Weitz³, B. Fabry²;

¹MPI Physics of Complex Systems, Dresden,
GERMANY, ²University Erlangen-Nuremberg,
GERMANY, ³Harvard University, Cambridge, MA

Biomaterial Gradients for Directed Cell Migration

Session Number: 7-6 Room: 309

Session Chair(s): H. G. Sundararaghavan

8:00 AM - 8:18 AM

Contact guidance of migrating cells through actin
waves

S. Das;

8:18 AM - 8:36 AM

Matrix stiffness affects cell-penetrating peptide
endocytosis and function

A. Panitch, J. L. Brugnano, J. McMasters;

Purdue University, West Lafayette, IN.

8:36 AM - 8:54 AM

Engineered Hydrogels for Regenerative Medicine
Applications

A. Khademhousseini;

8:54 AM - 9:12 AM

Cyclic Chemotactic Gradients and Chemo-Selection
in a Novel Microfluidic Device

S. Bajpai, M. Mitchell, M. King, **C. Reinhart-King;**

Cornell University, Ithaca, NY.

9:12 AM - 9:30 AM

Micro-composite Substrates for the Study of Cell-
Matrix Mechanical Interactions

P. Chao;

National Taiwan University, Taipei, TAIWAN

TUESDAY Podium Sessions

Mechanical Circulatory Support I: Future Pediatric Devices

Session Number: 7-7 Room: 300
Session Chair(s): K. Manning and T. Baldwin

8:00 AM - 8:36 AM

Ventricular Assist Devices: Current Technologies and Future Trends

U. Steineseifer;

Helmholtz Institute, RWTH Aachen University
GERMANY.

8:36 AM - 8:54 AM

Computational fluid dynamic analysis and In-vivo hemodynamics of Jarvik 2000 Infant VAD

J. Zhang¹, J. Teal², Y. Liu¹, P. G. Sanchez¹, S. Niu¹, R. Jarvik², B. P. Griffith¹, **Z. J. Wu**¹;

¹University of Maryland, Baltimore, MD, ²Jarvik Heart, Inc., New York, NY.

8:54 AM - 9:12 AM

Continuous flow pediatric MCS bridging to optimum therapy

S. Takatani¹, T. Shinshi², K. Nakata³, M. Shiono⁴;

¹Nihon University School of Medicine, Itabashi-ku, Tokyo, JAPAN, ²Tokyo Institute of Technology, Yokohama, JAPAN, ³Nihon University School of Medicine, Taito-ku, Tokyo, JAPAN.

9:12 AM - 9:30 AM

Predicting Platelet and Fibrin Adhesion with Mechanical Circulatory Support Devices

K. Manning

Penn State

Vulnerable Plaques I: Data, Modeling, & Mechanisms

Session Number: 7-8 Room: Ball-C
Session Chair(s): D. Ku and D. Tang

8:00 AM - 8:18 AM

Wall Shear Stress and Plaque Progression in Human Coronary Arteries: Esoteric or Clinically Relevant?

D. P. Giddens¹, H. Samady², L. Timmins¹, D. S. Molony¹, J. Suo¹, B. Gogas², M. McDaniel², A. Veneziani², O. Hung², M. Piccinelli²;

¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA.

8:18 AM - 8:36 AM

Lessons Learned from the PROSPECT Study

G. Mintz, A. Maehara;

Columbia University, the Cardiovascular Research Foundation, New York, NY.

8:36 AM - 8:54 AM

In-vivo Risk Assessment of Individual Coronary Artery Plaques: A New Paradigm for Pre-emptive Management of Patients with Coronary Artery Disease: The PREDICTION Study

P. Stone¹, S. Saito², S. Takahashi², A. U. Coskun³, E. Edelman¹, P. Libby¹, Y. Chatzizisis¹, K. Koskinas¹, A. Antoniadis¹, M. Papafaklis¹, C. L. Feldman¹;

¹Harvard Medical School, Boston, MA, ²Shonan Kamakura General Hospital, Kamakura, JAPAN, ³Northeastern University, Boston, MA.

8:54 AM - 9:12 AM

A fatigue crack growth model for plaque rupture

Z. Li, X. Pei;

Southeast University, Nanjing, CHINA.

9:12 AM - 9:30 AM

Human Coronary Plaque Progression Correlated Positively with Baseline Plaque Wall Stress and Strain and Negatively with Baseline Flow Shear Stress: an IVUS-Based Patient Follow-Up Study

Using 3D FSI Models with Cyclic Bending

L. Wang¹, J. Zheng², A. Maehara³, G. S. Mintz³, R. Fan⁴, C. Yang⁵, R. Bach², D. Muccigrosso², Z. Wu¹, K. L. Billiar¹, J. Zhu⁶, G. Ma⁶, **D. Tang**⁶;

¹Worcester Polytechnic Institute, Worcester, MA,

²Washington University, St. Louis, MO, ³The

Cardiovascular Research Foundation, Columbia

University, New York, NY, ⁴Beijing University of

Posts and Telecommunications, CHINA, ⁵China

Information Tech. Designing & Consulting Institute

Co., Ltd., Beijing, CHINA, ⁶ Southeast University,

Nanjing, CHINA

Vascular Growth & Remodeling Mechanics I

Session Number: 7-9 Room: 312

Session Chair(s): R. Gleason and A. Figueroa

8:00 AM - 8:18 AM

Computational Model of the In Vivo Development of a Tissue Engineered Vein

K. S. Miller¹, C. K. Breuer², J. D. Humphrey¹;

¹Yale University, New Haven, CT, ²Nationwide Children's Hospital, Columbus, OH.

TUESDAY Podium Sessions

8:18 AM - 8:36 AM

Balancing Stochastic and Deterministic Forces in Sprouting Angiogenesis: Developmental and Computational Modeling Approaches.

J. Walpole¹, J. Chappell², J. Cluceru², F. Mac Gabhann³, V. Bautch², **S. Peirce-Cottler**¹;

¹University of Virginia, Charlottesville, VA,

²University of North Carolina Chapel Hill, Chapel Hill, NC, ³Johns Hopkins University, Baltimore, MD.

8:36 AM - 8:54 AM

A physically motivated model for cell-mediated compaction and collagen remodeling in engineered vascular grafts

S. Loerakker, C. Obbink-Huizer, **F. Baaijens**;
Eindhoven University of Technology,
NETHERLANDS.

8:54 AM - 9:12 AM

Microstructural analysis of fiber orientation in swine carotid artery: structural quantification and constitutive modelling

A. Garcia¹, P. Saez¹, **E. Peña**¹, C. T. Gasser², M. A. Martinez¹;

¹University of Zaragoza, SPAIN, ²KTH Solid Mechanics, Stockholm, SWEDEN.

9:12 AM - 9:30 AM

Arterial Tissue Engineering: Mechanistic Modeling and Rational Design

A. Valentin, Y. Wang, P. Zunino, R. Allen, A. Robertson;
University of Pittsburgh, PA.

Musculoskeletal Tissue Engineering II

Session Number: 7-10 Room: 313

Session Chair(s): O. Akkus

8:00 AM - 8:36 AM

Beyond Stiffness: Do cells notice viscoelasticity?

D. Mooney;

Harvard University, Cambridge, MA.

8:36 AM - 8:54 AM

Electrochemically Aligned Collagen Biotextile for Tendon Tissue Engineering Applications

A. Islam, M. Younesi, **O. Akkus**;

Case Western Reserve University, Cleveland, OH.

8:54 AM - 9:12 AM

Characterizing Nanofibrous Composite Scaffolds with Spatially-Varying Moduli

A. A. Oberai, M. Tyagi, D. Li, J. A. Cooper, Jr., K. L. Lee, T. J. Anderson, **D. T. Corr**;

Rensselaer Polytechnic Institute, Troy, NY.

9:12 AM - 9:30 AM

Harnessing Biophysical, Biochemical and Biological Tools for Tendon Repair and Regeneration

D. I. Zeugolis;

National University of Ireland Galway, IRELAND

USNCB Mechanics of Tissue & Organ

Development II: Force Generation

Session Number: 7-11 Room: 305

Session Chair(s): L. Taber and L. Davidson

8:00 AM - 8:18 AM

Shaping tissues with contractile ratchets

A. C. Martin, S. Xie, C. Vasquez;

MIT, Cambridge, MA.

8:18 AM - 8:36 AM

Dynamic actomyosin contractions and the formation of multi-rosette complexes during neurulation.

D. Vijayraghavan, C. Miller, **L. Davidson**;

University of Pittsburgh, PA.

8:36 AM - 8:54 AM

Mechanical Regulation of Epithelial Morphogenesis

B. A. Filas, **L. A. Taber**;

Washington University, St. Louis, MO

8:54 AM - 9:30 AM

Cytomechanics of tissue morphogenesis: simple lessons from our chordate cousins

E. Munro;

University of Chicago, IL.

Multiscale Techniques in Biomechanics & Mechanobiology III

Session Number: 7-12 Room: 301

Session Chair(s): R. Mueller and P. Pivonka

8:00 AM - 8:18 AM

Multiscale modeling of mechanobiological bone adaptation: bridging organ, tissue and cellular scale

P. Pivonka¹, C. Lerebours¹, P. Buenzli², C. D. L. Thomas¹, J. G. Clement¹;

¹University of Melbourne, AUSTRALIA, ²Monash University, Melbourne, AUSTRALIA.

TUESDAY Podium Sessions

8:18 AM - 8:36 AM

Hand-In-Hand Across Length Scales: Imaging and Modeling of Structure and Function
M. Knothe Tate¹, R. Aaron², U. Knothe³, D. Zeidler⁴, S. Milz⁵, G. Saidel⁶;

¹University of New South Wales, Sydney, AUSTRALIA, ²Brown University, Providence, RI, ³Cleveland Clinic, OH, ⁴Carl Zeiss Microscopy, Oberkochen, GERMANY, ⁵Ludwig Maximilians University, Munich, GERMANY, ⁶Case Western Reserve University, Cleveland, OH.

8:36 AM - 8:54 AM

Modeling cell-matrix adhesions at different scales
J. Garcia-Aznar, Sr.¹, J. Escribano¹, M. Córdor¹, M. Sánchez²;

¹Universidad de Zaragoza, SPAIN, ²Centro Universitario de la Defensa Zaragoza, SPAIN.

8:54 AM - 9:12 AM

In Silico Mechanobiology in a Multiscale Model of Bone Adaptation

R. Müller;
Institute for Biomechanics, ETH Zurich, SWITZERLAND.

9:12 AM - 9:30 AM

Integrative Modelling: Toward a Data-Oriented Approach

M. Viceconti;
Dept. of Mechanical Engineering, and Insigneo Institute for in silico Medicine, University of Sheffield, UNITED KINGDOM

Imaging for Tissue Biomechanics III

Session Number: 7-13 Room: 311

Session Chair(s): E. Konofagou

8:00 AM - 8:18 AM

A Microchannel Flow Model for Soft Tissue Elasticity

K. J. Parker;
University of Rochester, NY.

8:18 AM - 8:36 AM

Ultrasound-based Mechanical Characterization of Abdominal Aortic Aneurysms

R. G. P. Lopata¹, V. L. Nguyen², M. F. J. Peters¹, A. M. Kok¹, M. C. M. Rutten¹, G. H. Schurink², F. N. van de Vosse¹;

¹Eindhoven University of Technology, NETHERLANDS, ²Maastricht University Medical Center, Maastricht, NETHERLANDS.

8:36 AM - 8:54 AM

Arterial strain imaging using ultrasound speckle tracking - in-silico, in-vitro and in-vivo validation

M. Larsson;
KTH Royal Institute of Technology, Stockholm, SWEDEN.

8:54 AM - 9:12 AM

Cardiovascular Elasticity Imaging: From Theory to Clinical Applications

E. Konofagou;
Columbia University, New York, NY.

9:12 AM - 9:30 AM

Evaluating ultrasonic techniques for arterial tissue characterization using numerical simulations

A. Swillens¹, A. Caenen¹, L. Bostyn¹, D. Shcherbakova¹, C. Papadacci², M. Pernot², B. Verhegghe¹, P. Segers¹;

¹Ghent University, BELGIUM, ²Institut Langevin, Paris, FRANCE

PhD Student Competition: Cartilage & Menisci Sponsored by the Bioengineering Division - ASME

Session Number: 7-14 Room: Ball-A

Session Chair(s): Hung and Fisher

8:00 AM - 8:15 AM

Freeze Rate and Cartilage Concentration Influence the Mechanical Properties and Pore Architecture of Cartilage-Derived Matrix Scaffolds

C. R. Rowland, L. A. Colucci, F. Guilak;
Duke University, Durham, NC.

8:15 AM - 8:30 AM

Thumb Carpometacarpal (CMC) Joint Stability Is Not Compromised in Early OA

E. Halilaj¹, D. C. Moore¹, T. K. Patel¹, J. B. Schwartz¹, C. J. Got¹, A. L. Ladd², A. C. Weiss¹, J. J. Crisco¹;

¹Rhode Island Hospital & Brown University, Providence, RI, ²Stanford School of Medicine, CA.

8:30 AM - 8:45 AM

Development of Tissue Engineered Menisci with Physiologically Distributed Loading

J. L. Puetzer, L. Bonassar;
Cornell University, Ithaca, NY.

TUESDAY Podium Sessions

8:45 AM - 9:00 AM

Prevention of Cartilage Degeneration by Intraarticular Treatment with Lubricin-Mimetics in the Rat Following Anterior Cruciate Ligament Transection.

K. J. Samaroo¹, M. Tan¹, M. Demange², M. Sisto², X. Deng², S. A. Rodeo², D. Putnam², L. J. Bonassar¹;
¹Cornell University, Ithaca, NY, ²The Hospital for Special Surgery, New York, NY.

9:00 AM - 9:15 AM

Bisphosphonate Rescues Articular Cartilage from Trauma Damage

M. Park, Y. Zhou, L. Wang, X. Lu;
University of Delaware, Newark, DE.

9:15 AM - 9:30 AM

The GOX/CAT Enzymatic System as a Novel Method on Enhancing the Functional Properties of Neocartilage through Hypoxia-induced Collagen Crosslinking

E. A. Makris, N. K. Paschos, J. C. Hu, K. A. Athanasiou;
University of California Davis, CA

Orthopaedic Implant Design

Session Number: 7-15 Room: Ball-B
Session Chair(s): P. Rullkoetter and M. Taylor

8:00 AM - 8:18 AM

Methods for Accounting for Patient Variability When Assessing Fixation of Orthopaedic Implants Using FE

M. Taylor;
Flinders University, Adelaide, AUSTRALIA.

8:18 AM - 8:36 AM

Understanding the spectrum of musculoskeletal loading conditions - key to advancing the frontier in TJR outcome prediction?

M. O. Heller;
University of Southampton, UNITED KINGDOM.

8:36 AM - 8:54 AM

Pre-Clinical Testing and Optimization of Implants Requires a Synergic Use of Numerical Models and In Vitro Experiments

L. Cristofolini;
University of Bologna, ITALY.

8:54 AM - 9:12 AM

Statistical Shape Modeling for Population-Based Evaluation of Total Knee Replacement
A. A. Ali¹, C. K. Fitzpatrick¹, C. W. Clary², L. M. Smoger¹, P. J. Rullkoetter¹, **P. J. Laz**¹;

¹University of Denver, CO, ²DePuy-Synthes, (a Johnson and Johnson Company), Warsaw, IN.

9:12 AM - 9:30 AM

Variation in the Femoral Morphology: Implications for Implant Design and Surgical Technique

C. Clary, L. Aram, M. Heldreth;
DePuy-Synthes, Warsaw, IN

Rehabilitation Dynamics

Session Number: 7-16 Room: 308
Session Chair(s): M. Miller, and T. Reid Bush

8:00 AM - 8:18 AM

Comparison of Upper Extremity Motion in a Virtual and Real World Task

R. Patterson, K. Singhal, C. Young, N. Bugnariu;
University of North Texas Health Science Center, Fort Worth, TX.

8:18 AM - 8:36 AM

An Evidence-based Approach to the Design of a Task-specific Fall Prevention Intervention

M. D. Grabiner, M. L. Pater, N. J. Rosenblatt;
University of Illinois at Chicago, IL.

8:36 AM - 8:54 AM

Effect of Vision Loss on Performance of Standard Peg Tests

A. J. Chambers, G. Owens, J. Trout, H. Livengood, N. Baker, A. Nau, R. Cham;
University of Pittsburgh, PA.

8:54 AM - 9:12 AM

Kinematics of Alternative Keyboards

N. A. Baker¹, K. Xiu¹, D. Landsittel¹, Z. Li²;
¹University of Pittsburgh, PA, ²Cleveland Clinic, OH.

9:12 AM - 9:30 AM

Rehab of ACL Injuries: Biomechanical Modeling and MRI

T. S. Buchanan, K. Manal;
University of Delaware, Newark, DE

PhD Student Competition - Human Locomotion Sponsored by the Bioengineering Division - ASME

Session Number: 7-17 Room: 307
Session Chair(s): Chaudhari and Morrow

8:00 AM - 8:15 AM

Age-Related Changes in Foot Placement Variability when Approaching and Stepping Over an Obstacle

B. C. Muir¹, S. Rietdyk¹, J. M. Haddad¹, R. E. A. Van Emmerik²;

¹Purdue University, West Lafayette, IN, ²University of Massachusetts, Amherst, MA.

TUESDAY Podium Sessions

8:15 AM - 8:30 AM

Return to Physical Activity Following Concussion Affects Recovery in Frontal Plane Balance Control during Dual-Task Walking

D. Howell, L. Osternig, L. Chou;
University of Oregon, Eugene, OR.

8:30 AM - 8:45 AM

Determination of Muscular Activity in the Lower Limb During Walking Using FDG-PET

S. Kolk¹, E. M. E. Klawer², J. Schepers³, E. P. Visser¹, V. Weerdesteyn¹, N. Verdonchot¹;
¹Radboud University Medical Center, Nijmegen, NETHERLANDS, ²University of Twente, Enschede, NETHERLANDS, ³Materialise N.V., Leuven, BELGIUM.

8:45 AM - 9:00 AM

Biomechanics of the Eccentric Heel-drop Exercise

R. A. Weinert-Aplin, A. H. McGregor, A. M. J. Bull;
Imperial College London, UNITED KINGDOM.

9:00 AM - 9:15 AM

Soft Footwear Introduces Tradeoffs between Loading Rate and Vertical Impulse during the Impact Phase of Walking and Heel Strike Running

B. J. Addison, D. E. Lieberman;
Harvard University, Cambridge, MA.

9:15 AM - 9:30 AM

Footwear Effects on Pelvic-Leg Coordination During Overground Walking

B. H. Romer¹, J. W. Fox², A. E. Jagodinnsky², J. M. Rehm², W. H. Weimar²;
¹Louisiana Tech University, Ruston, LA, ²Auburn University, AL

ANZSB Student Awards

Session Number: 7-18 Room: 310

Session Chair(s): R. Barrett, and A. Creswell

8:00 AM - 8:18 AM

Muscle contributions to recovery from a forward loss of balance by stepping in older adults

D. Graham¹, C. Carty¹, D. Lloyd¹, G. Lichtwark², R. Barrett¹;
¹Griffith University, Gold Coast, AUSTRALIA, ²The University of Queensland, Brisbane, AUSTRALIA.

8:18 AM - 8:36 AM

Brain Viscoelasticity is Associated with Cranial Venous Drainage Paths

A. Hatt¹, S. Cheng^{1,2}, K. Tan^{1,3}, R. Sinkus⁴, L. E. Bilston^{1,3}
¹Neuroscience Research Australia, Randwick,

AUSTRALIA, ²Department of Engineering, Macquarie University, North Ryde, AUSTRALIA, ³University of New South Wales, Randwick, AUSTRALIA, ⁴Imaging Sciences and Biomedical Engineering Division, King's College, London, UNITED KINGDOM

8:36 AM - 8:54 AM

Protection From Exercise-Induced Muscle Damage in the Absence of Changes in Medial Gastrocnemius Fascicle Behaviour in Humans in vivo

B. W. Hoffman, A. G. Cresswell, T. J. Carroll, G. A. Lichtwark;
The University of Queensland, Brisbane, AUSTRALIA.

8:54 AM - 9:12 AM

Changes in Brain Mechanical Properties during Early Postnatal Development

A. C. Pong¹, L. Juge², L. Bilston^{1,2}, S. Cheng³;
¹School of Medical Sciences, University of New South Wales, Sydney, AUSTRALIA, ²Neuroscience Research Australia, Sydney, AUSTRALIA, ³Department of Engineering, Macquarie University, Sydney, AUSTRALIA.

9:12 AM - 9:30 AM

Impact of kinematic modelling approaches on lower limb joint kinematics in children with cerebral palsy

H. Kainz, L. Modenese, C. P. Carty, D. J. Saxby, D. G. Lloyd;
Griffith University, Centre for Musculoskeletal Research, School of Rehabilitation Sciences, Southport, AUSTRALIA

Virtual Reality and Rehabilitation

NSF Symposium on Neurofunctionality Failure Analysis and Augmentation

Session Number: 7-19 Room: 303

Session Chair(s): R. Patterson and S. Wilson

8:00 AM - 8:18 AM

Measurement of Brain Functions controlling Posture and Locomotion with Near Infrared Spectroscopy and Virtual Environments

J. Fung;
McGill University, Montreal, QC, CANADA.

8:18 AM - 8:36 AM

Applications of Technology to Neuropsychological Assessment and Rehabilitation

T. D. Parsons;
University of North Texas, Denton, TX.

TUESDAY Podium Sessions

8:36 AM - 8:54 AM

Use of Virtual Environments for Evaluation of Human Motor Performance and Clinical Rehabilitation

N. Bugnariu;

University of North Texas Health Science Center, Ft. Worth, TX.

8:54 AM – 9:30 AM

See Program Supplement and Errata Sheet for possible additions

ISB - Footwear Biomechanics II: Muscle

Session Number: 7-20 Room: 304

Session Chair(s): I. Davis, K. Mickle, and T. Arndt

8:00 AM - 8:18 AM

Can Footwear Interventions Produce Foot Muscle Adaptations in Older People?

K. J. Mickle;

University of Wollongong, AUSTRALIA.

8:18 AM - 8:36 AM

Muscles and Footwear in Running: Implications for Running Injury Prevention

A. Zadpoor¹, A. Asadi Nikooyan²;

¹Delft University of Technology, NETHERLANDS,

²University of Colorado, Boulder, CO.

8:36 AM - 8:54 AM

Increased Muscle Activity during Barefoot and Shod Running with Weaker Ankles

J. Baltich¹, A. G. Lucas-Cuevas², H. Enders¹, B. Nigg¹;

¹University of Calgary, AB, CANADA, ²University of Valencia, SPAIN.

8:54 AM - 9:12 AM

Age and Gender Effects on Movement Coordination Variability in Running.

K. Boyer, J. Freedman-Silvernail, S. Strycharz, J. Hamill;

University of Massachusetts-Amherst, MA.

9:12 AM - 9:30 AM

Alterations in Muscle-Tendon Mechanics when Walking in High Heeled Shoes

N. Cronin;

University of Jyväskylä, FINLAND

Tuesday, 8 July 2014

11:00– 12:30 PM

Bio-inspired Manufacturing

Session Number: 8-1 Room: 109

Session Chair(s): K. Ye and C. Dong

11:00 AM - 11:18 AM

In vivo Imaging of Inflammation Using VCAM-Targeted Nanoparticles

N. Masoodzadehgan, S. Tong, **G. Bao;**

Georgia Institute of Technology, Atlanta, GA.

11:18 PM – 11:36 AM

Programmable materials for drug delivery and regenerative medicine

Y. Wang;

Penn State, University Park, PA.

11:36 PM – 11:54 AM

3D Tissue Niches for Directed Human Pluripotent Stem Cells

K. Ye¹, S. Jin¹, W. Wang²;

¹Binghamton University, State University of New York, NY, ²University of Arkansas, Fayetteville, AR.

11:54 PM – 12:12 PM

Development of a Highly Elastic Photocrosslinkable Cell-laden Tropoelastin-based Hydrogel

N. Annabi¹, K. Tang¹, S. Mithieux², M. Nikkhah¹, A.

Ameri¹, A. Weiss², **A. Khademhosseini**¹;

¹Harvard Medical School, Cambridge, MA,

²University of Sydney, AUSTRALIA

12:12 PM – 12:30 PM

See Program Supplement and Errata Sheet for possible additions

Actomyosin Mechanobiology II

Session Number: 8-2 Room: 110

Session Chair(s): P. Yingxiao and M. Gardel

11:00 AM - 11:18 AM

Soft Matrix Mediates H3K9 Demethylation in Tumor Cells

N. Wang¹, A. Tajik¹, J. Seong¹, J. Chen², Q. Jia², Y. Wang³;

¹University of Illinois at Urbana-Champaign, IL,

²Huazhong University of Science and Technology,

Wuhan, CHINA, ³University of California, San Diego,

La Jolla, CA.

11:18 AM - 11:36 AM

Effects of Cytoskeleton Stress-free state on RBC Responses in Shear Flows

Q. Zhu¹, Z. Peng²;

¹UC San Diego, La Jolla, CA, ²MIT, Cambridge, MA.

TUESDAY Podium Sessions

11:36 AM - 11:54 AM

Chiral Self-Organization of the Actin Cytoskeleton
Y. Tee¹, T. Shemesh², V. Thiagarajan¹, R. F. Hariadi³, K. L. Anderson⁴, C. Page⁴, N. Volkman⁴, D. Hanein⁴, S. Sivaramakrishnan³, M. M. Kozlov⁵, **A. Bershadsky**²;

¹Mechanobiology Institute, National University of Singapore, SINGAPORE, ²Weizmann Institute of Science, Rehovot, ISRAEL, ³University of Michigan, Ann Arbor, MI, ⁴Sanford Burnham Medical Research Institute, La Jolla, CA, ⁵Tel Aviv University, ISRAEL.

11:54 AM - 12:12 PM

Distinct Biophysical Mechanisms of FAK
Mechanoactivation by Different Extracellular Matrix
Proteins

Y. Wang¹, J. Seong², A. Tajik³, N. Wang³;
¹UCSD, La Jolla, CA, ²UIUC, Neuroscience, IL,
³UIUC, Urbana, IL.

12:12 PM - 12:30 PM

Molecular Mechanisms of Cell Mechano-Sensing
via Actomyosin Contractility

T. Kim;
Purdue University, West Lafayette, IN

Cell-substrate Interaction III

Session Number: 8-3 Room: 111
Session Chair(s): V. Vogel and U. Schwarz

11:00 AM - 11:18 AM

Forces, Form, and Function in the Multicellular
Context

C. S. Chen;
Boston University and the Harvard Wyss Institute
for Biologically Inspired Engineering, Boston, MA.

11:18 AM - 11:36 AM

Macroscopic substrate curvature can direct cell
proliferation and matrix organization in growing
microtissues

P. Kollmannsberger¹, C. M. Bidan², J. W. C. Dunlop², P. Fratzl², V. Vogel¹;
¹ETH Zürich, Laboratory of Applied
Mechanobiology, Zurich, SWITZERLAND, ²Max
Planck Institute of Colloids and Interfaces,
Department of Biomaterials, Golm, GERMANY.

11:36 AM - 11:54 AM

Nonlinear Elasticity in the Interaction of Living Cells
with their Mechanical Environment

Y. Shokef¹, R. Golkov¹, E. Kaufman¹, D. Ben-
Yaakov², S. A. Safran²;
¹Tel-Aviv University, ISRAEL, ²Weizmann Institute of
Science, Rehovot, ISRAEL.

11:54 AM - 12:12 PM

Cell-topography Interactions and Direct Cellular
Reprogramming
K. W. Leong;

12:12PM - 12:30 PM

Mechanobiology regulation of normal and tumor
stem cells in the brain

S. Kumar
University of California, Berkley, CA.

Optical and Magnetic Cell Manipulation

Session Number: 8-4 Room: 306
Session Chair(s): J. Käs and R. Merkel

11:00 AM - 11:18 AM

Investigation of cellular deformation and relaxation
by optical stretching

J. Kaes;

11:18 AM - 11:36 AM

Microrheology with magnetic tweezers

B. Fabry¹, P. Kollmannsberger², N. Bonakdar³;
¹University of Erlangen-Nuremberg, Erlangen,
GERMANY, ²ETH, Zurich, SWITZERLAND, ³Max-
Planck-Institute, Erlangen, GERMANY.

11:36 AM - 11:54 AM

Resolving the Mechanobiology of the Epithelium on
Native Basement Membranes

M. Plodinec¹, P. Oertle¹, S. Benayat², W. Halfter², B. Henrich³, I. Nathke⁴, M. Bentires-Alj⁵;
¹University of Basel, SWITZERLAND, ²University of
Pittsburgh, PA, ³University Hospital Basel,
SWITZERLAND, ⁴University of Dundee, UNITED
KINGDOM, ⁵Friedrich Miescher Institute for
Biomedical Research, Basel, SWITZERLAND.

11:54 AM - 12:12 PM

Optical Force Probe Assays of Cell-Surface Bound
Extremely Soft Materials

J. E. Curtis;
Georgia Institute of Technology, Atlanta, GA.

12:12 PM - 12:30 PM

High-Throughput Mechanical Phenotyping for Cell
Functional Changes

O. Otto, A. Ekpenyong, P. Rosendahl, C. Faigle, A. Mietke, S. Golfier, M. Herbig, C. J. Chan, **J. Guck**;
Technische Universität Dresden, GERMANY

TUESDAY Podium Sessions

Whole Cells and Collective Behaviors

Session Number: 8-5 Room: 302

Session Chair(s): G. Genin and R. Kaunas

11:00 AM - 11:18 AM

Putting the squeeze on airway epithelium

J. Fredberg;

Harvard University, Boston, MA.

11:18 AM - 11:36 AM

Acoustic Tweezing Cytometry for Mechanobiology and Stem Cell Applications

J. Fu;

University of Michigan, Ann Arbor, MI.

11:36 AM - 11:54 AM

The Direction of Stretch-Induced Cell and Stress Fiber Orientation Depends on Collagen Matrix Mechanical Properties

A. Tondon, **R. Kaunas;**

Texas A&M University, College Station, TX.

11:54 AM - 12:12 PM

Investigation of the Passive and Active Contractile Response to Cells to Cyclic Loading

N. Reynolds, P. Weafer, **P. McGarry;**

National University of Ireland Galway, IRELAND.

12:12 PM - 12:30 PM

Probing the Mechanics of the Actin Cytoskeleton in Fibroblasts Cultured in 3D Tissue Constructs

S. Lee¹, A. Nekouzadeh², K. M. Pryse², E. L. Elson², **G. M. Genin**²;

¹National Taiwan University, Taipei, TAIWAN,

²Washington University in St. Louis, MO

Engineered Cellular Environments

Session Number: 8-6 Room: 309

Session Chair(s): D-H Kim and C. Simmons

11:00 AM - 11:18 AM

Microfluidic platform for mechanobiological studies of valvular endothelial cell

J. Kim, C. Lacerda, J. Lee, X. Wang;

Texas Tech University, Lubbock, TX.

11:18 AM - 11:36 AM

The application of active and passive tension in skeletal muscle tissue engineering

P. H. Lee;

Ohio State University, Columbus, OH.

11:36 AM - 11:54 AM

Multi-Taxis Microfluidic Platform For Wound Mechanobiology

J. H. Shin, S. Song, S. An;

KAIST, Daejeon, REPUBLIC OF KOREA.

11:54 AM - 12:12 PM

Role of tissue stiffness on the maintenance of breast cancer stem cells

E. Jabbari;

University of South Carolina, Columbia, SC.

12:12 PM - 12:30 PM

Microengineered Physiological Biomimicry: Human Organ-on-Chips

D. Huh;

University of Pennsylvania, Philadelphia, PA.

Mechanical Circulatory Support II: Improving Adult VADs

Session Number: 8-7 Room: 300

Session Chair(s): K. Manning

11:00 AM - 11:18 AM

Monitoring of the interaction between assisted heart and pump from pump parameters only: A powerful tool for diagnostics and optimization of VAD-therapy

H. Schima¹, F. Moscato¹, M. Granegger², M. Haller¹, M. Masetti¹, T. Haberl¹, J. Riebandt¹, C. Marko³, T. Schloegelhofer¹, D. Zimpfer¹;

¹Med. Univ. Vienna, AUSTRIA, ²Ludwig Boltzmann-Cluster for Cardiovascular Research, Vienna, AUSTRIA, ³Rehabilitation Center Felbring, Lower Austria, AUSTRIA.

11:18 AM - 11:36 AM

Device Thrombogenicity Emulation (DTE) - a Methodology for Optimizing the Thromboresistance of Mechanical Circulatory Support Devices and Testing the Efficacy of Anticoagulants

D. Bluestein¹, W. Chiu¹, Y. Alemu¹, G. Girdhar¹, J. Sheriff¹, C. Gao¹, P. le Tran², S. Einav¹, M. J. Slepian²;

¹Stony Brook University, NY, ²University of Arizona, Tucson, AZ,

11:36 AM - 11:54 AM

Least-Squares FEM for Stress-based and Strain-based Hemolysis Estimation

J. Nam¹, L. Pauli², M. Pasquali³, M. Behr²;

¹Sungkyunkwan University, Suwon, REPUBLIC OF KOREA, ²RWTH Aachen University, Aachen, GERMANY, ³Rice University, Houston, TX.

TUESDAY Podium Sessions

11:54 AM - 12:12 PM

The Role of Computational Modeling and Simulation in the Total Product Life Cycle of Peripheral Vascular Devices

N. Ibrahim, L. K. Pack, T. M. Morrison;
Food and Drug Administration, Silver Spring, MD.

12:12 PM - 12:30 PM

Flow Performance of the Impella CP Heart Pump
S. C. Corbett, D. T. Price, K. Lee, T. Siess;
Abiomed, Danvers, MA

Vulnerable Plaques II: Data, Modeling, Mechanisms

Session Number: 8-8 Room: Ball-C
Session Chair(s): F. Gijssen and D. Bluestein

11:00 AM - 11:18 AM

Shear stress and atherosclerosis in human coronary arteries

F. Gijssen;
Erasmus MC, Rotterdam, NETHERLANDS.

11:18 AM - 11:36 AM

The diagnosis and treatment of atherosclerosis
Z. Fayad;
Mount Sinai Hospital, Icahn School of Medicine, New York, NY.

11:36 AM - 11:54 AM

MicroCT Imaging of Atherosclerotic Plaque: Effect Of Image Resolution And Contrast
L. Cardoso, S. Weinbaum;
The City College of New York, NY.

11:54 AM - 12:12 PM

Mechanobiological study on the vascular cells under the physiological pulsatile flow
Y. Fan*, X. Gong, H. Liu, Y. Huang;
Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education, School of Biological Science and Medical Engineering, Beihang University, Beijing, CHINA.

12:12 PM - 12:30 PM

Biomechanical factors and Risk of Rupture in Coronary Vulnerable Plaques - FSI Studies using Patient based micro-CT and IVUS measurements
D. Bluestein¹, X. Liang¹, S. Rambhia¹, M. Xenos¹, I. Lavi², R. Kornowski^{2,3}, L. Cardoso⁴, S. Weinbaum⁴, S. Einav^{4,3};
¹Stony Brook University, NY, ²Tel Aviv University, ISRAEL, ³Rabin Medical Center, Petach Tikva, ISRAEL, ⁴The City College of The City University of New York, NY.

Vascular Growth & Remodeling Mechanics II

Session Number: 8-9 Room: 312
Session Chair(s): R. Gleason and A. Figueroa

11:00 AM - 11:18 AM

Aortic Remodeling Due to Reduced Amounts of Elastic Fiber Proteins

J. K. Cheng¹, J. D. Procknow¹, V. P. Le², C. Luetkemeyer², R. P. Mecham¹, H. C. Han³, H. Yanagisawa⁴, **J. E. Wagenseil**¹;
¹Washington University, Saint Louis, MO, ²Saint Louis University, MO, ³University of Texas, San Antonio, TX, ⁴University of Texas, Southwestern Medical Center, Dallas, TX.

11:18 AM - 11:36 AM

Mechanistic Micro-Structural Theory of Soft Tissues Growth and Remodeling

Y. Lanir;
Technion - I.I.T, Haifa, ISRAEL.

11:36 AM - 11:54 AM

Imaging the Vascular Lumen and the Wall: Informing Models of Vascular Growth and Remodeling
D. Saloner;
University of California San Francisco, CA.

11:54 AM - 12:12 PM

Fluid-Chemically-Driven Growth of the Intra-Luminal Thrombus: A Follow-Up Study
J. Biasseti¹, P. Spazzini², J. Swedenborg³, T. Gasser⁴;
¹KTH Royal Institute of Technology, Stockholm, SWEDEN, ²National Institute of Metrological Research, Turin, ITALY, ³Karolinska Institute, Stockholm, SWEDEN.

12:12 PM - 12:30 PM

Towards Patient-specific Modeling of Thoracic Aortic Aneurysms Growth
G. Martufi¹, T. Gasser², J. J. Appoo¹, E. S. Di Martino¹;
¹University of Calgary, AB, CANADA, ²Royal Institute of Technology, Stockholm, SWEDEN

Passive Skeletal Muscle: Experiments & Modeling I

Session Number: 8-10 Room: 313
Session Chair(s): C. Simms

11:00 AM - 11:18 AM

Collagenous Networks: What Can Be Learned from Discrete Random Fiber Models?

A. Mauri¹, A. E. Ehret¹, C. R. Picu², E. Mazza¹;
¹ETH Zurich, SWITZERLAND, ²Rensselaer Polytechnic Institute, Troy, NY.

TUESDAY Podium Sessions

11:18 AM - 11:36 AM

On the anisotropy of skeletal muscle tissue under compression

M. Böhl¹, A. Ehret², K. Leichsenring¹, W. Christine¹, R. Kruse³;

¹Institute of Solid Mechanics, Braunschweig, GERMANY, ²Institute of Mechanical Systems, Zurich, SWITZERLAND, ³Institute of Applied Mechanics, Braunschweig, GERMANY.

11:36 AM - 11:54 AM

Micro-structural response of muscle tissue under large deformations

M. Takaza, G. McManus, P. Strafford, C. K. Simms; Trinity College Dublin, IRELAND.

11:54 AM - 12:12 PM

A multi-scale approach to study pressure ulcer aetiology

C. Oomens¹, D. Bader²;

¹Eindhoven Univ. of Technology, NETHERLANDS, ²University of Southampton, UNITED KINGDOM.

12:12 PM - 12:30 PM

Loading Conditions in Muscle Tissues in the Buttocks during Sitting on Different Support Surfaces

A. Gefen;

Tel Aviv University, ISRAEL

USNCB Mechanics of Tissue & Organ Development

III: Multiscale Methods

Session Number: 8-11 Room: 305

Session Chair(s): L. Taber and Nelson

11:00 AM - 11:18 AM

The role of mechanics in guiding the spatial orientation of the osteocyte lacunar-canalicular system

W. Allen¹, R. T. Anderson¹, C. D. Frazier², V. L. Ferguson², **D. Carpenter**¹;

¹University of Colorado-Denver, CO, ²University of Colorado-Boulder, CO.

11:18 AM - 11:36 AM

Bending and Folding Tissues Under Pressure

C. M. Nelson;

Princeton University, Princeton, NJ.

11:36 AM - 11:54 AM

Modeling Intra- and Inter-Cellular Active Processes Using the Subcellular Element Model: Cytoskeletal Adaptation, Tissue Viscosity, and Collective Cell Motility

T. Newman;

University of Dundee, UNITED KINGDOM.

11:54 AM - 12:12 PM

Reverse Engineering Embryogenesis

G. W. Brodland;

University of Waterloo, ON, CANADA.

12:12 PM - 12:30 PM

Measuring morphogenetic stresses and dynamic mechanical properties in live embryos

M. S. Hutson, X. Ma, H. E. Lynch, A. K. Jayasinghe, S. M. Crews;

Vanderbilt University, Nashville, TN

Respiratory Biomechanics: Linking Structure and Function in the Lung

Session Number: 8-12 Room: 301

Session Chair(s): B. Suki and S. Wada

11:00 AM - 11:18 AM

Does Biofluid Mechanics Modelling inform the Physiology from which it stems?

R. Schroter;

Imperial College, London, UNITED KINGDOM.

11:18 AM - 11:36 AM

Multiscale Investigation of Alveolar Stresses in Ventilator-induced Lung Injury

D. R. Einstein¹, A. D. Freed², K. M. Minard¹, R. E. Jacob¹, L. Pasa-Tolic¹, C. R. Anderton¹, A. P. Kuprat¹, S. Kabilan¹, C. J. Greenshields³, H. G. Weller³, J. C. Gee⁴, R. Glenny⁵;

¹Pacific Northwest National Laboratory, Richland, WA, ²Saginaw Valley State University, University Center, MI, ³OpenCFD, Bracknell, UNITED KINGDOM, ⁴University of Pennsylvania, Philadelphia, PA, ⁵University of Washington, Seattle, WA.

11:36 AM - 11:54 AM

Relationship between lung volume recruitment, lung mechanics, regional sound transmission and gas exchange in a model of ARDS

R. L. Dellaca¹, E. Zannin, P. P. Pompilio;

Politecnico di Milano University, Milano, ITALY.

TUESDAY Podium Sessions

11:54 AM - 12:12 PM

A model of pulmonary acinus structure composed of alveoli of various sizes, shapes and locations, coalescing into an intricately branched ductal tree
K. Koshiyama, S. Wada;
Osaka University, Toyonaka, JAPAN.

12:12 PM - 12:30 PM

Computational modeling of lung structure and function during the progression of emphysema
B. Suki, A. Takahashi, A. Majumdar, H. Parameswaran;
Boston University, MA

Reproductive & Women's Health I: Uterine Peristalsis & Myometrial Contractility

Session Number: 8-13 Room:311
Session Chair(s): M. House and M. Oyen

11:00 AM - 11:18 AM

Stresses in the Uterine Wall during Hyperperistalsis May be the Origin of Endometriosis
A. J. Jaffa¹, S. Shaked², D. Grisaru¹, D. Elad²;
¹Sourasky Tel Aviv Medical Center, ISRAEL, ²Tel Aviv University, ISRAEL.

11:18 AM - 11:36 AM

Single-cell mechanics and calcium signalling in organotypic slices of human myometrium.
F. C. Loftus, M. J. E. Richardson, **A. Shmygol**;
Warwick University, Coventry, UNITED KINGDOM.

11:36 AM - 11:54 AM

Telemedicine in the Uterine Peristalsis Investigation
E. Brzozowska¹, **E. Oczeretko**¹, Z. Gajewski²;
¹Bialystok University of Technology, POLAND, ²Warsaw University of Life Sciences, POLAND.

11:54 AM - 12:12 PM

Tracking the changes in electrophysiological activity of the uterus as it approaches labor using magnetomyographic technique
H. Eswaran¹, R. B. Govindan², J. D. Wilson³, C. L. Lowery⁴;
¹University of Arkansas for Medical Sciences, Little Rock, AR, ²Washington National Children's Hospital, Washington DC, ³University of Arkansas at Little Rock, AR.

12:12 PM - 12:30 PM

A model of Stokesian peristalsis and ovum transport in a three-dimensional uterine tube.
V. Aranda¹, R. Cortez², L. Fauci²;
¹Universidad Tecnica Federico Santa Maria, Santiago, CHILE, ²Tulane University, New Orleans, LA

Spine Loading and Stabilization

Session Number: 8-14 Room: Ball-A
Session Chair(s): Hurschler

11:00 AM - 11:18 AM

An in vitro investigation on the relevance of interpedicular widening in the dynamics of spinal burst fractures.
N. Brandolini, N. Kapur, R. M. Hall;
University of Leeds, UNITED KINGDOM.

11:18 AM - 11:36 AM

Estimation of lumbar load for complicated asymmetric lifting using musculoskeletal modeling
M. de Zee¹, M. S. Andersen¹, T. Alkjær², E. B. Simonsen², H. Koblach²;
¹Aalborg University, DENMARK, ²University of Copenhagen, DENMARK.

11:36 AM - 11:54 AM

Pedicle Screws and Lateral Mass Screws for Dorsal Spondylodesis of the Atlas - An In-Vitro Comparison of the Primary Stability
G. Huber¹, R. A. Kueny¹, F. Fensky², K. Püschel², W. Lehmann², N. Hansen-Algenstaedt², M. M. Morlock¹;
¹TUHH Hamburg University of Technology, GERMANY, ²University Medical Center Hamburg-Eppendorf, Hamburg, GERMANY.

11:54 AM - 12:12 PM

Merging in vivo estimates of passive tissue changes with local dynamic stability of spine movement during repetitive spine flexion
S. J. Howarth¹, D. C. Kingston², S. H. M. Brown³, R. B. Graham⁴;
¹Canadian Memorial Chiropractic College, Toronto, ON, CANADA, ²University of Waterloo, ON, CANADA, ³University of Guelph, ON, CANADA, ⁴Nipissing University, North Bay, ON, CANADA.

12:12 PM - 12:30 PM

Effect of dynamic stabilizer on the adjacent segments of lumbar spine under realistic loading condition
H. Choi, Y. Kim;
Dankook University, Yongin, REP of KOREA

TUESDAY Podium Sessions

12:30 PM - 12:48 PM

Analysis of the biomechanical effects of two-step traction therapy on the lumbar spine

W. Park¹, K. Kim¹, J. Yang², Y. Kim¹;

¹Kyung Hee Univ., Yongin, REP of KOREA, ²Hanmed Co. Ltd, Gimhae, REP of KOREA

Knee Grand Challenge II

Session Number: 8-15 Room: Ball-B

Session Chair(s): BJ Fregly

*Continued from Sunday Session 1-17

11:00 AM - 11:18 AM

Patient-specific Musculoskeletal Modelling of Total Knee Arthroplasty using Force-dependent Kinematics

M. S. Andersen¹, M. A. Marra², V. Vanheule³, R.

Fluit⁴, N. Verdonschot², J. Rasmussen¹;

¹Aalborg University, DENMARK, ²Radboud University Nijmegen Medical Centre, NETHERLANDS, ³Materialise N.V., Leuven, BELGIUM, ⁴University of Twente, Enschede, NETHERLANDS.

11:18 AM - 11:36 AM

Total Knee Replacement Contact Force Prediction Using Parametric Numerical Model

R. D. Freed, J. C. Simon, S. P. Mell, R. M. Trombley, M. A. Wimmer, H. J. Lundberg;

Rush University, Chicago, IL.

11:36 AM - 11:54 AM

Prediction and Validation of the Tibiofemoral Joint Force of an Implanted Knee with E-tibia

S. Wang, N. Zheng;

UNC Charlotte, Charlotte, NC.

11:54 AM - 12:12 PM

Feasibility Tuning to Improve Optimization Prediction of Knee Contact Forces

A. L. Kinney, A. V. Rao, B. J. Fregly;

University of Florida, Gainesville, FL.

12:12 PM - 12:30 PM

Contact force comparison of knee compartment during normal and turning gait

Y. Kim, A. Dorj, T. Purevsuren, K. Kim;

Kyung Hee University, Yongin, REP of KOREA

CSB Promising Young Investigator & Masters Awards

Session Number: 8-16 Room: 308

Session Chair(s): D. Andrews

11:00 AM - 11:36 AM

MRI based investigation of the link between naturally developing intervertebral disc degeneration and muscle fatty degeneration in a canine model (Young Investigator Award)

S. H. M. Brown, S. G. Nykamp, A. B. Harriss, A.

Lerer, T. G. Koch, T. Gibson;

University of Guelph, ON, CANADA.

11:36 AM - 11:54 AM

Is Intervertebral Disc Pressure Linked to Herniation?

M. Noguchi¹, C. E. Gooyers², T. Karakolis¹, J. P. Callaghan¹;

¹University of Waterloo, ON, CANADA, ²Giffin Koerth Forensic Engineering, Toronto, ON, CANADA.

11:54 AM - 12:12 PM

Improving Musculoskeletal Hand Modelling by Incorporating Intrinsic Structures

A. R. MacIntosh, P. J. Keir;

McMaster University, Hamilton, ON, CANADA.

12:12 PM - 12:30 PM

An Examination of Sarcomere Length Non-Uniformities in Actively Stretched Muscle Myofibrils

K. R. Johnston, A. Jinha, W. Herzog;

University of Calgary, AB, CANADA

PhD Student Competition: Orthopaedics

Sponsored by the Bioengineering Division - ASME

Session Number: 8-17 Room: 307

Session Chair(s): Wang and Li

11:00 AM - 11:15 AM

Effects of Advanced Glycation End Products (AGES) on Bone Formation

Y. Xiao^{1,2}, A. Mostafa^{1,2}, B. Giri¹, M. Appleford³, X. Wang^{1,3};

¹Mechanical Engineering, University of Texas at San Antonio, TX, ²School of Biological Science and Medical Engineering, Beihang University,

³Biomedical Engineering, University of Texas at San Antonio, TX.

11:15 AM - 11:30 AM

Multiplex Osteocyte Gene Expression in an In Vivo Model of Mechanical Bone Adaptation

A. J. Trüssel, R. E. Wilson, S. Stanger, Z. Li, G. A.

Kuhn, D. J. Webster, R. Müller;

Inst. for Biomechanics, ETH Zurich, SWITZERLAND.

TUESDAY Podium Sessions

11:30 AM - 11:45 AM

Prediction of in-vivo Knee Joint Kinematics using a Statistical Shape Modeling

J. Li, T. Tsai, S. Wang, P. Li, Y. Kwon, H. Rubash, G. Li;

Massachusetts General Hospital/Harvard Medical School, Boston, MA.

11:45 AM - 12:00 PM

A Novel Magnesium Ring for Repair of an Injured Anterior Cruciate Ligament - In Vitro and In Vivo Studies in Goats

K. F. Farraro, K. E. Kim, A. Speziali, M. M. Tei, N. Sasaki, S. L. Woo;

University of Pittsburgh, PA.

12:00 PM - 12:15 PM

Modeling subject-specific lower-extremity alignment improves medial-lateral knee joint contact force predictions during gait

Z. F. Lerner, R. C. Browning;

Colorado State University, Fort Collins, CO.

12:15 PM - 12:30 PM

Directed tissue growth along highly orientated scaffold pores in bone regeneration: the role of the scaffold-bone interface

A. Princ¹, G. Duda², A. Ellinghaus¹, H. Leemhuis³, A. Petersen²;

¹Julius Wolff Institut - Charité Universitätsmedizin Berlin, GERMANY, ²Julius Wolff Institut - Charité Universitätsmedizin Berlin, Center for Musculoskeletal Surgery, Berlin-Brandenburg Center and School for Regenerative Therapies Charité - Universitätsmedizin Berlin, GERMANY, ³Matricel GmbH, Herzogenrath, GERMANY

ANZSB Student Awards

Session Number: 8-18 Room: 310

Session Chair(s): R. Barrett and A. Creswell

11:00 AM - 11:18 AM

Different Inverse Kinematic Models with the Same Marker Set Alter Lower Limb Muscle-Tendon Length Estimates in Children with Cerebral Palsy

C. P. Carty, H. Kainz, L. Modenese, D. J. Saxby, D. G. Lloyd;

Griffith University, Gold Coast, AUSTRALIA.

11:18 AM - 11:36 AM

Assessing the Impact of Sub-Failure Injury on the Development of Post-Traumatic Osteoarthritis in a Novel, Biomechanically Relevant Murine Model.

C. Blaker, M. T. Jackson, C. B. Little, E. Clarke;

Kolling Institute of Medical Research, Sydney Medical School, University of Sydney, St. Leonards, NSW, AUSTRALIA.

11:36 AM - 11:54 AM

Mechanics and Energetics of Walking at Optimal and Non-Optimal Velocity-Cadence Combinations.

S. F. Brennan, A. G. Cresswell, D. J. Farris, G. A. Lichtwark;

University of Queensland, Brisbane, AUSTRALIA.

11:54 AM - 12:12 PM

Biomechanical properties in pathological tendon: What are the regional patterns and do proteoglycans matter?

R. Choi¹, E. Jacobsen², M. M. Smith¹, J. Clarke³, A. J. Dart², C. B. Little¹, E. Clarke¹;

¹Kolling Institute of Medical Research, Sydney Medical School, University of Sydney, St Leonards, NSW, AUSTRALIA, ²Camden Vet Hospital, University of Sydney, Camden, NSW, AUSTRALIA, ³Faculty of Health Sciences, University of Sydney, Lidcombe, NSW, AUSTRALIA.

12:12 PM - 12:30 PM

The Proprioceptive and Mechanical Role of the Tibialis Anterior Muscle in Responding to Unexpected Surface Perturbations

J. T. Day, G. A. Lichtwark, A. G. Cresswell;

The University of Queensland, Brisbane, AUSTRALIA

PhD Student Competition: Image-Based Measurements

Sponsored by the Bioengineering Division - ASME

Session Number: 8-19 Room: 303

Session Chair(s): Pekkan and VendeGeest

11:00 AM - 11:15 AM

Three Dimensional Measurement of Porcine Sclera Deformation using High Resolution Ultrasound Speckle Tracking

B. Cruz Perez, H. Chen, H. J. Morris, R. T. Hart, J. Liu;

Ohio State University, Columbus, OH.

11:15 AM - 11:30 AM

Ultrasound Ultrafast Imaging: application to the 2D Mapping of cerebral vascular Resistivity and tissue Elasticity in the preterm infant brain

C. Demene¹, M. Pernot¹, V. Biran², M. Alison³, M. Fink¹, O. Baud², M. Tanter¹;

¹Institut Langevin, ESPCI Paristech, Paris, FRANCE, ²Réanimation et Pédiatrie Néonatales, Hôpital Robert Debré, Paris, FRANCE, ³Département d'Imagerie Médicale, Hôpital Robert Debré, Paris, FRANCE.

TUESDAY Podium Sessions

11:30 AM - 11:45 AM

A Diffusion Tensor Informed Model of The Gastrocnemius: A NZ White Rabbit Study
M. Alipour, K. Mithraratne, J. Fernandez;
Auckland University, NEW ZEALAND.

11:45 AM - 12:00 PM

Changes in Sarcomere Lengths of the Human Vastus Lateralis with Knee Flexion Measured with In Vivo Microendoscopy
X. Chen, G. Sanchez, M. Schnitzer, S. Delp;
Stanford University, CA.

12:00 PM - 12:15 PM

High frame rate imaging of cardiac blood flow by visualization of echoes from blood particles
H. Takahashi, H. Hasegawa, H. Kanai;
Tohoku University, Sendai, JAPAN.

12:15 PM - 12:30 PM

A Reliable Protocol for Shearwave Elastography of Lower Limb Muscles at Rest and Stretched
G. Dubois¹, W. Kheireddine¹, C. Vergari¹, D. Bonneau¹, P. Thoreux¹, P. Rouch¹, M. Tanter², J. Gennisson², W. Skalli¹;
¹Arts et Metiers ParisTech, Paris, FRANCE, ²Institut Langevin, Laboratoire Ondes et Acoustique, ESPCI ParisTech, Université Paris VII, Paris, FRANCE

ISB - Footwear Biomechanics III: Movement

Session Number: 8-20 Room: 304

Session Chair(s): T. Arndt and B. Nigg

11:00 AM - 11:36 AM

The habitual joint movement and its relation to footwear
G. Brüggemann;

11:36 AM - 11:54 AM

Initial Foot Contact Patterns in Shod Distance Running
D. De Clercq¹, B. Breine¹, E. C. Frederick², P. Malcolm¹;
¹Ghent University, BELGIUM, ²Exeter Research Inc., Brentwood, NH.

11:54 AM - 12:12 PM

Determinants on soccer specific non-linear sprint performance
W. Potthast;
German Sport University Cologne, GERMANY.

12:12 PM - 12:30 PM

Lower Limb Loading During the Deceleration Phase of Turning
M. J. Lake, A. Lishman;
John Moores University, Liverpool, UNITED KINGDOM

Tuesday, 8 July 2014

2:00- 4:00 PM

ESB Awards Session

Session Number: 9-18 Room 310

Session Chair: P. Zioupos

Clinical Biomechanics Award Finalists

2:00-3:00 PM

Is angle-stable locked lateral plating biomechanically superior to conventional plate fixation in the proximal phalanx?
M. Ernst, R. Shanmugam, D. Wahl, M. Windolf, R. G. Richards, **B. Gueorguiev**;
AO Research Institute Davos, SWITZERLAND.

Association of CT-based finite element estimates of femur strength with fracture status in three clinical studies

C. Falcinelli¹, E. Schileo¹, L. Balistreri¹, P. Henys², F. Baruffaldi¹, S. Sigurdsson³, V. Gudnason³, S. Boutroy⁴, F. Taddei¹;
¹Istituto Ortopedico Rizzoli, Bologna, ITALY, ²Technical University of Liberec, CZECH REPUBLIC, ³Icelandic Heart Association, Kópavogur, ICELAND, ⁴INSERM UMR 1033, Université de Lyon, FRANCE.

Biomechanical and Biological Properties of Different Topographic Locations of the Ankle Joint
N. K. Paschos, E. A. Makris, J. C. Hu, K. A. Athanasiou;
University of California Davis, CA.

A Cohesive Interface Approach to Model the Inter-Lamellar Behaviour of the Intervertebral Disc Annulus Fibrosus

M. Mengoni¹, B. L. Luxmoore¹, A. C. Jones¹, V. N. Wijayathunga¹, N. D. Broom², R. K. Wilcox¹;
¹Univ. of Leeds, UNITED KINGDOM, ²Univ. of Auckland, NEW ZEALAND.

ESB Student Award Finalists

3:00 PM- 4:00PM

Optimizing Fracture Healing through Fixation Stiffness using Numerical Simulation

M. Steiner¹, L. Claes¹, U. Simon², A. Ignatius¹, T. Wehner¹;

TUESDAY Podium Sessions

¹Institute of Orthopaedic Research and Biomechanics, Centre of Musculoskeletal Research, University of Ulm, GERMANY, ²Scientific Computing Centre, University of Ulm, GERMANY.

Relations between split-belt adaptation, after effects and perception of gait asymmetry
W. Hoogkamer¹, S. M. Bruijn², J. Duysens¹;
¹Movement Control and Neuroplasticity Research Group, Department of Kinesiology, KU Leuven, BELGIUM, ²MOVE Research Institute, VU University, Amsterdam, NETHERLANDS.

Mechanobiological Simulations of Prenatal Joint Morphogenesis
M. Giorgi¹, A. Carriero¹, S. J. Shefelbine², N. C. Nowlan¹;
¹Imperial College London, UNITED KINGDOM, ²Northeastern University, Boston, MA.

A Multiphysics Approach to Calculate Shear Stresses During Neotissue Growth in a Perfusion Bioreactor
Y. Guyot¹, I. Papantoniou², J. Schrooten², L. Geris¹;
¹University of Liege, BELGIUM, ²KU Leuven, BELGIUM

Tuesday, 8 July 2014
2:30– 4:00 PM

Bio-inspired Materials from Nanostructures I
Session Number: 9-1 Room: 109
Session Chair(s): Z. Xu

2:30 PM - 3:06 PM
Molecular Biomechanics of Wet Biological Adhesives and Their Synthetic Mimics
S. Manohar, **P. Messersmith**;
Northwestern University, Evanston, IL.

3:06 PM - 3:24 PM
Metal-Coordinate Polymer-Particle Composites: Another Step up in Bio-Inspired Hierarchical Materials
N. Holten-Andersen;
Massachusetts Inst of Technology, Cambridge, MA.

3:24 PM - 3:42 PM
Micromechanics of Silk Attachments: Increasing Strength and Toughness Through Material Behavior and Geometry
S. W. Cranford¹, N. Pugno²;
¹Northeastern University, Boston, MA, ²Università di Trento, ITALY.

3:42 PM - 4:00 PM
Bottom-up design of the structure and mechanics of interfacial materials
Z. Qin;
Massachusetts Inst of Technology, Cambridge, MA

Engineering Molecular Mechanics with Synthetic Biology I

Session Number: 9-2 Room: 110
Session Chair(s): W. Ruder and P. LeDuc

2:30 PM - 3:06 PM
Synthetic biology: from parts to modules to therapeutic systems
R. Weiss;

3:06 PM - 3:24 PM
Utilizing molecular mechanics and synthetic biology to create smarter biological materials
S. Paek, M. R. Anderson, W. C. Ruder;
Virginia Tech, Blacksburg, VA.

3:24 PM - 3:42 PM
Conditional Regulation of Gene Expression with Toehold Switches
A. A. Green;
Harvard University, Boston, MA.

3:42 PM - 4:00 PM
Genetically encoded self-assembly of large amyloid fibers
D. Ridgley, **J. Barone**;
Virginia Tech, Blacksburg, VA

Biophysical Aspects of Cell-Cell Adhesion
Session Number: 9-3 Room: 111
Session Chair(s): F. Julicher

2:30 PM - 2:48 PM
Model adhesive doublets reveal mechanosensitive regulation of E-cadherin recruitment by modulation of actin dynamics
W. Engl¹, B. Arasi¹, L. Yap¹, J. Thiery¹, **V. Viasnoff**²;
¹NUS, SINGAPORE, ²NUS/CNRS, SINGAPORE.

2:48 PM - 3:06 PM
Energy barriers and cell migration in confluent tissues
D. Bi, J. H. Lopez, J. M. Schwarz, **M. Manning**;
Syracuse University, NY.

3:06 PM - 3:24 PM
Interstitial fluid osmolarity determines progenitor cell segregation during zebrafish gastrulation
C. Heisenberg;
IST Austria, Klosterneuburg, AUSTRIA.

TUESDAY Podium Sessions

3:24 PM - 3:42 PM

Joined Forces of Cancer Cells and Fibroblasts
Against the Basement Membrane
A. Glentis, V. Gurchenkov, Y. Attie, P. Marianni, **D. Matic Vignjevic**;
Institut Curie, Paris, FRANCE.

3:42 PM - 4:00 PM

N-cadherin is Key to Regulating Nucleus Pulposus
Cell Behaviors on Substrates of Varying Stiffness
and Extracellular Matrix Composition
P. Y. Hwang, L. Jing, J. Chen, L. A. Setton;
Duke University, Durham, NC

Physical Properties of a Membrane Cytoskeleton Coupled System

Session Number: 9-4 Room: 306
Session Chair(s): N. Gov and P. Bassereau

2:30 PM - 3:06 PM

Mechanosensing by Tropomyosin-Controlled
Myosin Contractions
M. Sheetz;

3:06 PM - 3:24 PM

Force regulation of interactions between the E-
cadherin-catenin complex and actin filaments
C. Buckley, J. Tan, B. Pruitt, W. Weis, W. Nelson, **A. Dunn**;
Stanford University, CA.

3:24 PM - 3:42 PM

Mechanics of Reconstituted Cortex
M. Gardel;
U. of Chicago, IL.

3:42 PM - 4:00 PM

Passive and Active Fluctuations of Cells and Shells
G. Gompper;
Forschungszentrum Juelich, GERMANY

Whole Cell Biomechanics I

Session Number: 9 -5 Room: 302
Session Chair(s): M. Sato and N. Wang

2:30 PM - 3:06 PM

Mechanobiology and Developmental Control
D. Ingber;
Wyss Institute, Boston, MA.

3:06 PM - 3:24 PM

Mechanotransductive evolutionary origins of early
mesoderm specification in Bilateria
E. Farge¹, A. Bouclet¹, T. Brunet¹, D. Mitrossilis¹, B.
Driquez¹, G. Béalle², C. Ménager², F. Dumas-
Bouchiat³, D. Le-Roy³, C. Yanicostas⁴, N.
Dempsey³, A. Plessis⁵;
¹Institut Curie, Paris, FRANCE, ²Physico-Chemistry
of Electrolytes and Colloids, UPMC – ESPCI, Paris,
FRANCE, ³CNRS, Inst NEEL, Grenoble, FRANCE,
⁴U676, Hôpital Robert Debré, Paris, FRANCE,
⁵Institut Jacques Monod, Paris, FRANCE.

3:24 PM - 3:42 PM

Traction force microscopy-based mechanical
characterization of cell migration using
microchannel device
T. Ohashi¹, C. Shaoyi¹, J. Cooper-White²;
¹Hokkaido University, Sapporo, JAPAN, ²The
University of Queensland, Brisbane, AUSTRALIA.

3:42 PM - 4:00 PM

Early diagnosis and mechanobiology for vessel
restenosis

C. Wu;

National Cheng Kung University, Tainan, TAIWAN

Modeling Multiphysics and Complex Phenomena in Soft Tissues

Session Number: 9-6 Room: 309
Session Chair(s): J. Noailly

2:30 PM - 2:48 PM

Interactions of Cell-Scale and Tissue-Scale
Mechanics in Airway Smooth Muscle
J. E. Hiorns¹, **B. S. Brook**¹, O. E. Jensen²;
¹University of Nottingham, UNITED KINGDOM,
²University of Manchester, UNITED KINGDOM.

2:48 PM - 3:06 PM

Modeling cartilage degeneration via systems
biology and biomechanics approach

L. G. Alexopoulos;

National Technical University of Athens, GREECE.

3:06 PM - 3:24 PM

Aggrecan in cartilage

D. Smith¹, B. Gardiner¹, A. Grodzinsky²;
¹University of Western Australia, Perth, AUSTRALIA,
²Massachusetts Inst of Technology, Boston, MA.

TUESDAY Podium Sessions

3:24 PM - 3:42 PM

A Modeling and Simulation Pipeline for the Prediction of Localized Cartilage Mechanics: Towards a Multiscale Analysis Framework for Joint, Tissue, and Cell Scales

A. S. Reddy, A. Erdemir;
Computational Biomodeling (CoBi) Core, Lerner Research Institute, Cleveland Clinic, Cleveland, OH.

3:42 PM - 4:00 PM

Spatial and temporal strain distributions in cartilage during impact

C. C. van Donkelaar;

Mechanical Circulatory Support III: Devices

Session Number: 9-7 Room: 300

Session Chair(s): K. Cook and S. Koenig

2:30 PM - 2:48 PM

Miniaturization of MCS Devices

J. LaRose;

2:48 PM - 3:06 PM

Computational Models for Development of MCS devices

T. A. Kaufmann, S. Gross-Hardt, R. Graefe, U. Steinseifer;
Institute of Applied Medical Engineering, Helmholtz Institute, RWTH Aachen University, GERMANY.

3:06 PM - 3:24 PM

Seeking Physiologic Benefit with a Rotary Pump Artificial Pulse

K. Bourque, C. Cotter, C. Dague;
Thoratec Corporation, Burlington, MA.

3:24 PM - 3:42 PM

Mechanical Circulatory Support for Early-Stage Heart Failure Patients

P. Spence;
SCR Inc., Louisville, KY.

3:42 PM - 4:00 PM

Design and Testing of a Novel Suture-less, Off-Pump Ventricular Assist Device Connector and Delivery System

J. H. Jimenez;
Georgia Institute of Technology, Atlanta, GA

Abdominal Aortic Aneurysm I

Session Number: 9-8 Room: Ball-C

Session Chair(s): E. Finol and Y. Papaharilaou

2:30 PM - 3:06 PM

Aortic Aneurysms and Biomechanics: Where Have We Come From, Where Are We Going, and Why Does It Matter?

M. Fillinger;

3:06 PM - 3:24 PM

Abdominal Aortic Aneurysm Rupture prediction using FEA

T. McGloughlin¹, S. O'Leary², P. A. Grace², E. G. Kavanagh², B. J. Doyle³;
¹University of Limerick and Khalifa University of Science Technology and Research, IRELAND,
²University of Limerick, IRELAND, ³The University of Western Australia, Perth, AUSTRALIA.

3:24 PM - 3:42 PM

Translational Potential of Abdominal Aortic Aneurysm Rupture Risk Assessment: Wall Mechanics and Geometric Assessment

S. Raut¹, K. Lee², **E. A. Finol**³;
¹University of Texas at Austin, TX, ²University of Illinois at Urbana-Champaign, IL, ³University of Texas at San Antonio, TX.

3:42 PM - 4:00 PM

Experimental modeling of the flow dynamics within an abdominal aortic aneurysm

V. DEPLANO¹, Y. Knapp^{2,3}, C. Guivier-Curien², E. Bertrand¹;
¹Aix-Marseille Université, CNRS, Marseille, France, Marseille, FRANCE, ²Aix-Marseille Université, CNRS, Marseille, FRANCE. ³Université d'Avignon, Marseille, FRANCE,

Vascular Growth & Remodeling Mechanics III

Session Number: 9-9 Room: 312

Session Chair(s): R. Gleason and A. Figueroa

2:30 PM - 2:48 PM

Towards fluid solid growth simulations of vein graft biomechanics in coronary artery bypass surgery

A. B. Ramachandra¹, S. Sankaran², A. M. Kahn¹, J. D. Humphrey³, **A. L. Marsden**¹;
¹UCSD, La Jolla, CA, ²HeartFlow, Inc, Redwood City, CA, ³Yale University, New Haven, CT.

TUESDAY Podium Sessions

2:48 PM - 3:06 PM

Glycocalyx Core Protein Regulation of Vascular Endothelial Cell Signaling and Remodeling

E. E. Ebong¹, J. M. Tarbell²;

¹Northeastern University, Boston, MA, ²City College of New York, NY.

3:06 PM - 3:24 PM

Functional Remodeling of Carotid Artery in Two Swine Models of Heart Failure

X. Lu;

Indiana University Purdue Univ Indianapolis, IN.

3:24 PM - 3:42 PM

Fluid-Solid-Volumetric-Growth Framework of Abdominal Aortic Aneurysm Evolution

A. Grytsan¹, T. Eriksson¹, P. N. Watton², T. C. Gasser¹;

¹KTH Royal Institute of Technology, Stockholm, SWEDEN, ²University of Sheffield, UNITED KINGDOM.

3:42 PM - 4:00 PM

Longitudinal Variation of Structural and Mechanical Properties of Thoracic Aorta Using a Recruitment-Based Constitutive Model

S. Zeinali-Davarani, M. Chow, Y. Wang, R. Turcotte, Y. Zhang;

Boston University, MA

Passive Skeletal Muscle: Experiments & Modeling II

Session Number: 9-10 Room: 313

Session Chair(s): C. Simms

2:30 PM - 2:48 PM

The Influence of Vascular Perfusion Pressure on Passive Skeletal Muscle Mechanics

A. M. Reeve, M. P. Nash, A. J. Taberner, P. M. F. Nielsen;

Auckland Bioengineering Institute, NEW ZEALAND.

2:48 PM - 3:06 PM

The influence of sample size on apparent stress-strain behaviour in passive skeletal muscle

G. Blackburn, M. Takaza, **C. K. Simms**;

Trinity College Dublin, IRELAND.

3:06 PM - 3:24 PM

Tensile Response of the Muscle-Tendon Complex Modelling With Discrete Element Method.

A. Roux¹, J. Lecompte¹, L. Gras¹, I. Jordanoff², **S. Laporte**¹;

¹Arts et Métiers ParisTech, Paris, FRANCE, ²Arts et Métiers ParisTech, Bordeaux, FRANCE.

3:24 PM - 3:42 PM

Photobleaching as tool to measure local strain field in fibrous connective membranes

C. Jayyosi¹, M. Coret², K. Bruyère-Garnier¹;

¹Laboratoire de Biomécanique et Mécanique des chocs, Bron, FRANCE, ²LUNAM Université, GEM, Nantes, FRANCE.

3:42 PM - 4:00 PM

Cervical Spine Segment Tension Tests and Application to a Detailed Finite Element Model

J. B. Barker, D. S. Cronin, N. Chandrashekar; University of Waterloo, ON, CANADA

Lymphatics & Interstitial Fluid I: Biomechanics & Modeling

Session Number: 9-11 Room: 305

Session Chair(s): B. Dixon and J. Moore

2:30 PM - 3:06 PM

Lymphatic Function and Dysfunction: Lessons Learned from Experimental and Human Lymphedema

S. G. Rockson;

Stanford University School of Medicine, CA.

3:06 PM - 3:24 PM

Influences on Lymphatic Vascular Pump Function

C. D. Bertram¹, C. Macaskill¹, J. E. Moore, Jr.²;

¹University of Sydney, New South Wales, AUSTRALIA, ²Imperial College, London, UNITED KINGDOM.

3:24 PM - 3:42 PM

Lymphatics as Transport Pathway for Digestive Enzymes out of an Ischemic Small Intestine

G. W. Schmid-Schoenbein, M. Richter, A. Altshuler, A. Modestino, M. Heller;

University Of California, San Diego, La Jolla, CA.

3:42 PM - 4:00 PM

Blood Vessels to Lymphatics: A Pathway of Unanswered Questions

W. L. Murfee, D. P. Gaver;

Tulane University, New Orleans, LA

Respiratory Biomechanics: Remodeling & Regeneration

Session Number: 9-12 Room: 301

Session Chair(s): G. Maksym and L. Nicklason

2:30 PM - 2:48 PM

X-ray CT imaging of emphysema

M. Mishima;

Kyoto University, JAPAN.

TUESDAY Podium Sessions

2:48 PM - 3:06 PM

Unveiling the Mechanics of Healthy and Pathological Tracheobronchial Trees during Forced Expiration

A. Pradel¹, K. Blanc¹, P. Gilfriche¹, T. Similowski¹, C. Straus¹, **M. Filoche**²;

¹Université Pierre et Marie Curie, Paris, FRANCE,

²Ecole Polytechnique, Palaiseau, FRANCE.

3:06 PM - 3:24 PM

Mechanical properties of decellularized lungs

R. Farre;

University of Barcelona-IDIBAPS-CIBERES, SPAIN.

3:24 PM - 3:42 PM

High Throughput Methods for Studies of Acellular Human Lungs

D. E. Wagner¹, S. L. Fenn², N. R. Bonenfant¹, E. R. Marks¹, Z. Borg¹, P. Saunders¹, R. A. Oldinski², D. C. Weiss¹;

¹Department of Medicine, University of Vermont, Burlington, VT, ²College of Engineering and Mathematical Sciences, University of Vermont, Burlington, VT

3:42 PM - 4:00 PM

Stem cells in lung injury

P. R. M. Rocco;

Federal University of Rio de Janeiro, BRAZIL.

Reproductive & Women's Health II: Biomechanics of the Cervix

Session Number: 9-13 Room: 311

Session Chair(s): A. Shmygol and H. Eswaran

2:30 PM - 2:48 PM

Tissue Engineering to Improve Cervical Function During Pregnancy

M. House¹, E. Norwitz¹, S. Socrate², D. Kaplan³;

¹Tufts Medical Center, Boston, MA, ²MIT, Cambridge, MA, ³Tufts University, Medford, MA.

2:48 PM - 3:06 PM

Finite element analysis of cervical elastography: challenges and opportunities

J. Jingfeng¹, H. Feltovich², M. House³, **T. J. Hall**⁴;

¹Michigan Technological University, Houghton, MI,

²Intermountain Healthcare, Provo, UT, ³Tufts University, Boston, MA, ⁴University of Wisconsin-Madison, WI.

3:06 PM - 3:24 PM

Shear wave elasticity imaging for quantifying cervical softness in vivo

H. Feltovich¹, L. C. Carlson², S. Romero³, M. Palmeri⁴, A. Munoz del Rio⁵, T. J. Hall²;

¹Intermountain Healthcare, Provo, UT, ²University of Wisconsin-Madison, WI, ³Intermountain Healthcare, Salt Lake City, UT, ⁴Duke University Pratt School of Engineering, Durham, NC,

⁵University of Wisconsin-Madison, WI.

3:24 PM - 3:42 PM

The Constitutive Modeling of Human Cervical Tissue

K. Myers¹, J. Vink², W. Yao¹, C. Hendon¹, Y. Gan¹, K. Yoshida¹, M. Fernandez¹, N. Zork², R. Wapner²;

¹Columbia University, New York, NY, ²Columbia University Medical Center, New York, NY.

3:42 PM - 4:00 PM

Challenges and Solutions for Quantitative In Vivo Ultrasound Elastography of the Human Cervix in Pregnancy

V. L. Ferguson, B. N. Briggs;

University of Colorado, Boulder, CO

Intervertebral Disc Mechanobiology I

Session Number: 9-14 Room: Ball-A

Session Chair(s): K. Ito

2:30 PM - 2:48 PM

Spatial and temporal considerations of cellular mechanobiology in the intervertebral disc

A. H. Hsieh¹, S. Han¹, D. Hwang¹, C. Chen¹, C. Chou¹, K. M. Labus², M. Yu¹, C. M. Puttlitz², Y. Chen¹;

¹University of Maryland, College Park, College Park, MD, ²Colorado State University, Fort Collins, CO.

2:48 PM - 3:06 PM

Post-traumatic loading and its influence on leukocyte infiltration in the damaged disc

S. Dudli, D. Boffa, **S. J. Ferguson**;

ETH Zurich, SWITZERLAND.

3:06 PM - 3:24 PM

Microenvironmental Cues that Regulate Morphology and Phenotype of the Nucleus Pulposus Cell of the Intervertebral Disc

L. A. Setton, P. Y. Hwang, D. T. Bridgen, L. Jing, J. Chen;

Duke University, Durham, NC.

TUESDAY Podium Sessions

3:24 PM - 3:42 PM

Osmotic Pressure Drop Induces Nucleus Pulposus Inflammation

B. G. M. van Dijk¹, E. Potier¹, M. van Dijk², M. L. P. Langelaan³, N. E. Papen-Botterhuis³, **K. Ito**¹;
¹Eindhoven University of Technology, NETHERLANDS, ²DSM Ahead B.V., Geleen, NETHERLANDS, ³TNO, Eindhoven, NETHERLANDS.

3:42 PM - 4:00 PM

Spines in space; the deleterious effects of microgravity on the intervertebral disc

J. Lotz;
University of California, San Francisco, CA

DGfB Awards Session

Session Number: 9-15 Room: Ball-B
Session Chair(s): Muendermann

Walking with lateral trunk lean reduces the external knee adduction moment but can nevertheless increase medial knee loading

V. Schwachmeyer¹, I. Kutzner¹, A. Trepczynski¹, M. O. Heller², G. Bergmann¹;
¹Charité - Universitätsmedizin Berlin, GERMANY, ²University of Southampton, UNITED KINGDOM.

Long-term In Silico Simulations Predict Longitudinal In Vivo Bone Remodeling in a Mouse Model of Postmenopausal Osteoporosis
A. Levchuk, R. Sommer, S. D. Badilatti, F. M. Lambers, C. Weigt, G. Kuhn, R. Müller;
Institute for Biomechanics, ETH Zurich, SWITZERLAND.

Bone Mineral Density in the ACL Reconstructed and Contralateral Knee Measured using pQCT: A One-Year Follow-Up Study

A. Mündermann¹, N. Payer², G. Felmet³, H. Riehle²;
¹University Hospital Basel, SWITZERLAND, ²University of Konstanz, GERMANY, ³ARTICO Sports Clinic, Villingen-Schwenningen, GERMANY.

Robot-based testing of total hip replacements with consideration of soft tissue mechanics embedded in a musculoskeletal multibody model

D. Kluess¹, R. Grawe², S. Herrmann¹, M. Kaehler², C. Woernle², R. Bader¹;
¹Department of Orthopaedics, University Medicine Rostock, GERMANY, ²Chair of Technical Dynamics, University of Rostock, GERMANY.

Relation between preoperatively determined knee varus angles and dynamic knee adduction moments

J. Funken¹, K. Heinrich¹, R. Müller¹, R. Schmidt-Wiethoff², W. Potthast¹;
¹Institute of Biomechanics and Orthopaedics, German Sport University Cologne, GERMANY, ²ARCUS Clinics, Pforzheim, GERMANY.

Prediction of the vertebral compressive failure load using finite element models accounting for the adjacent intervertebral discs

Y. Lu¹, G. Maquer², O. Museyko³, K. Engelke³, P. Zysset², M. M. Morlock¹, G. Huber¹;
¹Institute of Biomechanics, Hamburg, GERMANY, ²Institute of Surgical Technology & Biomechanics, University of Bern, SWITZERLAND, ³Institute of Medical Physics, University of Erlangen-Nuremberg, GERMANY.

Determination of the Meniscal Material Properties based on MRI Data

M. Freutel, F. Galbusera, A. Ignatius, L. Dürselen;
Institute of Orthopaedic Research and Biomechanics, Ulm, GERMANY

CSB Doctoral Awards

Session Number: 9-16 Room: 308
Session Chair(s): D. Andrews

2:30 PM - 2:48 PM

Finger Flexor Tendon Frictional Work Increases with Tendon Velocity and Force

A. M. Kociolek, J. Tat, P. J. Keir;
McMaster University, Hamilton, ON, CANADA.

2:48 PM - 3:06 PM

Persistent Quadriceps Femoralis Atrophy and Weakness Six Months Following a Single Botulinum Toxin Type-A Injection in a Rabbit Model

R. Fortuna¹, A. Sawatsky¹, M. Vaz², W. Herzog¹;
¹University of Calgary, Calgary, AB, CANADA, ²Federal University of Rio Grande do Sul, Porto Alegre, BRAZIL.

3:06 PM - 3:24 PM

An Enhanced Role for Titin in Actively Stretched Skeletal Muscle

K. Powers, A. Jinha, T. Leonard, W. Herzog;
University of Calgary, AB, CANADA.

TUESDAY Podium Sessions

3:24 PM - 3:42 PM

Understanding the Composite Structure of the Annulus Fibrosus through Biaxial Mechanical Testing

T. Karakolis, J. P. Callaghan;
University of Waterloo, ON, CANADA.

3:42 PM - 4:00 PM

A probabilistic evaluation of the sensitivity of rotator cuff muscle force predictions to muscle attachment and glenohumeral stability uncertainty

J. Chopp-Hurley¹, J. Langenderfer², C. Dickerson¹;
¹University of Waterloo, Waterloo, ON, CANADA,
²Central Michigan University, Mount Pleasant, MI

ASB New Approaches to Biomechanics in Ergonomics & Human Factors

Session Number: 9-17 Room: 307

Session Chair(s): R. E. Hughes and R. Cham

2:30 PM - 2:48 PM

Understanding Low Back Disorder Causal Pathways

W. S. Marras, E. Mendel, T. Best;
The Ohio State University, Columbus, OH.

2:48 PM - 3:06 PM

Functional Modeling of the Hand and its Use in Device Design

T. Bush¹, S. Leitkam¹, J. de la Fuente², L. Bix¹;
¹Michigan State University, East Lansing, MI,
²California Polytechnic State University, San Luis Obispo, CA.

3:06 PM - 3:24 PM

Virtual Reality Assessment Modules - The Combination of Biomechanics and Human Factors to Assess Military Performance

S. I. Ringleb, E. Chancey, J. Hanson, S. Shah, M. Hoch, H. Barber, K. Kennedy, J. P. Bliss;
Old Dominion University, Norfolk, VA.

3:24 PM - 3:42 PM

Biomechanical Exposure Assessment for Office Workers: Identifying Injury Pathways

J. T. Dennerlein¹, P. W. Johnson², A. J. van der Beek³, J. H. van Dieën³;
¹Northeastern University, Boston, MA, ²University of Washington, Seattle, WA, ³VU University Medical Center, Amsterdam, NETHERLANDS,.

3:42 PM - 4:00 PM

Preventing Slips and Falls: Biomechanics and Environment

M. Redfern, K. Beschoner, R. Cham;
University of Pittsburgh, PA

ISB Motor Control I

Session Number: 9-19 Room: 303

Session Chair(s): C. de Luca

2:30 PM - 3:06 PM

The Integration Of Biomechanics and Neuroscience for Understanding Neural Control Of Movement and its Disruption in Neurological Disorders

W. Z. Rymer, X. Hu, N. L. Suresh;
Rehabilitation Institute of Chicago/Northwestern University, Chicago, IL.

3:06 PM - 3:24 PM

Managing Physical Interaction in Assistive and Therapeutic Technologies

N. Hogan;
Massachusetts Institute of Technology, Cambridge, MA.

3:24 PM - 3:42 PM

The Distribution Problem in Biomechanics and Movement Control

W. Herzog;
University of Calgary, AB, CANADA.

3:42 PM - 4:00 PM

A neuromusculoskeletal modeling toolbox to explore the effect of different neural solutions to human movement

D. G. Lloyd¹, C. Pizzolato¹, M. Sartori², M. Reggiani³;
¹Griffith University, Gold Coast, AUSTRALIA, ²Georg-August University, Göttingen, GERMANY,
³University of Padua, ITALY

ISB Footwear Biomechanics IV: Foot and Ankle

Session Number: 9-20 Room: 304

Session Chair(s): S. Bus, A. Gruber, and T. Arndt

2:30 PM - 2:48 PM

Data-driven directions for effective footwear provision for diabetic patients with a history of foot ulceration.

M. Arts¹, M. de Haart¹, R. Waaijman¹, R. Dahmen², H. Berendsen³, F. Nollet¹, **S. Bus**¹;
¹Academic Medical Center, Amsterdam, NETHERLANDS, ²Slotervaart Hospital, Amsterdam, NETHERLANDS, ³Reinier de Graaf Gasthuis, Amsterdam, NETHERLANDS.

TUESDAY Podium Sessions

2:48 PM - 3:06 PM

Offloading Capacity and Practical Considerations in the Application of Post-operative Footwear

D. Rosenbaum;

University Hospital Münster, GERMANY.

3:06 PM - 3:24 PM

Effect of ankle braces on ankle joint contact forces and full-body kinematics during change in direction and landing tasks

U. G. Kersting;

Aalborg University, DENMARK.

3:24 PM - 3:42 PM

The Motor System Response to the Change in Foot-Ground Interface with Forefoot Running

A. H. Gruber, J. Hamill, K. A. Boyer;

University of Massachusetts Amherst, MA.

3:42 PM - 4:00 PM

The effect of ageing on the navicular drop during walking

V. Segers, I. Van Caekenberghe, D. De Clercq, S. De Mits;

Ghent University, BELGIUM

Tuesday, 8 July 2014

4:30– 6:00 PM

Bio-inspired Materials from Nanostructures II

Session Number: 10-1 Room: 109

Session Chair(s): Z. Xu

4:30 PM - 4:48 PM

Bioinspired Hierarchical Materials for Superior Toughness and Strength

Z. Zhang¹, Y. Zhang¹, B. Liu², H. Gao³;

¹Institute of High Performance Computing, SINGAPORE, ²Tsinghua University, Beijing, CHINA, ³Brown University, Providence, RI.

4:48 PM - 5:06 PM

Molecular Mechanics of Chitin-Protein Interface

Z. Yu, **D. Lau;**

City University of Hong Kong, HONG KONG.

5:06 PM - 5:24 PM

Cooperative entry of nanoparticles into the cell

X. Shi, J. Wang;

Institute of Mechanics, Chinese Academy of Sciences, Beijing, CHINA.

5:24 PM - 5:42 PM

Interfacial strengthening and toughening strategies of nacreous biomimetic composites

Y. Ni;

University of Science and Technology of China, Hefei, CHINA.

5:42 PM - 6:00 PM

Failure behaviors of Nanostructural β -sheet Crystallites under Various Loading Rates

C. Xu, **D. Li, B. Ji;**

Biomechanics and Biomaterials Laboratory, Beijing Institute of Technology, CHINA

Engineering Molecular Mechanics with Synthetic Biology II

Session Number: 10-2 Room: 110

Session Chair(s): W. C. Ruder and P. R. LeDuc

4:30 PM - 4:48 PM

Programming cellular behavior with genetic and microfluidic circuits

A. Khalil;

Boston University, Boston, MA.

4:48 PM - 5:06 PM

Sudden Motility Reversal Indicates Sensing of Magnetic Field Gradients in Magnetospirillum Magneticum (AMB-1)

L. M. Gonzalez¹, W. C. Ruder², W. C. Messner³, P. R. LeDuc¹;

¹Carnegie Mellon University, Pittsburgh, PA, ²Virginia Tech, Blacksburg, VA, ³Tufts University, Medford, PA.

5:06 PM - 5:24 PM

Controlling Biomolecular Assemblies with Synthetic Biology

F. Y. Chang, R. Zhang, **W. C. Ruder;**

Virginia Tech, Blacksburg, VA.

5:24 PM - 5:42 PM

Finite Element-based Fast Force Recovery for 2.5D Traction Force Microscopy Experiments

A. Jorge-Peñas, P. Gratesolle, H. Van Oosterwyck;

KU Leuven, BELGIUM.

5:42 PM - 6:00 PM

Regulation of Focal Adhesion Initiation by Lipids and Membrane Bending

P. J. Butler, D. Fuentes;

Penn State University, University Park, PA

TUESDAY Podium Sessions

Cell-Cell Adhesion & Cell Rheology

Session Number: 10-3 Room: 111
Session Chair(s): C. P. Heisenberg

4:30 PM - 5:06 PM

Mechanical coherence of epithelial tissues: the active role of cell-cell junctions.

A. S. Yap, G. A. Gomez, J. M. Leerberg, S. K. Wu, M. Michael;
The University of Queensland, Brisbane, AUSTRALIA.

5:06 PM - 5:24 PM

Emergence of collective modes and tridimensional structures from epithelial confinement.

M. Deforet¹, V. Hakim², **P. Silberzan**¹;
¹Institut Curie, Paris, FRANCE, ²Ecole Normale Supérieure, Paris, FRANCE.

5:24 PM - 5:42 PM

The Role of Filopodia in Directed Cancer Cell Migration in 2D and 3D

S. Geraldo¹, A. Simon¹, P. Maiuri¹, A. Funck², J. Bibette², M. Piel¹, **D. Matic Vignjevic**¹;
¹Institut Curie, Paris, FRANCE, ²ESPCI, Paris, FRANCE.

5:42 PM - 6:00 PM

The Cytoplasm of Living Cells Behaves as a Poroelastic Material

E. Moeendarbary¹, L. Valon², M. Fritzsche¹, A. Harris¹, D. Moulding¹, A. Thrasher¹, E. Stride³, L. Mahadevan⁴, **G. Charras**¹;
¹University College London, UNITED KINGDOM, ²Institut Curie, Paris, FRANCE, ³Oxford University, UNITED KINGDOM, ⁴Harvard University, Cambridge, MA

Force Generation by the Cytoskeleton on the Membrane I

Session Number: 10-4 Room: 306
Session Chair(s): N. Gov and P. Bassereau

4:30 PM - 5:06 PM

Cell locomotion driven by solitary actin gelation waves.

E. N. Sackmann;
Technical University Munich, Garching, GERMANY.

5:06 PM - 5:24 PM

Detailed Simulations and Theory of Filopodial Protrusion Dynamics

G. Papoian;

5:24 PM - 5:42 PM

Active Cytoskeletal Regulation of Cellular Membrane Tension

S. Sun;

Johns Hopkins University, Baltimore, MD.

5:42 PM - 6:00 PM

The dynamics of active contractile sheets

Y. Ideses, **A. Bernheim**;
Ben-Gurion University of the Negev, Beer-Sheva, ISRAEL

Whole Cell Biomechanics II

Session Number: 10-5 Room: 302
Session Chair(s): M. Sato and N. Wang

4:30 PM - 4:48 PM

Soft Tumor Cells Are Highly Tumorigenic

N. Wang¹, Y. Tan¹, J. Chen², Q. Jia², A. Tajik¹;
¹University of Illinois at Urbana-Champaign, IL, ²Huazhong University of Science and Technology, Wuhan, CHINA.

4:48 PM - 5:06 PM

Muscle-Like Behaviour of Non-Muscle Cells, Real-Time Response to Stiffness, and Early Cell Polarization

D. Mitrossilis, J. Fouchard, D. Pereira, A. Richert, M. Saint-Jean, **A. Asnacios, Sr.**;
Paris-Diderot University, Paris, FRANCE.

5:06 PM - 5:24 PM

Cytoskeletal remodeling modulates cardiomyocyte contractile function during aging

A. J. Engler;
UC San Diego, La Jolla, CA.

5:24 PM - 5:42 PM

Mechanical and Chemical Stimulations Effect Translocation

of Protein Kinase C α in Endothelial Cells
S. Kudo, M. Arai, K. Nishimura, C. Kora, K. Nakajima, T. Sera;
Kyushu University, Fukuoka, JAPAN.

5:42 PM - 6:00 PM

Force control of cellular adhesion arises from collective bond and cytoskeleton structure organizations at multi-scales: from theory to experiments

D. Isabey¹, E. Planus², M. Nguyen¹, G. Pelle¹, B. Louis¹;
¹Inserm-CNRS, CRETEIL, FRANCE, ²Inserm-CNRS, GRENOBLE, FRANCE

TUESDAY Podium Sessions

GEM4

Session Number: 10-6 Room: 309
Session Chair(s): Hsi

4:30 PM - 4:48 PM

Helical-Centreline Stent Suppresses Intimal Hyperplasia in Pig Carotid Arteries

C. G. Caro¹, A. Seneviratne¹, K. B. Heraty², C. Monaco³, M. G. Burke², R. Krams¹, C. C. Chang⁴, P. Gilson², G. Coppola⁵;

¹Imperial College London, UNITED KINGDOM, ²Veryan Medical Limited, Horsham, UNITED KINGDOM, ³Kennedy Institute Of Rheumatology, Oxford, UNITED KINGDOM, ⁴Saint Joseph's Translational Research Institute, Atlanta, GA, ⁵Yale School of Medicine, New Haven, CT.

4:48 PM - 5:06 PM

Integration Nanomaterials and 3D Printing for Complex Tissue Regeneration

C. O'Brien, N. Castro, J. O'Brien, **L. Zhang**;
The George Washington University, Washington, DC.

5:06 PM - 5:24 PM

The glyco-caylx forces metastasis by priming integrins

V. Weaver

5:24 PM - 6:00PM

The Study of Human Diseases at the Intersections of Engineering, Sciences & Medicine

S. Suresh

Heart Valve Fluid Mechanics: The Chandran Impact

Session Number: 10-7 Room: 300

Session Chair(s): K. Manning and A. Yoganathan

4:30 PM - 4:48 PM

Turbulent Shear Stress, Cavitation, Platelet Kinetics, Tissue Engineering, and Physical and Numerical Modeling: 30 Years of Impact on our Knowledge of Heart Valves

R. Schoephoerster;

The University of Texas at El Paso, TX.

4:48 PM - 5:06 PM

State of the Art Fluid Mechanics Studies on Bileaflet Mechanical Heart Valves

B. Yun, B. H. Jun, A. M. Fallon, N. Saikrishnan, **A. P. Yoganathan**;

Georgia Institute of Technology, Atlanta, GA.

5:06 PM - 5:24 PM

From Artificial Hearts and Heart Valves to Mechanical Forces on Cells

J. M. Tarbell;

The City College of New York, NY.

5:24 PM - 5:42 PM

Optimization of the thrombogenic performance of the syncardia total artificial heart with monoleaflet and bileaflet MHV

S. Einav^{1,3}, M. Slepian², D. Bluestein³;

¹Tel Aviv, ISRAEL, ²University of Arizona, Tucson, AZ, ³Stony Brook University, NY.

5:42 PM - 6:00 PM

Towards the Development of a Surgical Simulation Tool for Mitral Valve Repair Surgery

P. Gade¹, Y. Rim², A. Choi², V. Magnotta¹, N. Grosland¹, H. Kim², **S. Vigmstad**¹;

¹The Univ. of Iowa, Iowa City, IA, ²University of Texas Health Science Center, Houston, TX

Abdominal Aortic Aneurysm II

Session Number: 10-8 Room: Ball-C

Session Chair(s): E. Finol and Y. Papaharilaou

4:30 PM - 4:48 PM

Hemodynamics of abdominal aortic aneurysms

S. Shadden;

University of California, Berkeley, CA.

4:48 PM - 5:06 PM

Biomechanical and Micro-architectural Investigation of Ascending Thoracic Aortic Aneurysms with Different Aortic Valve Phenotypes

D. Vorp;

University of Pittsburgh, PA.

5:06 PM - 5:24 PM

Influence of Intraluminal Thrombus on Abdominal Aortic Aneurysm Evolution

E. Metaxa¹, N. Kontopodis², C. Ioannou², **Y.**

Papaharilaou¹;

¹Foundation for Research and Technology, Heraklion, GREECE, ²Medical School, University of Crete, Heraklion, GREECE.

5:24 PM - 5:42 PM

Influence of Unloaded Vascular Geometry and ILT Topology in Abdominal Aortic Aneurysms

F. Riveros¹, E. Finol², C. Gasser³, **J. F. Rodriguez**¹;

¹Aragon Institute for Engineering Research / University of Zaragoza, SPAIN, ²University of Texas San Antonio, TX, ³The Royal Institute of Technology, Stockholm, SWEDEN.

TUESDAY Podium Sessions

5:42 PM - 6:00 PM

Growth and remodeling model of abdominal aortic aneurysm: Toward clinical applications

S. Baek, J. Choi;

Michigan State University, East Lansing, MI

Cardiac Growth and Remodeling Mechanics

Session Number: 10-9 Room: 312

Session Chair(s): M. Nash and J. Holmes

4:30 PM - 4:48 PM

Intertwining of Mechanotransduction Pathways Required for Control of Macroscopic Geometry and Structure of the Heart

T. Arts, J. Lumens, T. Delhaas;

Maastricht University, NETHERLANDS.

4:48 PM - 5:06 PM

Modelling the looping phase of heart growth

N. Ebrahimi, J. Hussan, M. Cooling, C. Bradley, **P.**

Hunter;

University of Auckland, NEW ZEALAND.

5:06 PM - 5:24 PM

Mechanical analysis of structural and functional remodeling in heart failure

V. Y. Wang¹, J. A. Niestrawska², A. J. Wilson³, G. B. Sands³, A. A. Young⁴, I. J. LeGrice³, M. P. Nash⁵;

¹Auckland Bioengineering Institute, NEW ZEALAND,

²Department of Cardiovascular Engineering, RWTH Aachen University of Technology, GERMANY,

³Department of Physiology, University of Auckland, NEW ZEALAND, ⁴Department of Anatomy and

Radiology, University of Auckland, NEW ZEALAND,

⁵Department of Engineering Science, University of Auckland, NEW ZEALAND.

5:24 PM - 5:42 PM

Role of Reflex Hemodynamic Compensation in Post-Infarction Hypertrophy

W. Zhang¹, R. C. P. Kerckhoffs², **J. W. Holmes**¹;

¹University of Virginia, Charlottesville, VA,

²University of California, San Diego, CA.

5:42 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Connective Tissue Mechanical Behavior: Experiments & Modeling

Session Number: 10-10 Room: 313

Session Chair(s): C. Simms

4:30 PM - 4:48 PM

Biomechanical Study of Abdominal Wall in vivo: a Preliminary Study on Patients

D. Mitton¹, D. Tran¹, P. Beillas¹, P. Chiche², O. Duwat², J. Caillot³, F. Turquier⁴;

¹Université de Lyon - IFSTTAR, Lyon, FRANCE,

²Hôpital de Rambouillet, FRANCE, ³Hôpital Lyon-Sud, Lyon, FRANCE, ⁴Covidien, Trévoux, FRANCE.

4:48 PM - 5:06 PM

Mechanical Characterisation of the Porcine Linea Alba

G. M. Cooney¹, K. Moerman², M. Takaza¹, D. Winter³, C. K. Simms¹;

¹Trinity College Dublin, IRELAND, ²Academic

Medical Centre, Department of Radiology, Meibergdreef 9, Amsterdam, NETHERLANDS, ³St.

Vincent's University Hospital, Dublin, IRELAND.

5:06 PM - 5:24 PM

Uniaxial and Biaxial Response of Porcine Rectus Sheath

M. Lyons¹, D. C. Winter², C. K. Simms¹;

¹Trinity College, Dublin, IRELAND, ²Department of Surgery, St Vincent's University Hospital, Dublin 4,

IRELAND

5:24 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Lymphatics & Interstitial Fluid II: Cancer and Immunity

Session Number: 10-11 Room: 305

Session Chair(s): B Dixon and J. Moore

4:30 PM - 4:48 PM

Solid stress and interstitial fluid pressure in tumors: Coevolution, implications and alleviation

R. K. Jain;

Harvard Medical School - Massachusetts General Hospital, Boston, MA.

4:48 PM - 5:06 PM

Tissue Vascular Status Regulates the Dissemination of Interstitial Biomolecules to Regional and Systemic Tissues

N. A. Rohner, **S. N. Thomas**;

Georgia Institute of Technology, Atlanta, GA.

TUESDAY Podium Sessions

5:06 PM - 5:24 PM

Interstitial Flow, Hepatitis B, and Hepatocellular Carcinoma

A. C. Shieh;

Drexel University, Philadelphia, PA.

5:24 PM - 5:42 PM

Tumor-secreted exosome uptake and transport by lymphatic endothelial cells

M. Swartz;

5:42 PM - 6:00 PM

Inverse Mechanical Tropism of Metastatic Ovarian Cancer Cells

M. R. Dawson, D. McGrail;

Georgia Institute of Technology, Atlanta, GA

Respiratory Biomechanics: Transport & Disease

Session Number: 10-12 Room: 301

Session Chair(s): J. Bates and M. Filoche

4:30 PM - 4:48 PM

Mechanics and bioactivity of decellularized lung matrix

L. Niklason;

Yale University, New Haven, CT.

4:48 PM - 5:06 PM

Mechanics of airway smooth muscle cells

S. Ito, Y. Hasegawa;

Nagoya University School of Medicine, JAPAN.

5:06 PM - 5:24 PM

The Isolated Airway Wall in Asthma Research

P. B. Noble;

The University of Western Australia, Crawley, AUSTRALIA.

5:24 PM - 5:42 PM

Supplementing image-based measurements of the pulmonary circulation with structure-based computational models

K. S. Burrowes¹, A. R. Clark², R. B. Buxton³, G. K. Prisk³, M. H. Tawhai²;

¹University of Oxford, UNITED KINGDOM, ²Auckland Bioengineering Institute, The University of Auckland, NEW ZEALAND, ³University of California, San Diego, CA.

5:42 PM - 6:00 PM

Mechanobiology of Nasal Epithelial Cells in Response to Exposure to Air Pollution

D. Elad¹, U. Zaretsky¹, S. Avraham¹, R. Gottlieb¹, M. Wolf²;

¹Tel Aviv University, ISRAEL, ²Sheba Medical Center, Tel HaShomer, ISRAEL

Reproductive & Women's Health III: Biomechanics of Pregnancy & Delivery 1

Session Number: 10-13 Room:311

Session Chair(s): K. Myers and Feltovich

4:30 PM - 4:48 PM

Hydraulic mechanics of the pregnant uterus; Non-invasively determining the strength of human uterine contractions of labor

R. C. Young;

University of Tennessee Health Science Center, Memphis, TN.

4:48 PM - 5:06 PM

Mechanical Characterization of Cervical Tissue by Shear wave Ultrasound

G. Rus¹, F. S. Molina², L. Peralta¹, J. Florido¹, J. M. Melchor¹, A. Gomez¹, N. Bochud¹, J. Chiachio¹, M. Chiachio¹;

¹University of Granada, SPAIN, ²Hospital Universitario San Cecilio, Granada, SPAIN.

5:06 PM - 5:24 PM

Measuring the Biomechanical Properties of the Pregnant Cervix

S. Badir¹, M. Bajka², R. Zimmermann², **E. Mazza¹;**

¹ETH Zurich, SWITZERLAND, ²University Hospital, Zurich, SWITZERLAND.

5:24 PM - 5:42 PM

Cervical Mucus Properties Stratify Risk for Preterm Birth

A. Critchfield¹, G. Yao², A. Jaishankar², R. S. Friedlander³, O. Lieleg², P. S. Doyle², G. McKinley², M. House¹, **K. Ribbeck²;**

¹Tufts Medical Center, Boston, MA, ²MIT, Cambridge, MA, ³MIT-Harvard Division of Health Sciences and Technology, Cambridge, MA.

5:42 PM - 6:00 PM

Early Diagnosis of Threatened Premature Labor by Electrohysterographic Recordings - Advanced Signal Processing Methods

E. Oczeretko¹, A. Lemancewicz²;

¹Bialystok University of Technology, POLAND, ²Medical University of Bialystok, POLAND

TUESDAY Podium Sessions

Intervertebral Disc Mechanobiology II

Session Number: 10-14 Room: Ball-A
Session Chair(s): K. Ito and D. Elliot

4:30 PM - 4:48 PM

Development and Translation of Engineered Constructs that Replicate the Complex Hierarchical Structure and Function of the Intervertebral Disc
R. Mauck;
University of Pennsylvania, Philadelphia, PA.

4:48 PM - 5:06 PM

Structural and Functional Repair of Annulus Fibrosus Defects
M. Likhitpanichkul¹, M. Dreischarf², S. Illien-Junger¹, B. A. Walter¹, T. Nukaga³, R. G. Long¹, D. Sakai³, A. C. Hecht¹, **J. C. Iatridis**¹;
¹Icahn School of Medicine at Mount Sinai, New York, NY, ²Julius Wolff Institute, Charité-Universitätsmedizin, Berlin, GERMANY, ³Tokai University School of Medicine, Kanagawa, JAPAN.

5:06 PM - 5:24 PM

Rheological and Dynamic Properties and Glycosaminoglycan (GAG) of Degenerated Intervertebral Disc after Natural Crosslinking Reagent and Platelet-Rich Plasma Therapy - An In Situ Study Using Whole Organ Culture System
J. Wang, Y. Hsu;
National Taiwan University, Taipei, TAIWAN.

5:24 PM - 5:42 PM

Exploration of cause-and-effect relationships between extracellular matrix condition, mechanical cues, solute transport and cell viability in the intervertebral disc
J. Noailly¹, A. Malandrino¹, C. Ruiz¹, D. Lacroix²;
¹Biomechanics and Mechanobiology - Institute for Bioengineering of Catalonia (IBEC), Barcelona, SPAIN, ²INSIGNEO Institute for in silico Medicine - University of Sheffield, UNITED KINGDOM.

5:42 PM - 6:00 PM

Biomechanics of the intervertebral disc: ex vivo studies in a controlled environment
T. H. Smit¹, P. Vergroessen¹, K. Emanuel¹, K. Paul¹, I. Kingma²;
¹VU University Medical Centre, Amsterdam, NETHERLANDS, ²Faculty of Movement Sciences, VU University, Amsterdam, NETHERLANDS

Patellofemoral Mechanics & Pain

Session Number: 10-15 Room: Ball-B
Session Chair(s): S. Pal

4:30 PM - 4:48 PM

Consensus Summary of the 3rd International Patellofemoral Pain Research Retreat
I. S. Davis;
Harvard Medical School, Boston, MA.

4:48 PM - 5:06 PM

The Effect of Femoral Rotation During Total Knee Arthroplasty on Patellofemoral Contact Characteristics
L. G. Coles, S. Gheduzzi, A. W. Miles;
University of Bath, Claverton, UNITED KINGDOM.

5:06 PM - 5:24 PM

Are Kinematic and Kinetic Analyses Useful to Evaluate Patellofemoral Disorders in the Clinical Practice?
V. Sanchis-Alfonso¹, E. Montesinos-Berry², D. Garrido-Jaen³;
¹Hospital Arnau de Vilanova, Valencia, SPAIN, ²Agoriaz Orthopedic Center, Riaz, SWITZERLAND, ³Instituto de Biomecánica de Valencia (IBV), Valencia, SPAIN.

5:24 PM - 5:42 PM

Effects of Quadriceps Muscle Force Variability on Patellofemoral Cartilage Stress
S. Pal¹, T. Besier², M. Fredericson³, G. Gold³, S. Delp³, G. Beaupre⁴;
¹California Polytechnic State University, San Luis Obispo, CA, ²Auckland Bioengineering Institute, NEW ZEALAND, ³Stanford University, CA, ⁴VA Palo Alto, CA

5:42 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

State of the Art in Motion Capture & Analysis

Session Number: 10-16 Room: 308
Session Chair(s): M. Tanaka and T. Gardner

4:30 PM - 4:48 PM

Tracking, Recognition and Visualization of Humans Using Camera Networks
R. Chellappa;

TUESDAY Podium Sessions

4:48 PM - 5:06 PM

Capturing Olympic Divers and Swimmers, Baseball Pitchers, Hollywood Super Heroes, and Politicians: Advances in Next-Gen Motion Capture.

C. Bregler;

New York University, New York, NY.

5:06 PM - 5:24 PM

Inverse Dynamics and the Immeasurable Motions

J. Rasmussen¹, M. S. Andersen¹, M. Damsgaard²;

¹Aalborg University, DENMARK, ²AnyBody Technology, Aalborg, DENMARK.

5:24 PM - 5:42 PM

Integrating Virtual Reality and Motion Capture for Clinical Assessment and Rehabilitation

J. B. Dingwell¹, J. M. Wilken²;

¹University of Texas at Austin, TX, ²Brooke Army Medical Center, San Antonio, TX.

5:42 PM - 6:00 PM

Fluoroscopy and Roentgen Stereophotogrammetry to measure joint kinematics

B. L. Kaptein, E. R. Valstar;

LUMC, Leiden, NETHERLANDS

ASB New Approaches to Bio-mechanics in Ergonomics & Human Factors II

Session Number: 10-17 Room: 307

Session Chair(s): R. E. Hughes and R. Cham

4:30 PM - 5:06 PM

Advancing the Occupational Biomechanical Science Base Through New Measurement and Modeling Approaches

X. Zhang;

University of Pittsburgh, PA.

5:06 PM - 5:24 PM

Resolving relative contributions to fatigue-induced subacromial space changes: a combined kinematic/imaging/simulation approach

C. Dickerson¹, J. Chopp-Hurley¹, J. Langenderfer²;

¹University of Waterloo, ON, CANADA, ²Central Michigan University, Mount Pleasant, MI.

5:24 PM - 5:42 PM

Exposure to high levels of shoulder exposure to arm elevation results in altered biomechanics in dental hygienists

A. Karduna¹, L. Ettinger²;

¹University of Oregon, Eugene, OR, ²Saba University School of Medicine, Dutch Caribbean, NETHERLANDS.

5:42 PM - 6:00 PM

Application of Occupational Ergonomics Methods to the Analysis of Devices Used to Evacuate Individuals With Mobility Limitations From High Rise Buildings.

S. A. Lavender¹, G. E. Hedman², J. P. Mehta¹, S. Park¹, P. A. Reichelt², K. M. Conrad²;

¹The Ohio State University, Columbus, OH, ²The University of Illinois at Chicago, IL

ANZSB Young Investigator & Student Awards

Session Number: 10-18 Room: 310

Session Chair(s): R. Barrett

4:30 PM - 4:48 PM

Muscle Co-Contraction during Isometric Plantar Flexion and Dorsiflexion.

B. J. Raiteri, G. A. Lichtwark, A. G. Cresswell;

University of Queensland, Brisbane, AUSTRALIA.

4:48 PM - 5:06 PM

Calibrated 4-Degree of Freedom EMG-driven Model Predictions of Medial and Lateral Tibiofemoral Compartment Contact Loading in Healthy Humans during Walking, Running, and Side-step Cutting.

D. J. Saxby¹, P. Gerus², D. G. Lloyd¹;

¹Centre for Musculoskeletal Research, Gold Coast, AUSTRALIA, ²Laboratoire de Motricité Humaine Education, Sport, Santé, University of Nice-Sophia Antipolis, Nice, FRANCE.

5:06 PM - 5:24 PM

Measuring large deformation properties of calf muscles using Magnetic Resonance Elastography

K. Tan^{1,2}, S. Cheng^{1,3}, A. Hatt¹, L. E. Bilston^{1,4};

¹Neuroscience Research Australia, Randwick, AUSTRALIA, ²Graduate School of Biomedical Engineering, University of New South Wales, Randwick, AUSTRALIA, ³Department of Engineering, Macquarie University, ⁴Prince of Wales Clinical School, University of New South Wales, Randwick, AUSTRALIA

5:24 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

ISB Motor Control II

Session Number: 10-19 Room: 303

Session Chair(s): P. Rowe

4:30 PM - 4:48 PM

Motor Control Strategies in Humans for Avoiding Injury During Falls

S. N. Robinovitch, Y. Yang;

Simon Fraser University, Burnaby, BC, CANADA.

TUESDAY Podium Sessions

4:48 PM - 5:06 PM

Using Neural Control Signals to Study Joint Mechanics in Real-time

T. S. Buchanan, K. Manal;
University of Delaware, Newark, DE.

5:06 PM - 5:24 PM

Control of dexterous manipulation: biomechanics and neural mechanisms.

M. Santello;
Arizona State University, Tempe, AZ.

5:24 PM - 5:42 PM

Transposed Activation of Motor Units during Oscillatory Contractions

P. Contessa, J. Kline, C. De Luca;
Boston University, Boston, MA.

5:42 PM - 6:00 PM

Muscle activation and motor learning in older adults

E. A. Christou, Y. Chen, M. Kwon, C. Kim, T. Onushko, H. Moon;
University of Florida, Gainesville, FL

Physical Activity Assessment with Body Worn Sensors

Session Number: 10-20 Room: 304

Session Chair(s): D. Rosenbaum

4:30 PM - 4:48 PM

Research- and consumer-based activity monitors and future technological developments

G. Welk;
Iowa State University, Ames, IA.

4:48 PM - 5:06 PM

Applying sensor-based activity monitoring in clinical practice

R. Senden, I. Heyligers, B. Grimm;
Ahorse, Heerlen, NETHERLANDS.

5:06 PM - 5:24 PM

Quantity and quality of daily locomotion as predictors of fall risk in older adults

J. van Dieen¹, K. van Schooten¹, S. Rispens¹, P. Elders², P. Lips², M. Pijnappels¹;
¹VU University Amsterdam, NETHERLANDS, ²VU Medical Center Amsterdam, NETHERLANDS.

5:24 PM - 5:42 PM

Duration of stabilization after sit to stand movement detected with body worn sensors

R. C. Van Lummel¹, U. Lindemann², J. Evers¹, L. Van Oosten³, C. Becker², J. H. van Dieen³;
¹McRoberts, The Hague, NETHERLANDS,
²Department of Clinical Gerontology, Robert-Bosch Hospital, Stuttgart, GERMANY, ³MOVE Research Institute, VU University, Amsterdam, NETHERLANDS.

5:42 PM - 6:00 PM

Applications of physical activity assessment in Orthopaedics and Oncology

D. Rosenbaum;
University Hospital Münster, GERMANY

WEDNESDAY Podium Sessions

Wednesday, 9 July 2014
8:00– 9:30 PM

Nanomechanics of the Cellular Environment

Session Number: 11-1 Room: 109

Session Chair(s): J. Bourne and C. Reinhart-King

8:00 AM - 8:18 AM

Effects of Tumor-Like Matrix Stiffening on
Microvascular Growth and Integrity

B. Mason, D. LaValley, J. Califano, L. Bonassar, **C. Reinhart-King**;

Cornell University, Ithaca, NY.

8:18 AM - 8:36 AM

The Impact of Matrix Glycation and Mechanics on
Endothelial Cell Mechanotransduction, Collective
Migration, and Inflammatory Response

A. Canver, R. Urbano, **A. M. Clyne**;

Drexel University, Philadelphia, PA.

8:36 AM - 8:54 AM

The Effect of Pericellular Matrix Development on
the Deformation of Chondrocytes during Cartilage
Tissue Engineering.

C. C. van Donkelaar¹, M. Khoshgofar², S. A. H. de
Vries¹, M. C. van Turnhout¹, C. W. J. Oomens¹, K.
Ito¹;

¹Eindhoven University of Technology,
NETHERLANDS, ²Radboud University Medical
Center, Nijmegen, NETHERLANDS.

8:54 AM - 9:12 AM

Nanotopographic Cues Induce Polarity and
Directional Migration of Carcinoma Cells

A. Ray¹, O. Lee², D. Kim², **P. Provenzano**¹;

¹University of Minnesota, Minneapolis, MN,
²University of Washington, Seattle, WA.

9:12 AM - 9:30 AM

Mechanochemistry of Collagen Degradation and
Assembly

J. W. Ruberti, J. Paten;

Northeastern University, Boston, MA

Single Molecule Mechanics of Motor Proteins I

Session Number: 11-2 Room: 110

Session Chair(s): W. Hwang and M.J. Lang

8:00 AM - 8:36 AM

The structure and mechanics of the Vorticella
spasmoneme, a polymer engine capable of
mm/msec contractions

P. Masudaira;

8:36 AM - 8:54 AM

Large-scale simulations of the mechanics of
microtubules interactions with motor proteins

R. Dima;

University of Cincinnati, OH.

8:54 AM - 9:12 AM

Role of the Kinesin Neck-linker in Navigating
Obstacles on the Microtubule Surface

C. Berger;

9:12 AM - 9:30 AM

Tracking the Activity of Single Protein Translocases
with Optical Tweezers

M. Aubin-Tam;

Delft University of Technology, NETHERLANDS

Mechanotransduction at Focal Adhesions

Session Number: 11-3 Room: 111

Session Chair(s): M. Mofrad

8:00 AM - 8:18 AM

Stretching proteins: structural mechanisms that
enable mechano-chemical signal conversion

V. Vogel;

ETH Zurich, SWITZERLAND.

8:18 AM - 8:36 AM

Nanomechanics of Intercellular Force Transduction

D. Leckband, J. Li, J. Newhall, S. Barrick, A. Ray, E.
Tajkhorshid;

University of Illinois, Urbana, IL.

8:36 AM - 8:54 AM

Regulatory Pathways Controlling Focal Adhesion
Dynamics

B. Yang¹, Y. Nishimura¹, P. Kanchanawong¹, A.
Lichtenstein², B. Geiger², M. P. Sheetz¹, **A. D.**

Bershadsky¹;

¹Mechanobiology Institute, National University of
Singapore, SINGAPORE, ²Weizmann Institute of
Science, Rehovot, ISRAEL.

8:54 AM - 9:12 AM

Molecular Mechanics of the Focal Adhesion
Machinery

M. R. K. Mofrad;

University of California Berkeley, CA

9:12 AM - 9:30 AM

See Program Supplement and Errata Sheet for
possible additions

WEDNESDAY Podium Sessions

Force Generation by the Cytoskeleton on the Membrane II

Session Number: 11-4 Room: 306
Session Chair(s): N. Gov and P. Bassereau

8:00 AM - 8:18 AM

Cytokinesis dynamics: mechanics of cortical actin
J. Joanny, H. Turlier, J. Prost;
Institut Curie Centre de Recherche, Paris Cedex, FRANCE.

8:18 AM - 8:36 AM

Molecular Mechanisms of Contractility-based Cellular Mechanosensing
D. N. Robinson;
Johns Hopkins School of Medicine, Baltimore, MD.

8:36 AM - 8:54 AM

Effect of Protein-induced Spontaneous Curvature on Membrane Tension
P. Rangamani, K. K. Mandadapu, G. Oster;
UC Berkeley, CA.

8:54 AM - 9:12 AM

Probing membrane and cytoskeletal mechanics by magnetic particle actuation and 3D rotational particle tracking
M. Irmscher¹, A. M. de Jong¹, **H. Kress², M. W. J. Prins¹;
¹Eindhoven University of Technology, NETHERLANDS, ²University of Bayreuth, GERMANY.**

9:12 AM - 9:30 AM

Contractile forces regulate cell division in three-dimensional environments
A. Lesman;

Whole Cell Biomechanics III

Session Number: 11-5 Room: 302
Session Chair(s): M. Sato and N. Wang

8:00 AM - 8:18 AM

Formation of Mesoscale Structure and the Role of Cell Mechanics in Tissue Stiffening in Engineered 3D Microtissues
D. H. Reich¹, R. Zhao², T. Boudou³, W. Wang⁴, C. S. Chen⁵;
¹Johns Hopkins University, Baltimore, MD, ²University at Buffalo, NY, ³Grenoble Institute of Technology, FRANCE, ⁴University of Arizona, Tucson, AZ, ⁵Boston University, MA.

8:18 AM - 8:36 AM

Interfering with Nucleus-Actin Filament Binding in Endothelial Cells Exposed to Cyclic Stretching
N. Sakamoto¹, T. Anno², S. Chubachi³, S. Deguchi⁴, M. Sato⁵;
¹Department of Medical Engineering, Kawasaki University of Medical Welfare, Kurashiki, JAPAN, ²Department of Biomedical Engineering, Tohoku University, Sendai, JAPAN, ³Department of Bioengineering and Robotics, Sendai, JAPAN, ⁴Department of Nanopharmaceutical Sciences, Nagoya Institute of Technology, JAPAN, ⁵Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, JAPAN.

8:36 AM - 8:54 AM

Single Molecule Studies Unveil Biophysical and Molecular Mechanisms of Tumor Repopulating Cells
F. Chowdhury, N. Wang, T. Ha;
University of Illinois at Urbana-Champaign, IL.

8:54 AM - 9:12 AM

Mechanical interaction between actin stress fibers and the nucleus: Direct force transmission from the whole cell level to the nucleus
K. Nagayama, Y. Yahiro, S. Yamazaki, T. Matsumoto;
Nagoya Institute of Technology, JAPAN.

9:12 AM - 9:30 AM

Tensional homeostasis in single fibroblasts
D. A. Fletcher;
UC Berkeley, CA

Advancements in Tissue Engineering Bioreactor Design

Session Number: 11-6 Room: 309
Session Chair(s): M. Moretti and A. Marsano

8:00 AM - 8:18 AM

Recent advances in bioreactor designs for engineering complex tissues
K. Ronaldson, S. Bhumiratana, J. O'Neill, **G. Vunjak-Novakovic**;
Columbia University, New York, NY.

8:18 AM - 8:36 AM

Automated Cell Processing Based on Flexible Modular Platform
M. Kino-oka;
Osaka University, JAPAN.

WEDNESDAY Podium Sessions

8:36 AM - 8:54 AM

Bioreactors for translational research and engineered tissue manufacturing
A. Marsano, D. Wendt, I. Martin;
University Basel, SWITZERLAND.

8:54 AM - 9:30 AM

A microbio reactor for uniaxial mechanical stretch of cardiac stem cells monolayers
G. S. Ugolini¹, M. Soncini¹, A. Pavesi², R. D. Kamm³, R. Santoro⁴, G. Polvani⁵, M. Pesce⁴, G. B. Fiore¹, M. Rasponi¹;
¹Politecnico di Milano, ITALY, ²Singapore MIT Alliance for Research and Technology (SMART), SINGAPORE, ³Massachusetts Institute of Technology, Cambridge, MA, ⁴Laboratorio di Ingegneria Tissutale Cardiovascolare, Centro Cardiologico Monzino, Milan, ITALY, ⁵Dipartimento di Scienze Cliniche e di Comunità, Università di Milano, Milan, ITALY

Imaging in Vascular Biomechanics

Session Number: 11-7 Room: 300
Session Chair(s): M. Gounis, D Vorp, J. vande Geest

8:00 AM - 8:18 AM

MR and modeling to determine plaque stress
H. Nieuwstadt, A. van der Lugt, A. van der Steen, J. Wentzel, **F. Gijzen**;
Erasmus MC, Rotterdam, NETHERLANDS.

8:18 AM - 8:36 AM

Enhanced numerical diagnostic tools in abdominal aortic aneurysm rupture assessment
T. McGloughlin¹, A. Callanan², A. Tierney³;
¹University of Limerick and Khalifa University of Science Technology and Research, Limerick and Abu Dhabi, IRELAND, ²University of Edinburgh, UNITED KINGDOM, ³Cook Medical, Limerick, IRELAND.

8:36 AM - 8:54 AM

Wall-Motion Based Analysis of Left Atrial Mechanics
C. B. Moyer, P. T. Norton, J. D. Ferguson, J. W. Holmes;
University of Virginia, Charlottesville, VA.

8:54 AM - 9:12 AM

Mechanical and compositional assessment of atherosclerotic plaques using combined ultrasound elasticity and thermal strain imaging
K. Kim¹, X. Ding¹, A. M. Mahmoud¹, D. Dutta¹, S. A. Leers¹, D. N. Stephen²;
¹University of Pittsburgh, PA, ²University of California - Davis, CA.

9:12 AM - 9:30 AM

High Resolution Cone Beam CT Angiography to Detect Vascular Response to Arterial Implants
M. J. Gounis¹, A. S. Puri¹, I. M. J. van der Bom², J. Chueh¹, A. K. Wakhloo¹;
¹University of Massachusetts Medical School, Worcester, MA, ²Philips Healthcare, Best, NETHERLANDS

Abdominal Aortic Aneurysm III

Session Number: 11-8 Room: Ball-C
Session Chair(s): E. Finol and Y. Papaharilaou

8:00 AM - 8:18 AM

Human Thoracic and Abdominal Aortic Aneurysmal Tissues: Damage Experiments, Analysis and Modeling
D. M. Pierce¹, F. Maier², H. Weisbecker², C. Viertler³, P. Verbrugghe⁴, N. Famaey⁵, I. Fourneau⁴, P. Herijgers⁴, G. A. Holzapfel²;
¹University of Connecticut, Storrs, CT, ²Graz University of Technology, AUSTRIA, ³Medical University Graz, AUSTRIA, ⁴UZ Leuven, BELGIUM, ⁵KU Leuven, BELGIUM.

8:18 AM - 8:36 AM

Computational Mechanics of Abdominal Aortic Aneurysm
P. Hoskins;
University of Edinburgh, UNITED KINGDOM.

8:36 AM - 8:54 AM

Necropsy Studies of AAA: Role of Wall Tension and Failure Tension in Rupture
M. L. Raghavan¹, T. K. Chung¹, E. S. da Silva²;
¹University of Iowa, Iowa City, IA, ²University of São Paulo School of Medicine, BRAZIL.

8:54 AM - 9:12 AM

Assessment of Aortic Geometry, Pulsatile Motion, and Expansion in Rodent Experimental Aneurysms with Noninvasive Imaging.
C. J. Goergen;
Purdue University, West Lafayette, IN.

WEDNESDAY Podium Sessions

9:12 AM - 9:30 AM

Determining the Influence of Calcification on Rupture Potential of Abdominal Aortic Aneurysm (AAA) Tissue.

S. O'Leary¹, D. Healy², E. Kavanagh², P. Grace², T. McGloughlin¹, B. Doyle³;

¹Centre for Applied Biomedical Engineering Research, University of Limerick, IRELAND, ²Mid-Western Regional Hospital, Limerick, IRELAND, ³Intelligent Systems for Medicine Laboratory, School of Mechanical and Chemical Engineering, The University of Western Australia, Perth, AUSTRALIA

Mechanics of Myocardial Infarction & Post-Infarction Therapies

Session Number: 11-9 Room: 312

Session Chair(s): J. W. Holmes and J. F. Wenk

8:00 AM - 8:18 AM

Infarct Expansion, LV Remodeling and the Potential to Prevent Heart Failure

R. Gorman;

8:18 AM - 8:36 AM

Estimating Infarct Mechanical Property Alterations due to Hydrogel Injection

D. Mojsejenko¹, H. Wang¹, S. M. Dorsey², J. R. McGarvey², J. H. Gorman, III², J. J. Pilla², J. A. Burdick², R. C. Gorman², **J. F. Wenk**¹;

¹University of Kentucky, Lexington, KY, ²University of Pennsylvania, Philadelphia, PA.

8:36 AM - 8:54 AM

Tailoring Intramyocardial Hydrogel Injections for the Treatment of Acute Cardiac Infarcts

T. Franz, P. C. W. Wise, J. Kortsmits, L. Dubuis, N. H. Davies;

University of Cape Town, SOUTH AFRICA.

8:54 AM - 9:12 AM

Mechanism underlying mechanical dysfunction in the border zone of a myocardial infarction: finite element model and direct active force measurement studies

L. Lee¹, M. Genet¹, J. Wenk², E. Kuhl³, S. Kozerke⁴, R. Gorman⁵, J. Guccione¹;

¹University of California, San Francisco, CA, ²University of Kentucky, Lexington, KY, ³Stanford University, Palo Alto, CA, ⁴ETH Zürich, SWITZERLAND, ⁵University of Pennsylvania, Philadelphia, PA.

9:12 AM - 9:30 AM

Do Infarcts Really Expand or Compact? Implications for Design of Novel Therapies

W. J. Richardson, **J. W. Holmes**;

University of Virginia, Charlottesville, VA

Biomechanical Evaluation of Tissue Engineered Cartilage

Session Number: 11-10 Room: 313

Session Chair(s): M. Detamore

8:00 AM - 8:36 AM

Optimization of Culture Conditions for Large Cartilage Tissue Constructs Using Computational Modeling of Nutrient Consumption, Matrix Deposition and Growth

R. J. Nims, A. D. Cigan, M. B. Albro, G. Vunjak-Novakovic, C. T. Hung, **G. A. Ateshian**;

Columbia University, New York, NY.

8:36 AM - 8:54 AM

Cartilage biomechanics: What really happens inside a joint?

Z. Abusara, W. Herzog;

University of Calgary, AB, CANADA.

8:54 AM - 9:12 AM

A stratified approach to retain matrix in low concentration agarose gels subjected to sliding indentation

C. C. van Donkelaar¹, M. F. Frias Goyenechea¹, L. M. Kock², K. Ito¹;

¹Eindhoven University of Technology, NETHERLANDS, ²University Medical Center Utrecht, NETHERLANDS.

9:12 AM - 9:30 AM

Panel Discussion

M. S. Detamore;

University of Kansas, Lawrence, KS

Lymphatics and Interstitial Fluid III: Lymphatic Physiology

Session Number: 11-11 Room: 305

Session Chair(s): B. Dixon and J. Moore

8:00 AM - 8:18 AM

Computational Modelling of Lymph Flow in Lymph Nodes

M. Jafarnejad¹, M. C. Woodruff², M. C. Carroll², **J. Moore, Jr.**¹;

¹Imperial College London, UNITED KINGDOM,

²Harvard Medical School, Boston, MA.

WEDNESDAY Podium Sessions

8:18 AM - 8:36 AM

Mechanobiological Control of Lymphatic Transport
J. Baish¹, C. Kunert², T. Padera², **L. L. Munn**²;
¹Bucknell University, Lewisburg, PA,
²Massachusetts General Hosp., Charlestown, MA.

8:36 AM - 8:54 AM

Lymphatic Vessels in Health and Disease
T. P. Padera;
Massachusetts General Hospital, Boston, MA.

8:54 AM - 9:12 AM

Utilization of a feedback controlled lymphatic perfusion system for determining effects of shear rate and pressure on lymphatic wall shear stress sensitivity
J. Dixon¹, J. Kornuta¹, Z. Nepiyushchikh¹, D. Zawieja²;
¹Georgia Institute of Technology, Atlanta, GA,
²Texas A&M Health Science Center, Temple, TX.

9:12 AM - 9:30 AM

Regulation of Lymphatic Contractile Function
D. C. Zawieja;
Texas A&M Univ College of Medicine, Temple, TX

Multiscale Modeling I: Orthopaedics

Session Number: 11-12 Room: 301
Session Chair(s): A. Erdemir

8:00 AM - 8:36 AM

Future Directions for Multiscale Modeling in Biomechanics – *Where do we go from here?*
G. C. Y. Peng;
National Institutes of Health, Bethesda, MD.

8:36 AM - 8:54 AM

Multi-scale modeling empowers us to put the “bio” back in muscle “biomechanics”
S. S. Blemker, B. Sharafi, M. Rehorn;
University of Virginia, Charlottesville, VA.

8:54 AM - 9:12 AM

Deformation Behavior of Articular Chondrocytes in a Knee Joint - Multiscale Computational Analysis
P. Tanska, M. E. Mononen, **R. K. Korhonen**;
University of Eastern Finland, Kuopio, FINLAND

9:12 AM - 9:30 AM

Multiscale methods for modeling connective tissues
J. Weiss
University of Utah

Reproductive & Women's Health IV: Biomechanics of Pregnancy & Delivery 2

Session Number: 11-13 Room: 311
Session Chair(s): E. Mazza, and E. Oczeretko

8:00 AM - 8:18 AM

Second Harmonic Generation Microscopy: Quantitative Investigation of Fetal Membrane Microstructure during Deformation
A. Mauri¹, M. Perrini¹, C. Maake², M. Ehrbar³, M. L. Oyen⁴, E. Mazza¹;
¹ETH Zurich, SWITZERLAND, ²University of Zurich, SWITZERLAND, ³University Hospital Zurich, SWITZERLAND, ⁴Cambridge University, UNITED KINGDOM.

8:18 AM - 8:36 AM

Biomechanics of Fetal Membrane Fracture
M. L. Oyen¹, C. Koh², K. Tonsomboon¹;
¹University of Cambridge, UNITED KINGDOM,
²Universiti Tun Hussein Onn, Parit Raja, Johor, MALAYSIA.

8:36 AM - 8:54 AM

Microstructural and Compositional Contributions to Placental Membrane Mechanics and Timing of Rupture
B. N. Briggs, C. A. Barnard, V. L. Ferguson;
University of Colorado Boulder, CO.

8:54 AM - 9:12 AM

The Fluid Dynamics of Human Birth
M. C. Leftwich, A. Lehn, A. Baumer;
George Washington Univ., Washington, DC.

9:12 AM - 9:30 AM

Biomechanics of Blastocyst / Endometrium Interactions: A Tissue Engineered Model to Quantify Implantation Mechanics
R. W. Yucha¹, M. Jost², N. Rothstein³, M. S. Marcolongo¹;
¹Drexel University, Philadelphia, PA, ²Drexel University College of Medicine, Philadelphia, PA,
³Prime Synthesis, Inc., Philadelphia, PA

Robotics: Lower Limb Exoskeletons I

Session Number: 11-14 Room: Ball-A
Session Chair(s): G. Sawicki

8:00 AM - 8:36 AM

Emerging applications and challenges of Lower-Limb Exoskeletons
J. L. Pons;
Spanish National Research Council, Arganda del Rey, SPAIN.

WEDNESDAY Podium Sessions

8:36 AM - 8:54 AM

Optimization of Exoskeleton Actuation and Configuration through Human Experiments
P. Malcolm, S. Galle, W. Derave, D. De Clercq;
Ghent University, BELGIUM.

8:54 AM - 9:12 AM

Clutch-Spring Knee Exoskeleton for Running
H. M. Herr¹, G. Elliott¹, A. Marecki¹, G. Sawicki²;
¹MIT, Cambridge, MA, ²University of North Carolina,
Chapel Hill, NC.

9:12 AM - 9:30 AM

The Relative Benefits of Work Assistance and Torque Assistance in Ankle Exoskeletons
R. Jackson, S. Collins;
Carnegie Mellon University, Pittsburgh, PA.

Multiscale Techniques in Biomechanics & Mechanobiology

Session Number: 11-15 Room: Ball-B
Session Chair(s): R. Mueller and P. Pivonka

8:00 AM - 8:18 AM

Multi-scale fracture mechanics of biological and bioinspired cellulose nanocomposites
S. Keten;
Northwestern University, Evanston, IL.

8:18 AM - 8:36 AM

Molecular and mesoscale mechanics of mineralized collagen fibrils in bone
M. J. Buehler;
MIT, Cambridge, MA.

8:36 AM - 8:54 AM

Microporomechanics Reveals That Subjecting Bone to Physiological Strain Induces the Optimum Pressure Stimulus in Osteocytes
S. Scheiner¹, P. Pivonka², C. Hellmich¹;
¹Vienna University of Technology, AUSTRIA, ²The University of Melbourne, AUSTRALIA.

8:54 AM - 9:12 AM

Multiscale modeling of collagen structures in bone
K. S. Katti

9:12 AM - 9:30 AM

Multiscale mechanics of human osteogenesis imperfect
D. Katti

CSB Soft Tissue Mechanics

Session Number: 11-16 Room: 308
Session Chair(s): S. Federico

8:00 AM - 8:18 AM

Correlation of Non-destructive Electromechanical (Arthro-BST) Mapping with Histological Scores and Mechanical Properties in Human Knee Joints
S. Sim¹, A. Chevrier¹, M. Garon², E. Quenneville², A. Yaroshinsky³, C. D. Hoemann¹, **M. D. Buschmann**¹;
¹École Polytechnique de Montreal, QC, CANADA, ²Biomomentum Inc., Laval, QC, CANADA, ³VTL Systems Inc., Rolling Meadows, IL.

8:18 AM - 8:36 AM

Exploring Interactions Between The Magnitude Of Tissue Stretch And Cycle Rate On The Mechanical Properties Of Annulus Fibrosus With Cyclic, Biaxial Tensile Loads
C. E. Gooyers¹, J. P. Callaghan²;
¹Giffin Koerth Forensic Engineering, Toronto, ON, CANADA, ²University of Waterloo, ON, CANADA.

8:36 AM - 8:54 AM

Residual stresses in aortic tissue: from experiments to Finite Element Modeling
G. Martufi¹, T. Gasser², C. Bellini³, S. Rivolo⁴, K. Olsen¹, E. Di Martino¹;
¹University of Calgary, AB, CANADA, ²Royal Institute of Technology, Stockholm, SWEDEN, ³Yale University, New Haven, CT, ⁴King's College London, UNITED KINGDOM.

8:54 AM - 9:12 AM

Anterior cruciate ligament force markedly increases with gastrocnemius contraction: Analysis of the knee joint in gait and at different flexion angles
M. Adouni, **A. Shirazi-Adl**, H. Marouane;
Ecole Polytechnique, Montreal, QC, CANADA.

9:12 AM - 9:30 AM

The effect of bone trabecular structure on broadband ultrasound attenuation of different ultrasonic signals
B. Vafaeian, M. Kim, M. El-Rich, T. El-Bialy, S. Adeeb;
University of Alberta, Edmonton, AB, CANADA,

WEDNESDAY Podium Sessions

Evolutionary Biomechanics of Animal Locomotion I

Session Number: 11-17 Room: 307
Session Chair(s): J. R. Hutchinson

8:00 AM - 8:36 AM

Using Computer Modeling and Dynamic Simulation to Study the Evolution of Hominin Locomotor Biomechanics: Potential and Pitfalls

B. R. Umberger¹, M. C. O'Neill², L. Lee¹;

¹University of Massachusetts, Amherst, MA, ²Stony Brook University, NY.

8:36 AM - 8:54 AM

A Walking Tour of Human Evolution

H. Pontzer;

Hunter College, CUNY, New York, NY.

8:54 AM - 9:12 AM

The evolution of body shape and hindlimb locomotor function in bird-line dinosaurs

V. Allen, J. R. Hutchinson;

Royal Veterinary College, Hatfield, UNITED KINGDOM.

9:12 AM - 9:30 AM

Beyond Hinges: the Evolution of 3-D Limb Control in Birds and Other Theropod Dinosaurs.

S. Gatesy, R. Kambic, T. Roberts;

Brown University, Providence, RI

ASB Subject- & Patient-Specific Musculoskeletal Modeling I

Session Number: 11-18 Room: 310
Session Chair(s): D. D. Anderson

8:00 AM - 8:36 AM

Individual-Specific Computational Simulations: Challenges and Strategies

T. Brown;

8:36 AM - 8:54 AM

Patient-Specific Motion Capture and Biomechanical Modeling of Acetabular Dysplasia and Femoroacetabular Impingement

A. E. Anderson¹, A. L. Kapron¹, M. D. Harris¹, J. A. Weiss², C. R. Henak², C. L. Peters¹, S. K. Aoki¹, C. L. Abraham¹, S. A. Maas², B. J. Ellis²;

¹University of Utah Orthopaedics, Salt Lake City, UT, ²University of Utah Bioengineering, Salt Lake City, UT.

8:54 AM - 9:12 AM

Morphing Patient-Specific Musculoskeletal Models
J. Rasmussen¹, P. E. Galibarov², A. A. Al-Munajjed², M. S. Andersen¹;

¹Aalborg University, DENMARK, ²AnyBody Technology, Aalborg, DENMARK.

9:12 AM - 9:30 AM

Is subject-specific modeling necessary?

Probabilistic approaches can classify populations of models by functional features

F. Valero-Cuevas;

University of Southern California, Los Angeles, CA

Aging of the Neuromuscular System I

Session Number: 11-19 Room: 303
Session Chair(s): G. A. Power and B. Dalton

8:00 AM - 8:36 AM

Muscle power from single fibers to whole muscle

R. A. Fielding;

Tufts University, Boston, MA.

8:36 AM - 8:54 AM

Shortening induced torque depression in old age: Implications for power loss in the elderly?

G. A. Power¹, D. P. Makrakos², D. E. Stevens², W. Herzog¹, C. L. Rice², A. A. Vandervoort²;

¹University of Calgary, AB, CANADA, ²University of Western Ontario, London, ON, CANADA.

8:54 AM - 9:12 AM

Age-related Changes in Muscle Mechanical Properties

G. E. Caldwell¹, C. J. Hasson², R. H. Miller³;

¹University of Massachusetts, Amherst, MA,

²Northeastern University, Boston, MA, ³University of Maryland, College Park, MD

9:12 AM - 9:30 AM

See Program Supplement and Errata Sheet for possible additions

Design of Feet in Relation to Locomotion

Session Number: 11-20 Room: 304
Session Chair(s): A. Biewener and B. Full

8:00 AM - 8:18 AM

Pushing and pulling: foot design in climbing insects

W. Federle¹, T. Endlein², C. J. Clemente³, D. Labonte¹;

¹University of Cambridge, UNITED KINGDOM,

²University of Glasgow, UNITED KINGDOM,

³University of Queensland, Brisbane, AUSTRALIA.

WEDNESDAY Podium Sessions

8:18 AM - 8:36 AM

Mechanisms of Gecko Adhesion and their Application in Physics and Engineering

K. Autumn;

Lewis & Clark College, Portland, OR.

8:36 AM - 8:54 AM

How Does Foot Shape Influence Locomotor Strategy When Running Across a Range of Complex Media?

S. T. Hsieh;

Temple University, PHILADELPHIA, PA.

8:54 AM - 9:12 AM

The biomechanics of hands and feet in primates for the maintenance of gait and directional stability on arboreal supports.

D. Schmitt;

Duke University, Durham, NC.

9:12 AM - 9:30 AM

How Do Shoes Affect Foot Function in Humans During Walking and Running?

D. E. Lieberman, B. J. Addison, E. R. Castillo, H. L. Dingwall;

Harvard University, Cambridge, MA

Wednesday, 9 July 2014

11:00– 12:30 PM

Molecular Brushes: Models & Experiments

Session Number: 12-1 Room: 109

Session Chair(s): S. Vesentini

11:00 AM - 11:18 AM

Aggrecan: Unusual polyelectrolyte biophysics and interactions conferred by the bottlebrush structure.

P. L. Chandran;

Howard University, Washington, DC.

11:18 AM - 11:36 AM

Nanomechanics of Aggrecan Macromolecules

D. Dean¹, L. Han², C. Ortiz³, A. J. Grodzinsky¹;

¹Clemson University, Clemson, SC, ²Drexel University, Philadelphia, PA, ³Massachusetts Institute of Technology, Cambridge, MA.

11:36 AM - 11:54 AM

NANOMECHANICS OF NATURAL BRUSHES in silico

S. Vesentini, F. Rigoldi, A. Gautieri;

Politecnico di Milano, Milan, ITALY.

11:54 AM - 12:12 PM

Models, Simulations and Theory of Polyelectrolyte Brushes

C. Seidel;

Max Planck Institute of Colloids and Interfaces, Potsdam, GERMANY.

12:12 PM - 12:30 PM

Synthesis of Biomimetic Molecular Brushes

L. Cipolla;

University of Milano-Bicocca, Milano, ITALY

Single Molecule Mechanics of Motor Proteins II

Session Number: 12-2 Room: 110

Session Chair(s): M. J. Lang and W. Hwang

11:00 AM - 11:18 AM

Unraveling the Mechanochemistry of DNA

Unwinding by RecQ Helicase

K. C. Neuman;

National Institutes of Health, Bethesda, MD.

11:18 AM - 11:36 AM

A Single-Chain Model to Predict Buckling in Active Gels

J. D. Schieber, A. Cordoba, T. Indei;

Illinois Institute of Technology, Chicago, IL.

11:36 AM - 11:54 AM

Computational Studies of Protein Unfolding and Translocation in Allosteric

Cycles of AAA+ Nanomachines

G. Stan;

University of Cincinnati, OH.

11:54 AM - 12:12 PM

Unfolding and translocation machinery of ClpXP

J. Cordova¹, A. Olivares², Y. Shin², S. Calmat², K. Schmitz², B. Stinson², M. Aubin-Tam³, T. Baker², R. Sauer², **M. Lang**¹;

¹Vanderbilt University, Nashville, TN,

²Massachusetts Institute of Technology, Cambridge, MA, ³Delft University of Technology, NETHERLANDS.

12:12 PM - 12:30 PM

Searching, stepping, and stomping: how force regulates the dynamics of the motor protein Myosin V

M. Hinczewski;

WEDNESDAY Podium Sessions

Molecular Adhesion

Session Number: 12-3 Room: 111
Session Chair(s): V. Viasnoff

11:00 AM - 11:36 AM

Signaling reactions on the membrane: The roles of space, force, and time

J. Groves;

11:36 AM - 11:54 AM

Cell-autonomous increase in contractility drives compaction of the mouse embryo

J. Maître, T. Hiiragi;
EMBL, Heidelberg, GERMANY.

11:54 AM - 12:12 PM

Force transmission during tissue morphogenesis

P. Lenne;
CNRS, Marseille, FRANCE

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

Semi-flexible Cytoskeletal Filaments – Basis of Cell Mechanics

Session Number: 12-4 Room: 306
Session Chair(s): J. A. Kas

11:00 AM - 11:18 AM

Inelastic Mechanics of Polymer Networks and Cells

K. Kroy;
University of Leipzig, GERMANY.

11:18 AM - 11:36 AM

Bayesian analysis of live-cell fluorescence imaging data for quantitative cell biology

S. Guo, N. Monnier, Z. Barry, S. Gordonov, **M. Bathe;**
MIT, Cambridge, MA.

11:36 AM - 11:54 AM

The Cytoskeleton Significantly Impacts Invasive Behavior of Biological Cells

J. A. Kas, A. W. Fritsch, K. Seltmann, T. Magin;
University of Leipzig, GERMANY.

11:54 AM - 12:12 PM

Microtubule Mechanics Suggest Novel Regulation of Dynamic Instability

K. Taute¹, **E. Florin**²;
¹FOM Institute AMOLF, Amsterdam, NETHERLANDS, ²University of Texas, Austin, TX.

12:12 PM - 12:30 PM

Scale-Dependent Non-affine Elasticity of Semiflexible Polymer Networks
M. Atakhorrami¹, G. H. Koenderink², J. Paliarne³, F. C. MacKintosh⁴, **C. Schmidt**⁵;

¹University College, London, UNITED KINGDOM, ²FOM Institute AMOLF, Amsterdam, NETHERLANDS, ³École Normale Supérieure de Lyon, FRANCE, ⁴VU University, Amsterdam, NETHERLANDS, ⁵Georg-August-Universität, Göttingen, GERMANY

Emergent Behaviors of Integrated Cellular Systems I

Session Number: 12-5 Room: 302
Session Chair(s): R. Bashir, R. Nerem, and R. Kamm

11:00 AM - 11:36 AM

Engineering the Emergence of Differentiation and Morphogenesis of Pluripotent Stem Cells in 3D

T. C. McDevitt, M. Kinney, J. Wilson, A. Bratt-Leal, D. White, M. L. Kemp, A. Nguyen, S. Suri, A. Singh, H. Lu;

Georgia Institute of Technology, Atlanta, GA.

11:36 AM - 11:54 AM

Modeling epithelial morphogenesis

S. Shvartsman;
Princeton University, NJ.

11:54 AM - 12:12 PM

Control of tissue mechanical properties by cellular micro-architecture: the role of cell size.

J. Shawky, **L. Davidson;**
University of Pittsburgh, PA.

12:12 PM - 12:30 PM

Revealing mechanical forces involved in closing a circumferentially arranged embryonic tissue

C. Wang¹, B. J. Dzamba¹, G. F. Weber², D. W. DeSimone¹;
¹University of Virginia, Charlottesville, VA, ²Rutgers, The State University of New Jersey, Newark, NJ

WEDNESDAY Podium Sessions

Molecular Mechanisms of Tissues & Scaffolds

Session Number: 12-6 Room: 309

Session Chair(s): O. Akkus

11:00 AM - 11:18 AM

Mechanical Interaction between Osteopontin and Hydroxyapatite

O. Katsamenis¹, L. D. Silverman², N. Bouropoulos³, E. S. Sørensen⁴, J. D. Kilburn⁵, **P. J. Thurner**⁶;

¹University of Southampton, UNITED KINGDOM,

²Bard High School Early College, Newark, NJ,

³University of Patras, GREECE, ⁴University of

Aarhus, DENMARK, ⁵Queen Mary University

London, UNITED KINGDOM, ⁶Vienna University of

Technology, AUSTRIA.

11:18 AM - 11:36 AM

Fibrillar and Mineral-platelet Mechanics of Bone in Health and Disease: Insights from X-ray Nanomechanical Imaging

H. S. Gupta¹, A. Karunaratne², R. V. Thakker³, P. Fratzl⁴, S. Krauss⁴, J. W. C. Dunlop⁴, S. Funari⁵, P. Boesecke⁶, G. R. Davis¹, A. Boyde¹, R. Cox⁷, L. Bentley⁷, C. T. Esapa⁷, N. J. Terrill⁸, S. D. M. Brown⁷;

¹Queen Mary University of London, UNITED KINGDOM, ²Imperial College London, UNITED KINGDOM, ³Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, UNITED KINGDOM, ⁴Max Planck Institute of Colloids and Interfaces, Potsdam, GERMANY, ⁵HASYLAB-DESY, Hamburg, GERMANY, ⁶European Synchrotron Radiation Facility, Grenoble, FRANCE, ⁷MRC Harwell, UNITED KINGDOM, ⁸Diamond Light Source, Harwell, UNITED KINGDOM.

11:36 AM - 11:54 AM

Molecular Spectroscopic Identification of Water Compartments in Bone

M. Unal, S. Yang, **O. Akkus**;

Case Western Reserve University, Cleveland, OH.

11:54 AM - 12:12 PM

Mathematical Modeling of Collagen-Fibrin Co-gels

V. K. Lai¹, D. Bankwala², M. F. Hadi², V. H.

Barocas²;

¹University of Minnesota - Duluth, MN, ²University of Minnesota - Twin Cities, Minneapolis, MN.

12:12 PM - 12:30 PM

Stiffening and Unfolding of Tumor-associated Fibronectin Activate Proangiogenic Secretion of Adipogenic Stromal Cells

D. Gourdon;

Cornell University, Ithaca, NY

Hemodynamics & Medical Imaging

Session Number: 12-7 Room: 300

Session Chair(s): J. Moore and M. Gounis

11:00 AM - 11:18 AM

Imaging Hemodynamics: from Histology to MRI

J. Oshinski¹, I. Campbell², L. Timmins², E. Iffrig¹, A. Lam², F. Tong¹, W. Taylor¹, H. Samady¹, D.

Giddens²;

¹Emory University School of Medicine, Atlanta, GA,

²Georgia Institute of Technology, Atlanta, GA.

11:18 AM - 11:36 AM

Changes in Contrast Transport Dynamics as an Indicator of Efficacy of Flow Diverters - From Bench Top to Bedside

B. B. Lieber, C. Sadasivan, R. J. Dholakia, D. J. Fiorella, H. H. Woo;

Stony Brook University, NY.

11:36 AM - 11:54 AM

Advanced Analysis of Echo and MRI Images to Assess Mitral and Aortic Heart Valve Function

L. Mirabella, J. M. Rabbah, **A. Yoganathan**;

Georgia Institute of Technology, Atlanta, GA.

11:54 AM - 12:12 PM

Monitoring the Inflammatory Response in Stented Mice Aortas Using Novel Fluorescence-Based in vivo Imaging Techniques

K. K. Kapnis¹, C. M. Pitsillides¹, M. S. Prokopi², D.

Kokkinidou¹, B. C. Brott³, P. G. Anderson³, J. E.

Lemons³, A. S. Anayiotos¹;

¹Cyprus University of Technology, Limassol, CYPRUS, ²Trojantec Ltd, Bank of Cyprus Oncology Center, Nicosia, CYPRUS, ³University of Alabama at Birmingham, AL

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

Abdominal and Thoracic Aortic Aneurysm

Session Number: 12-8 Room: Ball-C

Session Chair(s): H. Yamada and R. Leask

11:00 AM - 11:18 AM

Computational Growth and Remodeling Models of Abdominal Aortic Aneurysms as a Tool for Generating Hypotheses, Identifying Key Mechanisms, and Designing Experiments

J. S. Wilson;

Yale University, New Haven, CT.

WEDNESDAY Podium Sessions

11:18 AM - 11:36 AM

Ascending Aortic Aneurysms; biomechanics and biochemistry

R. L. Leask¹, J. Chung¹, A. Emmott¹, R. Mongrain¹, K. Lachapelle¹, R. Cartier²;

¹McGill, Montreal, QC, CANADA, ²Montreal Heart Institute, QC, CANADA.

11:36 AM - 11:54 AM

Piecing Together Thoracic Aortic Mechanics and Biochemistry: a Picture Emerges

M. Labrosse;

University of Ottawa, ON, CANADA.

11:54 AM - 12:12 PM

Estimation of strength of thoracic aortic aneurysms from their stiffness

S. Sugita¹, T. Matsumoto¹, T. Ohashi², K. Kumagai², H. Akimoto², K. Tabayashi², M. Sato²;

¹Nagoya Institute of Technology, JAPAN, ²Tohoku University, Sendai, JAPAN.

12:12 PM - 12:30 PM

Pathology of aortic dissection: Structural changes in the layers of the tunica media

Y. Nakashima¹, K. Nakagawa², T. Tsukube³, M. Hoshino⁴, N. Yagi⁴;

¹Division of Pathology, Japanese Red Cross Fukuoka Hospital, JAPAN, ²Pathophysiological and Experimental Pathology, Graduate School of Medical Sciences, Kyushu University, Fukuoka, JAPAN, ³Division of Cardiovascular Surgery, Japanese Red Cross Kobe Hospital, Kobe, JAPAN, ⁴Research & Utilization Division, Japan Synchrotron Radiation Research Institute, Hyogo, JAPAN

Biomechanics of Heart Valves

Session Number: 12-9 Room: 312

Session Chair(s): M. Sacks

11:00 AM - 11:18 AM

Towards Understanding the Biomechanical Mechanisms Underlying Clinical Complications in Transcatheter Aortic Valve Replacement for Improvement of Next Generation Device Designs

T. E. Claiborne, M. Livelli, G. Marom, J. R. Taylor, H. A. Fernandez, D. Bluestein;
Stony Brook University, NY.

11:18 AM - 11:36 AM

Including Residual Stress and Initial Strain in Dynamic Fluid-Structure Interaction Models of the Aortic Root

V. Flamini¹, A. DeAnda², **B. E. Griffith**²;

¹New York University Polytechnic School of Engineering, Brooklyn, NY, ²New York University School of Medicine, NY.

11:36 AM - 11:54 AM

A Whole Heart Simulation of the Effects of a Novel Mitral Sub-Valvular Ring on Regional Mechanics

B. Baillargeon¹, I. Costa², L. C. Lee³, M. Genet³, J. F. Wenk⁴, E. Kuhl⁵, J. L. Navia⁶, **J. M. Guccione, Jr.**³;

¹Dassault Systèmes, Fremont, CA, ²University of Brasilia, BRAZIL, ³Univ. of San Francisco, CA, ⁴University of Kentucky, Lexington, KY, ⁵Stanford University, CA, ⁶Cleveland Clinic, OH.

11:54 AM - 12:12 PM

Modeling Cell-mediated Compaction and Collagen Remodeling in Tissue-engineered Heart Valves

S. Loerakker, F. P. T. Baaijens;

Department of Biomedical Engineering & Institute for Complex Molecular Systems, Eindhoven University of Technology, NETHERLANDS.

12:12 PM - 12:30 PM

Fluid-structure interaction simulations of artificial heart valves

I. Boraziani;

University at Buffalo SUNY, NY

Muscle Mechanics I

Session Number: 12-10 Room: 313

Session Chair(s): W. Herzog

11:00 AM - 11:18 AM

Residual force enhancement in humans: moving beyond purely mechanical properties

D. Hahn;

Ruhr-Universität Bochum, Faculty of Sport Science, Bochum, GERMANY.

11:18 AM - 11:36 AM

A role for titin in force enhancement, doublet potentiation and oscillatory work.

K. Nishikawa¹, J. A. Monroy², C. Pace¹;

¹Northern Arizona University, Flagstaff, AZ, ²Denison University, Granville, OH.

WEDNESDAY Podium Sessions

11:36 AM - 11:54 AM

Residual Force Enhancement Studied with Myosin Inhibitors and by Varying Temperature

G. J. Pinniger;

University of Western Australia, Crawley, AUSTRALIA.

11:54 AM - 12:12 PM

Titin structure and negative muscle work

S. L. Lindstedt;

Northern Arizona University, Flagstaff, AZ.

12:12 PM - 12:30 PM

A New Model of Muscle Contraction

W. Herzog;

University of Calgary, AB, CANADA

Cell-Biomaterial Interface I

Session Number: 12-11 Room: 305

Session Chair(s): K. Leong and B. Hoffman

11:00 AM - 11:18 AM

ECM Mechanics and Phenotypic Switching

C. M. Nelson;

Princeton University, NJ.

11:18 AM - 11:36 AM

Spatially and temporally coordinated processes of cells

at molecular to cellular scales

J. P. Spatz;

Max Planck Institute for Intelligent Systems & University of Heidelberg, Stuttgart, GERMANY.

11:36 AM - 11:54 AM

Engineering Highly Elastic Microengineered Hydrogels for Tissue Engineering

N. Annabi¹, K. Tang¹, S. Mithieux², A. Ameri¹, A. Weiss², A. Khademhosseini¹;

¹Harvard Medical School, Cambridge, MA, ²The University of Sydney, AUSTRALIA.

11:54 AM - 12:12 PM

Mechanical Control of Cardiac Reprogramming and Vascular Morphogenesis

A. Putnam;

University of Michigan, Ann Arbor, MI.

12:12 PM - 12:30 PM

Mechanical loading regulates cell-matrix adhesions of human mesenchymal stem cells (hMSCs) microencapsulated in 3D collagen meshwork

B. Chan, C. Li;

The University of Hong Kong, CHINA

Multiscale Modeling II: Cardiovascular

Session Number: 12-12 Room: 301

Session Chair(s): Pierce

11:00 AM - 11:18 AM

Adding to Our Understanding about Microvascular Remodeling: From Capillary Sprouting to Network Patterning

W. L. Murfee, D. B. Khismatullin;

Tulane University, New Orleans, LA.

11:18 AM - 11:36 AM

A Mechanobiological Model of Atherogenesis

H. N. Hayenga, S. Kubecka, A. Morris, R. Bhui, C. A. Meyer;

University of Texas, Dallas, Richardson, TX.

11:36 AM - 11:54 AM

Generation of Microvascular Networks: A Biological Patterning Problem

T. W. Secomb¹, J. P. Alberding¹, M. W. Dewhurst², A. R. Pries³;

¹University of Arizona, Tucson, AZ, ²Duke

University, Durham, NC, ³Charité -

Universitätsmedizin, Berlin, GERMANY.

11:54 AM - 12:12 PM

A Multiscale Model of Microcirculatory Biomechanics: From Ion Channel Activity to Vasomotor Responses.

A. Moshkforoush, A. Kapela, **N. M. Tsoukias;**

Florida International University, Miami, FL

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

Reproductive & Women's Health V: Biomechanics of the Placenta & Embryology

Session Number: 12-13 Room: 311

Session Chair(s): V. Ferguson and C Gargett

11:00 AM - 11:18 AM

Placenta and lung: villous and capillary geometrics, placental function and fetal health

C. M. Salafia¹, A. Serov², D. Habib³, D. Grebenkov², M. Filoche², B. Sapoval², D. Vvedensky⁴, J. Gill⁴;

¹Institute for Basic Research, Larchmont, NY,

²Ecole Polytechnique, Paris, FRANCE, ³Rutgers

University, New Brunswick, NJ, ⁴Imperial College,

London, UNITED KINGDOM.

WEDNESDAY Podium Sessions

11:18 AM - 11:36 AM

The role of fluid dynamics in the determination of the left-right asymmetry in developing embryos.

O. Piro;

University of Balearic Islands, Palma de Mallorca, SPAIN.

11:36 AM - 11:54 AM

In Vitro Model of Transplacental Transport of Glucose

A. J. Jaffa¹, R. Levkovitz², U. Zaretsky², D. Elad²;
¹Sourasky Tel Aviv Medical Center, ISRAEL, ²Tel Aviv University, ISRAEL.

11:54 AM - 12:12 PM

Timing of Mechanical Cues Is An Epigenetic Factor Regulating Cardiac Morphogenesis and Function

B. Johnson, D. Garrity, **L. P. Dasi;**
Colorado State University, Fort Collins, CO.

12:12 PM - 12:30 PM

Analysis of Blood Flow in the Embryonic Heart

P. Kozlovsky¹, M. Rosenfeld¹, A. Jaffa², D. Elad¹;
¹Tel-Aviv University, ISRAEL, ²Tel Aviv Sourasky Medical Center, ISRAEL

Robotics: Lower Limb Exoskeletons II

Session Number: 12-14 Room: Ball-A

Session Chair(s): G. Sawicki

11:00 AM - 11:18 AM

Design and Control of a Lower Limb Exoskeleton for Restoring Legged Mobility to People with Paraplegia

M. Goldfarb;

Vanderbilt University, Nashville, TN.

11:18 AM - 11:36 AM

Design and Control of the Mindwalker

H. Van der kooij¹, E. H. F. Van Asseldonk¹, L.

Wang¹, S. Wang²;

¹University of Twente, Enschede, NETHERLANDS,

²Delft University of Technology, NETHERLANDS.

11:36 AM - 11:54 AM

Simulation-based design of wearable robotic systems

C. F. Ong;

Stanford University, CA.

11:54 AM - 12:12 PM

Physiological Control Approaches to Robotic Lower Limb Exoskeletons

D. Ferris

12:12 PM - 12:30 PM

Next generation soft wearable robots

C. Walsh

Harvard/MIT/Wyss Inst. USA.

Multiscale Techniques in Bio-mechanics & Mechanobiology V

Session Number: 12-15 Room: Ball-B

Session Chair(s): R. Mueller and P. Pivonka

11:00 AM - 11:18 AM

Modeling bone elasticity. How to make the best of uncertainty?

V. Sansalone¹, D. Gagliardi¹, S. Naili¹, Y. Bala², C. Desceliers³;

¹Université Paris-Est, Créteil, FRANCE, ²University of Melbourne, AUSTRALIA, ³Université Paris-Est, Marne-la-Vallée, FRANCE.

11:18 AM - 11:36 AM

Mechanical Testing of Collagen Fibrils Using MEMS Platforms

R. Ballarini;

University of Minnesota, Minneapolis, MN.

11:36 AM - 11:54 AM

Computational Bone Remodeling in an Equine Model With Evaluation Using Biomarkers

J. Fernandez¹, D. Sreenivasan¹, C. Chilibeck¹, X.

Wang¹, D. Thomas², J. Clement², R. Das¹, J.

Cornish¹, H. Davies²;

¹University of Auckland, NEW ZEALAND, ²University of Melbourne, AUSTRALIA.

11:54 AM - 12:12 PM

Constitutive modeling of collagen fibril mechanical damage

F. Maceri, **M. Marino**, G. Vairo;

University of Rome Tor Vergata, Rome, ITALY

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

CSB Career Awards

Session Number: 12-16 Room: 308

Session Chair(s): S. Robinovitch

11:00 AM - 11:36 AM

From Mechanical Exposure to Lumbar Spine Injury and Pain - and Back Again

J. Callaghan;

11:36 AM - 12:12 PM

Biomechanics Applied to the Creation of Solutions to Important Mobility Challenges

WEDNESDAY Podium Sessions

G. Fernie

Evolutionary Biomechanics of Animal Locomotion II

Session Number: 12-17 Room: 307

Session Chair(s): J. R. Hutchinson

11:00 AM - 11:18 AM

3-D joint design, mechanics and evolution of the avian shoulder

D. Baier;

Providence College, RI.

11:18 AM - 11:36 AM

Building a Bird: Developmental and Evolutionary Construction of the Avian Body Plan

A. M. Heers;

Royal Veterinary College, Hatfield, UNITED KINGDOM.

11:36 AM - 11:54 AM

Arthropod Aloft: The Biomechanical and Ecological Origins of Insect Flight

R. Dudley;

University of California, Berkeley, CA.

11:54 AM - 12:12 PM

The Evolution of Swimming and Its Associated Hydrodynamics by Advanced Secondarily Aquatic Vertebrates

F. E. Fish;

West Chester University, PA.

12:12 PM - 12:30 PM

Fish Fins and Flapping Foils: Testing Hypotheses of Adaptive Morphology

K. L. Feilich;

Harvard University, Cambridge, MA

ASB Subject- & Patient-Specific Musculoskeletal Modeling II

Session Number: 12-18 Room: 310

Session Chair(s): D. Anderson

11:00 AM - 11:18 AM

Individual variations in bone mechanical strain environment: implications for osteogenic exercise

K. L. Troy¹, V. A. Bhatia², W. B. Edwards³, J. E. Johnson¹;

¹Worcester Polytechnic Institute, MA, ²University of Illinois at Chicago, IL, ³University of Calgary, AB, CANADA.

11:18 AM - 11:36 AM

Proximal Femoral Strengths in Men and Women Age 27 to 90+: A Subject-Specific Finite Element Modeling Study

J. H. Keyak¹, T. S. Kaneko¹, S. Khosla², S. Amin²;

¹University of California, Irvine, CA, ²Mayo Clinic, Rochester, MN.

11:36 AM - 11:54 AM

In vivo validation of a dynamic knee model used to simulate orthopedic procedures

R. L. Lenhart, J. Kaiser, K. Choi, D. G. Thelen;

University of Wisconsin-Madison, WI.

11:54 AM - 12:12 PM

Subject-specific Parameters and the Prediction of Knee Joint Contact Force Using Musculoskeletal Modeling

J. S. Higginson, B. A. Knarr;

University of Delaware, Newark, DE.

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

Aging of the Neuromuscular System II

Session Number: 12-19 Room: 303

Session Chair(s): G. A. Power and B. Dalton

11:00 AM - 11:18 AM

Oscillatory Neuromotor Activity and Aging

M. Shinohara;

Georgia Institute of Technology, Atlanta, GA.

11:18 AM - 11:36 AM

Aging and Inter-joint Coordination: Walking Speed Effects and Correlation to Clinical Balance Measures

L. Chou, S. Chiu;

University of Oregon, Eugene, OR.

11:36 AM - 11:54 AM

The vestibular control of standing balance in young and old men

B. H. Dalton¹, J. Blouin², M. D. Allen³, C. L. Rice³, J. T. Inglis²;

¹University of Oregon, Eugene, OR, ²University of British Columbia, Vancouver, BC, CANADA, ³Western University, London, ON, CANADA.

11:54 AM - 12:30 PM

Alterations to Muscle Architecture in Old Age: Form Meets Function

J. M. Wakeling;

Simon Fraser University, Burnaby, BC, CANADA

WEDNESDAY Podium Sessions

Maneuvering on Challenging Terrain

Session Number: 12-20 Room: 304
Session Chair(s): A. Biewener and B. Full

11:00 AM - 11:18 AM

Movement over granular media and bioinspired robotics

D. Goldman;
Georgia Tech

11:18 AM - 11:36 AM

Guinea Fowl Running Over Uneven Terrain: Neuromuscular Control and Energetic Implications

M. A. Daley, J. C. Gordon;
Royal Veterinary College, Hatfield, UNITED KINGDOM.

11:36 AM - 11:54 AM

Terrestrial Dynamics and Control of Unsteady Locomotion

D. L. Jindrich¹, M. Qiao²;
¹California State University San Marcos, CA,
²Arizona State University, Tempe, AZ.

11:54 AM - 12:12 PM

Limits to turning performance in fast running animals, moving laboratory grade measurements to the field or African savannah.

A. Wilson, T. Y. Hubel, K. Roskilly, J. C. Lowe; Royal Veterinary College, University of London, UNITED KINGDOM.

12:12 PM - 12:30 PM

Information, precision, and multifunctionality in the transformation of motor commands to movement

S. Sponberg;
University of Washington, Seattle, WA

Wednesday, 9 July 2014

3:00– 4:30 PM

Nanostructured Biomaterials

Session Number: 13-1 Room: 109
Session Chair(s): S. Ramakrishna & F. Yang

3:00 PM - 3:18 PM

Cellular behaviors on graphene is substrate depended

F. Du, F. Lin, **C. Xiong, J. Wang;**
Peking University, Beijing, CHINA.

3:18 PM - 3:36 PM

Nanostructured Scaffolds for Bone Tissue Engineering

S. P. Nukavarapu;
University of Connecticut Health Center, Farmington, CT.

3:36 PM - 3:54 PM

Electrosprayed core-shell nanoparticles for heart restoration

S. Ramakrishna, M. Zamani, M. P. Prabhakaran;
National University of Singapore, SINGAPORE.

3:54 PM - 4:30 PM

See Program Supplement and Errata Sheet for possible additions

Mechanics of Weak Protein-Ligand Interaction I

Session Number: 13-2 Room: 110
Session Chair(s): B. Ji and D. Li

3:00 PM - 3:36 PM

Dynamic catch of a $\alpha 1\beta 1$ -Thy-1-syndecan-4 trimolecular complex

L. Ju, V. Fiore, T. Barker, **C. Zhu;**
Georgia Institute of Technology, Atlanta, GA.

3:36 PM - 3:54 PM

Probabilistic Barrier Crossing in Single-Molecule Spectroscopy

J. Qian;
Zhejiang University, Hangzhou, CHINA.

3:54 PM - 4:12 PM

Effects of G-quadruplex Binding Ligands on the Mechanical Stability of G-quadruplex

H. You, **J. Yan;**
National University of Singapore, SINGAPORE.

4:12 PM - 4:30 PM

Nanoindentation of 35 virus capsids in a molecular model

M. Cieplak;
Polish Academy of Sciences, Warsaw, POLAND

WEDNESDAY Podium Sessions

Sub-Cellular Biophysics & Mechanosensing

Session Number: 13-3 Room: 111

Session Chair(s): G. Genin and R. R. Kaunas

3:00 PM - 3:18 PM

Active Dynamics and Mechanics of Cell Spreading and Shape Determination on Elastic Substrates

A. Zemel¹, N. Nisenholz¹, K. Rajendran², Q. Dang², H. Chen³, F. Rehfeldt⁴, D. E. Discher⁵, R. Kemkemer³, R. Krishnan²;

¹Hebrew University, Jerusalem, ISRAEL, ²Harvard Medical School, Boston, MA, ³Reutligen University, Stuttgart, GERMANY, ⁴George August University, Göttingen, GERMANY, ⁵University of Pennsylvania, Philadelphia, PA.

3:18 PM - 3:36 PM

Directing Stem Cell Fate in 3D through Nanoscopic Adhesive Domains

A. J. Engler;

UC San Diego, La Jolla, CA.

3:36 PM - 3:54 PM

Viscoelastic Properties of Soft Tissues: Comparison and Contrast with Polymer Networks

P. Janmey, A. VanOosten;

Univ. Pennsylvania, Philadelphia, PA.

3:54 PM - 4:12 PM

Calcium-dependent actomyosin contractility in osteocytes

A. Baik¹, G. Brown², A. Morrell², X. E. Guo²;

¹Regeneron Pharmaceuticals, Inc., Tarrytown, NY, ²Bone Bioengineering Laboratory, Department of Biomedical Engineering, Columbia University, New York, NY.

4:12 PM - 4:30 PM

Mechanosensing by branched actin networks

D. A. Fletcher;

UC Berkley, CA

Multiscale Modeling of Semi-flexible Polymers

Session Number: 13-4 Room: 306

Session Chair(s): J. D. Schieber

3:00 PM - 3:18 PM

Experimentally Determined Molecular Structure and Organization of Collagen in Tissues

J. P. R. O. Orgel;

Illinois Institute of Technology, Chicago, IL.

3:18 PM - 3:36 PM

Molecular dynamics simulations of type I collagen

S. Varma;

University of South Florida, Tampa, FL.

3:36 PM - 3:54 PM

Active self-assembly and spontaneous flows and motion

Z. Dogic;

Brandeis University, Waltham, MA.

3:54 PM - 4:12 PM

Systematic coarse-graining of the wormlike chain model for dynamic simulations

A. J. Spakowitz;

4:12 PM - 4:30 PM

Collagen and Silk Inspired Bio-hybrid Self Assembling Nanofibre Scaffold Biomaterial

S. Sundar;

National University of Singapore, SINGAPORE

Emergent Behaviors of Integrated Cellular Systems II

Session Number: 13-5 Room: 302

Session Chair(s): R. Bashir, R. Nerem, and R. Kamm

3:00 PM - 3:36 PM

3-D Biofabrication of Cellular Soft Robotics

R. Bashir, C. Cvetkovic, R. Raman, V. Chan;

UIUC, Urbana, IL.

3:36 PM - 3:54 PM

Elongated cell shapes enhance maturation of iPSC-CMs cultured on polyacrylamide hydrogels: cell structure and biomechanics

A. J. S. Ribeiro¹, Y. Ang², A. Denisin¹, D. Srivastava²,

B. L. Pruitt¹;

¹Stanford University, CA, ²Gladstone Institute of Cardiovascular Disease, San Francisco, CA.

3:54 PM - 4:12 PM

Emergence of a Flagellar Swimmer from Cardiomyocytes and Fibroblasts

B. Williams¹, S. Anand¹, J. Rajagopalan², **M. Saif**¹;

¹University of Illinois at Urbana-Champaign, IL,

²Arizona State University, Tempe, AZ.

4:12 PM - 4:30 PM

Tissue Engineering and Characterization of a Bioinspired Muscular Pump

H. Azizgolshani, M. Gharib;

California Institute of Technology, Pasadena, CA

WEDNESDAY Podium Sessions

Functional Tissue Engineering I

Session Number: 13-6 Room: 309
Session Chair(s): K. Costa and C. Hung

3:00 PM - 3:36 PM

Homologous "off-the-shelf" Tissue Engineered Heart Valves with Self-Repair Capacity: Long Term Functionality and in vivo Remodeling in Sheep
A. Driessen-Mol¹, M. Y. Emmert², P. E. Dijkman³, B. Sanders³, B. Weber², S. P. Hoerstrup², **F. Baaijens**¹;
¹Institute for Complex Molecular Systems, Eindhoven University of Technology, NETHERLANDS, ²Swiss Center for Regenerative Medicine, Zurich, SWITZERLAND, ³Eindhoven University of Technology, NETHERLANDS.

3:36 PM - 3:54 PM

Uterine tissue engineering using decellularized matrices
K. S. Furukawa¹, E. G. Santoso¹, K. Yoshida¹, Y. Hirota¹, O. Yoshino², S. Watanabe¹, A. Kishida³, Y. Osuga¹, S. Saito², T. Ushida¹;
¹University of Tokyo, JAPAN, ²University of Toyama, JAPAN, ³Tokyo Medical and Dental University, JAPAN.

3:54 PM - 4:12 PM

Engineered cardiac microtissue force arrays for high-content screening of contractile function
A. Chopra¹, M. Yang², J. Brandimarto², R. Zhu³, W. Keung⁴, A. Liu³, K. Margulies², R. A. Li⁵, D. H. Reich³, L. Tung³, C. S. Chen¹;
¹Boston University, Harvard Wyss Institute for Biologically Inspired Engineering, Boston, MA, ²University of Pennsylvania, Philadelphia, PA, ³Johns Hopkins University, Baltimore, MD, ⁴Stem Cell & Regenerative Medicine Consortium, The University of Hong Kong, CHINA, ⁵Stem Cell & Regenerative Medicine Consortium, The University of Hong Kong, Cardiovascular Research Center, Icahn School of Medicine at Mount Sinai, New York, NY

4:12 PM - 4:30 PM

Functional tissue engineering of articular cartilage
Clark Hung
Columbia University

Intraventricular Blood Flow Dynamics I

Session Number: 13-7 Room: 300
Session Chair(s): S. C. Shadden and J. C. del Alamo

3:00 PM - 3:36 PM

How the heart works when it fills: Kinematics and fluid mechanics and their clinical consequences
S. J. Kovács;
Washington University in St Louis, MO.

3:36 PM - 3:54 PM

From cardiac synchrony to ventricle remodelling passing through a vortex
G. Pedrizzetti¹, A. R. Martiniello², P. Caso², V. Bianchi², G. Tonti³;
¹University of Trieste, ITALY, ²Monaldi Hospital, Napoli, ITALY, ³"G. d'Annunzio" University, Chieti, ITALY.

3:54 PM - 4:12 PM

Computational Modeling of Flow-Mediated Thrombogenesis in Infarcted Ventricles
J. Seo, R. George, **R. Mittal**;
Johns Hopkins University, Baltimore, MD.

4:12 PM - 4:30 PM

The Propagation Velocity Spectrum of the Left Ventricle Early Filling Wave: Physical and Clinical Significance
P. P. Vlachos¹, W. C. Little²;
¹Purdue University, West Lafayette, IN, ²University of Mississippi Medical Center, Jackson, MS

Thoracic Aortic Aneurysm & Dissection

Session Number: 13-8 Room: Ball-C
Session Chair(s): H. Yamada

3:00 PM - 3:18 PM

Stretching Test and Histological Evaluation of Ascending Aorta with Aortic Dissection in the Elderly
H. Yamada¹, N. Sakata², T. Tashiro², H. Wada², E. Tayama³, Y. Nakayama³;
¹Kyushu Institute of Technology, Kitakyushu, JAPAN, ²Fukuoka University, JAPAN, ³Kyushu Medical Center, Fukuoka, JAPAN.

3:18 PM - 3:36 PM

Simulating the Dynamics of Aortic Dissection
B. E. Griffith¹, A. DeAnda¹, V. Flamini², G. Holzapfel³, D. M. McQueen⁴, C. S. Peskin⁴;
¹New York University School of Medicine, NY, ²New York University Polytechnic School of Engineering, Brooklyn, NY, ³Graz University of Technology, AUSTRIA, ⁴Courant Institute of Mathematical Sciences, New York University, NY.

3:36 PM - 3:54 PM

Biomechanical and Micro-architectural Investigation of Ascending Thoracic Aortic Aneurysms with Different Aortic Valve Phenotypes
D. A. Vorp, J. Pichamuthu, A. Tsamis, S. Pasta, A. D'Amore, J. Phillippi, T. Gleason;
University of Pittsburgh, PA.

WEDNESDAY Podium Sessions

3:54 PM - 4:12 PM

Quantification of aneurysmal growth of the descending aorta after surgical resection of the ascending aorta due to Type A dissection

E. S. Di Martino, G. Martufi, E. J. Herget, J. Wong, A. Franko, A. B. Bromley, J. J. Appoo;
University of Calgary, AB, CANADA

4:12 PM - 4:30 PM

Magnetic resonance imaging techniques to visualize wall motion and hemodynamics in aortic dissections

C. Karmonik
Methodist Hospital, Texas, USA

Micromechanics of Cardiovascular Tissues I

Session Number: 13-9 Room: 312

Session Chair(s): Kassab and Lanir

3:00 PM - 3:18 PM

A Novel Constitutive Model for the Mitral Valve Leaflet Based on Quantified Microstructure

M. S. Sacks, W. Zhang;
University of Texas at Austin, TX.

3:18 PM - 3:36 PM

In vivo MRI-validation of a micromechanics-based active contraction model of healthy and diseased human hearts

M. Genet¹, L. C. Lee¹, E. Kuhl², S. Kozerke³, **J. M. Guccione, Jr.**¹;
¹UCSF, San Francisco, CA, ²Stanford University, CA, ³ETH, Zurich, SWITZERLAND.

3:36 PM - 3:54 PM

Micro Mechanical 3D Constitutive Modeling of the Coronary Arterial Media

Y. Hollander¹, D. Durban¹, X. Lu², G. Kassab², Y. Lanir¹;
¹Technion, Haifa, ISRAEL, ²Indiana University-Purdue University Indianapolis, IN.

3:54 PM - 4:12 PM

Identification And Analysis Of High Risk μ calc Geometries For Fibrous Cap Rupture

A. Kelly-Arnold, N. Maldonado, L. Cardoso, **S. Weinbaum**;
The City College of New York, NY.

4:12 PM - 4:30 PM

Mechanotransduction Mechanisms for Growth and Remodeling of Myocardial Tissue

T. Arts, J. Lumens, T. Delhaas;
Maastricht University, NETHERLANDS

Muscle Mechanics II

Session Number: 13-10 Room: 313

Session Chair(s): W. Herzog

3:00 PM - 3:18 PM

Predicting Whole Muscle Behavior from Isolated Muscle Properties and Muscle Architecture.

J. H. Challis¹, B. Infantolino²;
¹Penn State University, University Park, PA, ²Penn State University Berks, Reading, PA.

3:18 PM - 3:36 PM

Linking Muscle Fibre Level Measurements of Contraction Dynamics to Acceleration Performance in Athletic Animals

A. M. Wilson, T. Y. Hubel, T. G. West, N. A. Curtin, R. C. Woledge;
Royal Veterinary College, University of London, UNITED KINGDOM.

3:36 PM - 3:54 PM

Velocity Dependence of Maximal Eccentric Dorsiflexion in Humans: Effects of Muscle Activity and Length-Force Property of the Tibialis Anterior

Y. Kawakami, K. Hishikawa, K. Shimamoto, Y. Mogi;
Waseda University, Saitama, JAPAN.

3:54 PM - 4:12 PM

In vivo dynamics of muscle function: implications for neuromuscular control and muscle model validation.

A. A. Biewener;
Harvard University, Cambridge, MA.

4:12 PM - 4:30 PM

Pinnation Angle Influences Active Fibre Strain But Not Damage in Synergist Muscles During In-vivo Eccentric Exercise

T. A. Butterfield;
University of Kentucky, Lexington, KY

Cell-Biomaterial Interface II

Session Number: 13-11 Room: 305

Session Chair(s): K. Leong and B. Hoffman

3:00 PM - 3:18 PM

Design Highly Stretchable, Tough and Biocompatible Hydrogels for Controlled Cell-Material Interactions in 3D

X. Zhao;
Duke University, Durham, NC.

WEDNESDAY Podium Sessions

3:18 PM - 3:36 PM

The role of mechanical cues in miniaturized 3D culture of embryonic stem cells and ovarian follicles

X. He;

The Ohio State University, Columbus, OH.

3:36 PM - 3:54 PM

Photocrosslinkable Microribbon-like Hydrogels for Forming Highly Flexible Macroporous Scaffolds for Musculoskeletal Tissue Repair

L. Han, B. Conrad, X. Tong, **F. Yang;**

Stanford University, CA.

3:54 PM - 4:12 PM

Rationally-Designed FRET-based Molecular Tension Sensors

B. Hoffman;

Duke University, Durham, NC.

4:12 PM - 4:30 PM

Matrix stiffness and confinement co-regulate tumor cell invasion

A. Pathak;

Washington University in St. Louis, MO

Computational Challenges in Multiscale Modeling I

Session Number: 13-12 Room: 301

Session Chair(s): M. Viceconti

3:00 PM - 3:36 PM

Stochastic Multiscale Modelling: Computational Challenges

R. Krause, I. Pivkin;

Institute of Computational Science, Lugano, SWITZERLAND.

3:36 PM - 3:54 PM

Multiscale modelling of the spine

D. Lacroix;

University of Sheffield, UNITED KINGDOM.

3:54 PM - 4:12 PM

In Silico Oncology: A generic platform for clinically driven and oriented cancer hypermodeling. The Hypermodel Based Oncosimulator

G. S. Stamatakos;

In Silico Oncology Group, Institute of Communication and Computer Systems, National Technical University of Athens, Zografos, GREECE.

4:12 PM - 4:30 PM

Multiscale Modelling of Skeletal Muscles

T. Heidlauf, O. Röhrle;

University of Stuttgart, GERMANY

Reproductive & Women's Health VI: Biomechanics of the Pelvic Floor 1

Session Number: 13-13 Room:311

Session Chair(s): M. Damaser and R.M. Natal Jorge

3:00 PM - 3:18 PM

Biomechanics of Pelvic Organ Prolapse: A Conceptual Model

J. O. DeLancey;

University of Michigan, Ann Arbor, MI.

3:18 PM - 3:36 PM

Biomechanical Factors That Dictate Local Mesh Burden of Prolapse Mesh

W. R. Barone¹, R. Amini², S. Maiti¹, P. Moalli³, **S. D. Abramowitch¹;**

¹University of Pittsburgh, PA, ²University of Akron, OH, ³Magee-Womens Research Institute, Pittsburgh, PA.

3:36 PM - 3:54 PM

Framework for Automated Patient Specific Analysis of the Female Pelvic Floor: From Images to Engineering Model

J. B. Alford, D. C. Simkins, L. Hoyte;

University of South Florida, Tampa, FL.

3:54 PM - 4:12 PM

Role of Biomechanics in Tissue Engineering Approaches for Treating Pelvic Organ Prolapse

C. E. Gargett¹, S. Edwards², A. Rosamilia³, D. Ulrich¹, K. Su⁴, J. Ramshaw⁴, J. Arkwright⁵, N. Young⁶, J. Lee¹, J. Werkmeister⁴;

¹MIMR-PHI Institute of Medical Research, Clayton, AUSTRALIA, ²CSIRO, Geelong, AUSTRALIA, ³Monash University, Clayton, AUSTRALIA, ⁴CSIRO, Clayton, AUSTRALIA, ⁵CSIRO, Sydney, AUSTRALIA, ⁶Monash Health, Clayton, AUSTRALIA.

4:12 PM - 4:30 PM

Mechanical Evaluation of New Meshes for Pelvic Organ Prolapse Repair

S. L. Edwards¹, D. Ulrich², K. Su¹, J. F. White¹, A. Rosamilia², J. A. M. Ramshaw¹, J. A. Werkmeister¹, C. E. Gargett²;

¹CSIRO Materials Science and Engineering, Melbourne, VIC, AUSTRALIA, ²The Richie Centre, MIMR-PHI Institute of Medical Research, Melbourne, VIC, AUSTRALIA

WEDNESDAY Podium Sessions

Degenerative Spine

Session Number: 13-14 Room: Ball-A
Session Chair(s): T. Oxland

3:00 PM - 3:18 PM

In Vivo Mechanics of the Cervical Spine During Dynamic Functional Loading in Single-Level Arthrodesis Patients and Asymptomatic Control Subjects

W. Anderst, W. F. Donaldson, III, J. Y. Lee, J. D. Kang;
University of Pittsburgh, PA.

3:18 PM - 3:36 PM

Clinical aspects of adjacent segment pathology
T. Lund;
ORTON Orthopaedic Hospital, Helsinki, FINLAND.

3:36 PM - 3:54 PM

Do in vivo kinematic studies provide insight into the degeneration of segment adjacent to a spinal fusion? - a systematic analysis

M. Malakoutian¹, D. Volkheimer², J. Street³, M. F. Dvorak³, H. J. Wilke², T. R. Oxland¹;
¹Department of Mechanical Engineering, University of British Columbia, Vancouver, BC, CANADA,
²Institute of Orthopaedic Research and Biomechanics, Center of Musculoskeletal Research, University of Ulm, GERMANY,
³Department of Orthopaedics, University of British Columbia, Vancouver, BC, CANADA.

3:54 PM - 4:12 PM

Can in vitro biomechanics explain the degeneration of adjacent segments? -A systematic analysis-

D. Volkheimer¹, M. Malakoutian², T. R. Oxland², H. Wilke¹;
¹Institute of Orthopaedic Research and Biomechanics, Ulm University, GERMANY,
²Department of Mechanical Engineering, University of British Columbia, Vancouver, BC, CANADA

4:12 PM - 4:30 PM

The Effect of Pre- and Post- Operative Kyphotic Deformity on the Dynamic Load Transfer within the Lumbar Spine.

A. Tsouknidas¹, S. Savvakis², K. Anagnostidis³, A. Lontos⁴, N. Michailidis¹;
¹Department of Mechanical Engineering, Aristotle University of Thessaloniki, GREECE, ²BETA CAE Systems S.A., Thessaloniki, GREECE, ³Cardiff Spine Unit, University Hospital of Wales, UNITED KINGDOM, ⁴Frederick University, Nicosia, CYPRUS

Structure-Function in Soft Tissue – Bone

Session Number: 13-15 Room: Ball-B
Session Chair(s): E. Morgan and T. Haut Donahue

3:00 PM - 3:36 PM

Structure-Function Relationship at the Soft Tissue-to-Bone Interface

H. H. Lu;
Columbia University, New York, NY.

3:36 PM - 3:54 PM

A multiscale structural investigation of the osteochondral junction

S. Turley, A. Thambyah, **N. D. Broom**;
University of Auckland, NEW ZEALAND.

3:54 PM - 4:12 PM

Tissue Engineering of soft-hard tissue interfaces

D. Kelly;
Trinity College Dublin, IRELAND.

4:12 PM - 4:30 PM

Meniscal Attachment Mechanics and the Effect of Osteoarthritis

T. L. Haut Donahue, H. M. Pauly;
Colorado State, Fort Collins, CO

CSB Occupational Biomechanics: Upper Extremity Analysis Tools

Session Number: 13-16 Room: 308
Session Chair(s): C. R. Dickerson

3:00 PM - 3:36 PM

Task and Object Factors of Grasping Mechanics and Behavior

T. J. Armstrong, R. Figueroa;
University of Michigan, Ann Arbor, MI.

3:36 PM - 3:54 PM

The Future is Waiting for Enhanced Ergonomic Assessment Tools

J. Potvin;
McMaster University, Hamilton, ON, CANADA.

3:54 PM - 4:12 PM

Biomechanics in Ergonomics Applications - Examples from the Industry

J. Lin;
Liberty Mutual Research Institute for Safety, Hopkinton, MA.

4:12 PM - 4:30 PM

See Program Supplement and Errata Sheet for possible additions

WEDNESDAY Podium Sessions

Role of Spasticity in Locomotion: Experiments & Simulations

Session Number: 13-17 Room: 307
Session Chair(s): I. Jonkers and F. De Groot

3:00 PM - 3:18 PM

Relation between spasticity and functional impairment in hemiparetic stroke

W. Z. Rymer;

Rehabilitation Institute of Chicago/Northwestern University, Chicago, IL.

3:18 PM - 3:36 PM

Assessing spasticity in CP: Analytical vs functional measures

L. Bar-On, G. Molenaers, E. Aertbeliën, D. Monari, A. Van Campenhout, K. Desloovere;
KU Leuven, BELGIUM.

3:36 PM - 3:54 PM

What is the influence of biarticular muscles on postural control?

J. A. Reinbolt, M. Mansouri;

University of Tennessee, Knoxville, TN.

3:54 PM - 4:12 PM

A Forward Simulation Framework to Predict the Effect of Increased Length and Velocity Feedback during Gait.

F. De Groot, K. Jansen, W. Aerts, J. Duysens, J. Vander Sloten, J. De Schutter, I. Jonkers;
KU Leuven, BELGIUM.

4:12 PM - 4:30 PM

How botulinum toxin injections redistribute lower limb muscle forces during gait in patients with cerebral palsy: a simulation-based study.

L. Bosmans¹, C. Huenaearts², G. Molenaers², K. Desloovere¹, **I. Jonkers**¹;

¹KU Leuven, BELGIUM, ²UZ Leuven, BELGIUM

ISB Presidential Symposium I

Session Number: 13-18 Room: 310
Session Chair(s): J. Challis and T. van den Bogert

3:00 PM - 3:18 PM

Can Successful Control for Vertical Jumps from Various Initial Postures Be Generated by Mapping?

M. F. Bobbert, R. Casius;
MOVE Research Institute Amsterdam,
NETHERLANDS.

3:18 PM - 3:36 PM

Human Vibrations

B. M. Nigg;

University of Calgary, AB, CANADA.

3:36 PM - 3:54 PM

High resolution reconstruction of functional skeletal kinematics is still an issue

A. Cappozzo;

University of Rome Foro Italico, Roma, ITALY.

3:54 PM - 4:12 PM

Skeletal Adaptation: Mechanisms & Influences

R. Zernicke¹, G. Goulet¹, J. Cole², K. Kozloff¹;

¹University of Michigan, Ann Arbor, MI, ²University of Michigan & North Carolina State, Ann Arbor, MI.

4:12 PM - 4:30 PM

Lateral Stability and Falls: An Overview of Biomechanical Findings from the FALLS Project

M. Rodgers¹, M. Fujimoto², W. N. Bair², M. Inacio², A. S. Ryan³, M. G. Prettyman², B. A. Beamer⁴, D. A. Yungher², O. Addison⁴, P. M. Young², J. Whitall², M. W. Rogers²;

¹National Institute for Biomedical Imaging and Bioengineering, National Institutes of Health, Bethesda, MD, ²Department of Physical Therapy and Rehabilitation Science, University of Maryland School of Medicine, Baltimore, MD, ³Division of Gerontology, University of Maryland School of Medicine, Baltimore, MD, ⁴Geriatric Research, Education and Clinical Center, Baltimore Veterans Affairs Medical Center, Baltimore, MD

Mechanical Loading as In Vivo Anabolic Agent for Bone Tissue Engineering

Session Number: 13-19 Room: 303
Session Chair(s): D. Pioletti

3:00 PM - 3:18 PM

Translation of Biomechanical Concepts in Bone Tissue Engineering

A. Roshan Ghias;

Columbia University, New York, NY.

3:18 PM - 3:36 PM

Fostering endogenous bone repair using biological and physical cues

G. N. Duda, A. Petersen, S. Geissler, K. Schmidt-Bleek;

Charité - Universitätsmedizin Berlin, GERMANY.

3:36 PM - 3:54 PM

Mechanical Loading During Mastication Influences Mandibular Bone Mass

P. Ammann;

Division of Bone Diseases, University Hospital Geneva, SWITZERLAND.

WEDNESDAY Podium Sessions

3:54 PM - 4:12 PM

Mechanical Regulation of Vascularization and Bone Regeneration

R. Guldberg, J. Boerckel, B. Uhrig, A. Li, L.

Krishnan, N. Willett;

Georgia Institute of Technology, Atlanta, GA.

4:12 PM - 4:30 PM

Genetic Regulation of Skeletal Anabolic Response to Mechanical Loading

C. Kesavan¹, W. Lau¹, J. Wergedal¹, D. J. Baylink²,

S. Mohan¹;

¹Loma Linda VA Healthcare Systems, CA, ²Loma Linda University, CA

Comparative Biomechanics of Bipedal Locomotion

Session Number: 13-20 Room: 304

Session Chair(s): R. Blickhan and N. Ogihara

3:00 PM - 3:18 PM

Bipedal locomotion in the Japanese macaque

N. Ogihara;

Keio University, Yokohama, JAPAN.

3:18 PM - 3:36 PM

Grounded Running in Avian Terrestrial Locomotion: Global Dynamics, Leg Joint Dynamics, and the Role of the Trunk

E. Andrada, C. Rode, J. A. Nyakatura, R. Blickhan;

Friedrich Schiller University Jena, GERMANY.

3:36 PM - 3:54 PM

Neuromechanics of Bipedal Locomotion in Ground Birds From Quail to Ostrich

M. A. Daley¹, J. C. Gordon¹, A. Birn-Jeffery²;

¹Royal Veterinary College, Hatfield, UNITED

KINGDOM, ²University of California, Riverside, CA.

3:54 PM - 4:12 PM

Similarities and Differences Between Human and Avian Bipedal Locomotion

J. Rubenson¹, D. G. Lloyd², J. R. Hutchinson³, R. L. Marsh⁴;

¹The University of Western Australia, Crawley, WA, AUSTRALIA, ²Griffith University, Gold Coast, AUSTRALIA, ³Royal Veterinary College, University of

London, Hatfield, UNITED KINGDOM,

⁴Northeastern University, Boston, MA.

4:12 PM - 4:30 PM

Leg function in humans and animals - toward bridging the gap between concepts and real-world locomotion;

A. Sevfarth, M. Maus, C. Ludwig, D. Maykranz, K. T.

Kalveram, C. Rode, F. Peuker, M. Groß:

Locomotion Lab, Institute of Sport Science,

Technical University Darmstadt, GERMANY

Wednesday, 9 July 2014

5:00– 6:30 PM

Quantifying a Dynamic Picture of the Brain in Action

NSF Symposium on Neurofunctionality Failure Analysis and Augmentation

Session Number: 14-1 Room: 109

Session Chair(s): G. Genin

5:00 PM - 5:18 PM

Measuring Non-Equilibrium Steady State Rate Constants in Living Cells

E. L. Elson;

Washington University School of Medicine, Saint

Louis, MO

5:18 PM - 5:36 PM

Model-based interpretation of brain mapping data

L. Mujica-Parodi

SUNY Stony Brook

5:36 PM - 5:54 PM

Flexible electronic for subdural electrophysiological mapping

J. Rogers, **N Lu**

UIUC

5:54 PM - 6:12 PM

Optogenetics as a tool for mapping the brain

E. Boyden

MIT

6:12 PM - 6:30 PM

Portable, near infrared monitoring of brain function

B. Onaral

Drexel

Mechanics of Weak Protein-Ligand Interaction II

Session Number: 14-2 Room: 110

Session Chair(s): B. Ji and D. Li

5:00 PM - 5:18 PM

C-terminal peptide of complexin-1 is important for facilitating SNAREs formation

J. Diao;

Stanford University & HHMI, CA.

WEDNESDAY Podium Sessions

5:18 PM - 5:36 PM

Rupture behaviors of receptor-ligand bond at ultralow loading rate

D. Li, B. Ji;

Beijing Institute of Technology, CHINA.

5:36 PM - 5:54 PM

Allosteric Conformational Transitions in Adenylate Kinase: Meta-dynamics simulations

D. Li¹, M. S. Liu², B. Ji¹;

¹Biomechanics and Biomaterials Laboratory, Beijing Institute of Technology, CHINA, ²CSIRO – Mathematics, Informatics and Statistics, Melbourne, AUSTRALIA.

5:54 PM - 6:12 PM

Mechanism of mechanical regulated Notch activation and structural bases of Notch NRR related T-ALL

J. LOU;

Institute of Biophysics, Beijing, CHINA.

6:12 PM - 6:30 PM

Mechanics of coordinative complexes and their roles in biomaterials

Z. Xu;

Tsinghua University, Beijing, CHINA

Measurements & Models for Cell-ECM Interactions

Session Number: 14-3 Room: 111

Session Chair(s): G. Genin and R. Kaunas

5:00 PM - 5:36 PM

Nanomechanics by which macrophages pick-up surface-bound bacteria

V. Vogel;

ETH Zurich, SWITZERLAND.

5:36 PM - 5:54 PM

Bioelectromechanics of Engineered Heart Tissues

E. L. Elson¹, T. M. Abney², T. Wakatsuki³, K. M. Pryse¹, G. M. Genin¹;

¹Washington University School of Medicine, Saint Louis, MO, ²Washington University in St. Louis, MO, ³In Vivo Sciences, LLC, Madison, WI.

5:54 PM - 6:12 PM

Substrate Mechanics: Why do cells care?

S. Safran;

Weizmann Institute of Science, Rehovot, ISRAEL.

6:12 PM - 6:30 PM

Live-cell Subcellular Study of Force-mediated Focal Adhesion Morphogenesis

S. Weng, Y. Shao, W. Chen, J. Fu;

University of Michigan-Ann Arbor, MI

Molecular Mechanics of Micro-tubules I

Session Number: 14-4 Room: 306

Session Chair(s): D. Sept and J. Ross

5:00 PM - 5:18 PM

The Story of the End: New Insight into how EB1 Mechanically Regulates Growing Microtubules

M. T. Valentine;

University of California, Santa Barbara, CA.

5:18 PM - 5:36 PM

Mechanics of Doubly Stabilized Microtubules

J. L. Ross;

University of Massachusetts Amherst, MA.

5:36 PM - 5:54 PM

Mechanics of Microtubule Bundles in Primary Cilia of Kidney Epithelial Cells

C. Battle¹, C. Ott², J. Lippincott-Schwartz², C. Schmidt¹;

¹Georg-August-Universität, Göttingen, GERMANY, ²National Institutes of Health, Baltimore, MD.

5:54 PM - 6:12 PM

Measuring Microtubule Mechanics: An Update to the Free-Fluctuating Method

T. L. Hawkins;

University of Wisconsin La Crosse, WI.

6:12 PM - 6:30 PM

Anisotropic Mechanics of Microtubules

D. Sept;

Emergent Behaviors of Integrated Cellular Systems III

Session Number: 14-5 Room: 302

Session Chair(s): R. Bashir, R. Nerem and R. Kamm

5:00 PM - 5:36 PM

A New Approach to Predicting Emergent Behaviors of Cell-ECM Interactions Using Stochastic Rules Generated from Mechanistic Computational Models

M. Mayalu¹, M. Kim², V. Chan¹, D. Neal¹, H. Kim¹, H. Asada¹;

¹Massachusetts Institute of Technology, Cambridge, MA, ²Singapore-MIT Alliance of Research and Technology, SINGAPORE.

WEDNESDAY Podium Sessions

5:36 PM - 5:54 PM

Manipulating Cells at Microscale for Biomedical Applications

F. Xu;

Bioinspired Engineering and Biomechanics Center (BEBC), and The Key Laboratory of Biomedical Information Engineering of Ministry of Education, School of Life Science and Technology, Xi'an Jiaotong University, CHINA.

5:54 PM - 6:12 PM

Fluidics at the Micro Scale for High-throughput High-content Developmental Biology

H. Lu;

Georgia Institute of Technology, Atlanta, GA.

6:12 PM - 6:30 PM

Growing Perfusible Microvascular Networks in Vitro

J. A. Whisler, M. B. Chen, R. D. Kamm;
MIT, Cambridge, MA

Functional Tissue Engineering II

Session Number: 14-6 Room: 309
Session Chair(s): K. Costa and C. Hung

5:00 PM - 5:18 PM

Engineered, Acellular Arteries in Hemodialysis Access

L. Niklason;

Yale University, New Haven, CT.

5:18 PM - 5:36 PM

Strategy for Preservation of Tissue Engineered Articular Cartilage for Long-Term Storage

A. B. Nover¹, S. L. Lee¹, L. A. Rogers¹, W. T. Yu¹, E. G. Lima², A. M. Stoker³, J. L. Cook³, G. A. Ateshian¹, C. T. Hung¹;

¹Columbia University, New York, NY, ²The Cooper Union, New York, NY, ³University of Missouri, Columbia, MO.

5:36 PM - 5:54 PM

Functional Tissue Engineering of Human Heart Muscle

K. D. Costa;

Icahn School of Medicine at Mount Sinai, New York, NY.

5:54 PM - 6:12 PM

Transitioning from Nanotechnology to Picotechnology: The Next Step Towards Improving Bone Growth

T. J. Webster;

Northeastern University, Boston, MA.

6:12 PM - 6:30 PM

Building Tissue Engineered Structures with Appropriate Short and Long-term Mechanical Properties

T. McAllister, N. Dusserre, N. L'Heureux;
Cytograft Tissue Engineering, Inc., Novato, CA

Intraventricular Blood Flow Dynamics II

Session Number: 14-7 Room: 300
Session Chair(s): S. Shadden and J.C. del Alamo

5:00 PM - 5:18 PM

Intraventricular flow dynamics in the clinical setting

J. Bermejo;

Hospital General Universitario Gregorio Marañón, Madrid, SPAIN.

5:18 PM - 5:36 PM

Cardiac blood flow studied with 4D flow MRI

T. Ebbers;

Linköping University, SWEDEN.

5:36 PM - 5:54 PM

Significance of Bernoulli Equation's Unsteady Term for Pressure Drop Estimation in Cardiovascular System

A. Falahatpisheh, **A. Kheradvar;**
University of California Irvine, CA.

5:54 PM - 6:12 PM

Fluid-Structure Interaction and Electromechanical Interaction in the Heart.

C. S. Peskin¹, B. E. Griffith², D. M. McQueen¹;
¹Courant Institute of Mathematical Sciences, New York University, NY, ²New York University School of Medicine, NY.

6:12 PM - 6:30 PM

Characterizations of the transport topology in the left ventricle

S. Shadden;

University of California, Berkeley, CA

WEDNESDAY Podium Sessions

Cerebral Aneurysms I: Clinical & Industrial Perspectives

Session Number: 14-8 Room: Ball-C
Session Chair(s): D. Steinman and Ragahavan

5:00 PM - 5:18 PM

2D viscoelastic thrombosis model for stented aneurysms

Julien Egger (a), Dominik Szczerba (b), Daniel A. Rüfenacht (c), Gabor Szekely (a), **Sven Hirsch** (d) a ETH, Department of Electrical Engineering, CH-8092 Zurich, b IT'IS Foundation, CH-8004 Zurich, c Swiss Neuro Institute, Department of Neuroradiology, Hirslanden Clinic, CH-8032 Zurich, d Zurich University of Applied Sciences, Institute of Applied Simulation, CH-8830 Wädenswil

5:18 PM - 5:36 PM

High Focal Curvature of the Inner Bend of the Carotid Siphon is Associated with Aneurysm Formation

A. Lauric, J. Hippelheuser, M. Safain, **A. M. Malek**; Tufts Medical Center, Boston, MA.

5:36 PM - 5:54 PM

Clinical applications of CFD simulations of intracranial aneurysms from the viewpoint of clinicians

K. Kono, T. Terada; Department of Neurosurgery, Wakayama Rosai Hospital, JAPAN.

5:54 PM - 6:12 PM

Where to Shoot for When Bringing Aneurysm Assessment Tools to the Clinic: Preferably not in the Foot

L. Antiga; Orobix Srl, Bergamo, ITALY.

6:12 PM - 6:30 PM

From Medical Imaging to CFD: A Translational Approach

A. Kamen; Princeton University, NJ

Micromechanics of Cardiovascular Tissues II

Session Number: 14-9 Room: 312
Session Chair(s): Kassab and Lanir

5:00 PM - 5:18 PM

Simulating stress fiber orientation in micro-tissue constructs

C. Obbkink-Huizer¹, J. Foolen¹, C. Oomens¹, C. Chen², M. Borochin², C. Bouten¹, **F. Baaijens**¹; ¹Eindhoven University of Technology, NETHERLANDS, ²University of Pennsylvania, Philadelphia, PA,

5:18 PM - 5:36 PM

Microstructure-based modeling of coronary arteries

H. Chen¹, X. Zhao¹, X. Lu¹, Y. Lanir², G. Kassab¹; ¹Indiana University-Purdue University Indianapolis, IN, ²Technion-Israel Institute of Technology, Haifa, ISRAEL.

5:36 PM - 5:54 PM

A Histomechanical Growth and Remodeling Framework for Arteries

T. Gasser; Royal Institute of Technology (KTH), Stockholm, SWEDEN.

5:54 PM - 6:12 PM

An Image-Driven Constitutive Modelling Framework for Heart Failure Mechanics

M. P. Nash¹, V. Y. Wang¹, J. A. Niestrawska², S. M. Huang¹, A. J. Wilson¹, G. B. Sands¹, A. A. Young¹, I. J. LeGrice¹; ¹University of Auckland, NEW ZEALAND, ²RWTH Aachen University of Technology, GERMANY.

6:12 PM - 6:30 PM

Global myocardial strain as feedback into local cellular electromechanics - finite element analysis of an infarct injured left ventricle

S. T. Wall¹, J. S. Sundnes¹, J. Guccione², B. L. de Oliveira¹, M. B. Ratcliffe²; ¹Simula Research Laboratory, Lysaker, NORWAY, ²University of California at San Francisco, CA

Muscle Mechanics III

Session Number: 14-10 Room: 313
Session Chair(s): W. Herzog

5:00 PM - 5:18 PM

Interventions to Prevent Rapid Sarcomere Loss Caused by Electrical Stimulation in Rabbit Triceps Surae Muscles

M. Yamamoto; University of Calgary, AB, CANADA.

WEDNESDAY Podium Sessions

5:18 PM - 5:36 PM

In Vivo Sarcomere Length in Healthy and Spastic Muscle

R. L. Lieber;

University of California, San Diego, CA.

5:36 PM - 5:54 PM

Increased Sarcomere Length is Associated with Decreased Range of Motion in Cerebral Palsy.

K. Kaiser¹, T. Leonard¹, K. Logan², B. Orlik², R. El-Hawary², J. Howard², W. Herzog¹;

¹University of Calgary, AB, CANADA, ²IWK Hospital, Halifax, NS, CANADA.

5:54 PM - 6:12 PM

Spastic muscles and gait function in cerebral palsy

D. Damiano;

National Institutes of Health, Bethesda, MD.

6:12 PM - 6:30 PM

Changes in calcium sensitivity after active stretch: role of titin and lattice spacing

V. Joumaa, W. Herzog;

University of Calgary, AB, CANADA

Cell-Biomaterial Interface III

Session Number: 14-11 Room: 305

Session Chair(s): K. Leong and B. Hoffman

5:00 PM - 5:18 PM

Mesenchymal stem cell mechanosensing in engineered fibrillar microenvironments

B. M. Baker¹, B. Trappmann¹, A. S. Nair², I. L. Kim², J. A. Burdick², V. B. Shenoy², C. S. Chen¹;

¹Boston University, MA, ²University of Pennsylvania, Philadelphia, PA.

5:18 PM - 5:36 PM

Effect of temporal application and spatial arrangement of topography on neuronal differentiation of stem cells

L. Chan, S. Ramesh, A. K. Moe, **E. Yim;**

National University of Singapore, SINGAPORE.

5:36 PM - 5:54 PM

Hydrogel-based electronics: Materials for next-generation biointerfaces

C. J. Bettinger;

Carnegie Mellon University, Pittsburgh, PA.

5:54 PM - 6:12 PM

Microscale Changes in Blood Vessel Wall Mechanics with Age and Diet

J. Kohn, S. Bajpai, N. Nishimura, **C. Reinhart-King;**

Cornell University, Ithaca, NY.

6:12 PM - 6:30 PM

Matrix Mechanical Properties and Composition Mediate Intercellular Junctions and Cell Function

C. Kuo

Computational Challenges in Multiscale Modeling II

Session Number: 14-12 Room: 301

Session Chair(s): M. Viceconti

5:00 PM - 5:18 PM

The challenges of incorporating both multi-scale function and population variability in models of the lung

M. Tawhai, K. Hedges, A. Clark;

University of Auckland, NEW ZEALAND.

5:18 PM - 5:36 PM

Multiscale Cartilage Biomechanics: Technical Challenges in Realizing a High-Throughput Modeling and Simulation Workflow

A. Erdemir;

Cleveland Clinic, OH.

5:36 PM - 5:54 PM

Multiscale Modelling of the Cardiovascular System

G. Dubini;

Politecnico di Milano, Milan, ITALY.

5:54 PM - 6:12 PM

Multiscale Modeling of Bone Functional Adaptation by Remodeling

T. Adachi;

Kyoto University, JAPAN.

6:12 PM - 6:30 PM

Multi-scale modeling of the placenta?

A. Clark

Reproductive & Women's Health VII: Biomechanics of the Pelvic Floor 2

Session Number: 14-13 Room: 311

Session Chair(s): J. DeLancey and L. Hoyte

5:00 PM - 5:18 PM

Biomechanics of Vaginal Birth and Levator Muscle Injury

J. A. Ashton-Miller, J. O. L. DeLancey, J. M. Miller, D. Jing, J. Kim;

University of Michigan, Ann Arbor, MI.

WEDNESDAY Podium Sessions

5:18 PM - 5:36 PM

Changes to Pubic Symphysis Length during Pregnancy and Delivery May Contribute to Pelvic Organ Prolapse

A. Borazjani, B. M. Couri, B. M. Balog, M. S. Damaser;
The Cleveland Clinic, OH.

5:36 PM - 5:54 PM

Effects of fetal head shape variations on the second stage of labour

X. Yan, J. Kruger, M. Nash, P. Nielsen;
Auckland Bioengineering Institute, NEW ZEALAND.

5:54 PM - 6:12 PM

The influence of the fetus head molding during delivery on the biomechanical behavior of the pelvic floor

M. Parente¹, E. Silva¹, T. Mascarenhas², R. Natal¹;
¹IDMEC-FEUP, Porto, PORTUGAL, ²Faculty of Medicine, U. Porto / Sao Joao Hospital, PORTUGAL.

6:12 PM - 6:30 PM

In Vivo Evaluation of Perineal Body Properties Using Ultrasound Elastography in Nulliparous Women

L. Chen, L. K. Low, K. Curtis, J. O. L. DeLancey, J. A. Ashton-Miller;
University of Michigan, Ann Arbor, MI

Biomechanics of the Spine

Session Number: 14-14 Room: Ball-A
Session Chair(s): J. L. Wang

5:00 PM - 5:18 PM

Mechanical Analysis of the Influence on Vertebral Stress by the Kyphosis Due to a Vertebral Compression Fracture

J. Sakamoto¹, H. Murakami¹, N. Kawahara²;
¹Kanazawa University, JAPAN, ²Kanazawa Medical University, JAPAN.

5:18 PM - 5:36 PM

Effects of Mechanical Properties of the Rod on the Failure Risks around the Screw in Posterior Spinal Instrumentation for Osteoporotic Vertebra -a FEM study-

D. Tawara¹, K. Noro¹, T. Tsujikami¹, Y. Okamoto², H. Murakami²;
¹Ryukoku University, Otsu, JAPAN, ³Kanazawa University Hospital, JAPAN.

5:36 PM - 5:54 PM

Effect of trunk muscles and degenerative diseases on spine biomechanics

Y. Kim;
Kyung Hee University, Yongin, REPUBLIC of KOREA.

5:54 PM - 6:12 PM

Non-invasive dynamic assessment of the lumbo-pelvic region in healthy people and low back pain patients

D. Sanchez-Zuriaga; SPAIN.

6:12 PM - 6:30 PM

Relationships between the Progression of Vertebral Failure and Trabecular Architecture in the Lumbar Spine

A. I. Hussein, E. F. Morgan;
Boston University, MA

Mechanobiology of Bone Healing

Session Number: 14-15 Room: Ball-B
Session Chair(s): E. Morgan

5:00 PM - 5:18 PM

Coupling in vitro and in silico models of endothelial and mesenchymal stem cell mechanobiology to improve our understanding of bone regeneration

D. Kelly;
Trinity College Dublin, IRELAND.

5:18 PM - 5:36 PM

Towards using mechanobiological computer simulations in clinical applications

H. Isaksson, H. Khayyeri;
Lund University, SWEDEN.

5:36 PM - 5:54 PM

Combining In Vivo Models, Experimental Mechanics, And Numerical Simulation To Deconstruct The Mechanobiology Of Bone Healing

E. F. Morgan, K. T. Salisbury Palomares, G. J. Miller, L. N. M. Hayward, P. L. Leong;
Boston University, MA.

5:54 PM - 6:12 PM

Mechanical Stimulation and Fragility Fracture: Is There a Role?

W. Cheung;
The Chinese University of Hong Kong, HONG KONG.

WEDNESDAY Podium Sessions

6:12 PM - 6:30 PM

Investigations on Bone Ingrowth on a Porous Coated Implant using Three-dimensional Finite Element Analysis and Mechano-regulatory Algorithm.

K. Mukherjee, S. Gupta;

Indian Institute of Technology Kharagpur, INDIA

Mechanics and Mechanobiology of Soft and Hard Tissues

Session Number: 14-16 Room: 308

Session Chair(s): S. Donahue and M. Masen

5:00 PM - 5:18 PM

Biomechanical properties of skin obtained with high frequency ultrasound

Y. Saijo¹, R. Nagaoka¹, M. Horie¹, K. Kobayashi²;

¹Tohoku University, Sendai, JAPAN, ²Honda Electronics, Toyohashi, JAPAN.

5:18 PM - 5:36 PM

Towards predictive modelling of the static and dynamic frictional behavior of human skin

M.A. Masen

Imperial College London, UK

5:36 PM - 5:54 PM

Assessment of Mechanic Properties of Skin by Acoustic Waves

Eduardo Ruvolo

Avon Products

5:54 PM - 6:12 PM

Diminished Disuse-induced Bone Loss in Perlecan Deficient Mice

A. Parajuli¹, X. D. Gu¹, X. Lai¹, Z. Rogers¹, W.

Tseng², X. S. Liu², C. Kirn-Safran¹, C. Price¹, L. Wang¹;

¹University of Delaware, Newark, DE, ²University of Pennsylvania, Philadelphia, PA.

6:12 PM - 6:30 PM

Naturally occurring models for preventing disuse induced bone loss

S. Donahue;

Colorado State University, Fort Collins, CO.

Evolutionary Biomechanics of Animal Locomotion III

Session Number: 14-17 Room: 307

Session Chair(s): J. R. Hutchinson

5:00 PM - 5:18 PM

Evolutionary and biomechanical consequences for the integration of locomotion and feeding in ram filter feeding whales

J. Goldbogen;

Stanford University, Pacific Grove, CA.

5:18 PM - 5:36 PM

Towards a whole animal, whole lineage perspective on the evolution of tetrapod locomotion

S. E. Pierce, J. R. Hutchinson;

Royal Veterinary College, Hatfield, UNITED KINGDOM.

5:36 PM - 5:54 PM

Inferring Locomotor Characteristics of a Stem Amniote Fossil: A First Step Towards Understanding Locomotor Mechanics during the Evolution of Amniotes

J. A. Nyakatura¹, V. R. Allen², E. Andrada¹, M. S. Fischer¹;

¹Friedrich-Schiller-Universität, Jena, GERMANY, ²Royal Veterinary College, London, UNITED KINGDOM.

5:54 PM - 6:12 PM

Evolution of Appendicular Loading Mechanics in Vertebrates: Land, Water, and the Move Between

R. W. Blob¹, S. M. Kawano¹, V. K. H. Young¹, K. M. Sheffield¹, N. R. Espinoza¹, M. T. Butcher²;

¹Clemson University, Clemson, SC, ²Youngstown State University, OH.

6:12 PM - 6:30 PM

Evolution on Limb Bone Loading in Monitor Lizards

C. J. Clemente;

University of Queensland, Brisbane, AUSTRALIA

ISB Presidential Symposium II

Session Number: 14-18 Room: 310

Session Chair(s): J. Challis and T. Van den Bogert

5:00 PM - 5:18 PM

Distributed Shear and Pressure on the Plantar surface of the Foot during Gait

B. L. Davis¹, V. Berki¹, M. Boswell¹, L. M. Guseila², D. Ciltea², L. Goss³, G. McMillan³, S. Barnes⁴;

¹University of Akron, OH, ²Akron General Medical Center, OH, ³Innovative Scientific Solutions Incorporated, Dayton, OH, ⁴Bertec Corporation, Columbus, OH.

5:18 PM - 5:36 PM

The Biomechanics of Better Breast Health

J. R. Steele;

University of Wollongong, AUSTRALIA.

WEDNESDAY Podium Sessions

5:36 PM - 5:54 PM

Does Changing Footfall Patterns Reduce Running-Related Injuries?

J. Hamill¹, R. H. Miller², J. Freedman Silvernail¹, A. H. Gruber¹;

¹University of Massachusetts Amherst, MA,

²University of Maryland, College Park, MD.

5:54 PM - 6:12 PM

The Distribution Problem in Biomechanics and Movement Control

W. Herzog;

University of Calgary, AB, CANADA.

6:12 PM - 6:30 PM

Design and control of limb motion in nature and engineering

A. J. van den Bogert;

Cleveland State University, OH

ANZSB Young Investigator Awards

Session Number: 14-19 Room: 303

Session Chair(s): R. Barrett and A. Creswell

5:00 PM - 5:18 PM

Is There Abnormal Intermuscular Force Transmission in Ankle Contracture after Stroke?

J. Diong¹, R. D. Herbert²;

¹Sydney Medical School, The University of Sydney, Lidcombe NSW, AUSTRALIA, ²Neuroscience Research Australia, Randwick NSW, AUSTRALIA.

5:18 PM - 5:36 PM

Understanding in-vivo relationship between brain tissue mechanical properties and microstructure changes in a rat model of hydrocephalus

L. Juge¹, A. Pong¹, A. Bongers², R. Sinkus³, L. E. Bilston⁴, S. Cheng⁵;

¹Neuroscience Research Australia, Randwick NSW, AUSTRALIA, ²Biological Resources Imaging Laboratory, University of New South Wales, Kensington NSW, AUSTRALIA, ³BHF Centre of Excellence, Division of Imaging Sciences and Biomedical Engineering, King's College London, King's Health Partners, St. Thomas' Hospital, London, UNITED KINGDOM, ⁴Prince of Wales Clinical School, University of New South Wales, Randwick NSW, AUSTRALIA, ⁵Macquarie University, Randwick NSW, AUSTRALIA.

5:36 PM - 5:54 PM

Linearly Scaled Male Generic Musculoskeletal Model does not represent

Female Musculotendon Geometries at the Hip

L. Modenese, H. Hoang, A. Loureiro, P. M. Mills, D. G. Lloyd;

Griffith Health Institute, Centre for Musculoskeletal Research, Griffith University, Southport, AUSTRALIA.

5:54 PM - 6:12 PM

Identification of kinetics and muscle force changes following ACL reconstruction using state of the art computer-based simulation and principle component analysis

H. Mokhtarzadeh, L. Perraton, L. Fok, M. A. Muñoz, K. Fortin, R. Clark, P. Pivonka, A. L. Bryant; The University of Melbourne, AUSTRALIA.

6:12 PM - 6:30 PM

Triceps Surae Demonstrates a Weak Frequency-Dependent Force Response when Activated with Double Pulse Stimulation

D. L. Mayfield;

University of Queensland, Brisbane, AUSTRALIA

How & Why to Couple Soft-Tissue - Rigid Body Simulations

Session Number: 14-20 Room: 304

Session Chair(s): S. Blemker and T. Van den Bogert

5:00 PM - 5:18 PM

Multi-Scale Dynamics of Human Movement

S. Schmitt¹, T. Rupp¹, M. Günther¹, O. Röhrle¹, W. Ehlers¹, N. Karajan²;

¹University Stuttgart, GERMANY, ²Dynamore, Stuttgart, GERMANY.

5:18 PM - 5:36 PM

Muscle fiber length heterogeneity does not influence peak local tissue strains in the biceps femoris long head muscle

N. Fiorentino, S. S. Blemker;

University of Virginia, Charlottesville, VA.

5:36 PM - 5:54 PM

Anterior Cruciate Ligament Reconstruction: A simulation study

Y. Y. Dhaher¹, S. Salehghaffari², M. Schroeder¹;

¹Northwestern University, Chicago, IL,

²Rehabilitation Institute of Chicago, IL.

5:54 PM - 6:12 PM

Novel Technique to Map the Biomechanical Properties of Entire Articular Surfaces Using

Indentation to Identify Osteoarthritic-like Regions
S. Sim¹, A. Chevrier¹, M. Garon², E. Quenneville², M. Buschmann¹;

¹Ecole Polytechnique de Montreal, QC, CANADA,

²Biomomentum Inc., Laval, QC, CANADA.

WEDNESDAY *Podium Sessions*

6:12 PM - 6:30 PM

Unified Finite-Element and Rigid Body

Musculoskeletal Simulation in ArtiSynth

I. Stavness¹, J. E. Lloyd², A. Sanchez², A. G.

Hannam², S. Fels²;

¹University of Saskatchewan, Saskatoon, SK,

CANADA, ²University of British Columbia,

Vancouver, BC, CANADA

THURSDAY Podium Sessions

Thursday, 10 July 2014
8:00– 9:30 PM

Enhanced Imaging & Treatment with Nanoparticles

Session Number: 15-1 Room: 109

Session Chair(s): M.N. Rylander and J. West

8:00 AM - 8:36 AM

Nanoparticle Hyperthermia Cancer Treatment:
Material Science to Clinical Patients

J. Hoopes¹, A. A Peterk¹, A. Giustini¹, J. A. Tate¹, R. V. Stigliano¹, L.A. Jarvis¹, D. J. Gladstone¹, K.M. Rosenkrantz¹, M. Garwood²

¹The Geisel School of Medicine and Thayer School of Engineering at Dartmouth; ²Univ MN Center for Magnetic Resonance Research

8:36 AM - 8:54 AM

Integrated Multimodal Imaging and Photothermal Therapy Using Nanoparticles

A. Coughlin, J. Ashton, L. Strong, **J. West**;
Duke University, Durham, NC.

8:54 AM - 9:12 AM

Self-Assembled Lipid-Polymer Hybrid Nanoparticles for siRNA Delivery

J. Shi;

Brigham & Women's Hospital, Harvard Medical School, Boston, MA.

9:12 AM - 9:30 AM

Evaluation of targeted nanoparticle delivery in biomimetic channels as in vitro blood vessel model

Y. Liu¹, A. Thomas¹, C. Orr¹, C. Uhl¹, J. Tan¹, S. Wang¹, D. Ou-yang¹, L. Lowe-Krentz¹, V. Muzykantov²;

¹Lehigh University, Bethlehem, PA, ²University of Pennsylvania, Philadelphia, PA.

Implications for Flow on Cell Adhesion & Drug Delivery

Session Number: 15-2 Room: 110

Session Chair(s): S.N. Thomas

8:00 AM - 8:18 AM

Design of Vascular-Targeted Carriers for Optimal Performance in Humans: Bringing Blood Cells-Particle Dynamics into the Game

P. Charoenphol, P. Onyskiw, K. Namdee, **O. Eniola-Adefeso**;

University of Michigan, Ann Arbor, MI.

8:18 AM - 8:36 AM

Divergence of Instantaneous versus Long Time- and Length-scale Adhesion Dynamics of Cells with Selectins in Fluid Flow

J. Oh, P. McClatchey, **S. N. Thomas**;
Georgia Institute of Technology, Atlanta, GA.

8:36 AM - 8:54 AM

Abluminal stimulation of sphingosine 1-phosphate receptors 1 and 3 promotes and stabilizes endothelial sprout formation

A. O. Awojodu¹, S. M. Lenz², A. Das², **E. A. Botchwey, III**¹;

¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA.

8:54 AM - 9:12 AM

Leukocyte Adhesion during Sickle Cell Disease Vaso-Occlusive Crisis

P. Sundd;
University of Pittsburgh, PA.

9:12 AM - 9:30 AM

Lymphatics and interstitial flow involvement in stromal activation: implications for therapy

J. Munson¹, M. Broggi², M. A. Swartz²;

¹University of Virginia, Charlottesville, VA, ²Ecole Polytechnique Federale de Lausanne, SWITZERLAND.

Cytoskeletal Mechanics & Physics of Adhesion I

Session Number: 15-3 Room: 111

Session Chair(s): A. Bershadsky and U. Schwarz

8:00 AM - 8:18 AM

3D ECM adhesion controls Intercellular mechanical stress. Its influence on bile canaliculi morphophysiology.

Q. Li¹, M. Mercade², K. Herr¹, J. Thiery¹, H. Yu¹, **V. Viasnoff**³;

¹NUS, SINGAPORE, ²INSA, Toulouse, FRANCE, ³NUS/CNRS, SINGAPORE.

8:18 AM - 8:36 AM

Distribution of mechanical tension within focal adhesions in living cells

A. Mekhdjian, M. Morimatsu, A. Chang, **A. Dunn**;
Stanford University, CA.

8:36 AM - 8:54 AM

Balancing forces in cell pairs

J. Sim, J. Möller, A. R. Dunn, W. I. Weis, W. J.

Nelson, B. L. Pruitt;
Stanford University, CA.

THURSDAY Podium Sessions

8:54 AM - 9:12 AM

Cytoplasmic intermediate filaments stiffen and immobilize the nucleus in adherent cells

S. Neelam, Y. Li, T. Chancellor, T. Lele, R.

Dickinson;

University of Florida, Gainesville, FL.

9:12 AM - 9:30 AM

Cell shape and forces in patterned environments

U. S. Schwarz;

Heidelberg University, GERMANY.

Intermediate Filaments

Session Number: 15-4 Room: 306

Session Chair(s): MacKintosh and Schmidt

8:00 AM - 8:36 AM

Intermediate Filaments: The molecular basis for assembly, network formation and strain-stiffening

H. Herrmann¹, N. Mücke¹, U. Aebi², P. Pawelzyk³,

N. Willenbacher³;

¹German Cancer Research Center, Heidelberg, GERMANY, ²Biozentrum, University of Basel, SWITZERLAND, ³Institute for Mechanical Process Engineering and Mechanics, KIT, Karlsruhe, GERMANY.

8:36 AM - 8:54 AM

Modulating Neural Intermediate Filaments Elasticity and Network Structure Through Non-specific Ionic Bridging

R. Beck;

Tel-Aviv University, ISRAEL.

8:54 AM - 9:12 AM

Intermediate Filament Mechanics in Living Cells

S. Köster;

Goerg-August University Goettingen, GERMANY.

9:12 AM - 9:30 AM

Force Spectrum Microscopy: A new probe of stochastic properties of molecular motors in cells

M. Guo¹, J. Lippincott-Schwartz², F. Mackintosh³, D.

Weitz¹;

¹Harvard University, Cambridge, MA, ²NIH,

Bethesda, MD, ³VU University, Amsterdam,

NETHERLANDS.

Stem Cell Nucleus I

Session Number: 15-5 Room: 302

Session Chair(s): D. Discher and T. McDevitt

8:00 AM - 8:36 AM

Nuclear plasticity and genome regulation during stem-cell differentiation

G. Shivashankar;

Mechanobiology Institute, National University of Singapore, SINGAPORE.

8:36 AM - 8:54 AM

Biophysical Regulation of Cell Reprogramming

T. Downing, J. Soto, J. Chu, **S. Li**;

University of California, Berkeley, CA.

8:54 AM - 9:12 AM

Multiparameter Microfluidic Mechanophenotyping of Stem Cells

D. Di Carlo;

University of California, Los Angeles, CA.

9:12 AM - 9:30 AM

Lamins regulate cell trafficking and lineage maturation of adult human hematopoietic cells

J. Shin;

Cell Motility

Session Number: 15-6 Room: 309

Session Chair(s): A. Pathak

8:00 AM - 8:18 AM

Mechanisms of Tumor Cell Invasion in Collagen-Based Microtracks is Distinct from 3D Migration Mechanisms

S. Carey, A. Rahman, C. Kraning-Rush, **C. Reinhart-**

King;

Cornell University, Ithaca, NY.

8:18 AM - 8:36 AM

Engineered Tissues to Quantify Tumor Spread and Drug Resistance

L. Barney, T. Nguyen, **S. R. Peyton**;

University of Massachusetts, Amherst, MA.

8:36 AM - 8:54 AM

Three-dimensional traction force dynamics in amoeboid cell motility

J. del Alamo, E. Bastounis, B. Álvarez-González, R.

Meili, J. François, R. Firtel, J. Lasheras;

U C San Diego, La Jolla, CA.

THURSDAY Podium Sessions

8:54 AM - 9:12 AM

Plasticity of the Cancer Cell Migration: Extracellular Matrix Drives the Optimisation of Blebbing, Adhesions and Spreading.

M. Tozluoglu¹, A. Tournier², R. P. Jenkins², S. Hooper², P. Bates², E. Sahai²;

¹University College London, UNITED KINGDOM,

²London Research Institute - Cancer Research UK, UNITED KINGDOM.

9:12 AM - 9:30 AM

Water Permeation Drives Tumor Cell Migration in Confined Microenvironments

K. Konstantopoulos¹, K. Stroka¹, H. Jiang², S. X. Sun¹;

¹The Johns Hopkins University, Baltimore, MD,

²University of Science and Technology of China, Hefei, CHINA.

Cardiovascular Fluid Mechanics I

Session Number: 15-7 Room: 300

Session Chair(s): Michler and Figueroa

8:00 AM - 8:18 AM

Direct and inverse modeling of solid boundary conditions in fluid-structure interaction for blood flows

P. Moireau¹, N. Xiao², C. Bertoglio³, M. Astorino³, C. Figueroa², M. Fernandez³, D. Chapelle¹, C. A. Taylor², J. Gerbeau³;

¹Inria, Palaiseau, FRANCE, ²Stanford University, Palo Alto, CA, ³Inria, Rocquencourt, FRANCE.

8:18 AM - 8:36 AM

Efficient coupling of 3D blood flow models

J. F. Gerbeau, M. Fernandez, S. Smaldone; INRIA, Le Chesnay, FRANCE.

8:36 AM - 8:54 AM

Localising Factors in the development of arterial disease

V. Peiffer, S. J. Sherwin, **P. D. Weinberg**; Imperial College London, UNITED KINGDOM.

8:54 AM - 9:12 AM

Finite Element Modeling of the Blood Flow in the Left Ventricle of the Heart including Aortic Valves

J. Hoffman¹, J. Hiromi Spühler¹, J. Jansson², N. Jansson³, M. Broomé¹, U. Gustafsson⁴;

¹KTH Royal Institute of Technology, Stockholm, SWEDEN, ²Basque Center for Applied Mathematics, Bilbao, SPAIN, ³RIKEN AICS, Kobe, JAPAN, ⁴Karolinska Institute, Stockholm, SWEDEN.

9:12 AM - 9:30 AM

Simulations of Intraventricular Flows with Physiological Mitral Valve Models

J. Seo, K. Shoele, V. Vedula, R. George, R. Mittal; Johns Hopkins University, Baltimore, MD.

Cerebral Aneurysms II: Tissue Mechanics & Mechanobiology

Session Number: 15-8 Room: Ball-C

Session Chair(s): P. Watton and A. Robertson

8:00 AM - 8:18 AM

Heterogeneity in Wall Structure and Mechanical Behavior in Cerebral Aneurysms

X. Duan¹, J. R. Cebra², K. Aziz³, S. C. Watkins¹, **A. M. Robertson**¹;

¹University of Pittsburgh, PA, ²George Mason University, Fairfax, VA, ³Allegheny General Hospital, Pittsburgh, PA.

8:18 AM - 8:36 AM

Modeling the mechanobiology of intracranial aneurysm evolution

A. Mandalitsi¹, H. Chen¹, P. Aparicio¹, J. Hornsby¹, E. Dickinson², T. Eriksson³, Y. Ventikos⁴, **P. N. Watton**²;

¹University of Oxford, UNITED KINGDOM,

²University of Sheffield, UNITED KINGDOM, ³KTH, Stockholm, Sweden, UNITED KINGDOM, ⁴UCL, London, UNITED KINGDOM.

8:36 AM - 8:54 AM

Biomechanics of aneurysms and implications in future treatment paradigm

F. P. K. Hsu;

8:54 AM - 9:30 AM

See Program Supplement and Errata Sheet for possible additions

Arterial Stiffness & Disease I

Session Number: 15-9 Room: 312

Session Chair(s): S. Greenwald

8:00 AM - 8:18 AM

The Case for the Reservoir-Wave Approach

J. V. Tyberg¹, C. Bouwmeester¹, L. M. Burrowes¹, N. G. Shrive¹, J. Wang²;

¹University of Calgary, AB, CANADA, ²Fu Jen Catholic University, New Taipei City, TAIWAN.

THURSDAY Podium Sessions

8:18 AM - 8:36 AM

Constitutive Formulation of the Mechanical Properties of Arterial Tissue Considered as a Mixture with Prestressed Constituents

A. Rachev¹, S. Zeinali-Davarani², J. Mattson², T. Shazly¹, Y. Zhang², Y. Zhang²;

¹University of South Carolina, Columbia, SC,

²Boston University, MA.

8:36 AM - 8:54 AM

Interaction of Wave Reflection with the PU and QA Loop Methods for the Assessment of Local Pulse Wave Velocity

P. Segers, A. Swillens, L. Taelman, J. Vierendeels; Ghent University, BELGIUM.

8:54 AM - 9:12 AM

Inverse Boundary Value Problems in Arterial Remodeling

A. Rachev¹, **T. Shazly**¹, R. Vito²;

¹University of South Carolina, Columbia, SC,

²Georgia Institute of Technology, Atlanta, GA.

9:12 AM - 9:30 AM

Effect of Pressure and Age on the Three Dimensional Micro-Structure and -Mechanical Properties of Arteries

M. J. Sherratt¹, L. A. Walton¹, J. K. Cruickshank², R. Akhtar³, B. Derby¹, P. J. Withers¹, R. S. Bradley¹, C. Austin¹;

¹University of Manchester, UNITED KINGDOM,

²Kings's College London, UNITED KINGDOM,

³University of Liverpool, UNITED KINGDOM.

Soft Tissues Mechanics I

Session Number: 15-10 Room: 313

Session Chair(s): P. Vena and V. Nguyen

8:00 AM - 8:36 AM

Surrogate Materials for the Study of Multiscale Mechanics in Connective Tissues

S. P. Reese¹, B. J. Ellis¹, J. L. Zitnay², **J. A. Weiss**¹;

¹University of Utah, Salt Lake City, UT, ²University of Minnesota, Minneapolis, MN.

8:36 AM - 8:54 AM

Constitutive formulation and numerical modeling of heel pad region as investigation of foot biomechanical behavior

A. N. Natali¹, E. Carniel¹, C. Fontanella², P. G. Pavan¹, A. Forestiero¹;

¹Center for Mechanics of Biological Materials, University of Padova, ITALY, ²Center for Mechanics of Biological Materials, University of Padova, ITALY.

8:54 AM - 9:12 AM

A Shear-Deformable Elastica Model for Soft Fibrous Tissues

T. D. Nguyen¹, B. Coudrillier²;

¹The Johns Hopkins University, Baltimore, MD,

²Georgia Institute of Technology, Atlanta, GA.

9:12 AM - 9:30 AM

Micro-models of heart valve remodeling

K. L. Billiar, M. H. Kural;

Worcester Polytechnic Institute, Worcester, MA.

Human Whole Body Thermal Modeling

Session Number: 15-11 Room: 305

Session Chair(s): K. Diller and D. Shrivastava

8:00 AM - 8:18 AM

Application of Whole-body Human Thermal Modeling to Design Diver Heating Systems

E. H. Wissler¹, M. Nuckols², J. Florian³, E.

Bandstra⁴, P. Sinha⁵, J. Yetto³;

¹University of Texas/Austin, TX, ²Duke University,

Durham, NC, ³Navy Experimental Diving Unit,

Panama City, FL, ⁴Navy Experimental Diving Unit,

Panama City, FL, ⁵Naval Clothing and Textile

Research Facility, Natick, MA.

8:18 AM - 8:36 AM

Computer Simulation of Thermoregulatory Alterations Caused by Anesthesia

G. M. Netscher, E. H. Wissler, K. R. Diller;

University of Texas at Austin, TX.

8:36 AM - 8:54 AM

Dynamic Thermal Interaction between Arterial Blood and Tissue Temperatures in Developing a Whole Body Heat Transfer Model

L. Zhu;

University of Maryland Baltimore County, MD.

8:54 AM - 9:12 AM

Predicting thermophysiological response and safe duration of exposure during firefighting activities: Validation and application of whole body model.

A. K. Paul, S. A. Zachariah, R. K. Banerjee;

University of Cincinnati, OH.

9:12 AM - 9:30 AM

Heating induced during MRI in high and ultra-high fields

D. Shrivastava, J. Tian, J. Hughes, J. T. Vaughan;

University of Minnesota, Minneapolis, MN.

THURSDAY Podium Sessions

Multiscale Mechanobiology in the Respiratory System I

Session Number: 15-12 Room: 301
Session Chair(s): B. Brook

8:00 AM - 8:18 AM

Bronchospasm, deep inspirations and the role of zyxin

J. Fredberg;

Harvard University, Boston, MA.

8:18 AM - 8:36 AM

Modeling Ventilation Heterogeneity and Respiratory Impedance in Asthma

G. N. Maksym, D. Leary, S. A. Bhatawadekar;
Dalhousie University, Halifax, NS, CANADA.

8:36 AM - 8:54 AM

Length-Dependency of Airway Smooth Muscle Force in Airway Responsiveness

A. Lee-Gosselin¹, C. D. Pascoe², C. Couture³, P. D. Paré², **Y. Bossé**¹;

¹Université Laval, Québec, QC, CANADA, ²University of British Columbia, Vancouver, BC, CANADA, ³Institut Universitaire de Cardiologie et de Pneumologie de Québec, Québec, QC, CANADA.

8:54 AM - 9:12 AM

Challenges in Creating a Multiscale Approach for Understanding Airway Hyperresponsiveness in Asthma

K. Lutchen, B. Harvey, H. Parameswaran;
Boston University, MA.

9:12 AM - 9:30 AM

Interactions Between Airway Wall Stiffness and Lung Volume: The Emergence of a Population at Risk for Obese Asthma

J. H. T. Bates, A. E. Dixon;

University of Vermont, Burlington, VT.

Reproductive & Women's Health VIII: Biomechanics of the Pelvic Floor 3

Session Number: 15-13 Room: 311
Session Chair(s): J. Ashton-Miller and S. Abramowitch

8:00 AM - 8:18 AM

A Mechanistic Biomechanical Theory for how Abnormalities in Extracellular Matrix Remodeling can lead to Pelvic Organ Prolapse

M. S. Damaser, A. Borazjani, B. M. Couri, G. Swaminathan, M. Kuang, A. Ramamurthi;
The Cleveland Clinic, OH.

8:18 AM - 8:36 AM

Organ Competition: A Dynamic Anatomically-Based 3-D Finite Element Model of the Interaction between Anterior and Posterior Compartment Prolapse

J. Luo, L. Chen, D. E. Fenner, J. A. Ashton-Miller, J. O. L. DeLancey;

University of Michigan, Ann Arbor, MI.

8:36 AM - 8:54 AM

Biaxial Viscoelasticity of Uterosacral and Cardinal Ligaments

W. Becker, T. Tan, **R. De Vita;**

Virginia Tech, Blacksburg, VA.

8:54 AM - 9:12 AM

Sports practice and urinary incontinence: relation between exercise, urine leakage, frequency and perception

R. Natal¹, T. da Roza¹, S. Brandão², J. Duarte³, M. Parente¹, T. Mascarenhas⁴;

¹IDMEC-FEUP, Porto, PORTUGAL, ²IDMEC-FEUP / Sao Joao Hospital, Porto, PORTUGAL, ³FADEUP, Porto, PORTUGAL, ⁴IDMEC-FEUP / Sao Joao Hospital / FMUP, Porto, PORTUGAL.

9:12 AM - 9:30 AM

Automated Biomechanical Analysis of female pelvic floor responses to vaginal shrinkage

D. Simkins, J. B. Alford, L. Hoyte, MD;

Univ. of San Francisco, CA.

Cervical Spinal Manipulations & Cerebrovascular Accidents

Session Number: 15-14 Room: Ball-A
Session Chair(s): W. Herzog and V. Feipel

8:00 AM - 8:18 AM

Global 3D Neck Kinematics during Cervical Spine Manipulation

B. Van Geyt, P. Dugailly, P. Klein, M. Rooze, **V. Feipel;**

Université Libre de Bruxelles, Brussels, BELGIUM.

8:18 AM - 8:36 AM

Vertebral Artery Flow Following Head Positions and Manipulation

J. Quesnele¹, C. Brown¹, **J. Triano**¹, S. Mior¹, G. Wells², M. Noseworthy³;

¹CMCC, Toronto, ON, CANADA, ²The Hospital for Sick Children, Toronto, ON, CANADA, ³McMaster University, Hamilton, ON, CANADA.

THURSDAY Podium Sessions

8:36 AM - 8:54 AM

Kinematics of HVLA Techniques of the Atlanto-Axial Joint

E. Catrysse¹, S. Probyn¹, S. Gianola², P. Van Roy¹;
¹Vrije Universiteit Brussel, BELGIUM, ²I.R.C.C.S. Orthopedic Institute Galeazzi, Milan, ITALY.

8:54 AM - 9:12 AM

Head-trunk and upper cervical spine kinematics during upper cervical spine manipulation using continuous motion tracking: A Reliability analysis 3D motion data and anatomical representation

P. Dugailly¹, B. Beyer², S. Sobczak¹, P. Salvia², M. Rooze², V. Feipel¹;
¹Faculty of Motor Sciences - Université Libre de Bruxelles, BELGIUM, ²Faculty of Medicine - Université Libre de Bruxelles, BELGIUM.

9:12 AM - 9:30 AM

The Biomechanics of Cervical Spinal Manipulation: Risk of Stroke?

W. Herzog, **B. Symons**;
University of Calgary, AB, CANADA.

Bone Mechanics & Quality

Session Number: 15-15 Room: Ball-B
Session Chair(s): M. van der Meulen

8:00 AM - 8:18 AM

Bone Tissue Quality: An Update at Two Length Scales

P. K. Zysset¹, T. Gross², J. Schwiedrzik¹, D. Pahr²;
¹Universität Bern, SWITZERLAND, ²Vienna University of Technology, AUSTRIA.

8:18 AM - 8:36 AM

Tissue mechanical properties of individual trabeculae: trabecular types, anatomic orientations, mineralization, and anisotropy.
E. Yu, **J. Wang**, **B. Zhou**, **X. E. Guo**;
Columbia University, New York, NY.

8:36 AM - 8:54 AM

In vivo assessment of cortical bone material properties using reference point indentation

M. L. Buxsein;
Harvard Medical School, Boston, MA.

8:54 AM - 9:12 AM

An Emerging View on the Biomechanics of Bone Fragility

T. Keaveny;
UC Berkeley, CA.

9:12 AM - 9:30 AM

Trabecular Bone Quality is Primarily Determined by Architecture

G. L. Niebur, J. G. Garrison, Z. Wu, T. C. Kreipke;
University of Notre Dame, IN.

Biomechanics of Osteoarthritis

Session Number: 15-16 Room: 308
Session Chair(s): K. Troy and A. Lerner

8:00 AM - 8:18 AM

Characterizing Mouse Knee Kinematics for Tibial Loading Model of Osteoarthritis

O. O. Adebayo¹, F. C. Ko¹, S. R. Goldring², M. B. Goldring², T. M. Wright², M. C. H. van der Meulen¹;
¹Cornell University, Ithaca, NY, ²Hospital for Special Surgery, New York, NY.

8:18 AM - 8:36 AM

Knee Joint Kinetic and Kinematic Characteristics of Knee Osteoarthritis Patients During Stair Ascent

K. Doslikova¹, C. N. Maganaris², V. Baltzopoulos³, S. M. P. Verschueren⁴, F. P. Luyten⁴, A. Ireland¹, M. J. Callaghan⁵, R. K. Jones⁶, D. T. Felson⁷, N. D. Reeves¹;

¹Manchester Metropolitan University, UNITED KINGDOM, ²Liverpool John Moores University, UNITED KINGDOM, ³Brunel University, London, UNITED KINGDOM, ⁴Katholieke Universiteit Leuven, BELGIUM, ⁵University of Manchester, UNITED KINGDOM, ⁶University of Salford, Manchester, UNITED KINGDOM, ⁷Boston University, MA.

8:36 AM - 8:54 AM

Morphometric Analysis of the Tibial-Femoral Joint in a Rabbit Pre-Clinical Model of Osteoarthritis

D. J. Pawson¹, T. H. Steiner¹, M. A. Zulliger², M. Wilke³, D. Nestic³, R. Müller¹, **K. S. Stok**¹;
¹ETH Zurich, SWITZERLAND, ²Scanco Medial AG, Brüttsellen, SWITZERLAND, ³University of Bern, SWITZERLAND.

8:54 AM - 9:12 AM

Osteoarthritis of the hip joint is caused by edge loading; A wear scar analysis

M. Masjedi, S. Federer, L. Duffell, J. Cobb;
Imperial College London, UNITED KINGDOM.

9:12 AM - 9:30 AM

An anisotropic model for articular cartilage damage to elucidate mechanisms underlying the initiation and progression of osteoarthritis

M. E. Stender, R. A. Regueiro, V. L. Ferguson;
University of Colorado, Boulder, CO.

THURSDAY Podium Sessions

Biomechanics of Flight I: Aerodynamics

Session Number: 15-17 Room: 307

Session Chair(s): J. van Leeuwen and G. Taylor

8:00 AM - 8:18 AM

The Mechanics and Behavior of Cliff Swallows in Tandem Pursuit and Group Flights

T. L. Hedrick, R. M. Shelton, B. E. Jackson, D. Evangelista;
University of North Carolina at Chapel Hill, NC.

8:18 AM - 8:36 AM

PIV measurements and the aerodynamics of insect flight.

R. J. Bomphrey;

Royal Veterinary College, London, UNITED KINGDOM.

8:36 AM - 8:54 AM

Comparative aerodynamics between birds and bats

A. Hedenström;

Lund University, SWEDEN.

8:54 AM - 9:12 AM

Dynamic wing deformation enhances aerodynamic efficiency differently in hawkmoth and hummingbird hovering

H. Liu¹, T. Nakata², M. Maeda¹, R. Noda¹, C. Rao¹, H. Tanaka³;

¹Chiba University, JAPAN, ²The Royal Veterinary College, London, UNITED KINGDOM, ³Shanghai Jiao Tong University and Chiba University International Cooperative Research Center, JAPAN.

9:12 AM - 9:30 AM

Time-Accurate Estimate of Flexible, Flapping Wing Aerodynamics

W. Shyy¹, C. Kang²;

¹Hong Kong University of Science and Technology, HONG KONG, ²University of Alabama in Huntsville, Huntsville, AL.

Lower Extremity Rehabilitation

Session Number: 15-18 Room: 310

Session Chair(s): Y. Dhaer

8:00 AM - 8:36 AM

Designing robotic devices for rehabilitation that integrates and accommodates the sensorimotor components intrinsic to the spinal cord

V. R. Edgerton;

Integrative Biology and Physiology, UCLA, Los Angeles, CA.

8:36 AM - 8:54 AM

Therapeutic uses of a Lower Limb Exoskeleton for Patients with SCI and Stroke

M. Goldfarb;

Vanderbilt University, Nashville, TN.

8:54 AM - 9:12 AM

A Novel Technique for Improving Response to Perturbations During Robotic-Assisted Treadmill Walking

G. Severini¹, A. Koenig¹, N. Lesniewski-Laas², J. Niemi², P. Bonato¹;

¹Harvard Medical School, Boston, MA, ²Wyss Institute - Harvard Medical School, Boston, MA.

9:12 AM - 9:30 AM

Development and Evaluation of LOPES: a Robot for Gait Training and Assessment

H. van der kooij¹, E. H. F. van Asseldonk¹, B. Koopman¹, G. van Oort¹, J. Meuleman²;

¹University of Twente, Enschede, NETHERLANDS, ²MOOG, Nieuw Vennep, NETHERLANDS.

OpenSim Showcase I: New Modeling Tools & Applications

Session Number: 15-19 Room: 303

Session Chair(s): J. Hicks and A. Seth

8:00 AM - 8:36 AM

OpenSim for Open Source Musculoskeletal Modeling and Simulation: Strides and Hurdles

J. L. Hicks, A. Seth, A. Habib, M. A. Sherman, S. L. Delp;

Stanford University, CA.

8:36 AM - 8:54 AM

Patient-specific software tools for OpenSim

J. A. Reinbolt;

University of Tennessee, Knoxville, TN.

8:54 AM - 9:12 AM

Using musculoskeletal modeling to evaluate the effects of tuning ankle foot orthoses

K. M. Steele¹, H. Choi¹, K. Bjornson², S. Fatone³;

¹University of Washington, Seattle, WA, ²University of Washington & Seattle Children's Research Institute, Seattle, WA, ³Northwestern University Feinberg School of Medicine, Chicago, IL.

9:12 AM - 9:30 AM

Modeling the Effect of Weakness and Contracture on Walking Capacity in Cerebral Palsy

G. Lichtwark, L. Barber;

The University of Queensland, Brisbane, AUSTRALIA.

THURSDAY Podium Sessions

EMG-Informed Estimates of Muscle Forces

Session Number: 15-20 Room: 304

Session Chair(s): T. Besier and R. Neptune

8:00 AM - 8:18 AM

Real-time Prediction of Muscle Forces from Subject Recorded EMG's

K. Manal, T. S. Buchanan;

University of Delaware, Newark, DE.

8:18 AM - 8:36 AM

Musculoskeletal Modeling Informed by Neural Excitation Estimates

M. Sartori¹, U. Yavuz¹, C. Froemmel¹, D. G. Lloyd², D. Farina¹;

¹University Medical Center Goettingen, GERMANY,

²Centre for Musculoskeletal Research, Gold Coast, AUSTRALIA.

8:36 AM - 8:54 AM

Motor modules organized around producing biomechanical subtasks can produce well-coordinated walking

J. L. Allen¹, R. R. Neptune²;

¹Emory University, Atlanta, GA, ²The University of Texas at Austin, TX.

8:54 AM - 9:12 AM

Predictive Musculoskeletal Simulations of Inclined Walking

T. W. Dorn, J. M. Wang, S. L. Delp;

Stanford University, CA.

9:12 AM - 9:30 AM

Skeletal muscle modelling - three-dimensional model validation

M. Böhl¹, R. Blickhan², **T. Siebert**³;

¹Institute of Solid Mechanics, Braunschweig, GERMANY, ²Friedrich-Schiller University, Jena, GERMANY, ³University of Stuttgart, GERMANY.

Thursday, 10 July 2014

11:00 - 12:30 PM

Micro/Nano Technology in Cryopreservation

Session Number: 16-1 Room: 109

Session Chair(s): A. Zhang and S. Bhowmick

11:00 AM - 11:36 AM

Microscale Biomaterials and Devices for Cell Cryopreservation by Low-CPA Vitrification

X. He;

The Ohio State University, Columbus, OH.

11:36 AM - 11:54 AM

The Application of Nanoparticles in the Cryopreservation of Biological System

B. Liu, F. Lv, B. Hao, W. Li;

University of Shanghai for Science and Technology, CHINA.

11:54 AM - 12:12 PM

Challenges facing the 21st century cryopreservation technology and our current and potential solutions with micro/nano technology

X. Han, Y. Yuan, R. M. Roberts;

University of Missouri, Columbia, MO.

12:12 PM - 12:30 PM

Modulation of Water/Solute Transport across Cell Membrane by Nanoparticles

G. Zhao;

University of Science and Technology of China, Hefei, CHINA

CNS Transport & Drug Delivery I: Experimental

Session Number: 16-2 Room: 110

Session Chair(s): M. Sarntinoranont and J. Smith

11:00 AM - 11:36 AM

Convection-enhanced delivery of highly penetrative nano-carriers to treat brain tumors

W. Saltzman, T. Patel, J. Zhou, J. Piepmeier;

Yale University, New Haven, CT.

11:36 AM - 11:54 AM

Ultrasound-assisted Convection-enhanced Delivery

W. Olbricht¹, J. Foo¹, A. Sarvazyan²;

¹Cornell University, Ithaca, NY, ²Artann Laboratories, West Trenton, NJ.

11:54 AM - 12:12 PM

Transport Properties of Extracellular Space Revealed by Diffusion Analysis

C. Nicholson, P. Kamali-Zare, L. Tao;

NYU Langone Medical Center, New York, NY.

12:12 PM - 12:30 PM

Fiberoptic Microneedles for Simultaneous Light and Drug Delivery in the Brain

C. Rylander¹, R. Andriani, Jr.¹, R. Hood¹, J.

Robertson¹, J. Rossmeisl, Jr.²;

¹Virginia Tech, Blacksburg, VA, ²Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA

THURSDAY Podium Sessions

Cytoskeletal Mechanics & Physics of Adhesion II

Session Number: 16-3 Room: 111

Session Chair(s): A. Bershadsky & W. Schwarz

11:00 AM - 11:36 AM

Mechanical Regulation of Cell Adhesion

M. Gardel;

U. of Chicago, IL.

11:36 AM - 11:54 AM

Models for self organization of the actin cytoskeleton

T. Shemesh¹, Y. Tee², M. Kozlov³, A. D. Bershadsky², M. Renz⁴, S. K. Y. Tang⁵, J. Lippincott-Schwartz⁴;

¹Harvard Medical School, Boston, MA,

²Mechanobiology Institute, SINGAPORE, ³Tel Aviv University, ISRAEL, ⁴The Eunice Kennedy Shriver; National Institute of Child Health and Human Development, Bethesda, MD, ⁵Stanford University, Stanford, CA.

11:54 AM - 12:12 PM

Cell Body Shape Dictates the Onset of Traction Force Generation and Growth of Adhesion Complexes at the Leading edge

J. Fouchard, C. Bimbar, A. Proag, N. Bufen, P. Durand-Smet, A. Richert, O. Cardoso, **A. Asnacios, Sr.;**

Paris-Diderot University, Paris, FRANCE.

12:12 PM - 12:30 PM

Chemomechanics of Integrin Binding and Cell Migration in Acidic pH Gradients

K. J. Van Vliet;

MIT, Cambridge, MA.

Active Cytoskeletal Networks I

Session Number: 16-4 Room: 306

Session Chair(s): MacKintosh and Schmidt

11:00 AM - 11:18 AM

Quantifying Non-equilibrium Dynamics in Model Cytoskeletal Networks

N. Fakhri¹, C. Battle¹, C. Broedersz², F. C. MacKintosh³, **C. F. Schmidt**¹;

¹Georg-August-Universität, Göttingen, GERMANY,

²Princeton University, Princeton, NJ, ³Vrije Universiteit, Amsterdam, NETHERLANDS.

11:18 AM - 11:36 AM

Molecular motors robustly drive active gels to a critically connected state

J. Alvarado¹, M. Sheinman², A. Sharma², F. MacKintosh², G. Koenderink³;

¹Massachusetts Institute of Technology, Cambridge, MA, ²VU University, Amsterdam, NETHERLANDS, ³FOM Institute AMOLF, Amsterdam, NETHERLANDS.

11:36 AM - 11:54 AM

Dynamics in Steady State in-Vitro Acto-Myosin Networks.

Y. Roichman, A. Sonn-Segev, H. Diamant; Tel Aviv University, ISRAEL.

11:54 AM - 12:12 PM

Actively stressed marginal fiber networks

C. Broedersz;

Princeton University, NJ.

12:12 PM - 12:30 PM

Non-equilibrium Origins of Motion in the Cell Nucleus

M. Kilfoil;

University of Massachusetts Amherst, MA

Stem Cell Nucleus II

Session Number: 16-5 Room: 302

Session Chair(s): D. Discher and T. McDevitt

11:00 AM - 11:36 AM

Characterization of stem cell mechanical structures and the role of stiffness in survival and invasion

A. Ribeiro¹, S. Spagnol¹, H. Lazarus², S. Badylak³, **K. N. Dahl**¹;

¹Carnegie Mellon University, Pittsburgh, PA, ²Case Western Reserve University, Cleveland, OH, ³University of Pittsburgh, PA.

11:36 AM - 11:54 AM

Transition from Pluripotency in Embryonic Stem Cells Distinguished by Auxetic Nucleus

K. Chalut;

University of Cambridge, UNITED KINGDOM.

11:54 AM - 12:12 PM

Nuclear Mechanics in Induced Pluripotent Stem Cells and Differentiated Cardiomyocytes from Patients with Dilated Cardiomyopathy

P. Davidson¹, E. di Pasquale², H. Nakahama², G. Condorelli², J. Lammerding¹;

¹Cornell University, Ithaca, NY, ²Humanitas Clinical and Research Center, Milan, ITALY.

THURSDAY Podium Sessions

12:12 PM - 12:30 PM

Time-dependent deformation or 'creep' of viscoelastic hydrogels of constant stiffness leads to enhanced spreading, proliferation, differentiation and increased Rac1 activity in human mesenchymal stem cells
A. Cameron, J. Frith, G. A. Gomez, A. Yap, J. J. Cooper-White;
The University of Queensland, Brisbane, AUSTRALIA

High Resolution Imaging in Mechanobiology I

Session Number: 16-6 Room: 309

Session Chair(s): R. Muller

11:00 AM - 11:36 AM

Biological Imaging over Four Length Scales with Phase Contrast X-ray Techniques
M. Stampanoni;
ETH Zurich / Paul Scherrer Institut, Villigen - PSI, SWITZERLAND.

11:36 AM - 11:54 AM

Multi-mode imaging of mineralized tissues
P. Fratzl, W. Wagermaier;
Max Planck Institute of Colloids and Interfaces, Potsdam, GERMANY.

11:54 AM - 12:12 PM

Assessment of the 3D Lacuno Canalicular Network from SR Nano-CT at Two Scales
F. Peyrin¹, P. Dong¹, A. Pacureanu², P. Cloetens³, M. Langer¹;
¹CREATIS, INSERM U1044, CNRS 5220, Villeurbanne Cedex, FRANCE, ²Centre for Image Analysis, Uppsala University, SWEDEN, ³ESRF, Grenoble, FRANCE.

12:12 PM - 12:30 PM

Quantitative 3D Bone Imaging at the Cell Level: Towards Realistic Modelling of Bone Mechanotransduction
P. Schneider;
University of Southampton, Faculty of Engineering and the Environment, Southampton, UNITED KINGDOM

Cardiovascular Fluid Mechanics II

Session Number: 16-7 Room: 300

Session Chair(s): Nordsletten and Figueroa

11:00 AM - 11:18 AM

Modeling blood pressure and heart rate dynamics in patients with orthostatic intolerance
M. S. Olufsen¹, J. T. Ottesen², J. Mehlsen³;
¹North Carolina State University, Raleigh, NC, ²Roskilde University, Roskilde, DENMARK, ³Frederiksberg Hospital, Copenhagen DENMARK.

11:18 AM - 11:36 AM

A computational model of drug delivery through microcirculation to compare different tumor treatment options
L. Cattaneo¹, M. Nabil², A. M. Robertson², R. Zakerzadeh², **P. Zunino²;**
¹Politecnico di Milano, Milan, ITALY, ²University of Pittsburgh, Pittsburgh, PA.

11:36 AM - 11:54 AM

Exploring a Multicompartmental Poroelastic Model for the Integrative Modelling of Fluid Transport
Y. Ventikos¹, J. C. Vardakis², D. Chou², B. J. Tully³;
¹University College London, UNITED KINGDOM, ²University of Oxford, UNITED KINGDOM, ³Oxyntix Ltd., Oxford, UNITED KINGDOM.

11:54 AM - 12:12 PM

Simulation of Baroreflex Control in 3D-OD Closed Loop Model of the Systemic Circulation Under the Effects of Gravity
K. D. Lau, C. Figueroa;
King's College London, UNITED KINGDOM.

12:12 PM - 12:30 PM

Unstable Flow in the Carotid Siphon: Implications for Aneurysm Initiation and Rupture
K. Valen-Sendstad¹, M. Piccinelli², D. A. Steinman¹;
¹University of Toronto, ON, CANADA, ²Emory University, Atlanta, GA

Cerebral Aneurysms III

Session Number: 16-8 Room: Ball-C

Session Chair(s): Raghavan

11:00 AM - 11:18 AM

Current perspectives on intracranial aneurysm pathobiology and research
R. Tulamo;

THURSDAY Podium Sessions

11:18 AM - 11:36 AM

Beyond the lumenal imaging: molecular imaging of the aneurysm wall

M. J. Gounis, S. Vedantham, J. P. Weaver, A. S. Puri, A. K. Wakhloo, A. A. Bogdanov, Jr;
University of Massachusetts Medical School,
Worcester, MA.

11:36 AM - 11:54 AM

The concept of Bundle of Inflow (BOI) for reducing flow in aneurysm

M. Ohta, H. Aizai, M. Zhang, Y. Li, X. Han, K. Yu, T. Nakayama;
Tohoku University, Sendai, JAPAN.

11:54 AM - 12:12 PM

Intracranial Aneurysm Morphology and Flow Dynamics: Importance of Parent Vessel Anatomy
S. Dhar¹, M. Tremmel¹, **J. Mocco**², H. Meng¹;
¹University at Buffalo, NY, ²Vanderbilt University,
Nashville, TN.

12:12 PM - 12:30 PM

Current perspectives on intracranial aneurysm pathobiology and research

R. Tulamo;
Helsinki University Central Hospital / Neurosurgery
Research Group, FINLAND

Arterial Stiffness & Disease II

Session Number: 16-9 Room: 312

Session Chair(s): S. Greenwald

11:00 AM - 11:18 AM

Synchrotron Imaging of Angiotensin II-induced Abdominal Aortic Aneurysm in Mice

B. Trachet¹, R. A. Fraga-Silva¹, O. Vardoulis¹, J. Bols², A. Caenen², P. Modregger³, A. Astolfo³, M. Stampanoni³, A. Tedgui⁴, P. Segers², N. Stergiopulos¹;
¹EPFL, Lausanne, SWITZERLAND, ²Ghent University, BELGIUM, ³PSI, Villigen, SWITZERLAND, ⁴INSERM, Paris, FRANCE.

11:18 AM - 11:36 AM

Dorsal-ventral difference in aortic stiffness: Correlation with collagen amount and effects on smooth muscle cells

S. SUGITA, T. Shirono, K. Nagayama, T. Matsumoto;
Nagoya Institute of Technology, JAPAN.

11:36 AM - 11:54 AM

Biomechanics of the ATAA: A local analysis using multiphoton microscopy, bulge inflation testing, and full-field measurements

F. M. Davis, A. Romo, P. Badel, S. Avril;
Ecole Nationale Supérieure des Mines de Saint-Etienne, St. Etienne, FRANCE.

11:54 AM - 12:12 PM

Effects of the Vasorelaxant Nitric Oxide on the Arterial Pulse Waveform: Mechanisms and Diagnostic Utility

B. A. Nier¹, A. A. E. Hunt¹, J. Alastruey², M. Sardarlou¹, **P. D. Weinberg**¹;
¹Imperial College London, UNITED KINGDOM, ²King's College London, UNITED KINGDOM.

12:12 PM - 12:30 PM

Mechanical and Structural Contributions of ECM Components in Arterial Mechanics

J. M. Mattson, M. J. Chow, R. Turcotte, Y. Zhang;
Boston University, MA

Soft Tissue Mechanics II

Session Number: 16-10 Room: 313

Session Chair(s): A. Zadpoor and S. Federico

11:00 AM - 11:18 AM

Continuum Mechanical Models of Soft Tissues

S. Federico;
The University of Calgary, AB, CANADA.

11:18 AM - 11:36 AM

Time-Dependent Response of Articular Cartilage to Nanoindentation Testing: Experiments and Modeling

M. Taffetani¹, M. Griebel², D. Gastaldi¹, S. Klisch², **P. Vena**¹;
¹Politecnico di Milano, ITALY, ²California Polytechnic State University, San Luis Obispo, CA.

11:36 AM - 11:54 AM

Polymeric Scaffold Materials Influence the Mechanical Environment of Bioreactor

G. Unnikrishnan¹, V. Unnikrishnan², J. Reddy¹;
¹Texas A&M University, College Station, TX, ²University of Alabama, Tuscaloosa, AL.

11:54 AM - 12:12 PM

Constitutive modelling of the human spine in healthy and degenerated conditions: a focus on the intervertebral disc tissue

A. Malandrino, J. Noailly;
Biomechanics and Mechanobiology - Institute for Bioengineering of Catalonia (IBEC), Barcelona, SPAIN

THURSDAY Podium Sessions

12:12 PM – 12:30 PM

See Program Supplement and Errata Sheet for possible additions

Cryotherapy & Mechanisms of Action

Session Number: 16-11 Room: 305

Session Chair(s): K. Diller and S. Khoshemivis

11:00 AM - 11:18 AM

Active Control of Skin Blood Flow During Cryotherapy

S. Khoshnevis, K. R. Diller;

University of Texas at Austin, TX.

11:18 AM - 11:36 AM

Cryotherapy: Devices and Mechanisms of Action

K. R. Diller;

University of Texas, TX.

11:36 AM - 11:54 AM

Cryotherapy, "Better Than Ice"

T. Quisenberry;

Thermotek, Inc., Flower Mound, TX.

11:54 AM - 12:12 PM

Cryotherapy May Cause Non-Freezing Cold Injury but not Freezing Cold Injury e.g., Frostbite

R. Pozos;

San Diego State University, CA.

12:12 PM - 12:30 PM

Iatrogenic Non Freezing Cold Injury in Surgical Patients

B. S. Mittler;

San Antonio, TX

Multiscale Mechanobiology in the Respiratory System II

Session Number: 16-12 Room: 301

Session Chair(s): B. Brooks

11:00 AM - 11:18 AM

Airway contractility in the cryopreserved precision cut lung slice

R. Krishnan¹, S. R. Rosner², S. Ram-Mohan³, X. Ai⁴,

J. R. Paez-Cortez⁴, T. L. Lavoie⁵, M. L. Dowell⁵, L.

Yuan³, A. Fine⁴, W. C. Aird¹, J. Solway⁵, J. J.

Fredberg²;

¹Harvard Medical School/ BIDMC, Boston, MA,

²Harvard School of Public Health, Boston, MA,

³Beth Israel Deaconess Medical Center, Boston,

MA, ⁴Boston University School of Medicine, MA,

⁵University of Chicago, Chicago, IL.

11:18 AM - 11:36 AM

Self-organized Ventilation Defects During Bronchoconstriction

T. Winkler;

Massachusetts General Hospital and Harvard Medical School, Boston, MA.

11:36 AM - 11:54 AM

Emergent Airway Smooth Muscle Mechanical Behaviour as a result of Actin-Myosin Disconnectivity and Dynamic Rearrangement of Contractile Units

B. S. Brook;

University of Nottingham, UNITED KINGDOM.

11:54 AM - 12:12 PM

Linking model simulation of airway bronchoconstriction to clinical measurements of lung function

M. Tawhai, K. Hedges, G. Donovan, J. Sneyd;

University of Auckland, NEW ZEALAND.

12:12 PM - 12:30 PM

Distribution of myosin filament length and its implications in the structure and function of smooth muscle contractile units

C. Y. Seow;

University of British Columbia, Vancouver, BC, CANADA

Reproductive & Women's Health IX: Penile & Sperm Biomechanics

Session Number: 16-13 Room: 311

Session Chair(s): G. Smith and S. Kieweg

11:00 AM - 11:18 AM

Mechanism of Temperature Sensing by Mammalian Sperm

S. Pérez-Cerezales, **M. Eisenbach**;

Weizmann Institute of Science, Rehovot, ISRAEL.

11:18 AM - 11:36 AM

Sperm motility: from mechanics to signaling

S. Olson;

Worcester Polytechnic Institute, MA.

11:36 AM - 11:54 AM

Indirect Eversion and Elastic Retraction in the American Alligator (*Alligator mississippiensis*): an Unusual Mechanism for Penile Erection.

D. Kelly;

University of Massachusetts, Amherst, MA.

THURSDAY Podium Sessions

11:54 AM - 12:12 PM

In Vivo Time Dependent Properties of Uterine Suspensory Tissue in Women with and without Pelvic Organ Prolapse

J. Luo, T. M. Smith, J. A. Ashton-Miller, J. O. L. DeLancey;
University of Michigan, Ann Arbor, MI.

12:12 PM - 12:30 PM

The Role of Sperm Motility and Cooperativity in Epithelial Detachment

J. Simons, L. Fauci, R. Cortez;
Tulane University, New Orleans, LA

Spine Musculoskeletal Modeling

Session Number: 16-14 Room: Ball-A
Session Chair(s): A. Vasavada

11:00 AM - 11:18 AM

Cross Section Biomechanical Metric Development and Response of an FE Neck Model during a Simulated Vertical Impact Event

N. White¹, K. Danelson², S. Gayzik², **J. Stitzel**²;
¹Exponent, Atlanta, GA, ²Wake Forest University, Winston-Salem, NC.

11:18 AM - 11:36 AM

Upper Cervical Spine Kinematics And Musculoskeletal Modeling

P. Dugailly¹, S. Sobczak¹, P. Salvia², F. Moissev², V. Sholukha², M. Rooze², S. Van Sint Jan², V. Feipel¹;
¹Faculty of Motor Sciences - Université Libre de Bruxelles, BELGIUM, ²Faculty of Medicine - Université Libre de Bruxelles, BELGIUM.

11:36 AM - 11:54 AM

Active Spine Modeling Representing a 6 Year-Old Child

K. Brolin, L. Gras, I. Stockman;
Chalmers University of Technology, Gothenburg, SWEDEN.

11:54 AM - 12:12 PM

Influence of Muscle Activation on Pediatric Neck Response

J. F. Luck, C. A. Cox, H. C. Cutcliffe, A. T. Dibb, R. W. Nightingale, C. R. Bass;
Duke University, Durham, NC.

12:12 PM - 12:30 PM

Effect of Subject-specific Vertebral Posture and Muscle Parameters on Musculoskeletal Model Predictions

A. N. Vasavada, E. Hughes, V. Small, S. Monda, D. Nevins, D. Lin;
Washington State University, Pullman, WA

Bone Mechanics

Session Number: 16-15 Room: Ball-B
Session Chair(s): P. Vena and E. Perilli

11:00 AM - 11:36 AM

Interstitial flow in the hierarchical pore space architecture of bone tissue

S. Cowin;

11:36 AM - 11:54 AM

A Multiscale Mechanical Approach to Identify Yield Surfaces and Irreversible Properties of Trabecular Bone

U. Wolfram¹, J. Schwiedrzik¹, T. Gross², D. H. Pahr², H. Wilke³, P. K. Zysset¹;

¹Institute for Surgical Technology Biomechanics, University of Bern, SWITZERLAND, ²Institute of Lightweight Design and Structural Biomechanics, Vienna University of Technology, AUSTRIA, ³Institute of Orthopaedic Research and Biomechanics, University of Ulm, GERMANY.

11:54 AM - 12:12 PM

Investigating Whole-organ Mechanical Failure, With Experimental Testing And Architectural Characterisation In The Micro-meter Range, On Human Vertebrae: Was The Core Telling It All?

E. Perilli¹, A. M. Briggs², J. Codrington³, J. D. Wark², K. J. Reynolds¹;

¹Medical Device Research Institute, Flinders University, Adelaide, AUSTRALIA, ²Department of Medicine, University of Melbourne; and Bone and Mineral Medicine, Royal Melbourne Hospital, AUSTRALIA, ³The University of Adelaide, AUSTRALIA.

12:12 PM - 12:30 PM

Experimental Evaluation of the Local Strain for Cortical Bone at the Tissue Level

E. Dall'Ara, M. Viceconti;
Department of Mechanical Engineering and INSIGNEO Institute for in silico Medicine, University of Sheffield, UNITED KINGDOM

THURSDAY Podium Sessions

Computational Joint Mechanics

Session Number: 16-16 Room: 308

Session Chair(s): J. Wayne

11:00 AM - 11:18 AM

Development and Preliminary Validation of a Computational Foot Model

J. laquinto¹, V. Isvilanonda², E. Williams², M. Stebbins², D. Haynor², B. Chu², P. Cavanagh², B. Sangeorzan¹, W. Ledoux¹;

¹RR&D Center of Excellence, VA Puget Sound, Seattle, WA, ²University of Washington, Seattle, WA.

11:18 AM - 11:36 AM

Investigating the Effects of Shoe Stiffness on Ankle Injury Risk Using Computational Models

K. D. Button, M. A. Davison, J. E. Braman, M. C. Schaefer, R. C. Haut;

Michigan State University, East Lansing, MI.

11:36 AM - 11:54 AM

Patient-specific Analysis of Hip Chondrolabral Mechanics: Studies of Hip Pathomorphology

J. A. Weiss¹, A. E. Anderson¹, C. L. Peters¹, C. R. Henak², M. D. Harris³, C. L. Abraham¹, A. L. Kapron¹, B. J. Ellis¹, S. A. Maas¹;

¹University of Utah, Salt Lake City, UT, ²Cornell University, Ithaca, NY, ³University of Denver, CO.

11:54 AM - 12:12 PM

Parametric Modeling of Surgical Correction in a Cohort of Patient-Specific Flatfoot Models

E. M. Spratley, E. A. Matheis, C. W. Hayes, R. S. Adelaar, J. S. Wayne;

Virginia Commonwealth University, Richmond, VA,

12:12 PM - 12:30 PM

Benefits of patient specific joint modeling, based on medical imaging, for hand kinematics analysis

C. Hansen¹, K. Ben Mansour¹, P. Devos¹, F. Gosselin², F. Marin¹;

¹Université de Technologie de Compiègne, BMBI UMR CNRS 7338, Compiègne, FRANCE, ²Institut CEA LIST – Laboratoire de Robotique Interactive, CEA Saclay – Digitéo Labs, Gif sur Yvette Cedex, FRANCE

Biomechanics of Flight II: Muscle Function & Control

Session Number: 16-17 Room: 307

Session Chair(s): G. Taylor, S. Combes, and J. van Leeuwen

11:00 AM - 11:18 AM

When Wings Inform: The Duality of Sensing and Actuation in Insect Flight Control

T. Daniel, B. Dickerson, A. Eberle, B. Brunton; University of Washington, Seattle, WA.

11:18 AM - 11:36 AM

Tomographic imaging of the insect flight motor

S. Walker; University of Oxford, UNITED KINGDOM.

11:36 AM - 11:54 AM

Calcium imaging of insect flight muscles

F. Lehmann, D. Skandalis, R. Berthé; University of Rostock, GERMANY.

11:54 AM - 12:12 PM

Muscle Mechanical Performance During Bird Flight

G. N. Askew; University of Leeds, UNITED KINGDOM

12:12 PM – 12:30 PM

From the muscles of babes; contractile activity of the flight muscles in developing birds.

B. Jackson, B.W. Tobalske, K. P. Dial University of Montana

Upper Extremity Rehabilitation

Session Number: 16-18 Room: 310

Session Chair(s): F. Huang

11:00 AM - 11:18 AM

Development of a Lower Limb Exoskeleton Robot for BMI Rehabilitation

J. Morimoto; ATR, Soraku-gun, Kyoto, JAPAN.

11:18 AM - 11:36 AM

Rehabilitation Robotics: Tools for Upper Extremity Therapy and Evaluation

H. I. Krebs; MIT, Cambridge, MA.

11:36 AM - 11:54 AM

Sensorimotor field distortions for upper extremity neurorehabilitation

J. Patton;

THURSDAY Podium Sessions

11:54 AM - 12:12 PM

Robot Aided Wrist Rehabilitation to enhance sensory-motor recovery process

L. Masia;

Nanyang Technological University, SINGAPORE

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

OpenSim Showcase II: New Modeling Tools & Applications

Session Number: 16-19 Room: 303

Session Chair(s): J. Hicks and A. Seth

11:00 AM - 11:18 AM

Musculoskeletal Simulation of Posture Perturbations in OpenSim

I. Stavness¹, V. Friesen¹, A. Seth²;

¹University of Saskatchewan, Saskatoon, SK, CANADA, ²Stanford University, CA.

11:18 AM - 11:36 AM

Modelling and simulation of recovery from forward loss of balance in older adults

R. S. Barrett¹, C. P. Carty¹, G. A. Lichtwark², G. Trewartha³, D. G. Lloyd¹, D. H. Graham¹;

¹Griffith University, Gold Coast, AUSTRALIA, ²The University of Queensland, Brisbane, AUSTRALIA, ³University of Bath, UNITED KINGDOM.

11:36 AM - 11:54 AM

The Musculoskeletal Atlas Project [MAP]: An anatomical and functional population model of the musculoskeletal system

T. Besier¹, J. Zhang¹, H. Sorby¹, J. Clement², D. Thomas², D. Lloyd³, P. Nielsen¹, M. Taylor⁴, P. Hunter¹;

¹University of Auckland, NEW ZEALAND, ²University of Melbourne, AUSTRALIA, ³Griffith University, Gold Coast, AUSTRALIA, ⁴Flinders University, Adelaide, AUSTRALIA.

11:54 AM - 12:12 PM

Animals in OpenSim: Basic Musculoskeletal Function and Model Validation

J. Rubenson¹, K. L. Easton¹, J. W. Rankin², D. G. Lloyd³, R. L. Marsh⁴, J. R. Hutchinson², S. L. Delp⁵;

¹The University of Western Australia, Crawley, WA, AUSTRALIA, ²Royal Veterinary College, University of London, Hatfield, UNITED KINGDOM, ³Griffith University, Gold Coast, AUSTRALIA, ⁴Northeastern University, Boston, MA, ⁵Stanford University, CA.

12:12 PM - 12:30 PM

Dynamic simulation of brachial plexus injury

K. Saul;

North Carolina State University, Raleigh, NC

ASB Technology & Rehabilitation - Technology

Session Number: 16-20 Room: 304

Session Chair(s): M. Rodgers and I. Davis

11:00 AM - 11:18 AM

Rehabilitation robotics - Historical perspective

H. I. Krebs;

MIT, Cambridge, MA.

11:18 AM - 11:36 AM

Toys and Games for Neuromuscular Therapy

J. J. Crisco, J. B. Schwartz, B. Wilcox, K. L. Kerman; Brown University/RIH, Providence, RI.

11:36 AM - 12:30 PM

PANEL DISCUSSION

Thursday, 10 July 2014

2:30 - 4:00 PM

Novel Devices and Modeling for Nanoparticle & Cell Transport in Biological System - Portonovo Ayyaswamy 70th Birthday Tribute Special Session II

Session Number: 17-1 Room: 109

Session Chair(s): Y.Liu and C. Rylander

2:30 PM - 3:06 PM

Functionalized Nanocarrier Binding to Cell Surface in Targeted Drug Delivery: Hydrodynamic and Adhesive Interactions

H. Yu, R. Radhakrishnan, D. M. Eckmann, **P. S. Ayyaswamy;**

University of Pennsylvania, Philadelphia, PA.

3:06 PM - 3:24 PM

Towards the Development of a Prognostic Tool for Rupture Prediction of Cerebral Aneurysms: A Mass Transport Approach

J. A. Costelloe¹, M. T. Walsh¹, I. Larrabide²;

¹University of Limerick, IRELAND, ²PLADEMA-CONICET and Universidad Nacional del Centro, Tandil, ARGENTINA.

THURSDAY Podium Sessions

3:24 PM - 3:42 PM

In vitro tissue mimetics to study nanoparticle and cellular transport

M. F. Kiani¹, G. Lamberti¹, K. Pant², B.

Prabhakarpanian²;

¹Temple University, Philadelphia, PA, ²CFD

Research Corporation, Huntsville, AL.

3:42 PM – 4:00 PM

Capturing of Circulating Tumor Cells in a Microfluidic device through Micro/Nanopatterned Surfaces

Shunqiang Wang¹, Antony Thomas¹, Elaine Lee², Chi-mon Chen², Shu Yang², Xuanhong Chen¹,

Yaling Liu¹

¹Lehigh University, ²University of Pennsylvania See Program Supplement and Errata Sheet for possible additions

CNS Transport & Drug Delivery II: Modeling

Session Number: 17-2 Room: 110

Session Chair(s): M. Sarntinoranont and J. Smith

2:30 PM - 2:48 PM

Interstitial Flow, Pathological States and Therapy Delivery in the Brain

R. Raghavan;

Therataxis, LLC, Baltimore, MD.

2:48 PM - 3:06 PM

Fluid Transport in the Spinal Cord and Subarachnoid Space in the Presence of Arachnoiditis and Stenosis

L. E. Bilston¹, S. Cheng², D. F. Fletcher³, S. Hemley⁴, M. A. Stoodley⁴;

¹Neuroscience Research Australia, Prince of Wales Clinical School, University of New South Wales,

Randwick, AUSTRALIA, ²Department of Engineering, Macquarie University, Neuroscience Research Australia, North Ryde, AUSTRALIA,

³School of Chemical and Biomolecular Engineering, University of Sydney, Camperdown, AUSTRALIA,

⁴Australian School of Advanced Medicine, Macquarie University, North Ryde, AUSTRALIA.

3:06 PM - 3:24 PM

Computational modeling of direct infusion into the temporal lobe

M. Sarntinoranont, W. Dai, T. Mareci, P. Carney; University of Florida, Gainesville, FL.

3:24 PM - 3:42 PM

Parametric Analysis of Drug Distribution During Infusions in Brain Tissue Using an Axisymmetric Finite Element Model with Backflow

G. A. Orozco¹, **J. H. Smith**², J. J. García¹;

¹Universidad del Valle, Cali, COLOMBIA, ²Lafayette College, Easton, PA.

3:42 PM - 4:00 PM

Intrathecal drug administration and magnetic targeting for treatment of CNS diseases

A. Linninger¹, I. Venugopal¹, H. Engelhard²;

¹University of Illinois at Chicago, IL, ²University of Illinois at College of Medicine, Chicago, IL

Cytoskeletal Mechanics & Physics of Adhesion III

Session Number: 17-3 Room: 111

Session Chair(s): A. Bershadsky and U. Schwarz

2:30 PM - 3:06 PM

How a Filopodium Exerts His Traction Force

T. Bornschlöggl¹, S. Romero², C. L. Vestergaard³, J. Joanny¹, G. Tran Van Nhieu², **P. Bassereau**¹;

¹Institut Curie, Paris, FRANCE, ²Collège de France, Paris, FRANCE, ³Technical University of Denmark, Kongens Lyngby, DENMARK.

3:06 PM - 3:24 PM

Microtubule Sliding Drives Formation of Processes in Neuronal and Non-Neuronal Cells

V. Gelfand;

Northwestern University, Chicago, IL.

3:24 PM - 3:42 PM

Chiral flows in the Acto-Myosin cytoskeleton

F. Julicher;

Max Planck Institute for the Physics of Complex Systems, Dresden, GERMANY

3:42 PM – 4:00 PM

Spatial and temporal control of contractility during apical constriction

A. C. Martin, C. Vasquez, F. M. Mason, M. Tworoger MIT, Cambridge, MA.

Active Cytoskeletal Networks II

Session Number: 17-4 Room: 306

Session Chair(s): F. MacKintosh and C. Schmidt

2:30 PM -3:06 PM

Actin and myosin dynamics in cell turning and pathfinding

J. Therlot

Stanford University, CA

THURSDAY Podium Sessions

3:06 PM -3:24 PM

Cytoskeletal pattern formation: Self organization of topology.

A. Bausch;

Technische Universität München,
Unterschleißheim, GERMANY.

3:24 PM - 3:42 PM

Disordered Actomyosin Contracts in Unexpected Ways

M. Lenz;

CNRS & U. Paris-Sud, Orsay, FRANCE.

3:42 PM - 4:00 PM

Actomyosin Sliding is Attenuated in the Contraction of Disordered Networks

M. Murrell¹, M. Gardel²;

¹University of Wisconsin - Madison, WI, ²University of Chicago, IL

Stem Cell Nucleus III

Session Number: 17-5 Room: 302

Session Chair(s): D. Discher and T. McDevitt

2:30 PM - 2:48 PM

Extracellular Matrix Dynamics of 3D Pluripotent Stem Cell Aggregates

T. C. McDevitt, R. Nair, A. Kitchel, M. Kinney, T. Hookway, K. Fridley, M. Cooke;

Georgia Institute of Technology, Atlanta, GA.

2:48 PM - 3:06 PM

Hippo-YAP Signaling and Its Functional Regulation of Mechanosensitive Behaviors of Human Pluripotent Stem Cells

J. Fu;

University of Michigan, Ann Arbor, Ann Arbor, MI.

3:06 PM - 3:24 PM

Adipose Stem Cells in the Human Rotator Cuff are Novel Brown Fat Progenitors Influenced by Cuff State

G. Meyer, E. Sato, S. R. Ward, A. J. Engler;
UCSD, San Diego, CA.

3:24 PM - 3:42 PM

In Vitro Organized Germ Layers from a Single Mouse Embryonic Stem Cell

Y. Poh, N. Wang;

University of Illinois Urbana-Champaign, IL.

3:42 PM - 4:00 PM

Mechanical regulation of mesenchymal stem cells within synthetic extracellular matrices.

B. Trappmann, B. M. Baker, C. S. Chen;
Boston University, MA

High Resolution Imaging in Mechanobiology II

Session Number: 17-6 Room: 309

Session Chair(s): R. Muller

2:30 PM - 2:48 PM

Micro- and nanomechanics of bone affect mechanical performance and mechanobiology

P. J. Thurner¹, O. L. Katsamenis², S. Nobakhti², T. Jenkins², N. Harvey³, G. Limbert²;

¹Vienna University of Technology, AUSTRIA,

²University of Southampton, UNITED KINGDOM,

³MRC Lifecourse Epidemiology Unit, Southampton, UNITED KINGDOM.

2:48 PM - 3:06 PM

Microfluidic Imaging of In Vivo Gene Expression in Mechanobiology

R. Müller;

Institute for Biomechanics, ETH Zurich, SWITZERLAND.

3:06 PM - 3:24 PM

Identifying genetic regulators of bone's response to altered levels of weightbearing based on in vivo μ CT phenotypes

S. Judex¹, J. Sankaran¹, W. Zhang², L. Donahue², E. Ozcivici³;

¹Stony Brook University, NY, ²The Jackson

Laboratory, Bar Harbor, ME, ³Izmir Institute of Technology, TURKEY.

3:24 PM - 3:42 PM

In vivo Imaging of Bone Formation and Resorption to Assess Bone Adaptation to Mechanical Loading in Aging Mice

A. Birkhold¹, H. Razi¹, R. Weinkamer², G. Duda¹, S. Checa¹, **B. M. Willie**¹;

¹Charité – Universitätsmedizin Berlin, GERMANY,

²Max Planck Institute of Colloids and Interfaces, Potsdam, GERMANY.

3:42 PM - 4:00 PM

Kinetics of Bone Mineralization and Demineralization in Postmenopausal Osteoporosis

D. Ruffoni¹, R. Weinkamer², G. Kuhn³, R. Müller³;

¹Department of Aerospace and Mechanical

Engineering, University of Liege, BELGIUM, ²Max

Planck Institute of Colloids and Interfaces,

Department of Biomaterials, Potsdam, GERMANY,

³Institute for Biomechanics, ETH Zurich, SWITZERLAND

THURSDAY Podium Sessions

New Frontiers in 1-D Cardiovascular Modeling

Session Number: 17-7 Room: 300

Session Chair(s): N. Chesler

2:30 PM - 2:48 PM

On adding viscoelasticity to 1D fluid dynamics models, and the effect of outflow boundary conditions

M. S. Olufsen¹, C. Battista¹, M. A. Haider¹, D. Bia², Y. Zocalo², R. L. Armentano²;

¹North Carolina State University, Raleigh, NC,

²Republic University, Montevideo, URUGUAY.

2:48 PM - 3:06 PM

One-Dimensional Modelling of the Perinatal Cardiovascular System

J. P. Mynard;

Murdoch Childrens Research Institute, Parkville, Victoria, AUSTRALIA.

3:06 PM - 3:24 PM

A 1-D Model of Murine Hemodynamics

L. Aslanidou¹, **B. Trachet**¹, P. Reymond¹, A. V.

Jungo¹, P. Segers², N. Stergiopoulos¹;

¹EPFL, Lausanne, SWITZERLAND, ²Ghent

University, BELGIUM.

3:24 PM - 3:42 PM

Insights into right ventricular dysfunction through 1-D modeling of pulmonary circulations

S. Tewari¹, B. Carlson¹, D. Beard¹, **N. Chesler**²;

¹University of Michigan, Ann Arbor, MI, ²University of Wisconsin, Madison, WI

3:42 PM - 4:00 PM

Translational potential of 1-D cardiovascular modeling

D. Burkoff

Columbia University

Cerebral Aneurysms IV: Hemodynamics

Session Number: 17-8 Room: Ball-C

Session Chair(s): Cebra and Steinman

2:30 PM - 2:48 PM

Velocity Imaging in Experimental Models and In Vivo for Assessing the Role of Hemodynamics in Cerebral Aneurysm Evolution

D. Saloner;

University of California San Francisco, CA.

2:48 PM - 3:06 PM

Angiographic Flow Imaging of Cerebral Aneurysms for Flow Diversion Assessment

L. Jou¹, G. Chintalapani², H. Kang³, M. E. Mawad¹;

¹Baylor College of Medicine, Houston, TX,

²Siemens Medical Solutions, Houston, TX, ³Seoul National University Hospital, REPUBLIC OF KOREA.

3:06 PM - 3:24 PM

Multi-Scale FSI Simulation of a Middle Cerebral Artery

M. Oshima¹, Y. Ishigami¹, A. Yo², S. Yamamoto²;

¹The University of Tokyo, JAPAN, ²Shibaura Institute of Technology, Tokyo, JAPAN.

3:24 PM - 3:42 PM

Flow Instabilities in Sidewall Aneurysms: A Possible Association with Rupture Status?

K. Valen-Sendstad¹, A. Lauric², A. M. Malek², **D. A.**

Steinman¹;

¹University of Toronto, ON, CANADA, ²Tufts Medical Center, Boston, MA.

3:42 PM - 4:00 PM

Analysis of Possible Pathways for Cerebral Aneurysm Rupture

J. Cebra¹, D. Sforza¹, M. Vazquez², C. Putman³;

¹George Mason University, Fairfax, VA, ²Barcelona Supercomputing Center, Barcelona, SPAIN, ³Texas Neurointerventional Surgery Associates, Dallas, TX

Arterial Stiffness & Disease III

Session Number: 17-9 Room: 312

Session Chair(s): S. Greenwald

2:30 PM - 2:48 PM

Identifying Local Groups of Dysfunctional Endothelial Cells in Vulnerable Plaques

R. M. Pedrigi, V. V. Mehta, S. M. Bovens, T.

Homma, E. Petretto, R. Krams;

Imperial College London, UNITED KINGDOM.

2:48 PM - 3:06 PM

Investigation of Pulse Transit Times (PTTs) Utilizing Multisite Reflectance Photoplethysmography Under Conditions of Artificially Induced Peripheral Vasoconstriction

P. Kyriacou, K. Budidha, H. Njoum;

City University London, UNITED KINGDOM.

THURSDAY Podium Sessions

3:06 PM - 3:24 PM

Towards Computational Diagnosis of Coronary Artery Disease

S. Shaw¹, C. Kruse², J. R. Whiteman¹, H. T. Banks³, Z. R. Kenz³, S. Hu³, S. E. Greenwald⁴, M. Birch⁵, J. Reeves⁵, M. P. Brewin⁶;

¹Brunel University, Uxbridge, UNITED KINGDOM, ²INRIA, Paris, FRANCE, ³North Carolina State University, Cary, NC, ⁴Queen Mary University of London, UNITED KINGDOM, ⁵Barts Health National Health Service Trust, London, UNITED KINGDOM, ⁶Salisbury District Hospital, Salisbury, UNITED KINGDOM.

3:24 PM - 3:42 PM

Acoustic Localisation of Coronary Artery Stenosis: Wave Propagation in Soft Tissue Mimicking Gel

H. T. Banks¹, M. J. Birch², M. P. Brewin³, E. Cantor³, **S. E. Greenwald**³, S. Hu¹, Z. R. Kenz¹, B. Khera³, C. Kruse⁴, J. Reeves², S. Shaw⁴, J. R. Whiteman⁴;

¹North Carolina State University, Raleigh, NC, ²Barts Health Trust, London, UNITED KINGDOM, ³Barts & The London School of Medicine & Dentistry, London, UNITED KINGDOM, ⁴Brunel University, London, UNITED KINGDOM.

3:42 PM - 4:00 PM

Non-invasive measurement of pressure-diameter relationship and smooth muscle contractility of human brachial arteries through transmural pressure manipulation

T. Yaguchi¹, K. Nagayama¹, H. Tsukahara², H. Masuda², T. Matsumoto¹;

¹Nagoya Institute of Technology, JAPAN, ²UNEX Corporation, Nagoya, JAPAN

Meniscus Tissue Engineering and Mechanics

Session Number: 17-10 Room: 313

Session Chair(s): T. L. Haut Donahue

2:30 PM - 2:48 PM

Long-term Wear Evaluation of an Artificial Medial Meniscus Implant

J. J. Elsner¹, M. Shemesh², A. Shefy-Peleg², E. Zylberberg², E. Linder-Ganz²;

¹Active Implants, Cambridge, MA, ²Active Implants, Netanya, ISRAEL.

2:48 PM - 3:06 PM

A Longitudinal Comparison of Mechanical Changes in the Menisci for Two Experimental Models of ACL Injury

K. M. Fischenich¹, K. D. Button², C. DeCamp², R. C. Haut², T. L. Haut Donahue¹;

¹Colorado State University, Fort Collins, CO,

²Michigan State University, East Lansing, MI.

3:06 PM - 3:24 PM

Biomechanical Performance of an Anatomically Shaped Polycarbonate Urethane Total Meniscus Replacement

A. C. T. Vrancken, F. Eggermont, T. G. van Tienen, D. Janssen, P. Buma, N. Verdonschot; Radboud University Nijmegen Medical Center, NETHERLANDS.

3:24 PM - 3:42 PM

Challenge in Tissue Engineering: Meniscal Replacement

L. Dürselen;

Institute of Orthopaedic Research and Biomechanics, Center of Musculoskeletal Research, Ulm University, GERMANY.

3:42 PM - 4:00 PM

Elastin distribution in the bovine menisci

S. H. J. Andrews¹, J. B. Rattner², Z. Abusara², A. Adesida¹;

¹University of Alberta, Edmonton, AB, CANADA,

²University of Calgary, AB, CANADA.

Skin Biomechanics I

Session Number: 17-11 Room: 305

Session Chair(s): Limbert

2:30 PM - 2:48 PM

A Structural Insight into Skin Wrinkles

M. F. Leyva-Mendivil, A. Page, N. Bressloff, G. Limbert;

University of Southampton, UNITED KINGDOM.

2:48 PM - 3:06 PM

Finite Element Simulations to Determine Skin Changes that Affect the Risk for Pressure Ulcers

A. Gefen;

Tel Aviv University, ISRAEL.

3:06 PM - 3:24 PM

Biomechanical modeling of the stratum corneum

R. Santoprete, B. Querleux;

L'Oreal, Aulnay sous Bois, FRANCE.

3:24 PM - 3:42 PM

Mechanical Behavior of Skin: The Struggle for the Appropriate Testing Method

C. Oomens;

Eindhoven University of Technology, NETHERLANDS.

THURSDAY Podium Sessions

3:42 PM - 4:00 PM

Deciphering Skin Mechanics to Develop Next Generation Treatments

K. Levi¹, J. Keller²;

¹Bio-X Consulting, Inc., Mountain View, CA, ²Bio-X Technologies GmbH, Berlin, GERMANY

Multiscale Mechanobiology in Respiratory System III

Session Number: 17-12 Room: 301
Session Chair(s): S. Ghadiali and D. Gaver

2:30 PM - 2:48 PM

Opportunities and Challenges for Respiratory System Mechanobiology

D. Tschumperlin;

Mayo Clinic, Rochester, MN.

2:48 PM - 3:06 PM

Multiphase Flow in the Lung and Its Impact on Epithelial Cells

J. Grotberg;

University of Michigan, Ann Arbor, MI.

3:06 PM - 3:24 PM

Multiscale Modeling of Pulmonary Mechanics

W. A. Wall, M. Ismail, C. Roth, L. Yoshihara;

Technical University of Munich, Garching, GERMANY.

3:24 PM - 3:42 PM

Optimizing Ventilator Waveforms to Promote Cellular Viability

J. Pillert, **D. P. Gaver**;

Tulane University, New Orleans, LA.

3:42 PM - 4:00 PM

Acinus-on-a-chip: respiratory physiology using in vitro microfluidics

J. Sznitman;

Technion - Israel Institute of Technology, Haifa, ISRAEL

Reproductive & Women's Health X: Microfluidic Devices & Assisted Reproduction

Session Number: 17-13 Room:311
Session Chair(s): L. Griffith and M. Eisenbach

2:30 PM - 2:48 PM

Microfluidics for Gamete and Embryo Isolation, Culture, and Bioanalysis

G. D. Smith, S. Takayama;

University of Michigan, Ann Arbor, MI.

2:48 PM - 3:06 PM

Mammalian Gamete Selection with Coherent Anti-Stokes Raman Scattering (CARS) Microscopy

G. D. Smith, J. Jasensky, Z. Chen;

University of Michigan, Ann Arbor, MI.

3:06 PM - 3:24 PM

Live-Cell Imaging and the Selection of Human Embryos to Facilitate Single Embryo Transfer.

K. A. Miller, N. Millan, M. Allen, C. Craig, D.

Hoffman;

IVF Florida Reproductive Associates, Margate, FL.

3:24 PM - 3:42 PM

Microfluidic devices for the pre-implantation culture of human embryos

S. Le Gac;

MESA+ Inst. for Nanotechnology, University of Twente, Enschede, NETHERLANDS.

3:42 PM - 4:00 PM

Microfluidic Devices for the Study of Human Trophoblast Invasion

C. M. Oefner¹, W. Polacheck², R. Kamm², M. Oyen¹, A. Moffett¹;

¹University of Cambridge, UNITED KINGDOM, ²MIT, Cambridge, MA.

Spinal Facet Biomechanics

Session Number: 17-14 Room: Ball-A
Session Chair(s): B. Winkelstein

2:30 PM - 2:48 PM

Joint Loading History and the Influence on Facet Joint Mechanics

J. P. Callaghan¹, J. D. M. Drake², S. J. Howarth³;

¹University of Waterloo, ON, CANADA, ²York University, Toronto, ON, CANADA, ³Canadian Memorial Chiropractic College, Toronto, ON, CANADA.

2:48 PM - 3:06 PM

Cervical Facet Joint Biomechanics in Normal & Injury Conditions

B. Winkelstein, N. Jaumard, J. Udupa, W. Welch;

University of Pennsylvania, Philadelphia, PA.

3:06 PM - 3:24 PM

Lumbar Facet Joint Contact Mechanics Are Level-Dependent

A. A. Espinoza Orias, P. Simon, N. Inoue, R. N.

Natarajan;

Rush University Medical Center, Chicago, IL.

THURSDAY Podium Sessions

3:24 PM - 3:42 PM

Biaxial Mechanical Testing of Cadaveric Lumbar Facet Capsular Ligaments

A. Claeson, **V. Barocas**;

University of Minnesota, Minneapolis, MN

Whole Bone Computations I

Session Number: 17-15 Room: Ball-B

Session Chair(s): E. Guo and Keaveny

2:30 PM - 2:48 PM

Application of the Finite Element Method for High-Throughput Assessment of Bone Strength from High-Resolution Peripheral Quantitative Computed Tomography

S. Boyd;

University of Calgary, AB, CANADA.

2:48 PM - 3:06 PM

HR-pQCT Based Individual Trabecula Segmentation (ITS) and Nonlinear Finite Element (FE) Analyses of Human Distal Radius and Tibia

B. Zhou¹, J. Wang¹, E. Yu¹, S. Nawathe², K. K.

Nishiyama¹, E. Shane¹, T. M. Keaveny², **X. Guo**¹;

¹Columbia University, New York, NY, ²University of California, Berkeley, CA.

3:06 PM - 3:24 PM

Finite Element Analysis Methodology for Computing Proximal Femoral Load Capacity and Evaluating Hip Fracture Risk

J. H. Keyak¹, T. F. Lang²;

¹University of California, Irvine, CA, ²University of California, San Francisco, CA.

3:24 PM - 3:42 PM

Fracture Risk Assessment Using HR-pQCT and Cohesive Finite Element Modeling

A. Ural;

Villanova University, Villanova, PA.

3:42 PM - 4:00 PM

Micro- Finite Element Analysis for Identification of Patients at Risk of Fractures: State-of-the-Art

B. van Rietbergen, K. Ito;

Eindhoven University of Technology, NETHERLANDS.

Biomechanics of Elbow & Shoulder Arthroplasty I

Session Number: 17-16 Room: 308

Session Chair(s): J. Bischoff and H. Henninger

2:30 PM - 2:48 PM

Invited Speaker

L. D. Higgins;

2:48 PM - 3:06 PM

Biomechanics of Reverse Total Shoulder Arthroplasty

H. B. Henninger, R. Z. Tashjian, R. T. Burks;

University of Utah, Salt Lake City, UT.

3:06 PM - 3:24 PM

New Perspectives in Reverse Shoulder Arthroplasty Biomechanics and Design

C. Roche¹, M. Hamilton¹, P. Diep¹, P. Flurin², T. Wright³, J. Zuckerman⁴, H. Routman⁵;

¹Exactech, Gainesville, FL, ²Bordeaux-Merignac Clinic, Bordeaux, FRANCE, ³University of Florida, Gainesville, FL, ⁴Hospital for Joint Diseases, New York, NY, ⁵Atlantis Orthopaedics, Palm Beach, FL.

3:24 PM - 3:42 PM

In Vitro Numerical Stress Analysis of Glenoidal Component of Reverse Shoulder Prosthesis: Comparison of Baseplate Fixation Methods.

L. Kirkayak;

Istanbul Technical University, Istanbul, TURKEY.

3:42 PM - 4:00 PM

Analysis of Retrieved Semi-Constrained Total Elbows

J. S. Day¹, D. MacDonald², M. Ramsey³, B. Morrey⁴, P. Connor⁵, S. Kurtz⁶;

¹Exponent, Inc., Philadelphia, PA, ²Drexel University, Philadelphia, PA, ³Rothman Institute, Philadelphia, PA, ⁴Mayo Clinic, Rochester, MN, ⁵Ortho Carolina, Charlotte, NC, ⁶Drexel University, Philadelphia, PA

Biomechanics of Flight III: Maneuverability & Stability

Session Number: 17-17 Room: 307

Session Chair(s): J. van Leeuwen, and H. Liu

2:30 PM - 2:48 PM

Vision-based Flight Stabilization and Control in Hawkmoths

G. K. Taylor¹, R. I. Holbrook¹, T. Müller¹, S. P. Windsor²;

¹University of Oxford, UNITED KINGDOM,

²University of Bristol, UNITED KINGDOM.

2:48 PM - 3:06 PM

Strategies for Mitigating Gust Perturbations in Insects

J. Vance¹, I. Faruque², J. Humbert²;

¹College of Charleston, SC, ²University of Maryland, College Park, MD.

THURSDAY Podium Sessions

3:06 PM - 3:24 PM

Kinematics and Aerodynamics of Banked Turns in Freely Flying Fruit Flies

F. T. Mujres¹, M. J. Elzinga¹, N. A. Iwasaki¹, J. Melis², M. H. Dickinson¹;

¹University of Washington, Seattle, WA, ²Delft University of Technology, NETHERLANDS.

3:24 PM - 3:42 PM

Sensory Feedback and Dynamics of Aerial Turning in the Pigeon

I. G. Ros¹, M. A. Badger², A. N. Pierson³, L. C. Bassman⁴, A. A. Biewener¹;

¹Harvard University, Bedford, MA, ²University of California, Berkeley, CA, ³Boston University, MA, ⁴Harvey Mudd College, Claremont, CA.

3:42 PM - 4:00 PM

Influence of load position on flight stability and maneuverability of bumblebees

S. Ravi¹, A. Mountcastle², S. Combes²;

¹MIT University, Melbourne, AUSTRALIA, ²Harvard University, Bedford, MA.

Gait Modification I

Session Number: 17-18 Room: 310

Session Chair(s): P. Shull and I. Davis

2:30 PM - 3:06 PM

The Benefits and Risks of Minimal and Barefoot Running

I. S. Davis;

Harvard Medical School, Boston, MA.

3:06 PM - 3:24 PM

Gait Lab Meets Holodeck: Real-Time Biomechanical Analysis in Virtual Reality

A. J. van den Bogert;

Cleveland State University, Cleveland, OH.

3:24 PM - 3:42 PM

The role of gait modification in the clinical management of k

M. A. Hunt;

University of British Columbia, Vancouver, BC, CANADA.

3:42 PM - 4:00 PM

Gait Modification to Increase Sprint Running Speeds: Acute, Cross-Sectional, and Artificial Considerations

P. Weyand, K. Clark, L. Ryan;

Southern Methodist University, Dallas, TX.

3:24 PM - 4:00 PM

See Program Supplement and Errata Sheet for possible additions

FEBio Symposium I

Session Number: 17-19 Room: 303

Session Chair(s): B. J. Ellis and J. A. Weiss

2:30 PM - 3:06 PM

Finite Element Modeling of Mechanics, Transport, and Chemical Reactions in Biological Tissues and Cells

G. A. Ateshian¹, R. J. Nims¹, S. Maas², J. A. Weiss²;

¹Columbia University, New York, NY, ²University of Utah, Salt Lake City, UT.

3:06 PM - 3:24 PM

Bringing Finite Element Analysis of Biological Structures to the Masses by Extending Simulation Software with Open Access Models

A. Erdemir;

Cleveland Clinic, OH.

3:24 PM - 3:42 PM

Explicit and Nonlinear Conjugate Gradient Solution Algorithms in FEBio

S. L. Evans;

Cardiff University, UNITED KINGDOM.

3:42 PM - 4:00 PM

3D Printable Transtibial Prosthetic Socket Design Based on Inverse FEA of a Residual Limb

D. M. Senge¹, K. M. Moerman², H. Herr¹;

¹MIT, Cambridge, MA, ²University of Amsterdam, NETHERLANDS.

ASB Technology & Rehabilitation – Retraining Session

Session Number: 17-20 Room: 304

Session Chair(s): M. Rodgers and I. Davis

2:30 PM - 2:48 PM

Advances in Robot-Assisted Gait Training

P. Bonato;

Harvard Medical School, Charlestown, MA.

2:48 PM - 3:06 PM

Relearning to Walk After Stroke

D. Reisman;

University of Delaware, Newark, DE.

3:06 PM - 3:24 PM

Gait Retraining of Faulty Mechanics in Runners

I. S. Davis;

Harvard Medical School, Boston, MA.

THURSDAY Podium Sessions

Thursday, 10 July 2014
4:30 – 6:00 PM

Functional Micro/Nanodevices for Quantitative Cell and Tissue Mechanics

Session Number: 18-1 Room: 109
Session Chair(s): R. Bashir and J. Fu

4:30 PM - 5:06 PM

MicroMetrologies for Quantitative Mechanobiology
B. L. Pruitt;
Stanford University, CA.

5:06 PM - 5:24 PM

Measuring physical properties of single cells
S. Manalis;

5:24 PM - 5:42 PM

Differential adhesive signature for distinguishing and separating partially reprogrammed cells from human induced pluripotent stem cells
A. Singh;
Cornell University, Ithaca, NY.

5:42 PM – 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Molecular Imaging & Therapeutic Approaches

Session Number: 18-2 Room: 110
Session Chair(s): G. Bao and M. Gounis

4:30 PM - 4:48 PM

Magnetic Nanoparticle Heating for Cancer and Regenerative Medicine Applications.
M. Etheridge, **J. C. Bischof;**
University of Minnesota, Minneapolis, MN.

4:48 PM - 5:06 PM

Molecular imaging of enzyme activity in vascular disease.
A. Bogdanov, Jr.;
University of Massachusetts Medical School, Worcester, MA.

5:06 PM - 5:24 PM

Mechanics of Nanoparticle Internalization into Endothelial Cells under Flow
D. Gonzalez-Rodriguez, J. Lafaurie-Janvore, A. Babataheri, J. Husson, A. I. Barakat;
Ecole Polytechnique, Palaiseau, FRANCE.

5:24 PM - 6:00 PM

Advances in Biomaterials
R. Langer;
MIT, Cambridge, MA.

Prenatal Skeletal Development: Mechanobiology & Mechanotransduction

Session Number: 18-3 Room: 111
Session Chair(s): N. Nowlan

4:30 PM - 4:48 PM

The role of muscle loading on the development of the tendon enthesis
A. Schwartz, F. Long, **S. Thomopoulos;**
Washington University, St. Louis, MO.

4:48 PM - 5:06 PM

Using the Zebrafish Jaw to Model Strains and Signaling During Joint Development
L. H. Brunt, J. Norton, K. A. Roddy, E. Rayfield, **C. L. Hammond;**
University of Bristol, UNITED KINGDOM.

5:06 PM - 5:24 PM

A Biophysical Model for Column Formation in Growth Plate Cartilage
A. T. Dudley¹, S. M. Romereim², N. I. Conoan¹;
¹University of Nebraska Medical Center, Omaha, NE, ²Northwestern University, Evanston, IL.

5:24 PM - 5:42 PM

Cyclic Hydrostatic Pressure Stimulates Enhanced Bone Development in the Fetal Chick Femur - Applications in Tissue Engineering
A. J. El Haj;
Keele University, North Staffs, UNITED KINGDOM.

5:42 PM - 6:00 PM

The impact of mechanical stimulation from muscle contractions on ossification and joint formation during mouse development: exploring developmental mechanisms disturbed in the absence of contractions
P. Murphy, D. Kelly, R. Rolfe;
Trinity College Dublin, IRELAND.

Cytoskeletal Rheology In Vivo

Session Number: 18-4 Room: 306
Session Chair(s): F. MacKintosh and C. Schmidt

4:30 PM - 4:48 PM

High Resolution Mapping of Intracellular Fluctuations Using Carbon Nanotubes
N. Fakhri¹, A. D. Wessel¹, C. Willms¹, M. Pasquali², D. R. Klopfenstein¹, F. C. MacKintosh³, C. F. Schmidt¹;
¹Georg-August-Universität, Göttingen, GERMANY, ²Rice University, Houston, TX, ³Vrije Universiteit, Amsterdam, NETHERLANDS.

THURSDAY Podium Sessions

4:48 PM - 5:06 PM

Active fluctuations in cells

F. MacKintosh;

VU University, Amsterdam, NETHERLANDS.

5:06 PM - 5:24 PM

Cell migration and cytoskeletal remodeling

B. Fabry, J. Steinwachs, C. Metzner;

University of Erlangen-Nuremberg, GERMANY.

5:24 PM - 5:42 PM

Mechanics of an Intracellular RNA/Protein Emulsion

C. Brangwynne

Princeton University, N.J.

5:42 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Stem Cell Nucleus IV

Session Number: 18-5 Room: 302

Session Chair(s): D. Discher and T. McDevitt

4:30 PM - 4:48 PM

Microarrays to probe mechanobiological regulation of stem cell fate

C. A. Simmons;

University of Toronto, ON, CANADA.

4:48 PM - 5:06 PM

Mapping the Mechanome: Retrospective and Prospective Approaches

M. Knothe Tate¹, P. Gunning¹, J. Whitelock¹, V. Sansalone²;

¹University of New South Wales, Sydney, AUSTRALIA, ²University of Paris Est, Paris Creteil, FRANCE.

5:06 PM - 5:24 PM

Intracellular Force Regulation of Pluripotent Stem Cell Specification and Differentiation

T. Ahsan;

Tulane University, New Orleans, LA.

5:24 PM - 5:42 PM

Dynamic changes in the biomechanics of 3D pluripotent stem cell aggregates accompany cell fate specification and morphogenesis

M. A. Kinney, T. C. McDevitt, R. Saeed;

Georgia Institute of Technology & Emory University, Atlanta, GA.

5:42 PM - 6:00 PM

Tensile forces applied on a cell-embedded 3D scaffold can direct early differentiation of embryonic stem cells toward the mesoderm germ layer

S. Levenberg;

High Resolution Imaging in Mechanobiology III

Session Number: 18-6 Room: 309

Session Chair(s): R. Muller

4:30 PM - 4:48 PM

Control of Tissue Formation around Orthopedic Implants

D. Pioletti;

EPFL, Lausanne, SWITZERLAND.

4:48 PM - 5:06 PM

In Vivo Measurements of Human Bone Micro Architecture and the Non-Invasive Assessment of Bone Strength

S. Boyd;

University of Calgary, AB, CANADA.

5:06 PM - 5:24 PM

Simultaneous [Ca²⁺]_i and Actin Dynamic Imaging of Osteocytes in Intact Mouse Tibiae Under Cyclic Mechanical Loading

A. E. Morrell¹, D. Jing¹, A. D. Baik¹, B. Zhou¹, X. L. Lu², L. Wang², **X. E. Guo**¹;

¹Columbia University, New York, NY, ²University of Delaware, Newark, DE.

5:24 PM - 5:42 PM

Skeletal Response to Disuse Assessed by High Resolution pQCT

G. J. Kazakia;

University of California, San Francisco, CA.

5:42 PM - 6:00PM

Mechanical Competence of Fractured and Healing Bone Assessed by High Resolution pQCT and Micro-Finite Element Analysis

B. van Rietbergen¹, J. J. A. de Jong², A. J. Arias

Moreno¹, J. P. W. van den Bergh³, J. J. Arts⁴, K. Ito¹;

¹Eindhoven University of Technology, NETHERLANDS, ²Research school NUTRIM, Maastricht University, NETHERLANDS,

³Department of Internal Medicine, Viecuri Medical Center, Venlo, NETHERLANDS, ⁴Department of

Orthopedics, Maastricht University Medical Center, NETHERLANDS.

THURSDAY Podium Sessions

Biomechanics of the Coronary Circulation

Session Number: 18-7 Room: 300

Session Chair(s): G. S. Kassab

4:30 PM - 4:48 PM

Collateral flow, Wedge Pressure and the Assessment of Coronary Resistance

M. Siebes, J. P. H. M. van den Wijngaard, P. van Horssen, F. Nolte, T. van de Hoef, J. J. Piek, J. A. E. Spaan;

Academic Medical Center, Univ. of Amsterdam, Amsterdam, NETHERLANDS.

4:48 PM - 5:06 PM

Pulsatile Flow in the Entire Coronary Arterial Tree

Y. Huo;

Peking University, Beijing, CHINA.

5:06 PM - 5:24 PM

Vascular Compliance Enhancing Endocardial Vulnerability

D. Algranati¹, G. S. Kassab², Y. Lanir¹;

¹Technion Israel Institute of Technology, Haifa, ISRAEL, ²Indiana University-Purdue University, Indianapolis, IN.

5:24 PM - 5:42 PM

Multi-scale, multi-physics heart simulator for the understanding of pathophysiology of coronary circulation

S. Sugiura¹, T. Iwamura², J. Okada¹, T. Washio¹, F. Kajiya³, T. Hisada¹;

¹The University of Tokyo, Kashiwa-shi, Chiba, JAPAN, ²Fujitsu Ltd., Kawasaki, JAPAN, ³Kawasaki University of MedWelfare, Kurashiki, JAPAN.

5:42 PM - 6:00 PM

Multi-scale Computational Modeling of Coronary Blood Flow

N. P. Smith¹, J. Lee¹, M. Sinclair¹, E. Hyde¹, A. Cookson¹, J. Spaan², M. Seibes², R. Chabiniok¹, D. Nordsletten¹;

¹Kings College London, UNITED KINGDOM, ²Amsterdam Medical Center, NETHERLANDS.

Cerebral Aneurysms V: Risk Assessment & Modeling

Session Number: 18-8 Room: Ball-C

Session Chair(s): Meng and Raghavan

4:30 PM - 4:48 PM

Epidemiological Assessment of Local Flow Dynamics as a Primary Causative Factor

B. B. Lieber, C. Sadasivan, R. J. Dholakia, J. M. Fu, D. J. Fiorella, H. H. Woo;
Stony Brook University, NY.

4:48 PM - 5:06 PM

The role of computational modelling in the integrated healthcare management of cerebral aneurysms.

Y. Ventikos¹, T. Peach², M. Ngoepe², K. Spranger², D. Zajarias-Fainsod², D. Baeriswyl¹;

¹University College London, UNITED KINGDOM,

²Institute of Biomedical Engineering, University of Oxford, UNITED KINGDOM.

5:06 PM - 5:24 PM

Cerebral Aneurysm Risk Prediction: Role of Heterogeneous Hemodynamic Mechanisms

H. Meng;

University at Buffalo, Buffalo, NY.

5:24 PM - 5:42 PM

Challenges in designing a study of prognostic indicators of longitudinal instability in unruptured untreated cerebral aneurysms

M. L. Raghavan, B. Berkowitz, K. Johnson, M. Ramachandran, R. Retarekar;

University of Iowa, Iowa City, IA.

5:42 PM - 6:00PM

See Program Supplement and Errata Sheet for possible additions

Tissue & Vascular Cell Mechanics

Session Number: 18-9 Room: 312

Session Chair(s): P. Janmey and T. Matsumoto

4:30 PM - 4:48 PM

An original endothelialized coronary bifurcation model to investigate pathologic mechanisms underlying coronary atherosclerotic disease

S. K. Yazdani¹, M. Atigh¹, A. Parks¹, S. Kim¹, G. Finet², R. I. Pettigrew³, J. Ohayon⁴;

¹University of South Alabama, Fairhope, AL,

²Hospices Civils de Lyon and Claude Bernard University, Lyon, FRANCE, ³National Institute of Health, Bethesda, MD, ⁴Polytech Annecy-Chambéry, Le Bourget du Lac, FRANCE.

4:48 PM - 5:06 PM

Characterisation of the Two-Layered "Media" in the Mammalian Carotid Artery

S. E. Greenwald¹, C. Evagora¹, L. H. Timmins², J. E. Moore, Jr.³;

¹Barts & The London School of Medicine & Dentistry, Queen Mary University of London, UNITED KINGDOM, ²Wallace H. Coulter

Department of Biomedical Engineering Georgia Institute of Technology and Emory University, Atlanta, GA, ³Imperial College London, UNITED KINGDOM.

THURSDAY Podium Sessions

5:06 PM - 5:24 PM

Mechanical Analysis of Aortic Walls Considering Heterogeneity at a Cellular Level

T. Matsumoto¹, Y. Uno¹, S. Iijima¹, S. Nakamura², H. Yokota², K. Nagayama¹;

¹Nagoya Institute of Technology, JAPAN, ²RIKEN, Wako, JAPAN.

5:24 PM - 5:42 PM

Arterial stiffening induces endothelial dysfunction through changes in endothelial cell contractility
M. Lampi, J. Huynh, D. Zhou, F. Bordeleau, J. Kohn,

C. Reinhart-King;

Cornell University, Ithaca, NY.

5:42 PM - 6:00 PM

Mechanosensation in collagen gels

C. A. McCulloch;

Matrix Dynamics Group, University of Toronto, ON, CANADA.

Mechanobiology & Inflammation of Cartilage

Session Number: 18-10 Room: 313

Session Chair(s): C. Chen and J. Fredberg

4:30 PM - 4:48 PM

Exercise, a negative regulator of local and systemic inflammation

S. Agarwal, A. D. Blazek, N. Young, T. D. Eubank, N.

L. Weisleder, L. Wu, W. Jarjour;

The Ohio, State University, Columbus, OH.

4:48 PM - 5:06 PM

Chondrocyte Response to Overload Injury: Relevance to Post-Traumatic Osteoarthritis and Cartilage Repair

Y. Wang, Y. Li, A. G. Bajpayee, A. J. Grodzinsky; MIT, Cambridge, MA.

5:06 PM - 5:24 PM

New paradigms for common mechano-inflammatory mechanisms in osteoarthritis and tumor metastasis

P. A. Torzilli¹, J. W. Bourne², T. Cigler³, C. Vincent⁴;

¹Hospital for Special Surgery/Weill Cornell Medical College, New York, NY, ²Hospital for Special Surgery, New York, NY, ³Weill Cornell Medical College, New York, NY, ⁴Weill Cornell Medical College/Karolinska Institute, New York, NY.

5:24 PM - 5:42 PM

CITED2: a key mediator of mechanotransduction in articular joint protection

H. B. Sun;

Albert Einstein College of Medicine, Bronx, NY.

5:42 PM - 6:00 PM

NF- κ B Mediates Cartilage Degradation Induced by Trauma Injury and IL-1

M. Kashyap, K. Carter, F. Wei, **C. T. Chen**;

UT Southwestern Medical Center, Dallas, TX.

Skin Biomechanics II

Session Number: 18-11 Room: 305

Session Chair(s): Corr and Limbert

4:30 PM - 4:48 PM

Molecular Mechanism for Surface Ligand Activity of a Collagen Scaffold that Induces Regeneration of Skin and Peripheral Nerves

I. V. Yannas, D. Tzeranis, P. So;

Massachusetts Inst.of Technology, Boston, MA.

4:48 PM - 5:06 PM

Cell-seeded Skin Tissue Substitute: The Material Properties of Skin Tissue and Skin Grafts

C. K. Oseghale, R. Aburashed, K. Paulson, J.

Berniaskie, V. Gabriel, E. Di Martino;

University of Calgary, AB, CANADA.

5:06 PM - 5:24 PM

Evolution of the Microstructural Organization during a Mechanical Assay on Skin

B. Lynch¹, S. Bancelin², M. C. Schanne-Klein², C. Bonod-Bidaud³, F. Ruggiero³, J. M. Allain¹;

¹Solid Mechanics Laboratory, Ecole Polytechnique, Palaiseau, FRANCE, ²Laboratory for Optics and Biosciences, Ecole Polytechnique, Palaiseau, FRANCE, ³Institute of Functional Genomics of Lyon, FRANCE.

5:24 PM - 5:42 PM

Effects of Elastin Components on the Extensibility of Skins of Hairless Rats

E. Yamamoto;

Kinki University, Wakayama, JAPAN.

5:42 PM - 6:00 PM

Full-Field Biaxial Characterization of Skin using a Custom Built Bulge Test Device

N. Kumaraswamy¹, K. Ravi-Chandar¹, M. K.

Markey¹, G. P. Reece², M. C. Fingeret²;

¹The University of Texas at Austin, TX, ²The University of Texas MD Anderson Cancer Center, Houston, TX.

THURSDAY Podium Sessions

Multiscale Mechaniobiology in Respiratory System IV

Session Number: 18-12 Room: 301
Session Chair(s): W. Wall and J. Sznitman Ghadiali

4:30 PM - 4:48 PM

Functional Analysis of Upper Airway Cilia

B. Louis¹, J. Papon¹, M. Bottier¹, A. Coste¹, E. Escudier², M. Filoche¹, D. Isabey¹;
¹INSERM, Université Paris Est and CNRS ERL 7240, Créteil, FRANCE, ²INSERM U933, Université Pierre et Marie Curie, Paris, FRANCE.

4:48 PM - 5:06 PM

Mechanobiology of Alveolar Epithelial Cells in ARDS

E. Roan;
University of Memphis, Memphis, TN.

5:06 PM - 5:24 PM

Stretch Sensitive Mechanotransduction in the Respiratory System

K. Naruse;
Okayama University School of Medicine, JAPAN.

5:24 PM - 5:42 PM

MicroRNAs as Novel Regulators of Mechanotransduction in the Lung

S. Ghadiali, N. Higuaita-Castro, K. Nelson, R. Zielinski, B. Whitson, P. Nana-Sinkam;
The Ohio State University, Columbus, OH.

5:42 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Reproductive & Women's Health XI: Women's Health

Session Number: 18-13 Room: 311
Session Chair(s): S. Olson and S. Le Gac

4:30 PM - 4:48 PM

Gender, Age, and Diabetes: Donor Characteristics that Impact Autologous Stem Cell-Based Vascular Engineering

J. Krawiec, J. Weinbaum, P. Rubin, D. Vorp;
University of Pittsburgh, PA.

4:48 PM - 5:06 PM

Consideration of Vaginal Tissue Biomechanics in the Design of Vaginal Gels for Drug Delivery
M. Anwar, K. V. Camarda, J. Fleenor, J. Melendez, M. Pacey, **S. L. Kieweg**;
University of Kansas, Lawrence, KS.

5:06 PM - 5:24 PM

Biomechanics of Infant Feeding

D. Elad¹, P. Kozlovsky¹, O. Blum¹, E. Botzer², M. Zelicovich², L. Ben-Sira², S. Dolberg²;
¹Tel Aviv University, ISRAEL, ²Sourasky Tel Aviv Medical Center, ISRAEL.

5:24 PM - 5:42 PM

Hemodynamics of Umbilical Cord Clamping At Birth, Preterm Infants, and Gas Exchange

M. B. Yigit¹, W. J. Kowalski², D. J. R. Hutchon³, K. Pekkan²;

¹Koc University, Istanbul, TURKEY, ²Carnegie Mellon University, Pittsburgh, PA, ³Darlington Memorial Hospital, Darlington, UNITED KINGDOM.

5:42 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Spine Biomechanics Modeling

Session Number: 18-14 Room: Ball-A
Session Chair(s): B. Winkelstein and June

4:30 PM - 4:48 PM

Preflexion, Muscle Activity and Torso Constraint Affect Cervical Spine Buckling Behavior

J. Sganga, H. C. Ctucliffe, C. R. Bass, **R. Nightingale**;
Duke University, Durham, NC.

4:48 PM - 5:06 PM

Fracture Tolerance of the Lumbar Spine During High-Rate Axial Loading

B. D. Stemper¹, S. Chirvi¹, W. H. Curry¹, K. Kieh¹, J. L. Baisden¹, N. Yoganandan¹, G. R. Paskoff², B. S. Shender²;

¹Medical College of Wisconsin, Milwaukee, WI, ²Naval Air Warfare Center, Aircraft Division, Patuxent River, MD.

5:06 PM - 5:24 PM

Detailed Finite Element Cervical Spine Model Response Evaluation

D. Cronin, D. Singh, J. Barker, J. Fice;
University of Waterloo, ON, CANADA.

5:24 PM - 5:42 PM

Finite Element Musculoskeletal Model with Feedback Control to Simulate Spinal Postural Responses

K. Brolin, J. Östh, J. Ólafsdóttir, J. Davidsson;
Chalmers University of Technology, Gothenburg, SWEDEN.

THURSDAY Podium Sessions

5:42 PM – 6:00 PM

See Program Supplement and Errata Sheet for possible additions

Whole Bone Computations II

Session Number: 18-15 Room: Ball-B

Session Chair(s): E. Guo, P. Zysset, and B. van Rietbergen

4:30 PM - 4:48 PM

Computed tomography-based nonlinear finite element analysis to assess bone strength and bone mechanics -ex vivo validation and clinical application in osteoporosis-

K. Imai;

The University of Tokyo, JAPAN.

4:48 PM - 5:06 PM

Predicting the mechanical response and fracture risk in femurs with actual metastatic tumors

Z. Yosibash;

Ben Gurion University of the Negev, Beer-Sheva, ISRAEL.

5:06 PM - 5:24 PM

Modeling Scale Transition of Anisotropic Elasticity and Damage in Lamellar Bone

P. K. Zysset¹, A. Reisinger², E. Spiesz³, D. Pahr², J. J. Schwiedrzik¹;

¹Universität Bern, SWITZERLAND, ²Vienna

University of Technology, AUSTRIA, ³Eindhoven

University of Technology, NETHERLANDS.

5:24 PM - 5:42 PM

Bone Mechanical Behavior: Contributions of Tissue Microstructure

M. C. H. van der Meulen;

Cornell University, Ithaca, NY.

5:42 PM - 6:00 PM

Quantitative Visualization of Vertebral Failure for Advancing Study of the Pathogenesis of Spine Fractures

E. F. Morgan, A. I. Hussein, G. U. Unnikrishnan, T. M. Jackman;

Boston University, Boston, MA.

Biomechanics of Elbow & Shoulder Arthroplasty II

Session Number: 18-16 Room: 308

Session Chair(s): J. Bischoff and H. Henninger

4:30 PM - 4:48 PM

Biomechanical Considerations in the Development of a Total Elbow Prosthesis

R. Varadarajan;

Zimmer Inc., Warsaw, IN.

4:48 PM - 5:06 PM

A Computational Model of the Terrible Triad Injury for the Comparison of Radial Head Prosthetics

C. A. Woodcock, **J. S. Wayne;**

Virginia Commonwealth University, Richmond, VA.

5:06 PM - 5:24 PM

Contact Mechanics of Elbow Prostheses: Linked TER and Hemiarthroplasty

R. Willing¹, G. J. W. King², J. A. Johnson³;

¹SUNY Binghamton, Binghamton, NY, ²St. Joseph's Health Centre, London, ON, CANADA, ³University of Western Ontario, London, ON, CANADA.

5:24 PM - 5:42 PM

Biplane X-ray Imaging of In-vivo Shoulder Function

M. Bey, C. Peltz, V. Moutzouris;

Henry Ford Health System, Detroit, MI.

5:42 PM - 6:00 PM

Analysis of Surface Damage on Retrieved Total Shoulder Replacements

F. Ansari¹, L. Malito¹, A. Martin¹, S. B. Gunther², T. R. Norris³, M. Ries⁴, L. Pruitt¹;

¹University of California, Berkeley, Berkeley, CA,

²Martha Jefferson Hospital, Charlottesville, VA,

³San Francisco Shoulder, Elbow & Hand Clinic, San

Francisco, CA, ⁴University of California, San

Francisco, CA.

Biomechanics of Flight IV: Coping with Environmental Challenges

Session Number: 18-17 Room: 307

Session Chair(s): J. van Leeuwen and H. Liu

4:30 PM - 4:48 PM

Flying Mt. Everest: morphology and kinematics for flight in thin air

M. Dillon¹, R. Dudley²;

¹University of Wyoming, Laramie, WY, ²University of California, Berkeley, CA.

4:48 PM - 5:06 PM

Analysis of motor variability in the maneuvering flight of hummingbirds

D. Altshuler¹, K. Middleton²;

¹University of British Columbia, Vancouver, BC,

CANADA, ²University of Missouri School of

Medicine, Columbia, MO.

5:06 PM - 5:24 PM

All-weather flyers of the insect world: Bumblebee flight stability in challenging aerial environments

S. A. Combes, S. Ravi, J. D. Crall;

Harvard University, Bedford, MA.

THURSDAY Podium Sessions

5:24 PM - 5:42 PM

Into Rude Air: Hummingbird Flight under Challenging Circumstances

R. Dudley, V. Ortega-Jimenez;
University of California, Berkeley, CA.

5:42 PM - 6:00 PM

Flock-flying in Pigeons, Ibises and Geese

J. Usherwood;
The Royal Veterinary College, Hatfield, UNITED KINGDOM.

Gait Modification II

Session Number: 18-18 Room: 310

Session Chair(s): P. Shull and I. Davis

4:30 PM - 4:48 PM

Using Simulation to Understand Changes in Post-Stroke Muscle Function Due to Robotic Exoskeleton Training

J. S. Higginson, R. Khoeilar;
University of Delaware, Newark, DE.

4:48 PM - 5:06 PM

An Overview of Wearable Sensing and Feedback for Gait Analysis and Intervention

P. B. Shull¹, W. Jirattigalachote², M. A. Hunt³, M. R. Cutkosky², S. L. Delp⁴;

¹State Key Laboratory of Mechanical System and Vibration, School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, CHINA, ²Department of Mechanical Engineering, Stanford University, CA, ³Department of Physical Therapy, University of British Columbia, Vancouver, BC, CANADA, ⁴Department of Bioengineering, Stanford University, CA.

5:06 PM - 5:24 PM

The metabolic and cognitive demands of altering natural gait

J. Barrios, L. Caldwell;
University of Dayton, OH.

5:24 PM - 5:42 PM

Real-time visual feedback for gait retraining: applications of the GRAIL system for knee osteoarthritis

J. van den Noort¹, F. Steenbrink², S. Roeles², J. Harlaar¹;

¹VU University Medical Center, Amsterdam, NETHERLANDS, ²Motek Medical BV, Amsterdam, NETHERLANDS.

5:42 PM - 6:00 PM

See Program Supplement and Errata Sheet for possible additions

FEBio Symposium II

Session Number: 18-19 Room: 303

Session Chair(s): B.J. Ellis and J. A. Weiss

4:30 PM - 4:48 PM

Mechanics of Atrial Fibrillation and Radiofrequency Ablation

C. B. Moyer, P. T. Norton, J. D. Ferguson, J. W. Holmes;
University of Virginia, Charlottesville, VA.

4:48 PM - 5:06 PM

A Finite Element Model of the Female Pelvic Region during Pregnancy

M. Fernandez¹, S. Jambawalikar², N. Zork², J. Vink², R. Wapner², **K. Myers**¹;
¹Columbia University, New York, NY, ²Columbia University Medical Center, New York, NY.

5:06 PM - 5:24 PM

Applying FEBio to Study Deformation-Induced Cell and Tissue Damage as related to Acute and Chronic Injuries

A. Gefen;
Tel Aviv University, ISRAEL.

5:24 PM - 5:42 PM

Shape-function Relations in Darwin's Finches and Stag beetles Tested with MicroCT and FEBio

J. A. Soons¹, J. Goyens¹, A. Herrel², P. Aerts¹, J. J. J. Dirckx¹;

¹University of Antwerp, Antwerpen, BELGIUM, ²Museum National d'Histoire, Paris, FRANCE.

5:42 PM - 6:00 PM

Suitability of Spherical Models of Noncommunicating Hydrocephalus

W. R. Hendra¹, J. J. García², **J. H. Smith**¹;
¹Lafayette College, Easton, PA, ²Universidad del Valle, Cali, COLOMBIA.

ASB Award Session, Including Recognition of ASB Fellows

Session Number: 18-20 Room: 304

Session Chair(s): J.H. Challis

4:30 PM - 4:48 PM

Non-uniform Deformation of the Achilles Tendon during Loading in Young and Middle-aged Adults

L. C. Slane, D. G. Thelen;
University of Wisconsin-Madison, WI.

THURSDAY Podium Sessions

4:48 PM - 5:06 PM

Osteocyte Strain Transmission is Reduced Due to Age-related Changes in the Microstructural, Micromechanical, and Macromechanical Properties of Bone

A. R. Stern¹, T. Cline², C. Meers², B. Billings², M. Van Dyke³, C. Bergman⁴, T. Register⁴, Y. Liu², M. Johnson², L. Bonewald², M. Stern⁵;

¹Engineering Systems, Inc / UMKC, Charlotte, NC,

²University of Missouri - Kansas City, Kansas City, MO, ³Virginia Tech, Blacksburg, VA, ⁴Wake Forest University, Winston-Salem, NC, ⁵Winthrop

University, Rock Hill, SC.

5:06 PM - 5:24 PM

Reduction in Proximal Femoral Strength in Patients with Acute Spinal Cord Injury

W. B. Edwards¹, T. J. Schnitzer², K. L. Troy³;

¹University of Calgary, Calgary, AB, CANADA,

²Northwestern University Feinberg School of Medicine, Chicago, IL, ³Worcester Polytechnic Institute, Worcester, MA.

5:24 PM - 5:42 PM

Uni-directional Coupling between Tibiofemoral Frontal and Transverse Plane Rotation Supports Valgus Collapse Mechanism of ACL Injury

A. M. Kiapour¹, A. Kiapour², V. V. Goel², C. E. Quatman³, S. C. Wordeman³, T. E. Hewett³, C. K. Demetropoulos⁴;

¹Boston Children's Hospital, Harvard Medical

School, Boston, MA, ²Engineering Center for

Orthopaedic Research Excellence (ECORE),

University of Toledo, Toledo, OH, ³Sports, Health

and Performance Institute, The Ohio State

University, Columbus, OH, ⁴The Johns Hopkins

University Applied Physics Laboratory, Laurel, MD.

5:42 PM – 6:00 PM

See Program Supplement and Errata Sheet for possible additions

FRIDAY Podium Sessions

Friday, 11 July 2014
8:00 – 9:30 PM

Biophysical Regulation of Cell Reprogramming & Directed Differentiation

Session Number: 19-1 Room: 109
Session Chair(s): R. Bashir and J. Fu

8:00 AM - 8:36 AM
Soft Platforms To Measure Cellular Forces In Vivo
B. Williams¹, J. Rajagopalan², **M. Saif**¹;
¹University of Illinois at Urbana-Champaign, IL,
²Arizona State University, Tempe, AZ.

8:36 AM - 8:54 AM
Micro and Nano Patterning for Cell and Tissue Engineering
S. Li;
University of California, Berkeley, CA.

8:54 AM - 9:12 AM
Multiscale Fabrication of Matrix Proteins and Topographical Structures for Guided Cell Migration by Combining Capillary Force Lithography and Plasma Lithography
D. Kim¹, K. Nam¹, P. Kim¹, P. Provenzano², S. Kwon³;
¹University of Washington, Seattle, WA, ²University of Minnesota, Minneapolis, MN, ³Seoul National University, REPUBLIC OF KOREA.

9:12 AM – 9:30 AM
How smart cancer cells can be when navigating through mazes
D. Irimia

Biofilm Ecomechanics

Session Number: 19-2 Room: 110
Session Chair(s): K. Van Vliet and J. Han

8:00 AM - 8:36 AM
How drugs regulate the nanomechanics by which macrophages pick-up surface-bound bacteria
J. Möller¹, V. Vogel²;
¹Department of Health Sciences and Technology, Laboratory of Applied Mechanobiology, Zurich, SWITZERLAND, ²Laboratory of Applied Mechanobiology, Zurich, SWITZERLAND.

8:36 AM - 8:54 AM
Gelation of Microbial Alginate by Magnetic Resonance
J. Brown;
University of Montana

8:54 AM - 9:12 AM
Hydrogel-based contact active antimicrobial coatings
M. Chan-Park;
SINGAPORE.

9:12 AM - 9:30 AM
Shear trapping of motile cells
R. Rusconi¹, M. Barry¹, J. S. Guasto², R. Stocker¹;
¹Massachusetts Institute of Technology, Cambridge, MA, ²Tufts University, Medford, MA.

Computational Modeling of Cells & Cytoskeleton I

Session Number: 19-3 Room: 111
Session Chair(s): D. Stamenovic and T. Adachi

8:00 AM - 8:18 AM
Motorized Glasses and Crystals: Microscopic Models of Active Matter and the Cytoskeleton
P. G. Wolynes;
Rice University, Houston, TX.

8:18 AM - 8:36 AM
Active stresses and mechanics of intra/extracellular networks
F. MacKintosh;
VU University, Amsterdam, NETHERLANDS.

8:54 AM - 9:12 AM
Catch-bond-assisted dynamic formation of actomyosin functional structure
Y. Inoue, T. Adachi;
Institute for Frontier Medical Sciences, Kyoto University, JAPAN.

9:12 AM - 9:30 AM
Contractility and Dissipation in Actin Bundles and Networks
T. Kim;
Purdue University, West Lafayette, IN

Human Disease Mechanics

Session Number: 19-4 Room: 306
Session Chair(s): G. Popescu and CT Lim

8:00 AM - 8:18 AM
Soluble fibrin determines the preferential adhesion of cancer cells to polymorphonuclear leukocytes (PMNs) over endothelium in a shear flow
T. Ozcemir, **C. Dong**;
Penn State University, University Park, PA.

FRIDAY Podium Sessions

8:18 AM - 8:36 AM

Cell Mechanics and Red Blood Cell-Borne Human Diseases

M. Dao;

MIT, Cambridge, MA.

8:36 AM - 8:54 AM

Optical measurement of biomechanical properties of human red blood cells: pathogenesis and pathophysiology of RBC-related diseases

Y. Park;

KAIST, Yusung gu, REPUBLIC OF KOREA.

8:54 AM - 9:12 AM

Measuring cell-generated forces in real-time

B. Bhaduri¹, Y. Li¹, A. J. Levine², K. Killian¹, G. Popescu¹;

¹University of Illinois at Urbana Champaign, IL,

²University of California at Los Angeles, CA.

9:12 AM - 9:30 AM

Emerging behavior in human neural networks measured by quantitative phase imaging

G. Popescu;

Mechanobiology of Development & Stem Cell Differentiation

Session Number: 19-5 Room: 302

Session Chair(s): G Dai

8:00 AM - 8:18 AM

Biophysical Regulation of Functional Motor Neuron Generation from Human Pluripotent Stem Cells

J. Fu;

University of Michigan, Ann Arbor, MI.

8:18 AM - 8:36 AM

Differentiate Arterial and Venous Endothelial Cells from Pluripotent Stem Cell

D. Kim, **G. Dai;**

Rensselaer Polytechnic Institute, Troy, NY.

8:36 AM - 8:54 AM

Shear stress and angiogenesis during vascular development

S. Ghaffari¹, G. Chouinard-Pelletier¹, **E. A. V. Jones**²;

¹McGill University, Montreal, QC, CANADA, ²KU Leuven, BELGIUM.

8:54 AM - 9:12 AM

Contractility Mediated Stem Cell Differentiation in Mechanically Constrained 3D Microtissues.

J. Eyckmans, E. Bellas, V. B. Shenoy, C. S. Chen;

Boston University, MA.

9:12 AM - 9:30 AM

FGF-mediated contractile gradients drive polarized cell movements to form the avian hindgut

N. L. Nerurkar, C. J. Tabin;

Harvard Medical School, Boston, MA

Jamming & Junctions in Collective Cell Migration I

Session Number: 19-6 Room: 309

Session Chair(s): J. Fredberg and X. Trepat

8:00 AM - 8:36 AM

Increasing cortical contractility triggers the emergence of a novel amoeboid migration mode in zebrafish embryonic progenitor cells

C. Heisenberg;

IST Austria, Klosterneuburg, AUSTRIA.

8:36 AM - 8:54 AM

The Impact of Jamming on Boundaries of Collectively Moving Weak-interacting Cells

J. A. Kas, K. D. Nnetu, M. Zink;

University of Leipzig, GERMANY.

8:54 AM - 9:12 AM

Contact Inhibition of Locomotion Probabilities Drive Solitary Versus Collective Cell Migration.

R. A. Desai¹, **C. S. Chen**²;

¹Medical Research Council-National Institute of Medical Research & University College London, UNITED KINGDOM, ²Boston University & The Wyss Institute for Biologically Inspired Engineering, MA.

9:12 AM - 9:30 AM

Force, Cadherin Adhesions, and the Regulation of Cytoskeleton Dynamics Driving Collective Cell Migration

G. Weber;

Rutgers, The State University of New Jersey, Newark, NJ

Thrombosis & Hemodynamics I

Session Number: 19-7 Room: 300

Session Chair(s): D. Ku and D. Bluestein

8:00 AM - 8:36 AM

Intravascular Thrombosis in the Surgical Setting

D. N. Ku, M. Mehrabadi, L. Casa, C. Aidun, S.

Hastings;

Georgia Institute of Technology, Atlanta, GA.

FRIDAY Podium Sessions

8:36 AM - 8:54 AM

Biological Importance of Bond Lifetime in Regulating an Adhesive Interaction that Safeguards Vasculature Integrity

T. Diacovo¹, H. Zhou¹, L. Zheng², J. Emsley³, J. Chen¹;

¹Columbia University Medical Center, New York, NY, ²Children's Hospital of Philadelphia, Philadelphia, PA, ³University of Nottingham, UNITED KINGDOM.

8:54 AM - 9:12 AM

Biomechanics of Blood Clotting

A. Alexander-Katz;

Massachusetts Inst. of Tech., Cambridge, MA.

9:12 AM - 9:30 AM

Mass transfer limitations of coagulation and fibrin formation under flow

K. B. Neeves;

Colorado School of Mines, Golden, CO

Cerebrospinal Fluid Dynamics

Session Number: 19-8 Room: Ball-C

Session Chair(s): F. Loth and B. Martin

8:00 AM - 8:18 AM

Modelling of Spinal-Cord Fluid-Structure Interactions: Porous Effects

C. D. Bertram¹, M. J. Russell², M. Heil²;

¹University of Sydney, New South Wales, AUSTRALIA, ²University of Manchester, UNITED KINGDOM.

8:18 AM - 8:36 AM

Effects of Fluid Structure Interaction in a Three Dimensional Model of the Spinal Subarachnoid Space

L. E. Bilston¹, S. Cheng², D. F. Fletcher³, S. Hemley⁴, M. A. Stoodley⁴;

¹Neuroscience Research Australia, Prince of Wales Clinical School, University of New South Wales, Randwick, AUSTRALIA, ²Department of Engineering, Macquarie University, Neuroscience Research Australia, North Ryde, AUSTRALIA, ³School of Chemical and Biomolecular Engineering, University of Sydney, Camperdown, AUSTRALIA, ⁴Australian School of Advanced Medicine, Macquarie University, North Ryde, AUSTRALIA.

8:36 AM - 8:54 AM

Cerebrospinal Fluid Dynamics: Solute Transport As Seen By Positron Emission Tomography

M. I. Papisov;

Massachusetts General Hospital & Harvard Medical School, Boston, MA.

8:54 AM - 9:12 AM

Characterization and modeling of cerebrospinal fluid dynamics in Chiari Malformation

B. A. Martin¹, S. Pahlavian¹, N. Shaffer¹, T. Yiallourou², S. Thyagaraj¹, M. Majcher¹, R. Kenyon¹, A. Bunck³, M. Luciano⁴, J. Tew⁵, J. Oshinski⁶, R. S. Tubbs⁷, F. Loth¹;

¹Conquer Chiari Research Center, University of Akron, OH, ²Laboratory of Hemodynamics and Cardiovascular Technology, EPFL, Lausanne, SWITZERLAND, ³Institut und Poliklinik für Radiologische Diagnostik Uniklinik, Köln, GERMANY, ⁴Department of Pediatric Neurosurgery, Cleveland Clinic Foundation, OH, ⁵Mayfield Clinic, Cincinnati, OH, ⁶Department of Radiology, Emory University, Atlanta, GA, ⁷Department of Pediatric Neurosurgery, Children's Hospital Alabama, Birmingham, AL.

9:12 AM - 9:30 AM

Cerebrospinal Fluid Flow and Mixing Patterns Due to Spinal Microanatomy

A. Linninger, K. Tangen;

University of Illinois at Chicago, IL

Multiscale Cardiac Electromechanics I

Session Number: 19-9 Room: 312

Session Chair(s): D. Hurtado and S. Goktepe

8:00 AM - 8:18 AM

Thermodynamical Framework for Modeling Chemical-Mechanical Coupling in Muscle Contraction - Formulation and Validation

M. Caruel, P. Moireau, D. Chapelle;

Inria, Palaiseau, FRANCE.

8:18 AM - 8:36 AM

From Cells to Ventricles: Understanding the Mechanisms of Ventricular Fibrillation through Multiscale Modeling

L. E. Perotti¹, A. Ponnaluri¹, S. Krishnamoorthi², N. P. Borgstrom¹, O. A. Ajijola¹, W. S. Klug¹, D. B. Ennis¹, A. Garfinkel¹;

¹University of California, Los Angeles, CA, ²IIT, Gandhinagar, Ahmedabad, INDIA.

8:36 AM - 8:54 AM

Comparison of patient specific biventricular electromechanical models constructed from MRI or 3D cardiac ultrasound

S. T. Wall¹, S. U. Gjerald¹, J. S. Sundnes¹, L. C. Lee², M. Genet², S. Sarvari³;

¹Simula Research Laboratory, Lysaker, NORWAY, ²University of California at San Francisco, CA, ³Oslo University Hospital, NORWAY.

FRIDAY Podium Sessions

8:54 AM - 9:12 AM

Computational Modeling of Coupled Cardiac Electromechanics Incorporating Electrical and Mechanical Dysfunctions

S. Goktepe, E. Berberoglu;
Middle East Technical University, Ankara, TURKEY.

9:12 AM - 9:30 AM

Multi-scale Modelling of Electromechanics in Heart Failure

S. Land¹, S. Niederer¹, B. Louch², O. Sejersted³, **N. P. Smith**⁴;

¹Kings College London, UNITED KINGDOM, ²Oslo University Hospital, NORWAY, ³Oslo University Hospital, NORWAY, ⁴University of Auckland, NEW ZEALAND

Inverse Methods in Soft Tissue Biomechanics I

Session Number: 19-10 Room: 313

Session Chair(s): J. Lu and S. Evans

8:00 AM - 8:18 AM

Intravascular Ultrasound Coronary Plaque Elasticity Reconstruction Methods Based on in vivo strain Measurements

J. Ohayon¹, A. Bouvier², S. Le Floc'h³, G. Finet⁴, M. M. Doyley⁵, R. I. Pettigrew⁶, G. Cloutier⁷;

¹University of Savoie, Polytech Annecy-Chambéry & Laboratory, Grenoble, FRANCE, ²University of Savoie & Laboratory, Grenoble, FRANCE,

³Laboratory, Université Montpellier II, Montpellier, FRANCE, ⁴Department of Hemodynamics and Interventional Cardiology, Hospices Civils de Lyon and Claude Bernard University Lyon1, FRANCE,

⁵Department of Electrical and Computer Engineering, University of Rochester, Rochester, NY, ⁶Laboratory of Integrative Cardiovascular Imaging Science, National Institute of Diabetes Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD, ⁷Laboratory of Biorheology and Medical Ultrasonics, University of Montreal Hospital Research Center (CRCHUM), Montréal, QC, CANADA.

8:18 AM - 8:36 AM

Using Inverse FE Analysis to Test the Local Anisotropic Mechanical Behaviour of Human Carotid Atherosclerotic Plaques

C. Chai¹, A. Akyildiz², L. Speelman², F. Gijssen², C. Oomens¹, M. Sambeek van³, A. Lugt van der², F. Baaijens¹;

¹Eindhoven University of Technology, NETHERLANDS, ²Erasmus Medical Centre, Rotterdam, NETHERLANDS, ³Catharina Hospital, Eindhoven, NETHERLANDS.

8:36 AM - 8:54 AM

Estimation of Atherosclerotic Plaque Material Properties

L. Speelman¹, A. C. Akyildiz¹, R. H. Hansen², H. A. Nieuwstadt¹, A. F. W. van der Steen¹, C. L. de Korte², F. J. Gijssen¹;

¹Erasmus MC Rotterdam, Rotterdam, NETHERLANDS, ²Radboud University Medical Center, Nijmegen, NETHERLANDS.

8:54 AM - 9:12 AM

Inverse Mechanical analysis for cerebral aneurism risk rupture assessment

F. Jourdan¹, M. Sanchez¹, D. Ambard¹, S. Mendez¹, F. Nicoud¹, V. Costalat²;

¹University Montpellier 2, Montpellier, FRANCE, ²CHU Gui de Chauliac, Montpellier, FRANCE.

9:12 AM - 9:30 AM

Material model identification from suture pull-out tests and planar tension tests on porcine linea alba

O. Siret¹, P. Badel¹, **S. AVRIL**¹, G. Guérin², W. Novacek², T. Belzacq², F. Turquier²;

¹Ecole des Mines, Saint-Etienne, FRANCE, ²Covidien Sofradim Production, Trévoux, FRANCE

Biomechanics of the Anterior Eye I

Session Number: 19-11 Room: 305

Session Chair(s): Grytz

8:00 AM - 8:36 AM

Mechanisms of Self-Organization for the Collagen Fibril Lattice in the Human Cornea

P. M. Pinsky, X. Cheng;
Stanford University, CA.

8:36 AM - 8:54 AM

Large deformation indentation of porcine ocular lenses: experiments and computational modeling

R. Regueiro¹, L. Foucard¹, F. Vernerey¹, C. Bay²;

¹University of Colorado, Boulder, CO, ²Texas A&M, College Station, TX.

8:54 AM - 9:12 AM

Air-puff Corneal Deformation Imaging to estimate Mechanical Properties in Normal and Treated corneas

S. Marcos, S. Kling, N. Bekesi, C. Dorronsoro;
Consejo Superior de Investigaciones Científicas, Madrid, SPAIN.

9:12 AM - 9:30 AM

Biomechanics of the Anterior Segment

W. J. Dupps, Jr.;
Cleveland Clinic, OH

FRIDAY Podium Sessions

Lung Biomechanics and Therapy

Session Number: 19-12 Room: 301

Session Chair(s): C.A. Evrensel and A.M. Al-Jumaily

8:00 AM - 8:36 AM

Mucus, Bronchoconstriction and Cough: The Mechanics of Obstruction Airway Disease

P. E. Krumpke¹, C. A. Evrensel²;

¹University of Nevada School of Medicine, Reno, NV, ²University of Nevada, Reno, NV.

8:36 AM - 8:54 AM

Effect of Mucus Rheology and Flow Patterns on Cough Clearance

C. A. Evrensel¹, S. Cesmeçi¹, P. E. Krumpke²;

¹University of Nevada, Reno, NV, ²University of Nevada School of Medicine, Reno, NV.

8:54 AM - 9:12 AM

New Tools for Mucus Clearance: High throughput Rheology and a Vertical Mucociliary Clearance Assay

R. Superfine;

University of North Carolina, Chapel Hill, NC.

9:12 AM - 9:30 AM

Mucus and its clearance: New insights from functional anatomic imaging

S. M. Rowe¹, G. J. Tearney²;

¹University of Alabama at Birmingham, AL, ²Massachusetts General Hospital, Boston, MA.

Vascular Mechanics

Session Number: 19-13 Room:311

Session Chair(s): A. Zadpoor and C. Bellini

8:00 AM - 8:18 AM

On the Passive and Active Constitutive Models of Human Arteries

Z. Yosibash;

Ben Gurion University of the Negev, Beer-Sheva, ISRAEL.

8:18 AM - 8:36 AM

Modeling vascular wall and red blood cell interactions in sickle cell disease

Y. Alapan, J. Little, **U. A. Gurkan**;

Case Western Reserve University, Cleveland, OH.

8:36 AM - 8:54 AM

Numerical Modeling of in Vivo Mitral Valve Biomechanics to Optimize Surgical Repair: Preliminary Application to the Simulation of ePTFE Neochordae Implantation in Prolapsing Valves.

E. Votta¹, F. Sturla², F. Onorati², M. Stevanella¹, G. Puppini², G. Faggian², A. Redaelli¹;

¹Department of Electronics, Information and Bioengineering (DEIB), Politecnico di Milano, ITALY, ²Division of Cardiovascular Surgery, Università degli Studi di Verona, ITALY.

8:54 AM - 9:12 AM

Microstructurally-Motivated Models of Arterial Mechanics Based on Growth and Remodeling Concepts.

C. Bellini, S. Roccabianca, J. D. Humphrey; Yale University, New Haven, CT.

9:12 AM - 9:30 AM

High Accuracy Pressure Drop Measurements for Combined Functional and Bio-Mechanical Assessment of Coronary Stenoses

O. M. Rotman¹, U. Zaretsky¹, A. Shitzer², S. Einav¹;

¹Tel-Aviv University, ISRAEL, ²Technion Institute of Technology, Haifa, ISRAEL.

Spine Biomechanics I

Session Number: 19-14 Room: Ball-A

Session Chair(s): Shirazi-Adl and Lacroix

8:00 AM - 8:36 AM

On the Fluid Flow Mechanisms in the Intervertebral Disc under Physiological Dynamic Loading-Unloading Cycles

H. Schmidt, Sr.¹, A. Shirazi-Adl², M. Bashkuev¹, C. Schilling¹, M. Dreischarf¹;

¹Charité - Universitätsmedizin Berlin, GERMANY, ²École Polytechnique, Montréal, QC, CANADA.

8:36 AM - 8:54 AM

Loads on a Vertebral Body Replacement Measured *in vivo*

A. Rohlmann, M. Dreischarf, T. Zander, A. Bender, F. Graichen, H. Schmidt, G. Bergmann;

Charité - Universitätsmedizin Berlin, GERMANY.

FRIDAY Podium Sessions

8:54 AM - 9:12 AM

Comparison of Eight Published Lumbar Spine Finite Element Models

M. Dreischarf¹, T. Zander¹, A. Shirazi-Adl², C. Puttlitz³, C. Adam⁴, C. Chen⁵, V. Goel⁶, A. Kiapour⁶, Y. Kim⁷, K. Labus³, J. Little⁴, W. Park⁷, Y. Wang⁵, H. Wilke⁸, A. Rohlmann¹, H. Schmidt¹;

¹Charité - Universitätsmedizin Berlin, GERMANY, ²Division of Applied Mechanics, Department of Mechanical Engineering, École Polytechnique, Montréal, QC, CANADA, ³Orthopaedic Bioengineering Research Laboratory, Colorado State University, Fort Collins, CO, ⁴Paediatric Spine Research Group, Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, AUSTRALIA, ⁵Department of Physical Therapy and Assistive Technology, National Yang-Ming University, Taipei, TAIWAN, ⁶Departments of Bioengineering and Orthopaedic Surgery, University of Toledo, OH, ⁷Department of Mechanical Engineering, Kyung Hee University, Yongin, REPUBLIC OF KOREA, ⁸Institute of Orthopaedic Research and Biomechanics, Ulm, GERMANY.

9:12 AM - 9:30 AM

Assessing spine control and its link to back pain

N. P. Reeves;

Michigan State University, East Lansing, MI.

Micromechanics of Bone & Biomaterials

Session Number: 19-15 Room: Ball-B

Session Chair(s): H van Lenthe

8:00 AM - 8:18 AM

QCT-based Finite Element Analysis Provides the Best Surrogate of In Vitro Bone Strength at the Three Major Osteoporotic Fracture Sites

P. K. Zysset¹, E. Dall'Ara², **P. Varga**³, D. H. Pahr⁴;

¹Institute of Surgical Technology and Biomechanics, University of Bern, SWITZERLAND, ²Department of Mechanical Engineering and INSIGNEO Institute for in silico Medicine, University of Sheffield, UNITED KINGDOM, ³Julius Wolff Institute & Berlin-Brandenburg School for Regenerative Therapies, Charité - Universitätsmedizin Berlin, GERMANY, ⁴Institute of Lightweight Design and Structural Biomechanics, Vienna University of Technology, Vienna, AUSTRIA.

8:18 AM - 8:36 AM

Resorption Cavities and Microdamage Caused by Fatigue in Human Vertebral Cancellous Bone

M. G. Goff, F. M. Lambers, **C. J. Hernandez;**

Cornell University, Ithaca, NY.

8:36 AM - 8:54 AM

A Cohesive Interface Approach To Model The Inter-Lamellar Behaviour Of The Intervertebral Disc Annulus Fibrosus

M. Mengoni¹, B. L. Luxmoore¹, A. C. Jones¹, V. N. Wijayathunga¹, N. D. Broom², R. K. Wilcox¹;

¹University of Leeds, UNITED KINGDOM, ²University of Auckland, NEW ZEALAND.

8:54 AM - 9:12 AM

Directed tissue growth along highly orientated scaffold pores in bone regeneration: the role of the scaffold-bone interface

A. Princ¹, G. Duda², A. Ellinghaus¹, H. Leemhuis³, A. Petersen²;

¹Julius Wolff Institut - Charité Universitätsmedizin Berlin, GERMANY, ²Julius Wolff Institut - Charité Universitätsmedizin Berlin, Center for Musculoskeletal Surgery, Berlin-Brandenburg Center and School for Regenerative Therapies Charité - Universitätsmedizin Berlin, GERMANY, ³Matricel GmbH, Herzogenrath, GERMANY.

9:12 AM - 9:30 AM

The Contribution of Bone Microstructure to Bone Organ Level Mechanical Quality

H. van Lenthe;

KU Leuven, BELGIUM

Understanding the Multi-Faceted Upper Extremity

Session Number: 19-16 Room: 308

Session Chair(s): W. M. Murray and C. Peterson

8:00 AM - 8:18 AM

In Vivo Kinematics of the Thumb Carpometacarpal (CMC) Joint

J. Crisco¹, E. Halilaj¹, D. Moore¹, T. Patel¹, A. Ladd², A. Weiss¹;

¹Brown University/RIH, Providence, RI, ²Stanford University School of Medicine, Stanford, CA.

8:18 AM - 8:36 AM

Musculoskeletal Biomechanics of the Shoulder During Pediatric Manual Wheelchair Propulsion

B. A. Slavens¹, M. S. Varre¹, A. J. Schnorenberg¹, L. C. Vogel², G. F. Harris³;

¹University of Wisconsin-Milwaukee, Milwaukee, WI, ²Shriners Hospitals for Children, Chicago, IL, ³Marquette University, Milwaukee, WI.

8:36 AM - 8:54 AM

Functional and morphological analysis of degenerative rotator cuff injury: integrating experimental and computational approaches

K. Saul;

North Carolina State University, Raleigh, NC.

FRIDAY Podium Sessions

8:54 AM - 9:12 AM

Muscle Gene Expression Patterns in Human Rotator Cuff Pathology
S. R. Ward, A. Choo, M. McCarthy, R. Pichika, E. Sato, R. L. Lieber, J. Lane, S. Schemm;
University of California, San Diego, La Jolla, CA.

9:12 AM - 9:30 AM

A Biomechanical Simulation Framework for Calculating Muscle-Tendon Contributions to Protective Elbow-Varus Torque during Baseball Pitching
J. H. Buffi¹, K. Werner², T. Kepple², W. M. Murray¹;
¹Northwestern University, Chicago, IL, ²C-Motion, Germantown, MD

How Swimmers Generate & Use Flow

Session Number: 19-17 Room: 307
Session Chair(s): U. Muller and E. Tytell

8:00 AM - 8:18 AM

Using Robotic Models to Understand How Fish Generate and Use Flow
G. V. Lauder, Jr.;
Harvard University, Cambridge, MA.

8:18 AM - 8:36 AM

The Roles of Flexibility, Vorticity, and Pressure in Efficient Propulsion
J. Dabiri;
Caltech, Pasadena, CA.

8:36 AM - 8:54 AM

Maneuvering Through a Complex Environment: Multifin Control of Bluegill Sunfish
B. Flammang, K. Kalionzes, G. Lauder;
Harvard University, Cambridge, MA.

8:54 AM - 9:12 AM

Maneuverability is a Seahorse's Middle Name
S. Henrion, R. P. M. Pieters, C. W. Spoor, C. J. Voosenek, J. L. van Leeuwen;
Wageningen University, NETHERLANDS.

9:12 AM - 9:30 AM

Kinematics and Hydrodynamics of Mobuliform Swimming
F. E. Fish;
West Chester University, PA

ASB Metabolic Energy Use in Movement I: Basic Principles

Session Number: 19-18 Room: 310
Session Chair(s): B. Umberger and J. Rubenson

8:00 AM - 8:36 AM

Deconstructing the Metabolic Cost of Walking in Young, Old and Obese People
R. Kram;
University of Colorado, Boulder, CO.

8:36 AM - 8:54 AM

Influence of Stimulus Pattern on Energy Turnover by Mammalian Skeletal Muscle.
N. Curtin¹, R. Woledge²;
¹Royal Veterinary College & Imperial College London, UNITED KINGDOM, ²Royal Veterinary College, London, UNITED KINGDOM.

8:54 AM - 9:12 AM

Muscle-specific energy use during locomotion; integrating physiological and biomechanical approaches.
R. L. Marsh;
Brown University, Providence, RI.

9:12 AM - 9:30 AM

The Metabolic Effects of Using Leg Prostheses during Walking and Running
A. Grabowski, A. Auyang, O. Beck, J. Jeffers, P. Taboga;
University of Colorado Boulder, CO.

Simulation of Human Movement I: Emerging Challenges

Session Number: 19-19 Room: 303
Session Chair(s): J. Reinbolt and S. Piazza

8:00 AM - 8:18 AM

Computer Simulation of the Upper Limb: Applications in Hand Surgery
W. Murray;
Northwestern University, Chicago, IL.

8:18 AM - 8:36 AM

Simulating the Influence of Ligament Properties on Cartilage Contact Patterns within the Context of Dynamic Movement
D. G. Thelen, J. Kaiser, R. L. Lenhart, K. W. Choi;
University of Wisconsin-Madison, WI.

FRIDAY Podium Sessions

8:36 AM - 8:54 AM

"Big" muscle data enable testing of hypotheses derived from dynamic simulations of movement
S. S. Blemker, K. Read, G. Handsfield, N. Fiorentino;
University of Virginia, Charlottesville, VA.

8:54 AM - 9:12 AM

Towards integration of medical imaging and wearable sensors for real-time subject-specific neuromusculoskeletal modelling
D. G. Lloyd¹, T. F. Besier², R. S. Barrett¹, J. W. Fernandez², C. Pizzolato¹, M. Sartori³, M. Reggiani⁴;
¹Griffith University, Gold Coast, AUSTRALIA, ²University of Auckland, NEW ZEALAND, ³Georg-August University, Göttingen, GERMANY, ⁴University of Padua, ITALY.

9:12 AM - 9:30 AM

Validation of Biomechanical Data in Human Movement Studies
R. R. Neptune;
The University of Texas at Austin, TX.

Dynamic Walking I

Session Number: 19-20 Room: 304
Session Chair(s): S. Collins

8:00 AM - 8:18 AM

What Is the Contribution of One Muscle to a Task?: a Critique of Induced Acceleration analysis
A. Ruina;
Cornell University, Ithaca, NY.

8:18 AM - 8:36 AM

Positively Missing: Reassessing Work Production in Human Gait and the Implications for Assistive Technology
K. E. Zelik¹, K. Z. Takahashi², G. S. Sawicki²;
¹IRCCS Santa Lucia Foundation, Rome, ITALY, ²North Carolina State University & University of North Carolina at Chapel Hill, Raleigh, NC.

8:36 AM - 8:54 AM

Applying principles of dynamic walking in bio-inspired exoskeleton design.
G. S. Sawicki;
North Carolina State University and University of North Carolina at Chapel Hill, Raleigh, NC.

8:54 AM - 9:30 AM

Mechanics and Energetics of Human Walking
A. Kuo
University of Michigan, Ann Arbor, MI

Friday, 11 July 2014

11:00 - 12:30 PM

Nano & Mesoscale Behavior of Biomolecular Materials I

Session Number: 20-1 Room: 109
Session Chair(s): S. Keten and J. Barone

11:00 AM - 11:36 AM

Tuning Mechanical Properties of Silk Proteins
D. Kaplan;
Tufts University, Medford, MA.

11:36 AM - 11:54 AM

A materials genome approach to engineering functional suprabiomolecular materials
S. Keten;
Northwestern University, Evanston, IL.

11:54 AM - 12:12 PM

Effects of water adsorption in amorphous cellulose investigated by Molecular Dynamics simulations
K. Kulasinski¹, S. Keten², S. Churakov³, D. Derome⁴, J. Carmeliet¹;
¹ETH Zurich, SWITZERLAND, ²Northwestern University, Evanston, IL, ³Paul Scherrer Institute, Villigen, SWITZERLAND, ⁴EMPA, Duebendorf, SWITZERLAND.

12:12 PM - 12:30 PM

Mechanics of biopolymer networks governed by the physical properties of the cross-linking molecules
X. Wei, **Y. Lin**;
The University of Hong Kong, HONG KONG

Progenitor & Stem Cell Identification I

Session Number: 20-2 Room: 110
Session Chair(s): K. Van Vliet and J. Han

11:00 AM - 11:18 AM

Mapping the Mechanical Forces Leading to Neurulation of the Zebrafish Embryo
P. Matsudaira¹, D. Bhattacharya¹, J. Zhong¹, A. Kabla²;
¹National University of Singapore, SINGAPORE, ²Oxford University, UNITED KINGDOM.

11:18 AM - 11:36 AM

Three-dimensional Photopolymerized Microstructures for In Vitro Stem Cell Studies
H. Taylor¹, J. An², K. Hu², N. Dhakal²;
¹UC Berkeley, Berkeley, CA, ²Nanyang Technological University, SINGAPORE.

FRIDAY Podium Sessions

11:36 AM - 11:54 AM

Nuclear mechanics as a biomarker for disease diagnostics

G. Shivashankar;

National University of Singapore, SINGAPORE.

11:54 AM - 12:12 PM

The Evolution of Mechanical Properties of Differentiating HSCs is Fate- and Function-Dependent

A. Ekpenyong¹, O. Otto¹, A. Jacobi¹, M. Wobus¹, C. Fiddler², E. Chilvers², **J. Guck**¹;

¹Technische Universität Dresden, GERMANY,

²University of Cambridge, UNITED KINGDOM.

12:12 PM - 12:30 PM

Role of Mechanical Cues in Myelin Repair

A. Jagielska¹, A. Norman², K. Holtzmann², J. Guck³, R. Franklin², K. J. Van Vliet¹;

¹MIT, Cambridge, MA, ²University of Cambridge,

UNITED KINGDOM, ³Technische Universität

Dresden, GERMANY

Computational Modeling of Cells & Cytoskeleton II

Session Number: 20-3 Room: 111

Session Chair(s): T. Kim and D. Stamenovic

11:00 AM - 11:18 AM

Actin cables and contractile rings: computational studies of cytoskeletal organization in fission yeast

D. Vavylonis, H. Tang, T. Bidone;

Lehigh University, Bethlehem, PA.

11:18 AM - 11:36 AM

How Actin Generates Force to Drive Endocytosis

A. E. Carlsson, P. V. Bayly;

Washington University, St Louis, MO.

11:36 AM - 11:54 AM

The cell cytoskeleton as a composite: mechanics and force transmission

M. Das;

Rochester Institute of Technology, Rochester, NY.

11:54 AM - 12:12 PM

Simple mechanical models for cell division

M. Karttunen;

University of Waterloo, ON, CANADA.

12:12 PM - 12:30 PM

Computational Modeling of Cell Chemotaxis Driven by Actin Polymerization

D. B. Khismatullin, H. Lan;

Tulane University, New Orleans, LA

Altered Cell Mechanics in Diseased Environments

Session Number: 20-4 Room: 306

Session Chair(s): C. T. Lim and G. Meyer

11:00 AM - 11:18 AM

“Fibronucleation” and Stiffness Gradients Drive

Tissue Fibrosis by Promoting Fibroblast

Recruitment and Activation through Cell Durotaxis

D. Lagares¹, F. Liu², V. Auernheimer³, L. G.

Vincent⁴, M. Kapoor⁵, M. J. Suter⁶, B. Fabry³, D.

Adams⁶, W. H. Goldmann³, A. J. Engler⁴, D. J.

Tschumperlin⁷, **A. M. Tager**¹;

¹Massachusetts General Hospital, Charlestown,

MA, ²Harvard School of Public Health, Boston, MA,

³Friedrich-Alexander-University of Erlangen-

Nuremberg, GERMANY, ⁴University of California,

San Diego, La Jolla, CA, ⁵University of Montreal,

QC, CANADA, ⁶Massachusetts General Hospital,

Boston, MA, ⁷Mayo Clinic College of Medicine,

Rochester, MN.

11:18 AM - 11:36 AM

Biophysical changes in the aging muscle stem cell niche

P. Gilbert;

University of Toronto, ON, CANADA.

11:36 AM - 11:54 AM

Cell-matrix interactions in calcific aortic valve disease

C. A. Simmons;

University of Toronto, ON, CANADA.

11:54 AM - 12:12 PM

Cardiac Myocyte Mechanotransduction in Native and Artificial Tissue Scaffolds

J. Schwan, A. Kwaczala, A. Lebid, **S. G. Campbell;**

Yale University, New Haven, CT.

12:12 PM - 12:30 PM

Hamstring Contractures in Children with Spastic

Cerebral Palsy result from a Stiffer Extracellular

Matrix and Increased in vivo Sarcomere Length

L. R. Smith¹, K. S. Lee², S. R. Ward², H. G.

Chambers³, R. L. Lieber²;

¹University of Pennsylvania, Philadelphia, PA,

²University of California, San Diego, CA, ³Rady

Children's Hospital, San Diego, CA

FRIDAY Podium Sessions

Receptor-Ligand Bindings in Blood Cells

Session Number: 20-5 Room: 302
Session Chair(s): M Long and M.H. Zaman

11:00 AM - 11:18 AM

Clustered Diffusion of Integrins in Blood Cells

M. H. Zaman;
Boston University, MA.

11:18 AM - 11:36 AM

Mechanical regulation of beta 2-intergrin-induced adhesion of hepatic leukocytes

C. Tong, H. Yang, Y. Du, S. Lü, Y. Zhang, **M. Long;**
Center of Biomechanics and Bioengineering and Key Laboratory of Microgravity (National Microgravity Laboratory), Institute of Mechanics, Chinese Academy of Sciences, Beijing, CHINA.

11:36 AM - 11:54 AM

Ligand discrimination by platelet glycoprotein Iba mechanosensor

L. Ju¹, Y. Chen¹, M. A. Cruz², **C. Zhu**¹;
¹Georgia Institute of Technology, Atlanta, GA,
²Baylor College of Medicine, Houston, TX.

11:54 AM - 12:12 PM

Effect of extracellular pH on selectin adhesion: Theory and experiment

T. M. Cao, T. Takatani, **M. R. King;**
Cornell University, Ithaca, NY.

12:12 PM - 12:30 PM

Distinct Signaling Mechanisms Regulate Migration in Unconfined versus Confined Spaces

K. Konstantopoulos, J. Yang, W. Hung;
The Johns Hopkins University, Baltimore, MD

Jamming & Junctions in Collective Cell Migration II

Session Number: 20-6 Room: 309
Session Chair(s): J. Fredberg and X. Trepat

11:00 AM - 11:18 AM

Collective migration and cell jamming

J. Fredberg;
Harvard University, Boston, MA.

11:18 AM - 11:36 AM

Control of Collective Cell Migration by Intercellular Adhesion Complexes

E. Bazellieres¹, V. Conte¹, R. Vincent¹, A. Elosegui¹, M. Bintanel¹, P. Roca-Cusachs², J. Muñoz³, M. Sales-Pardo⁴, R. Guimerà⁵, **X. Trepat**⁶;

¹Institute for Bioengineering of Catalonia, Barcelona, SPAIN, ²Institute for Bioengineering of Catalonia - UB, Barcelona, SPAIN, ³Universitat Politècnica de Catalunya, Barcelona, SPAIN, ⁴Universitat Rovira i Virgili, Tarragona, SPAIN, ⁵Universitat Rovira i Virgili / ICREA, Tarragona, SPAIN, ⁶Institute for Bioengineering of Catalonia / ICREA, Barcelona, SPAIN.

11:36 AM - 11:54 AM

Force generation, cytoskeletal architecture and junctional dynamics in embryonic wound repair

T. Zulueta-Coarasa¹, M. Tamada², E. Lee¹, **R. Fernandez-Gonzalez**¹;

¹University of Toronto, ON, CANADA, ²Sloan-Kettering Institute, New York, NY.

11:54 AM - 12:12 PM

Probing Collective Migration of a Complex Multicellular Embryonic Tissue Through Novel 3D Bioetching

M. Hazar¹, Y. Kim², L. A. Davidson³, **W. C. Messner**⁴, P. R. LeDuc¹;

¹Carnegie Mellon University, Pittsburgh, PA, ²Georgia Institute of Technology, Atlanta, GA, ³University of Pittsburgh, PA, ⁴Tufts University, Medford, MA.

12:12 PM - 12:30 PM

Influence of Cell-Cell Adhesion on Asymmetric Migration of Epithelial Cells on Micropatterned Surfaces

K. E. Worley, D. Shieh, L. Q. Wan;
Rensselaer Polytechnic Institute, Troy, NY

Thrombosis & Hemodynamics II: Multiscale Modeling 1

Session Number: 20-7 Room: 300
Session Chair(s): D. Bluestein and M. King

11:00 AM - 11:18 AM

Trafficking of Platelets and Red Blood Cells: Theoretical and Experimental Models

J. F. Antaki¹, A. Daly², M. Jamiolkowski², M. Kameneva², M. Massoudi³, A. Martin¹, P. Menon¹, W. Wagner², W. Wu¹;

¹Carnegie Mellon University, Pittsburgh, PA, ²University of Pittsburgh, PA, ³National Energy Technology Laboratory, Pittsburgh, PA.

FRIDAY Podium Sessions

11:18 AM - 11:36 AM

The wall-stress footprint of blood cells flowing in microvessels

J. B. Freund¹, J. Vermot²;

¹University of Illinois at Urbana-Champaign, Urbana, IL, ²GBMC, CNRS/ INSERM/UdS, Illkirch, FRANCE.

11:36 AM - 11:54 AM

A multiscale approach to the design of hollow fiber-based devices for extracorporeal circulation

A. Pelosi¹, F. Consolo¹, A. Dimasi¹, J. Sheriff², D. Bluestein², G. B. Fiore¹, **A. Redaelli**¹;

¹Politecnico di Milano, Milano, ITALY, ²Stony Brook University, New York, NY.

11:54 AM - 12:12 PM

A Multiscale Modeling Approach to Determine Optimal Mechanical Conditions for Myocardial Cell Delivery and Contracting Band Generation: Improving Pulmonary Valve Replacement Surgery Outcome

D. Tang¹, C. Yang², T. Geva³, R. Rathod⁴, D. Annese⁴, A. Tang⁵, K. L. Billiar², G. Gaudette², P. J. del Nido⁴;

¹Southeast University, Nanjing, CHINA, ²Worcester Polytechnic Institute, Worcester, MA, ³Harvard University Medical School, Boston, MA, ⁴Harvard Medical School, Boston, MA, ⁵Harvard University, Cambridge, MA.

12:12 PM - 12:30 PM

Mesosopic Modeling of Hemodynamically Induced Blood Coagulation

G. Moiseyev, Jr.;

Technion, Haifa, ISRAEL.

Mechanical Factors Affecting Arterial Pathophysiology

Session Number: 20-8 Room: Ball-C

Session Chair(s): A. Anayiotos and U. Morbiducci

11:00 AM - 11:18 AM

From Morphology and Hemodynamics to Pathogenesis: Investigation of a Human Coronary Artery Plaque Using 3D Optical Coherence Tomography and Computational Fluid Dynamics

J. Suo¹, M. Macdaniel², P. Eshtehardi³, G. Bao¹, H. Samady⁴, D. Giddens¹;

¹Georgia Institute of Technology, Atlanta, GA, ²Emory University Hospital, Atlanta, GA, ³Albert Einstein College of Medicine, Bronx, NY, ⁴Emory University, Atlanta, GA.

11:18 AM - 11:36 AM

Impact of Head Rotation on the Geometry and Flow in Healthy Vertebral Arteries

N. Aristokleous¹, I. Seimenis², G. C. Georgiou³, A. S. Anayiotos¹;

¹Cyprus University of Technology, Lemesos, CYPRUS, ²Democritus University of Thrace, Alexandroupoli, GREECE, ³University of Cyprus, Nicosia, CYPRUS.

11:36 AM - 11:54 AM

Geometric Features of Type B Aortic Dissection and Their Role in the Progression of the Disease

Z. Cheng, N. B. Wood, R. G. J. Gibbs, **X. Xu**;

Imperial College London, UNITED KINGDOM.

11:54 AM - 12:12 PM

Impact of the severity and stiffness of repaired coarctation on central aortic hemodynamics and its clinical assessment: a fluid-structure interaction study

L. Taelman¹, J. Bols¹, J. Degroote¹, V. Muthurangu², J. Panzer¹, J. Vierendeels¹, **P. Segers**¹;

¹University of Ghent, BELGIUM, ²UCL, London, UNITED KINGDOM.

12:12 PM - 12:30 PM

On the Multidirectional Nature of Disturbed Shear at the Carotid Bifurcation

D. Gallo¹, M. G. Calmet¹, D. A. Steinman², **U. Morbiducci**¹;

¹Politecnico di Torino, Turin, ITALY, ²University of Toronto, ON, CANADA.

Multiscale Cardiac Electromechanics II

Session Number: 20-9 Room: 312

Session Chair(s): F. Hurtado and S. Goktepe

11:00 AM - 11:18 AM

Detailed myocardial fibre architecture modeling and its relevance to cardiac electromechanics

A. Nagler, J. Hörman, C. Bertoglio, W. A. Wall;

Technische Universität München, Garching, GERMANY.

11:18 AM - 11:36 AM

Electromechanics of Cardiac Tissues in Bio-hybrid Systems

P. Nardinocchi¹, M. Pezzulla¹, L. Teresi²;

¹Sapienza Università di Roma, ITALY, ²Università Roma Tre, Roma, ITALY.

FRIDAY Podium Sessions

11:36 AM - 11:54 AM

An HPC framework for Mechano-Electric simulations of the human biventricular anatomy
J. Aguado-Sierra, R. Aris, G. Houzeaux, **M. Vázquez**;
Barcelona Supercomputing Center, SPAIN.

11:54 AM - 12:12 PM

Biomechanical Simulation of the Heart: A Study of Health and Disease
L. Asner, M. Hadjicharalambous, R. Chabiniok, E. Sammut, J. Wong, G. Carr-White, R. Razavi, **D. Nordsletten**;
Kings College London, UNITED KINGDOM.

12:12 PM - 12:30 PM

Three-dimensional finite-element analysis of a biventricular human heart using a non-linear diffusion electrophysiological model
D. E. Hurtado¹, S. Castro¹, A. Gizzi²;
¹Pontificia Universidad Catolica de Chile, Santiago, CHILE, ²University Campus Bio-Medico of Rome, ITALY

Inverse Methods in Soft Tissue Biomechanics II

Session Number: 20-10 Room: 313

Session Chair(s): J. Ohayon and C. Oomens

11:00 AM - 11:18 AM

Use of 4D Ultrasound Data for the Determination of the Elastic Properties of the Human Aorta
A. Wittek, W. Derwich, T. Schmitz-Rixen, **C. Blase**;
Goethe University, Frankfurt, GERMANY.

11:18 AM - 11:36 AM

Characterization of mechanical properties for the three layers of human coronary arteries using an inverse method
B. Merei¹, S. Lessner², M. Sutton², P. Badel¹, **S. AVRIL**¹;
¹Ecole des Mines, Saint-Etienne, FRANCE, ²University of South Carolina, Columbia, SC.

11:36 AM - 11:54 AM

DIC Based Point-wise Characterization of Heterogeneous Properties of Gallbladder In Vitro
J. Lu¹, K. Genovese², J. D. Humphrey³;
¹Department of Mechanical and Industrial Engineering-The University of Iowa, Iowa City, IA, ²School of Engineering - University of Basilicata, POTENZA, ITALY, ³Department of Biomedical Engineering, Yale University, New Haven, CT.

11:54 AM - 12:12 PM

Full-geometry and full-surface deformation of aortic arch in-vitro
K. Genovese;
University of Basilicata, POTENZA, ITALY.

12:12 PM - 12:30 PM

Inverse finite element analysis to determine material parameters of a distributed fiber model
T. D. Nguyen¹, B. Coudrillier²;
¹The Johns Hopkins University, Baltimore, MD, ²Georgia Institute of Technology, Atlanta, GA.

Biomechanics of the Anterior Eye II

Session Number: 20-11 Room: 305

Session Chair(s): Amini and Downs

11:00 AM - 11:18 AM

The Role of Altered Cytoskeletal Stiffness in the Pathogenesis of Glaucoma
M. Johnson¹, E. H. Zhou², R. Fuchshofer³, R. M. Pedrigi⁴, R. Vargas-Pinto¹, S. T. Braakman⁴, K. M. Perkumas⁵, C. Ethier⁶, W. Stamer⁵, D. R. Overby⁴, J. J. Fredberg²;
¹Northwestern University, Evanston, IL, ²Harvard School of Public Health, Boston, MA, ³Universitaet Regensburg, Regensburg, GERMANY, ⁴Imperial College London, London, UNITED KINGDOM, ⁵Duke University, Durham, NC, ⁶Georgia Institute of Technology, Atlanta, GA.

11:18 AM - 11:36 AM

The relation between hydration and biomechanical properties of the cornea in uniaxial testing
H. Hatami-Marbini, A. Rahimi;
Oklahoma State University, Stillwater, OK.

11:36 AM - 11:54 AM

Mechanical Properties and Microstructure of the Human Sclera: Analysis for the Effects of Age and Glaucoma
B. Coudrillier¹, T. D. Nguyen²;
¹Georgia Institute of Technology, Atlanta, GA, ²Johns Hopkins University, Baltimore, MD.

11:54 AM - 12:12 PM

Statistically distributed fiber reinforced material models with fiber recruitment mechanism for the mechanical behavior of eye shells
A. Pandolfi¹, A. Gizzi², M. Vasta³;
¹Politecnico di Milano, ITALY, ²Universita' Campus Biomedico, Roma, ITALY, ³Universita' di Pescara-Chieti, Pescara, ITALY.

FRIDAY Podium Sessions

12:12 PM - 12:30 PM

New studies and new issues concerning the human cornea

A. Pandolfi;

Politecnico di Milano, ITALY.

Role of Airway Smooth Muscle in Lung Therapy

Session Number: 20-12 Room: 301

Session Chair(s): A.M. Al-Jumaily and C. A. Evrensel

11:00 AM - 11:18 AM

Inflammation Uncouples Biomechanical and Bioenergetic Responses in Airway Smooth Muscle-Signaling ER/Mitochondrial Stress

G. Sieck;

Mayo College of Medicine, Rochester, MN.

11:18 AM - 11:36 AM

Hill's Equation on Muscle Performance: Hidden Physiological Meanings

C. Y. Seow;

University of British Columbia, Vancouver, BC, CANADA.

11:36 AM - 11:54 AM

High-throughput physiology for asthma drug repurposing and discovery

J. Fredberg;

Harvard University, Boston, MA.

11:54 AM - 12:12 PM

Modeling of Excitation-Contraction Coupling in Airway Myocytes

E. Roux;

University of Bordeaux, INSERM, PESSAC, FRANCE.

12:12 PM - 12:30 PM

Smooth Muscle and the Parenchyma: Partners in Crime

J. H. T. Bates, B. Ma;

University of Vermont, Burlington, VT

Micromechanical Modeling of Fibrous Tissue

Session Number: 20-13 Room:311

Session Chair(s): V. Nguyen and E. Sander

11:00 AM - 11:18 AM

On the Construction of Mechanically Similar Networks

R. Y. Dhume, M. F. Hadi, V. H. Barocas;

University of Minnesota, Minneapolis, MN.

11:18 AM - 11:36 AM

From Composition through Topology to Mechanical Properties of Cross-linked Actin Networks

G. Zagar, P. R. Onck, E. Van der Giessen;

Zernike Institute for Advanced Materials, Groningen, NETHERLANDS.

11:36 AM - 11:54 AM

Simulation Heart Valve Biomaterial Fatigue

M. S. Sacks, W. Zhang;

University of Texas at Austin, TX.

11:54 AM - 12:12 PM

Nanomechanical properties of single alpha-synuclein fibrils providing insight into their structure

M. Bennink;

University of Twente, Enschede, NETHERLANDS

12:12 PM - 12:30 PM

Modeling strain-protected enzymatic degradation of collagen at the fiber and tissue

T. K. Tonge, T. D. Nguyen;

The Johns Hopkins University, Baltimore, MD

Spine Biomechanics II

Session Number: 20-14 Room: Ball-A

Session Chair(s): A. El-Rich and Rohlmann

11:00 AM - 11:18 AM

Effect of Body Weight on Spine Loads in Different Activities: A Detailed Biomechanical Modeling Investigation

N. Arjmand¹, M. Hajhosseinali¹, A. Shirazi-Adl²;

¹Sharif University of Technology, Tehran, ISLAMIC REPUBLIC OF IRAN, ²École Polytechnique de Montréal, QC, CANADA.

11:18 AM - 11:36 AM

Experimental and Computational Investigation of Trunk Response to Sudden Forward Perturbations

A. Shahvarpour¹, A. Shirazi-Adl¹, B. Bazrgari², C.

Larivière³;

¹Ecole Polytechnique, Montreal, QC, CANADA,

²University of Kentucky, Lexington, KY, ³IRSST,

Montreal, QC, CANADA.

11:36 AM - 11:54 AM

Mechanical Back Load at Work as a Risk Factor for Low-back Pain: a Prospective Cohort Study.

I. Kingma¹, P. Coenen¹, C. R. L. Boot², P. M.

Bongers³, J. H. van Dieën¹;

¹VU University Amsterdam, NETHERLANDS, ²VU

University Medical Centre, Amsterdam,

NETHERLANDS, ³TNO Healthy Living, Hoofddorp,

NETHERLANDS.

FRIDAY Podium Sessions

11:54 AM - 12:12 PM

Sensory feedback in spinal control

J. van Dieen, G. Andreopoulou, E. Cofre Lizama, E. Maaswinkel;
VU University Amsterdam, NETHERLANDS.

12:12 PM - 12:30 PM

Changes in Gait following Transfemoral Amputation
Increase Spinal Loads

B. D. Hendershot¹, E. J. Wolf¹, **B. Bazrgari**²;
¹Walter Reed National Military Medical Center, Bethesda, MD, ²University of Kentucky, Lexington, KY.

Interface Mechanics in Orthopedics

Session Number: 20-15 Room: Ball-B

Session Chair(s): A. Eberhardt and D. Cortes

11:00 AM - 11:18 AM

Experimental and Computational Analysis of the
Cement-Bone Interface of Cemented Orthopaedic
Implants

D. Janssen¹, P. Srinivasan¹, D. Waanders¹, J. R. Goodheart², M. A. Miller², N. Verdonshot¹, K. A. Mann²;
¹Radboud University Medical Center, Nijmegen, NETHERLANDS, ²SUNY Upstate Medical University, Syracuse, NY.

11:18 AM - 11:36 AM

An experimentally validated finite element method
for augmented vertebral bodies

D. H. Pahr, M. Kinzl;
Vienna University of Technology, Vienna, AUSTRIA.

11:36 AM - 11:54 AM

Bone- Cement Interface: Experimental Observation
and Numerical Simulation

J. Tong;
University of Portsmouth, UNITED KINGDOM.

11:54 AM - 12:12 PM

Investigation of peri-implant bone plasticity

D. Nolan, N. Kelly, **P. McGarry**;
National University of Ireland Galway, IRELAND.

12:12 PM - 12:30 PM

Trabecular Bone Microstructure Affects Screw
Stability: Experimental and Computational
Quantification

H. van Lenthe;
KU Leuven, BELGIUM

Mechanics of the Shoulder

Session Number: 20-16 Room: 308

Session Chair(s): A. Karduna and R. Debski

11:00 AM - 11:18 AM

Multibody System Dynamics of the Reverse
Shoulder Arthroplasty: Computational and
Experimental Evaluation

A. Martins¹, C. Quental¹, **J. Folgado**¹, J. Ambrosio¹,
J. Monteiro², M. Sarmento²;
¹IDMEC, Instituto Superior Tecnico, University of
Lisbon, PORTUGAL, ²Medical School, University of
Lisbon, PORTUGAL.

11:18 AM - 11:36 AM

Numerical Characterization of Shoulder Muscle
Actions

A. Ramos, M. Bola, J. A. Simões;
University of Aveiro, PORTUGAL.

11:36 AM - 11:54 AM

The In Vivo Relationship between Pediatric
Shoulder Muscle Volumes and 3D Strength
H. Im¹, K. Alter¹, S. Brochard², S. Brochard², C.
Pons², F. T. Sheehan¹;

¹National Institutes of Health, Bethesda, MD,
²Rehabilitation Medicine Department, University
Hospital of Brest, FRANCE.

11:54 AM - 12:12 PM

In Vitro Detection of Impingement in Reverse
Shoulder Arthroplasty

L. R. North, M. A. Hetzler, M. Pickell, K. J. Deluzio, J.
T. Bryant, R. T. Bicknell;
Queen's University, Kingston, ON, CANADA.

12:12 PM - 12:30 PM

Examining Methods for Predicting Multidirectional
Shoulder Strength

J. N. Hodder, J. R. Potvin;
McMaster University, Hamilton, ON, CANADA

How Undulatory Swimmers Generate & Use Flow

Session Number: 20-17 Room: 307

Session Chair(s): U. Muller and E. Tytell

11:00 AM - 11:18 AM

Undulatory passive swimmers and active flapping
flight

J. Zhang;
New York University, NY.

FRIDAY Podium Sessions

11:18 AM - 11:36 AM

Learning How to Swim: Inverse Dynamics Analysis of Larval Zebrafish Swimming
C. J. Voesenek, R. P. M. Pieters, J. L. Van Leeuwen;
Wageningen University, NETHERLANDS.

11:36 AM - 11:54 AM

Three dimensional effects and the leading edge vortex formation during undulatory swimming
M. Daghooghi, R. Bottom, **I. BORAZJANI**;
University at Buffalo SUNY, NY.

11:54 AM - 12:12 PM

Larval Fish Swimming - What We Can Learn From Body Dynamics
U. K. Muller¹, C. J. Voesenek², J. L. van Leeuwen²;
¹California State University Fresno, CA,
²Wageningen University, NETHERLANDS.

12:12 PM - 12:30 PM

Self-wake capture influences escape performance of C-start of larval fish
G. Li, H. Liu;
Chiba University, Chiba-shi, JAPAN

ASB Metabolic Energy Use in Movement II: Basic Principles

Session Number: 20-18 Room: 310
Session Chair(s): B. Umberger and J. Rubenson

11:00 AM - 11:18 AM

The Role of Negative External and Positive Internal Mechanical Work in Human Locomotion Energetics
A. E. Minetti;
University of Milan, ITALY.

11:18 AM - 11:36 AM

Adaptation and Metabolic Economy
J. C. Dean;
Medical Univ of South Carolina, Charleston, SC.

11:36 AM - 11:54 AM

A Data-Driven Neuromuscular Model of Walking and its Application to Prosthetic Control
H. M. Herr, J. Markowitz;
MIT, Cambridge, MA.

11:54 AM - 12:12 PM

The relationship between balance control and energy expenditure in healthy and pathological human movement.
H. Houdijk;
MOVE Research Institute, Amsterdam,
NETHERLANDS.

12:12 PM - 12:30 PM

Metabolic Energy Optimality Predicts Human Locomotion Patterns: from Point-mass Models to Complex Muscle-driven Biped Models
M. Srinivasan;
The Ohio State University, Columbus, OH

Simulation of Human Movement II: Emerging Challenges

Session Number: 20-19 Room: 303
Session Chair(s): J. Reinbolt and S. Piazza

11:00 AM - 11:18 AM

Prediction of Ground Reaction Forces in Inverse Dynamic Simulations
M. S. Andersen¹, R. Fluit², S. Kolk³, N. Verdonshot³, B. F. J. M. Koopman², J. Rasmussen¹;
¹Aalborg University, DENMARK, ²University of Twente, Enschede, NETHERLANDS, ³Radboud University Nijmegen Medical Centre, Nijmegen, NETHERLANDS.

11:18 AM - 11:36 AM

Generating Three-dimensional Dynamically Consistent Simulations of Walking using Optimal Control
A. J. Meyer¹, J. N. Jackson², M. A. Patterson¹, A. V. Rao¹, B. J. Fregly¹;
¹University of Florida, Gainesville, FL, ²National Institutes of Health, Bethesda, MD.

11:36 AM - 11:54 AM

Time Traveling with Forward Dynamics
R. H. Miller;
University of Maryland, College Park, MD.

11:54 AM - 12:12 PM

Functional outcome prediction in a clinical context: balancing between the clinicians' dreams and state of the art simulation performance.
I. Jonkers¹, F. De Groot¹, W. Bartels², J. De Schutter¹, J. Vander Sloten¹;
¹KU Leuven, BELGIUM, ²Mobelife, Leuven, BELGIUM

12:12 PM - 12:30 PM

See Program Supplement and Errata Sheet for possible additions

FRIDAY Podium Sessions

Dynamic Walking II

Session Number: 20-20 Room: 304

Session Chair(s): S. Collins

11:00 AM - 11:18 AM

Understanding Human Walking Stability and Control Using System Identification and Energy Optimal Feedback Control

M. Srinivasan, Y. Wang, B. Clark;
The Ohio State University, Columbus, OH.

11:18 AM - 11:36 AM

Control of Energy Minimization in Human Walking

M. Donelan;
Biomedical Physiology & Kinesiology, Simon Fraser University, Burnaby, BC, CANADA.

11:36 AM - 11:54 AM

Biomechanics and Energetics of Human Locomotion on Even and Uneven Terrain

A. Voloshina, D. Ferris;
University of Michigan, Ann Arbor, MI.

11:54 AM - 12:12 PM

Modulating prosthetic ankle push-off work at each step may reduce balancing effort during walking

M. Kim, T. Tembulkar, S. H. Collins;
Carnegie Mellon University, Pittsburgh, PA.

12:12 PM - 12:30 PM

Decentralized Control in Natural and Artificial Legged Systems

H. Geyer;
Carnegie Mellon University, Pittsburgh, PA.

Friday, 11 July 2014

3:00– 4:30 PM

Nano & Mesoscale Behavior of Biomolecular Materials II

Session Number: 21-1 Room: 109

Session Chair(s): S. Keten and S. Cranford

3:00 PM - 3:18 PM

Adsorption and swelling of a polymeric biocomposite investigated by Molecular Dynamics simulations

D. Derome¹, K. Kulasinski¹, S. Keten², S. Churakov³, J. Carmeliet⁴;
¹Empa, Duebendorf, SWITZERLAND, ²Northwestern University, Evanston, IL, ³PSI, Villigen, SWITZERLAND, ⁴ETHZ, Zürich, SWITZERLAND.

3:18 PM - 3:36 PM

Multiscale mechanics and modeling of the hierarchical structure of crystalline cellulose

P. Zavattieri¹, F. Dri¹, R. Moon²;
¹Purdue University, West Lafayette, IN, ²USDA Forest Service, Forest Products Laboratory, Madison, WI.

3:36 PM - 3:54 PM

Mechanics of hierarchically self-assembled amyloids

D. Ridgley, **J. Barone**;
Virginia Tech, Blacksburg, VA.

3:54 PM - 4:12 PM

Cooperation Makes It Happen: Quantifying Geometric Compatibility of Biomolecules

S. W. Cranford;
Northeastern University, Boston, MA.

4:12 PM - 4:30 PM

Multiscale Modeling and Optimization of Natural and Biomimetic Myosin-based Systems

P. Egan¹, C. Schunn², J. Cagan¹, P. LeDuc¹;
¹Carnegie Mellon University, Pittsburgh, PA, ²University of Pittsburgh, PA

Progenitor & Stem Cell Identification II

Session Number: 21-2 Room: 110

Session Chair(s): K. Van Vliet and J. Han

3:00 PM - 3:36 PM

Engineering Epithelial Tissues from Human Pluripotent Stem Cells

S. Palecek;
University of Wisconsin - Madison, WI.

3:36 PM - 3:54 PM

Stem Cell Heterogeneity: Identifying Subsets of Mesenchymal Stromal Cells for Tissue Engineering & Translational Medicine

W. Lee¹, H. Shi¹, Z. Poon¹, J. Chan², G. Shivashankar², C. Lim², J. Han³, K. Van Vliet³;
¹Singapore MIT-Alliance for Research and Technology, SINGAPORE, ²National University of Singapore, SINGAPORE, ³Massachusetts Institute of Technology, Boston, MA.

3:54 PM - 4:12 PM

The challenge of massive expansion of MSC for bone regenerative applications.

J. K. Y. Chan;
KK Women's and Children's Hospital, SINGAPORE.

FRIDAY Podium Sessions

4:12 PM - 4:30 PM

Biophysically derived osteoprogenitors from mesenchymal stem/stromal cell (MSC) cultures for applications in orthopedics and hematology.

Z. Poon¹, J. Lee W.C.¹, K. Van Vliet²;

¹National University of Singapore, SINGAPORE,

²MIT, Cambridge, MA

Computational Modeling of Cells & Cytoskeleton III

Session Number: 21-3 Room: 111

Session Chair(s): T. Adachi and T. Kim

3:00 PM - 3:18 PM

Computational investigation of the cytoskeleton response under static and fluid flow loading conditions

D. Lacroix, S. Barreto, H. Khayeri;

University of Sheffield, UNITED KINGDOM.

3:18 PM - 3:36 PM

Mapping cell stiffness and pre-stress with subcellular resolution

E. P. Canovic¹, T. Seidl¹, S. R. Polio¹, A. A. Oberai², P. E. Barbone¹, M. L. Smith¹, **D. Stamenovic**¹;

¹Boston University, MA, ²Rensselaer Polytechnic Institute, Troy, NY.

3:36 PM - 3:54 PM

Epithelial Tissue Morphogenesis Assessed by Divided Media

P. Cañadas, Y. Chélin, J. Averseng, B. Maurin;

University Montpellier 2, Montpellier, FRANCE.

3:54 PM - 4:12 PM

The role of bond breakage in providing viscoelasticity to the extracellular matrix: insights from fibronectin

M. L. Smith;

Boston University, MA.

4:12 PM - 4:30 PM

Multi-scale Modeling of the Pacinian Corpuscle Shows That Receptor Depth and Structure Contribute to Stimulus Threshold and Location Sensitivity.

J. C. Quindlen, V. K. Lai, V. H. Barocas;

University of Minnesota, Minneapolis, MN

Cell Biomechanics & Mechanobiology in Inflammation

Session Number: 21-4 Room: 306

Session Chair(s): N. Chahine

3:00 PM - 3:18 PM

Painful Tissue Loading Can Induce Widespread Inflammation via Integrated Mechanotransduction Cascades

B. Winkelstein, J. Kras, L. Dong;

University of Pennsylvania, Philadelphia, PA.

3:18 PM - 3:36 PM

Biomechanical Preconditioning and Oxidative Homeostasis in Osteoarthritis

T. Griffin, M. Boeving, Y. Fu, R. Issa, J. Hudson;

Oklahoma Medical Research Foundation, Oklahoma City, OK.

3:36 PM - 3:54 PM

Effect of Inflammation on Cell Biomechanics and in the Etiology of Disc Degeneration

R. Maidhof¹, T. Jacobsen¹, N. Paknejad², S. Rabbany², **N. Chahine**¹;

¹The Feinstein Institute for Medical Research, Manhasset, NY, ²Hofstra University, Hempstead, NY.

3:54 PM - 4:12 PM

Collagen density regulates matrix vesicle-induced nucleation of microcalcifications: insights into atherosclerotic plaque vulnerability

J. Hutcheson¹, C. Goettsch¹, N. Maldonado¹, T. Faits¹, S. Bertazzo², E. Aikawa¹;

¹Harvard Medical School/Brigham & Women's Hospital, Allston, MA, ²Imperial College London, UNITED KINGDOM.

4:12 PM - 4:30 PM

Increased Arterial Stiffness Exacerbates Inflammation

H. N. Hayenga;

University of Texas, Dallas, Richardson, TX

FRIDAY Podium Sessions

Biomechanical Meet Molecular Cues: Impact on Tissue

Session Number: 21-5 Room: 302
Session Chair(s): Duda

3:00 PM - 3:18 PM

Aging Tips the Scales by Restraining Adaptive Bone Formation but has Limited Effect on Resorption
A. Birkhold¹, H. Razi¹, R. Weinkamer², G. Duda¹, S. Checa¹, **B. M. Willie¹**;
¹Charité – Universitätsmedizin Berlin, GERMANY,
²Max Planck Institute of Colloids and Interfaces, Potsdam, GERMANY.

3:18 PM - 3:36 PM

Mechanical cues in breast cancer bone metastasis
M. Lynch, L. Bonassar, M. van der Meulen, C. Fischbach;
Cornell University, Ithaca, NY.

3:36 PM - 3:54 PM

Investigating osteoarthritis using a non-invasive joint loading model
B. Poulet¹, K. Staines², R. de Souza³, S. Shefelbine⁴, **A. A. Pitsillides²**;
¹University College London, UNITED KINGDOM,
²Royal Veterinary College, London, UNITED KINGDOM,
³University of Mato Grosso, BRAZIL,
⁴Northeastern University,, Boston,, MA.

3:54 PM - 4:12 PM

Mechanical Loading to Stimulate Bone Formation In Vivo
M. C. H. van der Meulen, F. Ko;
Cornell University, Ithaca, NY.

4:12 PM - 4:30 PM

Load Complexity Categories: An Important Consideration in Bone Adaptation Studies
J. G. Skedros;

Collective Cell Migration: Bridging Theory and Experiment I

Session Number: 21-6 Room: 309
Session Chair(s): J. Fredberg and X. Trepat

3:00 PM - 3:36 PM

Models of Motility, from Single Cells to the Collective
H. Levine;
Rice University, Houston, TX.

3:36 PM - 3:54 PM

The Cellular Mechanics of Wound Healing
A. Bruges¹, E. Anon¹, V. Conte¹, J. Veldhuis², J. Colombelli³, J. Munoz⁴, B. Ladoux⁵, X. Trepat¹, **G. W. Brodland²**;
¹Institute for Bioengineering of Catalonia, Barcelona, SPAIN, ²University of Waterloo, ON, CANADA, ³Institute for Research in Biomedicine, Barcelona, SPAIN, ⁴Laboratori de Càlcul Numèric, Barcelona, SPAIN, ⁵Institut Jacques Monod, Paris, FRANCE.

3:54 PM - 4:12 PM

Active Mechanics of Epithelial Morphogenesis
G. Salbreux¹, A. Nandi¹, M. Merkel¹, M. Popovic¹, R. Etoiray², S. Eaton², F. Jülicher¹;
¹Max Planck Institute for the Physics of Complex Systems, Dresden, GERMANY, ²Max Planck Institute for Cell Biology and Genetics, Dresden, GERMANY.

4:12 PM - 4:30 PM

The Dynamics of Heterogeneous Cell Populations
A. Kabla;
University of Cambridge, UNITED KINGDOM

Thrombosis & Hemodynamics III: Multiscale Modeling 2

Session Number: 21-7 Room: 300
Session Chair(s): D. Bluestein

3:00 PM - 3:18 PM

Multiscale modeling of flow induced thrombosis using dissipative particle dynamics (DPD) and coarse grained molecular dynamics (CGMD)
D. Bluestein¹, P. Zhang¹, C. Gao¹, J. Sheriff¹, S. Pothapragada², N. Zhang², M. Livelli¹, J. S. Soares³, M. J. Slepian⁴, Y. Deng²;
¹Stony Brook University- Biomedical Engineering, NY, ²Stony Brook University- Applied Math, NY, ³UT Austin- Biomedical Engineering, TX, ⁴Sarver Heart Center, U. Arizona, Tucson, AZ.

3:18 PM - 3:36 PM

Simulation of platelet, thrombus and erythrocyte hydrodynamic interactions in a 3D arteriole with in vivo comparison
W. Wang¹, T. G. Diacovo², J. Chen², J. B. Freund³, **M. R. King¹**;
¹Cornell University, Ithaca, NY, ²Columbia University, New York, NY, ³University of Illinois at Urbana-Champaign, IL.

FRIDAY Podium Sessions

3:36 PM - 3:54 PM

The Role of Intraclot Transport in the Dynamics of Platelet Deposition and Coagulation Under Flow

A. L. Fogelson¹, K. Leiderman²;

¹University of Utah, Salt Lake City, UT, ²University of California, Merced, CA.

3:54 PM - 4:12 PM

Multiscale Modeling of Thrombus Formation and Growth in Aortic Dissection

A. Yazdani, G. Karniadakis;

Brown University, Providence, RI.

4:12 PM - 4:30 PM

Multi-scale computational study on the formation and destruction of primary thrombus under the influence of the blood flow and red blood cells

H. Kamada¹, Y. Imai², T. Ishikawa², T. Yamaguchi³;

¹School of Medicine, Tohoku University, Sendai, JAPAN, ²Department of Bioengineering and

Robotics, Tohoku University, Sendai, JAPAN, ³Graduate School of Biomedical Engineering,

Tohoku University, Sendai, JAPAN

Device-Tissue Interactions I: Stents, DES, & Angioplasty Balloons

Session Number: 21-8 Room: Ball-C

Session Chair(s): R. Mongrain and M. Walsh

3:00 PM - 3:18 PM

Synergy Between Interventional Cardiologists, Engineers and Graduate Students for Innovation in Cardiovascular Devices - The Case of Multidisciplinary Design Optimization for Biodegradable Stent Development and Testing

O. F. Bertrand¹, R. Mongrain²;

¹Quebec Heart-Lung Institute, Quebec City, QC, CANADA, ²McGill University, Montreal, QC, CANADA.

3:18 PM - 3:36 PM

Fully bioresorbable coronary stent : from preclinical to clinical evaluation

Q. Lafont, Sr.¹, M. Vert, Sr.²;

¹cardiology, René Descartes University, Paris, FRANCE, ²René Descartes University, Paris, FRANCE.

3:36 PM - 3:54 PM

Diagnosis of Coronary Artery Disease using Fluid Dynamic Principles

K. Kolli¹, S. Peelukhana¹, A. Imran¹, S. Paul¹, L.

Back², H. Tarek¹, L. Massoud³, E. Mohamed¹, **R. K. Banerjee**¹;

¹University of Cincinnati, OH, ²Jet Propulsion Laboratory, Pasadena, CA, ³University of Alabama at Birmingham, AL.

3:54 PM - 4:12 PM

Optimization of Drug-Eluting Stents

F. Bozsak, J. M. Chomaz, **A. I. Barakat**;

Ecole Polytechnique, Palaiseau, FRANCE.

4:12 PM - 4:30 PM

Biomechanical Acceleration of Biodegradation and Challenges to Stent Modeling

D. Hayman, **J. Moore, Jr.**;

Imperial College London, UNITED KINGDOM

In Vitro Systems for Studying Organ Biomechanics

Session Number: 21-9 Room: 312

Session Chair(s): E. Sanders

3:00 PM - 3:18 PM

Tension in cell-matrix adhesions directs 3D cell migration in response to interstitial flow.

W. J. Polacheck, R. D. Kamm;

M.I.T., Cambridge, MA.

3:18 PM - 3:36 PM

Mechanical Interaction of Angiogenic Microvessels with the Extracellular Matrix

J. A. Weiss¹, J. B. Hoying², U. Utzinger³, L. T. Edgar¹,

C. J. Underwood⁴, L. Krishnan⁵, B. K. Baggett³, S. A.

Maas¹, J. E. Guilkey¹;

¹University of Utah, Salt Lake City, UT, ²University of Louisville, Louisville, KY, ³University of Arizona, Tucson, AZ, ⁴W.L. Gore and Associates, Inc., Flagstaff, AZ, ⁵Georgia Tech, Atlanta, GA.

3:36 PM - 3:54 PM

Cellular contribution to (cyclic) stretch-induced fibrous tissue morphogenesis and adaptation.

J. Foolen¹, M. Borochin², C. S. Chen², F. P.

Baaijens³, V. Vogel¹;

¹ETH Zurich, SWITZERLAND, ²University of Pennsylvania, Philadelphia, PA, ³Eindhoven University of Technology, NETHERLANDS.

FRIDAY Podium Sessions

3:54 PM - 4:12 PM

Role of Substrate Stiffness on Keratinocyte Sheet Formation Assessed From Time-Lapse Imaging
H. Zarkoob, J. C. Selby, K. A. N. Messingham, J. A. Fairley, **E. A. Sander**;
University of Iowa, Iowa City, IA.

4:12 PM - 4:30 PM

Patterning and Mechanodynamics: Live-cell Examination of Human Fibroblasts' Journey From Seeding to Matrix Production In Vitro
J. W. Ruberti¹, R. Zareian²;
¹Northeastern University, Boston, MA, ²University of California, Berkeley, CA

Inverse Methods in Soft Tissue Biomechanics III

Session Number: 21-10 Room: 313
Session Chair(s): S. Avril and K. Genovese

3:00 PM - 3:36 PM

Identification of the Mechanical Properties of Human Skin Using Multiple In Vivo Measurements
S. L. Evans;
Cardiff University, UNITED KINGDOM.

3:36 PM - 3:54 PM

A Novel, Patient Specific Computational Approach for Detecting Mechanical Causes of Pelvic Disorders
M. Maurer¹, N. Sindhvani², J. Deprest², E. Mazza¹;
¹ETH Zurich, SWITZERLAND, ²KU Leuven, BELGIUM.

3:54 PM - 4:12 PM

In-Vivo Calf Muscle Passive Elastic Behaviour Analysis Based on Inverse FEA and Detailed MRI Derived Boundary Conditions
K. M. Moerman¹, A. J. Nederveen¹, M. Froeling¹, C. K. Simms²;
¹Academic Medical Centre Amsterdam, Amsterdam, NETHERLANDS, ²University of Dublin, Trinity College, IRELAND.

4:12 PM - 4:30 PM

On a staggered iFEM approach for the consideration of friction in compression test of soft materials
M. Böhl¹, A. Ehret², R. Kruse³;
¹Institute of Solid Mechanics, Braunschweig, GERMANY, ²Institute of Mechanical Systems, Zurich, SWITZERLAND, ³Institute of Applied Mechanics, Braunschweig, GERMANY

Biomechanics of the Posterior Eye I

Session Number: 21-11 Room: 305
Session Chair(s): Grytz

3:00 PM - 3:18 PM

Biomechanics of the Optic Nerve Sheath in VIIP Syndrome
C. R. Ethier¹, J. Raykin¹, R. Gleason¹, L. Mulugeta², J. G. Myers³, E. S. Nelson³, B. Samuels⁴;
¹Georgia Institute of Technology, Atlanta, GA, ²Universities Space Research Association, Houston, TX, ³NASA Glenn Research Center, Cleveland, OH, ⁴University of Alabama at Birmingham, AL.

3:18 PM - 3:36 PM

Age- and Race-related Differences in Scleral Material Properties
J. C. Downs¹, M. A. Fazio¹, V. Libertiaux¹, L. Bruno², S. Gardiner³, C. A. Girkin¹, R. Grytz¹;
¹University of Alabama at Birmingham, AL, ²University of Calabria, Cosenza, ITALY, ³Devers Eye Institute, Portland, OR.

3:36 PM - 3:54 PM

Corneal and Scleral Strains Measured from Ultrasound Speckle Tracking
J. Liu, H. Morris, H. Chen, B. Cruz Perez, J. Palko, R. Hart, P. Weber, X. Pan;
Ohio State University, Columbus, OH.

3:54 PM - 4:12 PM

Scleral Collagen Architecture as a Mediator of Posterior Eye Biomechanical Behaviour and Disease
C. Boote;
Cardiff University, UNITED KINGDOM.

4:12 PM - 4:30 PM

Variation of the Mechanical Energy Density of the Posterior Human Sclera with Age and Race
M. A. Fazio¹, J. S. Morris², R. Grytz¹, L. Bruno³, C. Girkin¹, J. Downs¹;
¹University of Alabama at Birmingham, AL, ²The University of Texas MD Anderson Cancer Center, Houston, TX, ³University of Calabria, Arcavacata di Rende, ITALY

FRIDAY Podium Sessions

Therapeutic Lung Performance

Session Number: 21-12 Room: 301

Session Chair(s): A.M. Al-Jumaily and C.A. Evrensel

3:00 PM - 3:18 PM

Significance of Pressure Oscillation in Lung Therapy-New Findings

A. M. Al-Jumaily;

Auckland University of Technology, NEW ZEALAND.

3:18 PM - 3:36 PM

The Audible Human Project: Modeling and Imaging Sound Transmission in the Lungs and How it is Affected by Injury and Disease

T. Royston¹, Z. Dai¹, Y. Peng¹, S. Kearney¹, S. Kearney¹, B. Henry¹, H. A. Mansy², R. H. Sandler³, R. A. Balk⁴;

¹University of Illinois at Chicago, IL, ²University of Central Florida, Orlando, FL, ³Nemours Children's Hospital, Orlando, FL, ⁴Rush University Medical Center, Chicago, IL.

3:36 PM - 3:54 PM

Scaffold mechanical and biological properties in lung regeneration

E. Sen;

Ankara University School of Medicine Pulmonary Dis. Dept, Ankara, TURKEY.

3:54 PM - 4:12 PM

Fate of inhaled fine and ultrafine aerosols in pulmonary acinar airways: when particle diffusion becomes paramount

P. Hofemeier, J. Sznitman;

Technion - Israel Institute of Technology, Haifa, ISRAEL.

4:12 PM - 4:30 PM

See Program Supplement and Errata Sheet for possible additions

Innovations in Teaching Biomechanics

Session Number: 21-13 Room:311

Session Chair(s): A. Karduna

3:00 PM - 3:36 PM

What do you mean "I POGIL?"

S. R. Simonson;

Boise State University, ID.

3:36 PM - 3:54 PM

Teaching Entrepreneurship in Biomechanics

K. L. Billiar;

Worcester Polytechnic Institute, MA.

3:54 PM - 4:12 PM

If information is everywhere already, why should people come to class?

F. Valero-Cuevas;

Biomedical Engineering, Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, CA

4:12 PM - 4:30 PM

Panel Discussion

Spine Biomechanics III

Session Number: 21-14 Room: Ball-A

Session Chair(s): van Dieen and Reeves

3:00 PM - 3:18 PM

Using Patient Specific Finite Element Models to Understand the Biomechanics of Paediatric Spinal Deformity Surgery

J. Little;

Paediatric Spine Research Group, Queensland University of Technology, Brisbane, AUSTRALIA.

3:18 PM - 3:36 PM

Trunk Muscle Activity and Spinal Loads Substantially Alter with External Load Orientation and Position despite Identical Moment

Z. El Ouaaid¹, A. Shirazi-Adl¹, A. Plamondon², N. Arjmand³;

¹Ecole Polytechnique, Montreal, QC, CANADA, ²IRSST, Montreal, QC, CANADA, ³Sharif Univ of Technology, Tehran, ISLAMIC REPUBLIC OF IRAN.

3:36 PM - 3:54 PM

Comparison of Five Lifting Analysis Tools to Determine Low Back Loads

N. Arjmand¹, M. Rajaei¹, A. Shirazi-Adl², A. Plamondon³;

¹Sharif University of Technology, Tehran, ISLAMIC REPUBLIC OF IRAN, ²École Polytechnique de Montréal, Montréal, QC, CANADA, ³Institut de recherche Robert Sauvé en santé et en sécurité du travail (IRSST), Montréal, QC, CANADA.

3:54 PM - 4:12 PM

In Vivo Progression Of Global And Instrumented Segmental Stability Of Single- Vs. Two-Level

Anterior Cervical Discectomy And Fusion (ACDF)

A. Chien¹, W. Chou¹, D. Lai², Z. Chen¹, **J. Wang**¹;

¹Institute of Biomedical Engineering, National Taiwan University, Taipei, TAIWAN, ²Department of Surgery, National Taiwan University Hospital, Taipei, TAIWAN.

FRIDAY Podium Sessions

4:12 PM - 4:30 PM

Influence of the physiological variation of the lumbar spine morphology on the stresses in the intervertebral discs

F. Galbusera¹, M. Brayda-Bruno¹, H. Wilke²;
¹IRCCS Istituto Ortopedico Galeazzi, Milan, ITALY,
²Institute of Orthopedic Research and Biomechanics, Center of Musculoskeletal Research Ulm (ZMFU), Ulm University, GERMANY

Bone Mechanics I

Session Number: 21-15 Room: Ball-B
Session Chair(s): E. Dall'Ara and F. Taddei

3:00 PM - 3:18 PM

Spatial and Temporal Changes in the Multi-Scale Elastic Properties of Ovine Femoral Cortical Bone and Their Relation to Remodeling

P. Varga¹, J. Schneider¹, S. Bernard², S. Fröhlich¹, M. Heller³, Q. Grimal², K. Raum¹;
¹Julius Wolff Institute & Berlin-Brandenburg School for Regenerative Therapies, Charité - Universitätsmedizin Berlin, GERMANY, ²Laboratoire d'Imagerie Paramétrique, UPMC Université, Paris, FRANCE, ³Engineering and the Environment, University of Southampton, UNITED KINGDOM.

3:18 PM - 3:36 PM

Is Stair Climbing Better For Your Bones Than Walking?

M. E. Kersh¹, S. Martelli², R. Zebaze³, E. Seeman³, M. Pandy¹;
¹University of Melbourne, Parkville, AUSTRALIA,
²Flinders University, Adelaide, AUSTRALIA, ³Austin Health, Heidelberg, AUSTRALIA.

3:36 PM - 3:54 PM

Experimental model systems for musculoskeletal mechanobiology

M. Thompson, R. Tucker, T. Grant, J. Kahn, N. Bajuri;
University of Oxford, UNITED KINGDOM.

3:54 PM - 4:12 PM

Accuracy of patient-specific finite element models of bones: scapula as a study case

G. Campoli, B. Bolsterlee, F. van der Helm, H. Weinans, **A. Zadpoor**;
Delft University of Technology, NETHERLANDS.

4:12 PM - 4:30 PM

MicroCT-based Estimation of Human Trabecular Bone Stiffness: Sensitivity to Small Variations in Fixed Threshold at Different Spatial Resolution

M. Pani, G. Iori, E. Schileo, M. Baleani, F. Baruffaldi, F. Taddei;
Istituto Ortopedico Rizzoli, Bologna, ITALY

Dental Mechanics I

Session Number: 21-16 Room: 308
Session Chair(s): N. Inou

3:00 PM - 3:36 PM

Biomechanical Diagnosis in Orthodontics

K. Maki;
Showa University, Tokyo, JAPAN.

3:36 PM - 3:54 PM

Biomechanical assessment of dental implant treatment for fully edentulous maxillas

M. Todo¹, T. Arahira²;
¹Kyushu University, Kasuga, JAPAN, ²Fukuoka Dental College, Fukuoka, JAPAN.

3:54 PM - 4:12 PM

High Precision Analysis System of Jaw Movement

N. Inou¹, K. Saitou¹, H. Kimura¹, K. Maki²;
¹Tokyo Institute of Technology, Tokyo, JAPAN, ²Showa University, Tokyo, JAPAN.

4:12 PM - 4:30 PM

Biomechanical analysis of Invisalign treatment

W. Yanagisawa;
Department of Orthodontics, School of Dentistry Showa University, Tokyo, JAPAN

Control of Swimming – Sensing & Using Flow

Session Number: 21-17 Room: 307
Session Chair(s): U. Muller and E. Tytell

3:00 PM - 3:18 PM

Effects of mechanical stimulation on lateral line neuromasts in larval zebrafish: from afferent activity to motor response

J. C. Liao, O. Akanyeti, M. Haehnel-Taguchi, R. Levi;
The Whitney Lab for Marine Bioscience/University of Florida, Saint Augustine, FL.

3:18 PM - 3:36 PM

Predator Sensing and Evasion in Zebrafish Larvae

M. McHenry¹, W. Stewart², A. Nair¹, A. Soto¹;
¹UC Irvine, CA, ²UC Riverside, CA.

FRIDAY Podium Sessions

3:36 PM - 3:54 PM

Swimming and Sensing: High-Speed Tomographic PIV Measurements of Zooplankton Behavior

J. Yen¹, D. W. Murphy², D. R. Webster¹;

¹Georgia Tech, Atlanta, GA, ²Johns Hopkins, Baltimore, MD.

3:54 PM - 4:12 PM

The increased efficiency of fish swimming in a school

C. K. Hemelrijk¹, D. A. Reid¹, H. Hildenbrandt¹, J. T. Padding²;

¹Rijksuniversiteit Groningen, Groningen, NETHERLANDS, ²Eindhoven University of Technology, NETHERLANDS

4:12 PM - 4:30 PM

See Program Supplement and Errata Sheet for possible additions

Innovative Techniques for Improving Gait: Stroke & Cerebral Palsy I

Session Number: 21-18 Room: 310

Session Chair(s): K.M. Steele and J. Higginson

3:00 PM - 3:36 PM

Improving stroke mobility and the crucial role of measuring coordination and biomechanics

S. A. Kautz;

Medical Univ of South Carolina, Charleston, SC.

3:36 PM - 3:54 PM

Insights into impaired muscular coordination post-stroke using musculoskeletal modeling

J. Allen;

Emory University, Atlanta, GA.

3:54 PM - 4:12 PM

Volitional Coupling of Hip Extension with Hip Abduction is Altered Post-Stroke

N. Sanchez, R. Lopez-Rosado, J. P. A. Dewald;
Northwestern University, Chicago, IL.

4:12 PM - 4:30 PM

Targeting Specific Post-Stroke Gait Biomechanics to Improve Walking Function

D. Reisman;

University of Delaware, Newark, DE

Skeletal Muscle Mechanics in 3D

Session Number: 21-19 Room: 303

Session Chair(s): O. Rohrle and M. Böhl

3:00 PM - 3:36 PM

Choose your own 3D muscle modeling adventure via your constitutive model

S. S. Blemker;

University of Virginia, Charlottesville, VA.

3:36 PM - 3:54 PM

Towards Linking Continuum Muscle Models with Rigid Body Musculoskeletal Simulation

J. Fernandez, T. Besier, K. Mithraratne;

University of Auckland, NEW ZEALAND.

3:54 PM - 4:12 PM

From motorunit control to virtual EMG

O. Röhrle, M. Mordhorst, T. Heidlauf;

University of Stuttgart, GERMANY

4:12 PM - 4:30 PM

Skeletal muscle modeling- Three-dimensional model validation

O. Röhrle, **M. Böhl**

TU Carolo-Wilhelmina at Braunschweig, GERMANY

Running I

Session Number: 21-20 Room: 304

Session Chair(s): R. Kram

3:00 PM - 3:36 PM

Locomotor Dynamics of Cheetahs and Other Predators During Hunting and Ranging: a Comparison with Human Athleticism

A. M. Wilson;

Structure & Motion Lab, Royal Veterinary College, University of London, UNITED KINGDOM.

3:36 PM - 3:54 PM

Learning from biology: actuation and control of the MIT Cheetah

S. Kim;

Massachusetts Inst of Technology, Cambridge, MA.

3:54 PM - 4:12 PM

Sprint running mechanics: new technology, new concepts, new perspectives

J. Morin¹, P. Edouard¹, P. Samozino²;

¹Laboratory of Exercise Physiology, University of Saint-Etienne, FRANCE, ²Laboratory of Exercise Physiology, University of Savoy, Le Bourget du Lac, FRANCE.

FRIDAY Podium Sessions

4:12 PM - 4:30 PM

Start and curve running performance in sprinters with a unilateral leg amputation.

P. Taboga¹, A. M. Grabowski², P. E. di Prampero¹, R. Kram²;

¹University of Udine, Udine, ITALY, ²University of Colorado, Boulder, CO

Friday, 11 July 2014

5:00– 6:30 PM

Molecular Design & Nano-mechanics of Biomimetic Materials

Session Number: 22-1 Room: 109

Session Chair(s): A. Miserez

5:00 PM - 5:18 PM

How Holdfast Shape and Mechanics Influence Adhesion in Mussels, and What it Teaches us about Adhesive Structure Design

M. T. Valentine;

University of California, Santa Barbara, CA.

5:18 PM - 5:36 PM

Aquatic caddisfly silk: elastic, metal ion-dependent, double network fibers

R. Stewart;

University of Utah, Salt Lake City, UT.

5:36 PM - 5:54 PM

Metal-Coordination: Using one of Nature's Tricks to Control Molecular Material Mechanics

N. Holten-Andersen

Massachusetts Inst of Technology, Cambridge, MA.

5:54 PM - 6:12 PM

Biomimetic Articulating Surfaces Based on Ganoid Squamations in Armored Fish

S. Varshney, E. Zolotosky, N. Oxman, M. C. Boyce, C. Ortiz;

MIT, Cambridge, MA.

6:12 PM - 6:30 PM

Biomechanics of Mussel Adhesion and Surface Functionalization

H. Lee;

Korea Advanced Institute of Science and Technology, REPUBLIC OF KOREA.

Cancer Anti-Metastasis

Session Number: 22-2 Room: 110

Session Chair(s): K. Van Vliet and J. Han

5:00 PM - 5:36 PM

Optical Signatures Correlative of Metastatic Cancers in Distorted Environment

H. Yu¹, S. Xu², S. Zhuo², J. Yan², P. So³, R. Welsch³;

¹National University Health System, SINGAPORE,

²Singapore-MIT Alliance for Research and

Technology, SINGAPORE, ³Massachusetts Institute of Technology, Cambridge, MA.

5:36 PM - 5:54 PM

Circulating Tumor Cells as Biomarkers for Metastasis and Treatment

C. Lim;

National University of Singapore, SINGAPORE.

5:54 PM - 6:12 PM

High throughput microfluidics for enriching circulating tumor cells and other low-abundance cells from blood

J. Han;

MIT, Cambridge, MA.

6:12 PM - 6:30 PM

Interactions Between Hepatocellular Carcinoma Cells and T-cell Receptor Engineered T Cells in a 3D Microfluidic Platform.

A. Pavesi¹, T. A. Tanoto², A. Bertoletti², R. D. Kamm³;

¹Singapore MIT alliance - SMART, SINGAPORE,

²Emerging Infectious Disease Program, DUKE-NUS Graduate Medical School Singapore, SINGAPORE,

³MechanoBiology Laboratory, Department of Biological Engineering, Massachusetts Institute of Technology, Cambridge, MA.

Computational Modeling of Cells & Cytoskeleton IV

Session Number: 22-3 Room: 111

Session Chair(s): T. Adachi and T. Kim

5:00 PM - 5:18 PM

Nonlinear Mechano-chemical Transduction in Living Muscle Fibers

S. M. Mijailovich¹, B. Stojanovic², D. Nedic², M. Svcevic², M. A. Geeves³;

¹Northeastern University, Boston, MA, ²University of

Kragujevac, SERBIA, ³University of Kent, Canterbury, UNITED KINGDOM.

FRIDAY Podium Sessions

5:18 PM - 5:36 PM

Aggregation and adhesion kinetics of blood cells under shear flow

Y. Du¹, S. Lü¹, Y. Cui², Y. Zhang¹, **M. Long¹**;
¹Center of Biomechanics and Bioengineering and Key Laboratory of Microgravity (National Microgravity Laboratory), Institute of Mechanics, Chinese Academy of Sciences, Beijing, CHINA, ²Department of Mechanics, Tianjin University, CHINA.

5:36 PM - 5:54 PM

Biomechanics simulation of passive and active motions of blood cells

K. Tsubota;
Chiba University, JAPAN.

5:54 PM - 6:12 PM

Conformational changes of amyloid fibrils due to the environmental condition

G. Yoon¹, H. Choi², H. Chang², M. Lee², S. Na²;
¹Mechanical Engineering in Boston University, boston, MA, ²Mechanical Engineering in Korea University, Seoul, REPUBLIC OF KOREA.

6:12 PM - 6:30 PM

Towards a Comprehensive Computational Model for 3D Single Cell Migration and Cell-ECM-Interaction

A. Vuong, A. Rauch, L. Yoshihara, W. A. Wall;
Technische Universität München, Munich, GERMANY.

Biomechanics of Inflammation & Infection

Session Number: 22-4 Room: 306

Session Chair(s): N. Chahine

5:00 PM - 5:18 PM

Human antigen-presenting cells and T cells differ in their mechanical properties - potential role in immune responses

M. Saitakis¹, N. Bui², S. Dogniaux¹, A. Asnacios², C. Hivroz¹;
¹Institut Curie, Centre de Recherche and INSERM U932 Immunité et Cancer, Paris, FRANCE, ²Laboratoire Matière et Systèmes Complexes, CNRS and University Paris Diderot, Paris, FRANCE.

5:18 PM - 5:36 PM

Substrate Stiffness Regulates B Cell Activation

Z. Wan¹, K. Liu², A. Chau², W. Liu¹, **C. Xiong²**;
¹Tsinghua University, Beijing, CHINA, ²Peking University, Beijing, CHINA.

5:36 PM - 5:54 PM

A mathematical model of inflammation in endothelial cells upon exposure to shear stress - Numerical simulation of the production of NF- κ B, MMPs and cell adhesion molecules in different flow environments.

D. C. Baeriswyl, Y. Ventikos;
Univeristy College London, London, UNITED KINGDOM.

5:54 PM - 6:12 PM

Agent Based Modeling of Strain-Induced Lung Inflammation

R. Pidaparti¹, R. Heise², **A. Reynolds²**;
¹University of Georgia, Athens, GA, ²Virginia Commonwealth University, Richmond, VA.

6:12 PM - 6:30 PM

Ex-vivo MRI for quantitative evaluation of catheter related phlebitis in a rabbit model.

D. Weiss¹, S. Einav²;
¹Tel Aviv University, ISRAEL, ²Stony Brook University, NY

Scanning Probe Techniques in Cellular & Subcellular Biomechanics

Session Number: 22-5 Room: 302

Session Chair(s): S. Singamaneni

5:00 PM - 5:18 PM

Direct Observation of Amyloid Nucleation under Nanomechanical Stretching

J. Seog;
University of Maryland, College Park, MD.

5:18 PM - 5:36 PM

Atomic Force Microscopy to Derive Quantitative Mechanics of Cellular Brush and Elastic Modulus of Cell Body

I. Sokolov, M. Dokukin;
Tufts University, Medford, MA.

5:36 PM - 5:54 PM

Role of the local cell surface tilt in the measurement of the elastic modulus by AFM

S. Fereol¹, F. Nothias², R. Fodil¹;
¹University-UPMC, Paris / ISBS, University-UPEC, Creteil, FRANCE, Paris, FRANCE, ²University-UPMC, Paris, Paris, FRANCE.

5:54 PM - 6:30 PM

See Program Supplement and Errata Sheet for possible additions

FRIDAY Podium Sessions

Collective Cell Migration: Bridging Theory and Experiment II

Session Number: 22-6 Room: 309
Session Chair(s): J. Fredberg and X. Trepat

5:00 PM - 5:18 PM

Collective motion of cellular clusters

N. S. Gov;

Weizmann Institute of Science, Rehovot, ISRAEL.

5:18 PM - 5:36 PM

Interplay of RhoA and mechanical forces in collective cell migration driven by leader cells. M. Reffay¹, M. Parrini², O. Cochet-Escartin², B. Ladoux¹, A. Buguin², S. Coscoy², F. Amblard², J. Camonis², **P. Silberzan**²;

¹MSC - Paris Diderot, Paris, FRANCE, ²Institut Curie, Paris, FRANCE.

5:36 PM - 5:54 PM

Dynamics and Mechanics of Multicellular Spheroids and Cylindroids

P. Nassoy;

IOGS, Talence, FRANCE.

5:54 PM - 6:12 PM

Filopodia dynamics, ECM interaction, and 3D cell migration modeling

M. Kim¹, R. Kamm², H. Asada²;

¹Singapore-MIT Alliance for Research & Technology (SMART), SINGAPORE, ²Massachusetts Institute of Technology, Cambridge, MA.

6:12 PM - 6:30 PM

See Program Supplement and Errata Sheet for possible additions

Thrombosis & Hemodynamics IV

Session Number: 22-7 Room: 300
Session Chair(s): D. Ku and D. Bluestein

5:00 PM - 5:18 PM

Role of Hydrodynamic Shear Mediated Platelet Deformation on Cell Tethering, Translocation and Activation

S. Neelamegham, C. Zhang;

State University of New York - Buffalo, NY.

5:18 PM - 5:36 PM

The Impact of Implantation Configuration of Ventricular Assist Device on System Thrombogenicity

W. Chiu, Y. Alemu, A. J. McLarty, M. J. Slepian, D. Bluestein;

Stony Brook University, NY.

5:36 PM - 5:54 PM

Shear Degradation of Von Willebrand Factor in Flow

V. Turitto¹, S. Yang¹, Z. Demou²;

¹Illinois Institute of Technology, Chicago, IL,

²HeartWare Inc, Miami Lakes, FL.

5:54 PM - 6:12 PM

How smart are platelets? Cellular mechanics at the single platelet level

D. R. Myers, Y. Qiu, Y. Sakurai, R. Tran, **W. A. Lam**;
Georgia Institute of Technology/Emory University School of Medicine, Atlanta, GA.

6:12 PM - 6:30 PM

Effect of Margination Development Length on Thrombosis Growth Rate

M. Mehrabadi, C. Aidun, D. Ku;

Georgia Institute of Technology, Atlanta, GA

Device-Tissue Interactions II: Heart Valves, Grafts, & Shunts

Session Number: 22-8 Room: Ball-C
Session Chair(s): R. Mongrain and R. Leask

5:00 PM - 5:18 PM

In-vitro investigation of transcatheter mitral valve-in-valve procedure

R. RIEU¹, M. EVIN¹, P. BARRAGAN², P. PIBAROT³;

¹Aix-Marseille Université, Marseille Cedex 09, FRANCE, ²Hôpital Européen, Marseille, FRANCE, ³Quebec Heart and Lung Institute, Québec, QC, CANADA.

5:18 PM - 5:36 PM

Mechanics of deployment and apposition of stent grafts onto the aortic wall

C. Schwarz, **M. L. Raghavan**;

University of Iowa, Iowa City, IA.

5:36 PM - 5:54 PM

The heart assist program and the development of a new percutaneous mitral valve

R. Cecere;

McGill University, Montreal, QC, CANADA.

5:54 PM - 6:12 PM

Transcatheter Aorta Pulmonary Shunt (TAPS)

R. L. Leask, S. Cooper, J. Therrien, R. Mongrain, K. Guo, G. Martucci;

McGill, Montreal, QC, CANADA.

FRIDAY Podium Sessions

6:12 PM - 6:30 PM

Hemodynamic determinants of the ascending aorta

O. F. Bertrand;

Cardiology, Quebec Heart-Lung Institute, Quebec City, QC, CANADA

In Vitro Models of Organ Biomechanics

Session Number: 22-9 Room: 312

Session Chair(s): B. Winkelstein and R. June

5:00 PM - 5:18 PM

Fibrin gel geometry and boundary conditions control structural and compositional matrix reorganization

A. De Jesus, M. Aghvami, **E. Sander;**

University of Iowa, Iowa City, IA.

5:18 PM - 5:36 PM

Cytoskeletal and Membrane Changes Following Blast

P. J. VandeVord, E. Ereifej, C. Hampton;

Virginia Tech University, Blacksburg, VA.

5:36 PM - 5:54 PM

Electrophysiological Changes within the Hippocampus after Controlled Biaxial Deformation

B. Morrison, III, W. Kang;

Columbia University, New York, NY.

5:54 PM - 6:12 PM

High-stiffness agarose as a model for the chondrocyte pericellular matrix: compression-induced metabolomics changes

D. L. Zignego, S. E. Mailiot, **R. K. June;**

Montana State University, Bozeman, MT.

6:12 PM - 6:30 PM

Development of an In Vitro Cardiac Muscle Fiber

G. R. Gaudette¹, J. P. Guyette², J. T. Favreau¹, K. J. Hansen¹, H. C. Ott²;

¹WPI, Worcester, MA, ²Massachusetts General Hospital, Boston, MA.

Inverse Methods in Soft Tissue Biomechanics IV

Session Number: 22-10 Room: 313

Session Chair(s): K. M. Moerman and M. Bol

5:00 PM - 5:18 PM

Imaging the collagen organisation of soft tissues using Second Harmonic Generation Microscopy upon mechanical assay.

A. Benoit¹, G. Latour², M. Schanne-Klein², **J. Allain**¹;

¹Solid Mechanics Laboratory, Ecole Polytechnique, Palaiseau, FRANCE, ²Laboratory for Optics and Biosciences, Ecole Polytechnique, Palaiseau, FRANCE.

5:18 PM - 5:36 PM

A Combined Experimental - Computational Approach to Estimating the Dynamic Friction Coefficient of Brain Tissue

B. Rashid¹, M. Destrade², **M. D. Gilchrist**¹;

¹University College Dublin, IRELAND, ²NUI Galway, IRELAND.

5:36 PM - 5:54 PM

Characterizing Heterogeneous Tissue Deformation using Ultrasound Speckle Tracking

J. Liu, H. Chen, B. Cruz Perez, H. Morris;

Ohio State University, Columbus, OH.

5:54 PM - 6:12 PM

Can we use elastography to visualize the stress distribution within vascular tissues

M. M. Doyley;

University of Rochester, NY.

6:12 PM - 6:30 PM

A Subdomain Method for Estimating Scleral Shell Heterogeneity using an Inverse Finite Element Method Approach

J. P. Vande Geest, A. Ayyalasomayajula;

University of Arizona, Tucson, AZ

Biomechanics of the Posterior Eye II

Session Number: 22-11 Room: 305

Session Chair(s): Vande Geest and Pinsky

5:00 PM - 5:18 PM

Collagen Crimp Period Over The Eye

I. A. Sigal, N. J. Jan, J. L. Grimm, C. Gomez, K. Lathrop;

University of Pittsburgh, PA.

FRIDAY Podium Sessions

5:18 PM - 5:36 PM

An Improved Digital Volume Correlation Algorithm to Map In Vivo Optic Nerve Head Strains in Glaucoma Eyes

M. J. Girard¹, K. Chin¹, N. Strouthidis²;

¹In vivo Biomechanics Laboratory, Department of Biomedical Engineering, National University of Singapore, SINGAPORE, ²NIHR Biomedical Research Centre, Moorfields Eye Hospital NHS Foundation Trust and UCL Institute of Ophthalmology, London, UNITED KINGDOM.

5:36 PM - 5:54 PM

Lens placement in anterior chamber: effect on ocular health

R. Repetto¹, J. H. Siggers², J. O. Pralits¹, P. D. Khongar³;

¹University of Genoa, ITALY, ²Imperial College London, UNITED KINGDOM, ³University of L'Aquila, L'Aquila, ITALY.

5:54 PM - 6:12 PM

Viscoelastic model of vitreous humor: stress on the retina and mass transport

J. H. Siggers¹, R. Repetto², J. Meskauskas³;

¹Imperial College London, UNITED KINGDOM, ²University of Genoa, ITALY, ³Universitaet Goettingen, GERMANY.

6:12 PM - 6:30 PM

Multi-scale modeling of keratoconus progression based on anisotropic sliding and degradation of collagen fibrils

R. Grytz¹, M. Koster², S. Hayes³, C. Boote³, J. W. Ruberti⁴, G. Meschke², K. M. Meek³;

¹University of Alabama at Birmingham, AL, ²Ruhr University Bochum, GERMANY, ³Cardiff University, UNITED KINGDOM, ⁴Northeastern University, Boston, MA

Artificial Lungs

Session Number: 22-12 Room: 301

Session Chair(s): K. E. Cook

5:00 PM - 5:18 PM

Respiratory Dialysis: The New Wave in Extracorporeal CO₂ Removal

W. Federspiel;

University of Pittsburgh, PA.

5:18 PM - 5:36 PM

Oxygenator with Integrated Pulsatile Pump and Heat Exchanger: Development and Testing

R. Borchardt, J. Arens, P. C. Schlanstein, U. Steineseifer;

Institute of Applied Medical Engineering - Helmholtz Institute - RWTH Aachen University, Aachen, GERMANY.

5:36 PM - 5:54 PM

A Pediatric Pump-Lung (PediPL) for Kids, Infants, and Neonates: Challenges and Progress

Z. J. Wu, Y. Liu, P. G. Sanchez, B. P. Griffith;

University of Maryland, Baltimore, MD.

5:54 PM - 6:12 PM

Fluid Mechanical Design of Thoracic Artificial Lungs

K. E. Cook¹, R. E. Schewe², D. J. Skoog²;

¹Carnegie Mellon University, Pittsburgh, PA, ²University of Michigan, Ann Arbor, MI.

6:12 PM - 6:30 PM

Designing Mechanical Support for Pulmonary Hypertension

M. Bacchetta;

Columbia University

Nouveau Biomechanics: Big Data, Community Involvement, Open Science

Session Number: 22-13 Room: 311

Session Chair(s): A. Erdemir

5:00 PM - 5:18 PM

Open Source: Collaboration and Reproducible Science

W. Schroeder¹, B. Davis²;

¹Kitware, Inc., Clifton Park, NY, ²Kitware, Inc., Carrboro, NC.

5:18 PM - 5:36 PM

How Has the Knee Grand Challenge Improved Musculoskeletal Modeling Research?

B. J. Fregly¹, A. L. Kinney¹, T. F. Besier², D. D. D'Lima³;

¹University of Florida, Gainesville, FL, ²University of Auckland, NEW ZEALAND, ³Shiley Center at Scripps Clinic, La Jolla, CA.

5:36 PM - 5:54 PM

Simtk.org - Fostering Collaborations and Reproducibility in Scientific Research

J. P. Ku, J. Hicks, H. Kwong, J. Leskovec, J.

McAuley, R. Pandey, S. L. Delp;

Stanford University, CA.

FRIDAY Podium Sessions

5:54 PM - 6:12 PM

Regulatory Decision Making with Computational Modeling and Simulation

T. M. Morrison, J. C. Coburn, J. N. Hernandez, L. M. Angelone, D. R. Lochner;
US Food and Drug Admin., Silver Spring, MD.

6:12 PM - 6:30 PM

Person-Specific Modeling for Prediction of Future Knee Health in Population-Representative Cohorts

N. A. Segal, A. M. Kern, T. J. Stockman, D. D. Anderson;
University of Iowa, Iowa City, IA.

Spine Biomechanics IV: Patient-Specific Modeling

Session Number: 22-14 Room: Ball-A

Session Chair(s): Noailly and Arjmand

5:00 PM - 5:18 PM

How Does Lumbosacral Spine Geometry Affect Spinal Load-Sharing?

Finite Element Analysis Using Personalized Geometries.

s. Naserkhaki, **M. El-Rich**, G. Kawchuk, J. L. Jaremko;
University of Alberta, Edmonton, AB, CANADA.

5:18 PM - 5:36 PM

A patient-specific prediction platform for spine treatment prognosis

S. Morlacchi¹, J. Noailly², J. M. Pozo¹, A. Biancardi¹, I. Castro¹, J. Arenas¹, A. F. Frangi¹, **D. Lacroix**¹, J. Alsayednoor¹;

¹University of Sheffield, UNITED KINGDOM,

²Biomechanics and Mechanobiology - Institute for Bioengineering of Catalonia, Barcelona, SPAIN.

5:36 PM - 5:54 PM

Muscle model personalization and finite element exploration of the osteoligamentous spine, depending upon muscle activation in supine and standing position

T. Toumanidou¹, T. Dao², K. Ben Mansour², L. Del Rio³, F. Charleux⁴, M. Ho Ba Tho², **J. Noailly**⁴;

¹Biomechanics and Mechanobiology - Institute for Bioengineering of Catalonia (IBEC), Barcelona, SPAIN, ² Biomécanique et Biongénierie, Université de Technologie de Compiègne, Compiègne, FRANCE, ³CETIR Grup Mèdic, Barcelona, SPAIN, ⁴ACRIM-Polyclinique St Côme, Compiègne, FRANCE.

5:54 PM - 6:12 PM

Patient specific bone remodeling to predict changes in bone density after lumbar fusion

M. M. van Rijsbergen, M. Colloca, K. Ito, B. van Rietbergen;
Eindhoven University of Technology, NETHERLANDS.

6:12 PM - 6:30 PM

Intra-voxel micro-elasto-plasticity for CT-based patient-specific fracture risk assessment of vertebrae

R. Blanchard¹, C. Morin², A. Vella³, Z. Sant³, **C. Hellmich**¹;

¹Vienna University of Technology, AUSTRIA, ²Ecole de Mines de St. Etienne, FRANCE, ³University of Malta, Msida, MALTA

Bone Mechanics II

Session Number: 22-15 Room: Ball-B

Session Chair(s): E. Dall'Ara and D. Pahr

5:00 PM - 5:18 PM

Patient-specific Finite Element Modeling of Bone: Validation, Multi-Scale Models, Automatization, and Selected Examples.

D. H. Pahr;

Vienna University of Technology, AUSTRIA.

5:18 PM - 5:36 PM

Multiscale Mechanics of Bone

I. Jasiuk, E. Hamed, A. Setters;
University of Illinois, Urbana, IL.

5:36 PM - 5:54 PM

Mapping bone elasticity: 3D synchrotron imaging, multiscale modeling, and related issues

V. Sansalone¹, V. Bousson², S. Naili¹, F. Peyrin³, J. Laredo², G. Haiat¹;

¹Université Paris-Est, Créteil, FRANCE, ²Université Paris Diderot, FRANCE, ³CREATIS, Lyon, FRANCE.

5:54 PM - 6:12 PM

Fracture Prediction in Bones using Basic Engineering Principles in Clinical Settings

A. Nazarian;

Harvard, Boston, MA.

FRIDAY Podium Sessions

6:12 PM - 6:30 PM

Individual-specific Finite Element Modelling of Paediatric Femora

X. Li¹, M. Viceconti¹, G. C. Reilly², M. J. Carré¹, A. C. Offiah³;

¹Department of Mechanical Engineering, University of Sheffield, UNITED KINGDOM, ²Department of Materials Science and Engineering, University of Sheffield, UNITED KINGDOM, ³Academic Unit of Child Health, University of Sheffield, UNITED KINGDOM

Dental Mechanics II

Session Number: 22-16 Room: 308
Session Chair(s): N. Inou and J. Morton

5:00 PM - 5:18 PM

Changes in the Biomechanical Properties of the Periodontal Ligament following Orthodontic Treatment and Periodontitis

C. Bourauel, A. Konermann, R. Al-Malat, C. Dirk, S. Reimann, A. Jäger, L. Keilig;
University of Bonn, GERMANY.

5:18 PM - 5:36 PM

The influence of bone's elasticity on the apical migration of a natural tooth connected to an osseointegrated implant with a non-rigid attachment. A 3D Finite Element Analysis (FEA)
A. Tsouknidas¹, D. Giannopoulos², K. Michalakis³, S. Savvakis⁴, N. Michailidis¹, E. Lympoudi¹, A. Pissiotis⁵;

¹Department of Mechanical Engineering, Aristotle University of Thessalonik, GREECE, ²Aristotle University of Thessaloniki School of Dentistry, GREECE, ³Tufts University School of Dental Medicine and Department of Mechanical Engineering, Aristotle University of Thessalonik, Boston, MA, ⁴BETA CAE Systems S.A., Thessaloniki, GREECE, ⁵Department of Prosthodontics, Aristotle University of Thessaloniki School of Dentistry, GREECE.

5:36 PM - 5:54 PM

An innovative universal system for 3D force-moment measurements in orthodontics: in vitro testing

M. Mencattelli¹, M. Cultrone², C. Stefanini¹;

¹The Biorobotics Institute, Scuola Superiore Sant'Anna, Pontedera (Pisa), ITALY, ²Studio Dentistico Cultrone, Pontedera (Pisa), ITALY.

5:54 PM - 6:12 PM

Comparative evaluation of the effect of implant length and crown height in edentulous patients: A Finite Element study

G. Casaroli¹, N. Cavalli², L. Francetti², F. Galbusera³, T. Villa¹;

¹Politecnico di Milano, Milan, ITALY, ²Università degli studi di Milano, Milan, ITALY, ³IRCCS Istituto Ortopedico Galeazzi, Milan, ITALY.

6:12 PM - 6:30 PM

Predicting Bone Remodelling Stimulus Around Root-Form Dental Implants

C. J. Woods, A. Taylor, M. Browne, A. Dickinson;
University of Southampton, UNITED KINGDOM.

Control of Swimming – From External to Internal Mechanics

Session Number: 22-17 Room: 307
Session Chair(s): U. Muller and E. Tytell

5:00 PM - 5:18 PM

Optimality Analyses of Carangiform and Anguilliform Swimming

S. Kohannim¹, J. Chen², T. Iwasaki¹;

¹UCLA, Los Angeles, CA, ²University of Virginia, Charlottesville, VA.

5:18 PM - 5:36 PM

The Role of Mechanical Resonance in the Neural Control of Swimming in Fish

E. D. Tytell¹, C. Hsu², L. J. Fauti³;

¹Tufts University, Medford, MA, ²Feng Chia University, Taichung, TAIWAN, ³Tulane University, New Orleans, LA.

5:36 PM - 5:54 PM

Locomotor variations: how the dynamic mechanical behavior of cartilaginous backbones differs by anatomical region and ontogenetic stage

M. E. Porter¹, J. H. Long, Jr²;

¹Florida Atlantic University, Boca Raton, FL, ²Vassar College, Poughkeepsie, NY.

5:54 PM - 6:12 PM

Mimicking fish-muscle action in anguilliform swimming

B. THIRIA;

PMMH-ESPCI, Paris, FRANCE.

6:12 PM - 6:30 PM

Pectoral fin mechanoreception and its function in swimming.

R. Williams, IV, M. E. Hale;

Univ. of Chicago, IL.

FRIDAY Podium Sessions

Innovative Techniques for Improving Gait: Stroke & Cerebral Palsy II

Session Number: 22-18 Room: 310
Session Chair(s): K.M. Steele and J. Higginson

5:00 PM - 5:18 PM

Capitalizing on motor learning principles to improve post-stroke gait biomechanics
D. Chen, **T. Kesar**;
Emory University, Atlanta, GA.

5:18 PM - 5:36 PM

Gait-Related Alterations in the Sensorimotor Cortical Activity of Children with Cerebral Palsy
M. J. Kurz, T. W. Wilson;
Univ of Nebraska Medical Center, Omaha, NE.

5:36 PM - 5:54 PM

FES To Enhance Fitness, Activity and Walking in Cerebral Palsy.
S. C. K. Lee;
University of Delaware, Newark, DE.

5:54 PM - 6:30 PM

Device-Augmented Strategies to Enhance Mobility and Plasticity in Cerebral Palsy
D. Damiano;
National Institutes of Health, Bethesda, MD.

Motion Synthesis & Planning

Session Number: 22-19 Room: 303
Session Chair(s): Dorn

5:00 PM - 5:18 PM

Robotics-based Synthesis and Analysis of Human Natural Motion
E. Demircan;
Stanford University, Stanford, CA.

5:18 PM - 5:36 PM

Optimality and System Identification of Neural Feedback Control of Locomotion
T. Kiemel¹, D. Logan¹, K. A. Hoffman², J. J. Jeka³;
¹University of Maryland, College Park, MD,
²University of Maryland, Baltimore County, Baltimore, MD, ³Temple Univ, Philadelphia, PA.

5:36 PM - 5:54 PM

A Hybrid Walking Simulation Combining Reflex-Based and Dynamic Optimization Methods
S. J. Piazza, H. Celik;
Penn State University, University Park, PA.

5:54 PM - 6:12 PM

Simulations of Human Motion with Phase Transitions

M. Ackermann;

FEI University Center, São Bernardo do Campo, BRAZIL.

6:12 PM - 6:30 PM

Synthesizing sports movements using task-based trajectory optimization
P. Kugler

Running II

Session Number: 22-20 Room: 304
Session Chair(s): R. Kram

5:00 PM - 5:18 PM

Lumbopelvic Mechanics During Running Following Childbirth
E. Chumanov, M. Stiffler, B. Heiderscheit;
University of Wisconsin - Madison, WI.

5:18 PM - 5:36 PM

Built for Running: Why the Ankle Matters
S. S. M. Lee¹, S. J. Piazza²;
¹Northwestern University, Chicago, IL, ²The Pennsylvania State University, University Park, PA.

5:36 PM - 5:54 PM

Foot Posture in Human Running: Energetics, Muscle Actions, and Ground Reaction Forces
A. H. Gruber¹, K. A. Boyer¹, T. R. Derrick², B. R. Umberger¹, J. Hamill¹;
¹University of Massachusetts Amherst, MA, ²Iowa State University, Ames, IA.

5:54 PM - 6:12 PM

The Influence of Tendon Compliance on Gastrocnemius Energetics During Running at Different Speeds
G. Lichtwark¹, A. Lai², A. Schache², M. Pandy²;
¹The University of Queensland, Brisbane, AUSTRALIA, ²The University of Melbourne, AUSTRALIA.

6:12 PM - 6:30 PM

Modeling and scaling of spring constants in 'bouncing' gaits
D. V. Lee¹, C. P. McGowan²;
¹University of Nevada Las Vegas, NV, ²University of Idaho Moscow, ID.

BS(-2) Osmotic Loading Environment Alters Intervertebral Disc Mechanical Function

S. Bezci, J. Felipe, G.D. O'Connell
University of California, Berkeley, CA

BS(-1) Initiation effect of hepatocyte-endothelial cell co-culture on capillary morphogenesis in a microfluidic device

S. Menjo, R. Sudo;
Keio University, Yokohama, JAPAN

BS0 Multiscale Modeling of the Cervical Facet Capsular Ligament During Tensile Joint Loading

J. Zitnay¹, S.P. Lake², K.P. Quinn³, D.J. Lee³, B.A. Winkelstein³, V.H. Barocas¹;
¹University of Minnesota, MN, ²Washington University, St. Louis, MO, ³University of Pennsylvania, Philadelphia, PA

BS1 A Computational Analysis of Contact Stresses in the Glenoid Component of Shoulder Implants

R. Parrish, F. Ansari, L. Pruitt;
University of California, Berkeley, CA.

BS2 Evaluation of mechanical properties of bone in proton pump knock-out mice treated with gastrin receptor antagonist using three-point bending and nanoindentation tests.

M. Ramezanzadehkoldeh¹, K. M. Aasarød², R. Fossmark², U. Syversen², B. Skallerud¹;
¹Department of Structural engineering, Norwegian University of Science and Technology (NTNU), Trondheim, NORWAY, ²Department of Cancer Research and Molecular Medicine, Norwegian University of Science and Technology (NTNU), Trondheim, NORWAY.

BS3 Utilization of Peak Extraction Force of Kirschner (K-) Wire as a Predictor of Bone Mineral Density (BMD)

S. C. Denning, R. C. Pisano, III, A. Dincer, T. R. Bowen, D. M. Ebenstein, E. A. Kennedy;
Bucknell University, Lewisburg, PA.

BS4 Quantification of neural tissue deformation in type 1 Chiari malformation patients pre- and post-spinal decompression surgery and comparison to controls

M. Majcher¹, N. Shaffer¹, F. Loth¹, M. Luciano², J. Oshinski³, B. Martin¹;
¹Conquer Chiari Research Center, University of Akron, Akron, OH, ²Department of Pediatric Neurosurgery, Cleveland Clinic Foundation, Cleveland, OH, ³Department of Radiology, Emory University, Atlanta, GA.

BS5 Computational Comparison of Surgical Techniques in Coronary Artery Revascularization

C. Chu¹, A. B. Ramachandra², A. Kahn³, A. Marsden²;
¹Department of Bioengineering, UCSD, La Jolla, CA, ²Department of Mechanical and Aerospace Engineering,

UCSD, La Jolla, CA, ³Department of Medicine, UCSD, La Jolla, CA.

BS6 Numerical Simulation of Superior Sagittal Sinus Hemodynamics

D. M. Casey¹, B. A. Martin¹, G. A. Bateman², S. H. Pahlavian¹, N. Shaffer¹, K. Smith, Jr.¹, F. Loth¹;
¹University of Akron, OH, ²John Hunter Hospital, Newcastle, AUSTRALIA.

BS7 Feasible Ranges of Muscle Activation Quantify Musculoskeletal Redundancy in Human Walking

C. S. Simpson¹, M. H. Sohn¹, J. L. Allen², L. H. Ting²;
¹Georgia Institute of Technology, Atlanta, GA, ²Georgia Institute of Technology and Emory University, Atlanta, GA.

BS8 Integrating Finite Element Modeling and Musculoskeletal Dynamic Simulation for Evaluating the Effects of Meniscectomy on Tibiofemoral Mechanics In Vivo

R. E. Carey, L. Zheng, C. D. Harner, X. Zhang;
University of Pittsburgh, PA.

BS9 Evaluation of 2D Ultrasound Elastography for the Measurement of Non-uniform Displacements and Strains

A. C. Ehlers, L. Chernak Slane, D. G. Thelen;
University of Wisconsin-Madison, WI.

BS10 Tissue Bond Strength and Intraluminal Temperature as a Function of Applied Fusion Pressure

N. S. Anderson, E. Kramer, J. Cezo, V. L. Ferguson, M. E. Rentschler;
University of Colorado, Boulder, CO.

BS11 Mesenchymal Stem Cells as a Trojan Horse Therapy for Prostate Cancer

J. W. Ngai, J. M. Karp;
Harvard Medical School, Boston, MA.

BS12 Characterization of gait abnormalities in individuals affected by Multiple Sclerosis by means of the Gait Profile Score

G. Pilloni¹, G. Coghe¹, M. Galli², M. Pau¹;
¹University of Cagliari, ITALY, ²Polytechnic of Milan, ITALY.

BS17 A Quantitative Analysis of Cerebrospinal Fluid (CSF) Flow in Pediatrics with Type I Chiari Malformation

S. Sarda¹, J. J. Chern¹, N. K. Desai², J. N. Oshinski³;
¹Pediatric Neurosurgery Associates, Children's Healthcare of Atlanta, Atlanta, GA, ²Department of Radiology and Imaging Sciences, Emory University School of Medicine, Atlanta, GA, ³Department of Biomedical Engineering, Emory University School of Medicine and Georgia Institute of Technology, Atlanta, GA.

BS18 Effect of Remote Subthreshold Vibrotactile Noise on Hand Function Post-Stroke

M. Kosmopoulos, P. Hur, L. Enders, N. Seo;
University of Wisconsin-Milwaukee, Milwaukee, WI.

BS19 Prevention of Falls among the Elderly: A Novel Design for a Mobility Enhancing Walking Assistive Device

R. Parrish, G. Kim, N. Goldman, A. Dickey;
University of California, Berkeley, CA

BS13 Pinched Flow Microfluidic Ordering for Droplet Based Single Cell Kinase Activity Assay

C. Chen¹, R. Ramji¹, M. Wang¹, A. Bhagat², D. Weng³, C. Lim¹;
¹National University of Singapore, SINGAPORE, ²Clearbridge Biomedics, SINGAPORE, ³National Cancer Centre Singapore, SINGAPORE.

BS14 A Full Field non-Stereological Method for Quantifying Axon Counts in Optic Nerves

T. M. Cahir, F. Danford, T. Day, J. P. Vande Geest;
University of Arizona, Tucson, AZ.

BS15 Identification of Potential Possibility of Radiolucent Line Occurrence beneath Metal Block Augmentation during High Deep Flexion: Finite Element Analysis

D. Lim¹, J. Lee¹, J. Yum¹, Y. Jang¹, J. Kim², S. Lee³;
¹Sejong University, Seoul, REPUBLIC OF KOREA, ²Konyang University, Nonsan, REPUBLIC OF KOREA, ³Inje University, Seoul, REPUBLIC OF KOREA.

BS16 Gel Electrophoresis as a Simple Method to Measure Differences in the Permeability of Tissues

M. D. Hunckler, J. M. R. Tilley, R. K. Roeder;
University of Notre Dame, Notre Dame, IN.

BS20 Dynamic Moduli of Immature Ovine Vitreous using Advanced Rheology Techniques

J. Colter, A. Williams, P. R. Moran, B. Coats;
University of Utah, SLC, UT.

BS21 Homogeneously Distributed, Low Lap Region Strain in Cadaveric Lumbar AF Shear Lap Test

M. Golman, T. M. Nagel, V. H. Barocas;
University of Minnesota, Minneapolis, MN.

BS22 QuadCrew: Developing New Adaptive Equipment To Allow Quadriplegics To Row On A Crew Team

S. M. Masters, R. D. Bryant, M. A. Wessel, M. C. Imm;
University of Delaware, Newark, DE.

BS23 Characterization of Lubrication in the Temporomandibular Joint

B. Zimmerman, D.L. Burris, X. Lu;
University of Delaware, Newark, DE.

MS433 Potential Benefits of Cooperative Shared Control

K. Babecki, M. L. Tanaka;
Western Carolina University, Cullowhee, NC.

MS434 Development of a novel in-vitro thrombogenicity test methodology to clarify the risk of thrombus detachment from inflow cannula of left ventricular assist devices

A. Takahashi¹, K. Iwasaki¹, Y. Matsuhashi¹, M. Hirata¹, M. Nagai², K. Yamazaki³, M. Umezu¹;
¹Center for Advanced Biomedical Sciences, TWIns, Waseda University, Shinjuku-ku Tokyo, JAPAN, ²Department of Anesthesiology, Tokyo Women's Medical University, Shinjuku-ku Tokyo, JAPAN, ³Department of Cardiovascular Surgery, Tokyo Women's Medical University, Shinjuku-ku Tokyo, JAPAN.

MS435 Multi-scale Computational Fluid Dynamic Modeling of Owl's Silent Flight

C. Rao, H. Liu;
Graduate School of Engineering, Chiba University, Chiba, JAPAN.

MS436 Maternal Bone Regains Mechanical Competence after Lactation by Increasing the Thickness and Altering the Structure Type of the Remaining Trabeculae

C. M. J. de Bakker, A. R. Altman, C. Li, X. S. Liu;
University of Pennsylvania, Philadelphia, PA.

MS437 Increased Endocortical Formation and Periosteal Resorption in Premenopausal Women with Idiopathic Osteoporosis Treated with 18 Months of Intermittent Parathyroid Hormone.

M. Tribble¹, A. Cohen², C. de Bakker¹, K. Nishiyama², E. Shane², X. Liu¹;
¹University of Pennsylvania, Philadelphia, PA, ²Columbia University, New York, NY.

MS438 3-D Probabilistic Modeling of Trabecular Plates and Rods in Human Femoral Neck

A. Morshed¹, D. Mecke¹, J. Wang², E. Guo², X. Wang¹;
¹University of Texas at San Antonio, San Antonio, TX, ²Columbia University, New York City, NY.

MS439 Investigation of relationship between hemodynamics and wall pathology of human unruptured cerebral aneurysms

T. Sugiura¹, Y. Tobe¹, K. Kawamura², T. Yagi¹, Y. Iwabuchi¹, M. Yamanashi¹, K. Takamura¹, M. Umezu¹, Y. Hayashi³, H. Yoshida³, K. Nishitani³, Y. Okada³, S. Kitahara³;
¹Waseda University, Tokyo, JAPAN, ²Akita University Graduate School of Medicine, Akita, JAPAN, ³Kitahara International Hospital, Tokyo, JAPAN.

MS440 Modeling the Time-Dependent Intrapericardial Pressure-Volume Relationship with Effusion

R. Metoyer, Jr.¹, B. Smith²;
¹North Carolina State University, Raleigh, NC, ²Applied Research Associates, Raleigh, NC.

MS441 Effect of unidirectional VEGF supply on the formation of capillary networks with pericytes in a microfluidic device

K. Uwamori;
Keio University, Yokohama, JAPAN.

MS442 Neuromusculoskeletal Modeling of the Knee Joint before and after Anterior Cruciate Ligament Reconstruction - A Five Year Follow-up Study

A. Khandha, E. Gardinier, J. Capin, K. Manal, L. Snyder-Mackler, T. Buchanan;
University of Delaware, Newark, DE.

MS443 Prediction of core body temperature, sweat rate, cardiac output and stroke volume for firefighters using a 3D whole body model

S. A. Zachariah, A. K. Paul, A. Bhattacharya, R. K. Banerjee;
University of Cincinnati, OH.

MS444 A Preliminary Investigation of the Biomechanical Effects of Osteoarthritis Variables in the Human First Metatarsophalangeal Joint Using A Finite Element Approach

X. Chen¹, G. R. DiResta¹, P. S. Walker², S. Rao³;
¹Polytechnic School of Engineering of New York University, Brooklyn, NY, ²Department of Orthopaedic Surgery, New York University Hospital for Joint Diseases, NY, ³Department of Physical Therapy, Steinhardt School of Culture, Education and Human Development, New York University, NY.

MS445 Structural Effects of Cartilage Mechanical Properties in Finite Element Analysis of the Knee Joint

G. Torres-Gutierrez, A. Vidal-Lesso, R. Lesso-Arroyo, R. C. Ramos-Santillano;
Instituto Tecnológico de Celaya, MEXICO.

MS446 Using Biaxial Material Properties in Hyperelastic Anisotropic Model to Evaluate Damage in the Annulus Fibrosus

N. Momeni Shahraki, V. Goel, A. Fatemi;
University of Toledo, OH.

MS447 Prediction equations for leg kinematics and kinetics during slope walking and running

S. Mizrachi¹, R. Riemer¹, G. S. Sawicki²;
¹Ben-Gurion University of the Negev, Beer-Sheva, ISRAEL, ²North Carolina State University, Raleigh, NC.

Monday Poster Session - MS Poster Competition

MS448 Effect of graded facetectomy on motion response of an asymmetric finite element model of lumbar spine

C. R. Hassan, I. Zafarparandeh, I. Lazoglu, A. F. Ozer, D. U. Erbulut;
KOC University, Istanbul, TURKEY.

MS449 Kinematic Analysis of Sit-to-Walk Movement in a Fall-Prone Population

M. Christman, J. Morse, N. Godfrey, C. Wilson, D. Blowski,
A. Doig, A. Merryweather;
University of Utah, Salt Lake City, UT.

MS450 The Effects of Fatigue on Joint Kinematics during Running Using a Waveform Analysis Approach

L. Benson, K. O'Connor;
University of Wisconsin Milwaukee, WI.

MS451 Comparison of unilateral drop landings and land-and-cut maneuvers

E. Pitman, K. Fontenot, Z. A. Sievert, J. T. Weinhandl;
Old Dominion University, Norfolk, VA.

MS452 The influence of gender and limb dominance on lower extremity joint mechanics during land-and-cut maneuvers

K. Fontenot, E. Pitman, Z. A. Sievert, J. T. Weinhandl;
Old Dominion University, Norfolk, VA.

MS453 Bilateral Quadriceps Inhibition in Unilateral Anterior Knee Pain is Not Attributable to Gamma Loop Dysfunction.

T. G. J. Ingram, J. M. Roddick, J. M. Byrne;
Memorial University, St. John's, NL, CANADA.

MS454 Symmetrical Gait Deviations in Patients with Unilateral Piriformis Syndrome

H. Huang¹, C. Wang², S. Hong¹, T. Lu¹;
¹Biomedical Engineering, National Taiwan University, Taipei, TAIWAN, ²Department of Orthopaedic Surgery, School of Medicine, National Taiwan University, Taipei, TAIWAN.

MS455 Characteristics of Ground Reaction Force During a Backward Somersault and Drop Landing

K. Kmiecik;
Ball State University, Muncie, IN.

MS456 MR-based analysis of patellofemoral cartilage contact, thickness, and alignment during deep knee flexion.

B. R. Freedman¹, A. L. Lerner²;
¹University of Pennsylvania, Philadelphia, PA, ²University of Rochester, NY.

MS457 A Comparison of the Starting Angle of Thigh-Calf Contact between Sexes During High Knee Flexion Activities

T. McGillivray, A. Epp-Strobbe, S. Acker;
University of Waterloo, ON, CANADA.

MS458

Novel application of a μ CT perfusion technique to evaluate Achilles tendon vessel microarchitecture in three dimensions

B. R. Freedman, W. Tseng, G. W. Fryhofer, X. S. Liu, L. J. Soslowsky;
University of Pennsylvania, Philadelphia, PA.

MS459 A Microstructural Constitutive Framework for Injured Ligament

C. J. Sundgren, E. Rust, R. J. Brown, T. J. Lujan;
Boise State University, Boise, ID.

MS460 Shear Wave Speed as a Correlate Measure of Tendon Mechanical Properties During Healing

J. A. Martin, A. H. Biedrzycki, D. G. Thelen;
University of Wisconsin - Madison, Madison, WI.

MS461 Micromechanical Stimulation of 3D Tissue-Engineered Microtissues Using a Piezoelectric Actuated Cantilevers

M. J. Walker¹, A. R. West², P. Gratzner¹, J. Brown¹, G. N. Maksym¹;
¹Dalhousie University, Halifax, NS, CANADA, ²University of Manitoba, Winnipeg, MB, CANADA.

MS462 Impact of stent platform on wall shear stress distributions after implantation: insights from computational fluid dynamics simulations using optical coherence tomography and coronary CT angiography

J. K. Hughey¹, H. Otake², K. Hirata², J. F. LaDisa, Jr.¹;
¹Marquette University / Medical College of Wisconsin, Milwaukee, WI, ²Kobe University Graduate School of Medicine, Kobe, JAPAN.

MS463 Characterization of Essential Tremor in Seven Degrees of Freedom of the Upper Limb

D. Geiger, S. K. Charles;
Brigham Young University, Provo, UT.

MS464 How Important is the Smooth Transition of Pericellular Matrix Properties to the Chondrocyte Microenvironment? A Multiscale Finite Element Study of Healthy and Osteoarthritic Cases.

S. C. Sibole, W. Herzog;
University of Calgary, Calgary, AB, CANADA.

MS465

Network Modeling Approach to Predict Myofibroblast Differentiation

A. K. Schroer, W. Merryman;
Vanderbilt University, Nashville, TN.

MS466 More sustained neuromuscular activation patterns during gait are associated with obesity

P. Amiri, C. Hubble-Kozey, M. Dunbar, W. Stanish, J. Astephen Wilson;
Dalhousie University, Halifax, NS, CANADA.

MS467 Variability structure in hand-rim peak force during manual wheelchair propulsion: A pilot study.

Y. Moon, C. Jayaraman, J. J. Sosnoff;
University of Illinois at Urbana-Champaign, Urbana, IL.

MS468 Muscular Stabilization Strategies associated with Knee-osteoarthritis

H. J. Bigham, T. E. Flaxman, A. J. J. Smith, D. L. Benoit;
University of Ottawa, Ottawa, ON, CANADA.

MS469 Importance of hydration on enhancing corneal properties due to riboflavin UVA-induced collagen crosslinking treatment

A. Rahimi, H. Hatami-Marbini;
Oklahoma State University, Stillwater, OK.

MS470 Glenohumeral Joint Kinematics During Activities of Daily Living (ADLs) Following Single Tendon Rotator Cuff Repair

R. Inawat¹, J. Fritz¹, B. Slavens², L. Rankine³, D. Micksh³, S. Grindel³, S. Tarima⁴, G. Harris¹;
¹Orthopaedic and Rehabilitation Engineering Center, Marquette University/Medical College of Wisconsin, Milwaukee, WI, ²Rehabilitation Research Design and Disability (R2D2) Center, University of Wisconsin-Milwaukee, WI, ³Department of Orthopaedic Surgery, Medical College of Wisconsin, Milwaukee, WI, ⁴Division of Biostatistics, Medical College of Wisconsin, Milwaukee, WI.

MS471 Morphology and Density Variations in Bi-Concave Osteoarthritic Glenoids

N. K. Knowles, L. Ferreira, G. Athwal;
Western University, London, ON, CANADA.

MS472 Finite element analysis of bone stresses after an implantation of a new design of porous titanium coated hip prosthesis

J. Garcia¹, N. Nuño¹, C. M. Atienza², M. Utrera²;
¹École de technologie supérieure - Laboratoire de recherche en imagerie et orthopédie, Montréal, QC, CANADA, ²Instituto de Biomecánica de Valencia and Ciber-Bioingeniería, Biomateriales y Nanomedicina, Valencia, SPAIN.

MS473 Induced Kinetic Adaptations During Sit-to-Stand Using a Robotic Exoskeleton

J. M. Elrod, T. McGuirk, C. Patten;
University of Florida, Gainesville, FL.

MS474 Alterations of Relative Muscle Activation (Contributions) in Straight and Revolution Gaits due to Hemiplegia

D. Lim¹, H. Jung¹, S. Lee²;
¹Sejong University, Seoul, REPUBLIC OF KOREA, ²Inje University, Gimhae, REPUBLIC OF KOREA.

MS475 Modifiable determinants of physical function in older women with knee osteoarthritis

A. B. Kuntz, E. G. Wiebenga, E. C. Brenneman, H. S. Longpre, M. R. Maly;
McMaster University, Hamilton, ON, CANADA.

MS476 The effect of age and seat height on sit-to-stand transfer lower limb and trunk biomechanics and muscle activation

S. T. Hurley, D. J. Rutherford, C. L. Hubble-Kozey;
Dalhousie University, Halifax, NS, CANADA.

MS477 Movement related increases in toe arterial blood pressure during cycling: the effect of mechanical power output and cycling cadence

J. Goreham, D. Kimmerly, M. Ladouceur;
Dalhousie University, Halifax, NS, CANADA.

MS478 Transport and Deposition of Non-Spherical Aerosols in Pulmonary Acinar Airways

L. Shachar Berman, P. Hofemeier, Y. Delorme, S. Frankel, J. Sznitman;
Technion, Haifa, ISRAEL.

MS479 Experimental Measurement of the Progression of Vertebral Fracture Under Anterior Flexion

T. M. Jackman, A. I. Hussein, E. F. Morgan;
Boston University, Boston, MA.

MS480 Audio and Visual Biofeedback as Methods of Gait Retraining to Reduce Tibial Acceleration upon Foot Strike

A. M. Morgan, C. M. Meinerz, P. J. Malloy, C. F. Geiser, K. Kipp;
Marquette University, Milwaukee, WI.

MS481

The Impact of Headgear on the Effectiveness of a Female Soccer Header

J. Batty¹, J. White²;
¹U.S. Army Natick Soldier Research, Development and Engineering Center, Natick, MA, ²University Of Portsmouth Department of Sport and Exercise Science, Portsmouth, UNITED KINGDOM.

Monday Poster Session - MS Poster Competition

MS482 Effects of fatigue, extended duration exercise, and variation of size and geometry of SCBA pack on firefighters' ability to cross stationary obstacles

M. J. Angelini¹, R. M. Kesler², M. N. Petrucci¹, K. S. Rosengren³, G. P. Horn², E. T. Hsiao-Wecksler¹;
¹University of Illinois at Urbana-Champaign, Urbana, IL,
²Illinois Fire Service Institute, Champaign, IL,
³Northwestern University, Evanston, IL.

MS483 Mechanical Properties of Nanofibered PVDF Membrane, Yarn and Coil

j. huang, A. Dyson, M. Baniasadi, M. Jolandan;
University of Texas Dallas, Dallas, TX.

MS484 Study of Collagen Structure Remodeling in Response to Tension in Wound Healing Process Using a Novel Three-Dimensional Culture Model for Fibroblast

K. Shikano, S. Miyata;
Keio University, Yokohama, JAPAN.

MS485 Tensile property of stem cell-based self-assembled tissues (scSAT) cultured on a

nanoperiodic structured titanium surface

Y. Tani¹, K. Oya², N. Sugita³, N. Nakamura³, H. Fujie¹;
¹Tokyo Metropolitan University, Tokyo, JAPAN, ²Tokai University, Kanagawa, JAPAN, ³Osaka University Medical School, Osaka, JAPAN.

MS486 Optimization of Human Decellularized Adipose Tissue for Human Breast Implantation

E. Omid, L. Flynn, A. Samani;
Western University of Ontario, London, ON, CANADA.

MS487 Mechanisms of tumor cell extravasation in an in vitro microvascular network platform

M. B. Chen, J. Jeon, J. Whisler, R. Kamm;
Massachusetts Institute of Technology, Cambridge, MA.

MS488 Head FE models to evaluate primary response to blast loading and protection

D. Singh, D.S. Cronin;
University of Waterloo, ON, CANADA.

ADHESION

M24 Distinct Binding Kinetics of Mac-1 and LFA-1 in Neutrophil Activation
N. Li, D. Mao, M. Wang, S. Lü, C. Tong, Y. Zhang, M. Long;
Center of Biomechanics and Bioengineering and Key Laboratory of Microgravity (National Microgravity Laboratory), Institute of Mechanics, Chinese Academy of Sciences, Beijing, CHINA.

BASIS OF DISEASE

M25 Assessment and Regulation of Cellular Mechanics during Metastasis in Epithelial to Mesenchymal Transition Models
L. I. Volakis, R. Zielinski, R. Li, D. A. Kniss, S. N. Ghadiali;
The Ohio State University, Columbus, OH.

BIOIMAGING & BIO-OPTICS

M26 Two-dimensional Brain Deformation in Specific Anatomical Regions During Mild Angular Head Acceleration
A. K. Knutsen¹, E. Magrath¹, J. McEntee¹, F. Xing², J. L. Prince², P. V. Bayly³, J. Butman⁴, D. L. Pham¹;
¹The Henry M. Jackson Foundation, Bethesda, MD, ²Johns Hopkins University, Baltimore, MD, ³Washington University, St. Louis, MO, ⁴National Institutes of Health, Bethesda, MD.

M27 A two-dimensional laser diffraction scanner for quantifying sarcomere length variability in whole muscle sections
S. O'Connor, R. Lieber;
University of California, San Diego, San Diego, CA.

M28 Image Processing on Magnetic Resonance Images of Female Pelvic Cavity using Deformable Models
J. M. Tavares, R. M. N. Jorge, Z. Ma;
Faculdade de Engenharia da Universidade do Porto, PORTUGAL.

M29 4-Dimensional Ultrasound Imaging of Left-Ventricular Dynamics
F. W. Damen¹, Y. T. Delorme², S. H. Frankel², P. P. Vlachos³, C. J. Goergen¹;
¹Biomedical Engineering, Purdue University, West Lafayette, IN, ²Mechanical Engineering, Technion – Israel Institute of Technology, Haifa, ISRAEL, ³Mechanical Engineering, Purdue University, West Lafayette, IN.

M30 A comparison of standard and telecentric lenses for use in 3D digital image correlation strain measurements
R. Kope, L. Ferreira, S. Bashar;
Western University of Canada, London, ON, CANADA.

BIO-INSPIRED DESIGN

M31 Transtibial Liner Donning System
S. B. Sutherland, J. Simonson, J. Rainey, A. Labrum, M. Guthrie;
University of Idaho, Moscow, ID.

BIOMATERIALS

M32 A novel shear flow-based method to measure tissue and cell stiffness
Y. Hu, E. Bartolák-Suki, T. Wellman, C. L. N. de Oliveira, B. Suki;
Boston University, Boston, MA.

M33 Fabrication of 3D mesh structure for biodegradable drug-eluting stent by rapid prototyping
S. Park, J. Lee, W. Kim;
Korea Institute of Machinery & Materials, Daejeon, REPUBLIC OF KOREA.

M34 Designing nanofibrous materials for bioscience and medical applications
H. Zhu;
Cardiff University, UNITED KINGDOM.

M35 Viscoelastic effects of silicone gels on cellular traction force measurements
K. Kenry, M. Leong, M. Nai, F. Cheong, C. Lim;
National University of Singapore, SINGAPORE.

M36 Are We Performing Mechanical Tests Correctly on Ceramic Cements? - A Study on Calcium Sulphate Dihydrate
I. Koh¹, A. Lopez², B. Helgason¹, S. Ferguson¹;
¹Institute for Biomechanics, ETH-Zurich, Zurich, SWITZERLAND, ²Division of Applied Materials Science, The Ångström Laboratory, Uppsala University, SWEDEN.

M37 Assessing Local Ca²⁺ Concentrations in Calcium Phosphate Scaffolds by Computational Modelling
V. Manhas¹, Y. Guyot¹, Y. Chai², G. Kerckhofs¹, J. Schrooten², L. Geris¹;
¹University of Liege, BELGIUM, ²KULeuven, BELGIUM.

M38 The Effect of Fluid Shear Stress on in vitro Degradation of Poly(lactide-co-glycolide) Acid Membrane
Z. Chu, Q. Zheng, P. Xu, M. Guo, Y. Hou, Y. Fan*;
Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education, School of Biological Science and Medical Engineering, Beihang University, Beijing, CHINA.

M39 Active Biomaterial Cues for Directed Neurite Outgrowth.

H. G. Sundararaghavan, T. J. Whitehead, M. R. Wrobel;
Wayne State University, Detroit, MI.

BIOMECHANICAL INSTRUMENTATION

M40 A comparison of alternative 3D marker sets for tracking pelvic motion during gait

P. Bruno, J. Barden;
University of Regina, SK, CANADA.

M41 A Compact Apparatus for Stimulation of Endothelial Cells with Patient Specific Flow Patterns

M. Franzoni¹, I. Cattaneo¹, A. Remuzzi²;
¹IRCCS - Istituto di Ricerche Farmacologiche Mario Negri, Bergamo, ITALY, ²Department of Industrial Engineering, University of Bergamo, Dalmine (Bergamo), ITALY.

M42 Method And Apparatus For Creating In-Vitro Pulsatile Flow In Test Loops

R. Slazas;
Codman Neuro, Miami, FL.

M43 A first look at a closed loop IMU and FSR based feedback system for delivery of functional electrical stimulation during walking

N. Zahradka¹, A. Behboodi¹, K. Lenoir¹, M. S. Marion¹, H. Wright¹, A. Zarkou¹, M. Torres¹, E. Sazonov², S. C. K. Lee¹;
¹University of Delaware, Newark, DE, ²University of Alabama, Tuscaloosa, AL.

M44 Investigation on Actuation and Detection Mechanism of a Dental Osseointegration Detection Device

T. Chia¹, C. Chen², M. Pan¹;
¹National Central University, Jhongli, TAIWAN, ²Sijhih Cathay General Hospital, New Taipei City, TAIWAN.

M45 An Electrical Power Supply System for Instrumented Hip Joint Prostheses

M. Soares dos Santos¹, J. A. F. Ferreira², D. R. Fernandes², A. Ramos¹, J. A. O. Simões²;
¹Centre for Mechanical Technology and Automation, University of Aveiro; Department of Mechanical Engineering, University of Aveiro, PORTUGAL, ²Department of Mechanical Engineering, University of Aveiro, PORTUGAL.

M46 Reliability of Tekscan Sensors for Measuring Pressure Distribution on the Skin of Human Subjects

P. D. Wettenschwiler¹, R. Stämpfli¹, S. Lorenzetti², S. J. Ferguson², R. Rossi¹, S. Annaheim¹;
¹Empa, Swiss Federal Laboratories for Materials Science and Technology, St. Gallen, SWITZERLAND, ²Institute for Biomechanics, ETH Zurich, SWITZERLAND.

M47 An in vitro Experimental Model to Evaluate the Biomechanical Function of Meniscus Repair Methods.

M. Stanley, L. Jennings, E. Ingham, J. Fisher;
Institute of Medical and Biological Engineering, Leeds, UNITED KINGDOM.

M48 Deviation from True Body Temperature at Temperature Measuring Sites: Theoretical Simulation of the Temperature Field in Human Bodies of Various Sizes

O. Vesnovsky¹, L. W. Grossman¹, J. P. Casamento¹, L. D. T. Topoleski², L. Zhu²;
¹FDA Center for Devices & Radiological Health, Silver Spring, MD, ²University of Maryland Baltimore County, Baltimore, MD.

M49 Biomechanics in Manual Wheelchair Propulsion on a Brake-Type Dynamometer

J. Ryu¹, J. Son¹, S. Hwang², Y. Kim¹;
¹Yonsei University, Wonju, REPUBLIC OF KOREA, ²University of Pittsburgh, PA.

M50 A Large-Animal Isolated Assisted Heart for Studies of the Interaction between Heart and Cardiac Assist Devices: Influence of Pump Speed on Ventricular Mechanics.

M. Granegger, S. Mahr, J. Horvat, P. Aigner, D. Zimpfer, H. Schima, F. Moscato;
Medical University of Vienna, AUSTRIA.

M51 A New Fall Risk Monitoring Tool: Wireless Classification of Step and Spin Turns Using a Trunk and Shank / Foot Mounted IMUs

P. Fino, C. Frames, T. E. Lockhart;
Virginia Tech, Blacksburg, VA.

M52 A Novel In Vitro Joint Load Simulator To Study Joint and Orthopedic Device Behaviors During Highly Dynamic Motions

J. Hausselle, J. Green, P. Power, R. V. Gonzalez;
The University of Texas at El Paso, El Paso, TX.

M53 Biomechanical Effect of an Unilateral Stabilization of the Subaxial Cervical Spine

C. Schilling¹, G. Schmeiser², T. M. Grupp¹, R. Kothe²;
¹Aesculap AG, Tuttlingen, GERMANY, ²Schön Clinic Eilbek, Hamburg, GERMANY.

M54 An IMU-Based Method for Quantifying Gait: Algorithm Development and Comparisons to Motion Capture and Instrumented Treadmill Data

S. M. Cain, R. S. McGinnis, S. P. Davidson, R. V. Vitali, S. G. McLean, N. C. Perkins;
University of Michigan, Ann Arbor, MI.

M55 A new method for high resolution non-contact heart valve deformation analysis

S. Heide-Jørgensen¹, K. Krishna¹, J. Taborsky¹, T. Bechsgaard¹, J. Hønge², R. Zegdi³, P. Johansen¹;
¹Dept. of Engineering, Aarhus University, Aarhus, DENMARK, ²Dept. of Cardiothoracic surgery, Aarhus University Hospital, Skejby, Aarhus, DENMARK, ³Hôpital Européen Georges Pompidou, Service de Chirurgie Cardiovasculaire, Paris, FRANCE.

M56 A SPARSE MOTION CAPTURE DEVELOPMENT PLATFORM ACCURATELY PREDICTS LOWER EXTREMITY BIOMECHANICS DURING AN OCCUPATIONAL LIFTING TASK.

J. M. Leonardis¹, E. W. Sinsel¹, K. Werner², T. M. Kepple², H. J. Sommer, III³, F. L. Buczek¹;
¹National Institute for Occupational Safety and Health, Morgantown, WV, ²C-Motion Inc., Germantown, MD, ³Pennsylvania State University, University Park, PA.

M57 Accelerometer Calibration for Self-Contained Remote Gait Analysis System

T. Simpson¹, J. Gong¹, J. Lach¹, B. Bennett²;
¹University of Virginia, Charlottesville, VA, ²Northwestern Health Sciences University, Bloomington, MN.

M58 A Wearable Optical Gait Analysis System Using Smartphone Camera To Assess Spatio-Temporal Parameters

A. Kim, J. Kim, S. Rietdyk, B. Ziaie;
Purdue University, Lafayette, IN.

M59 Non-invasive Biomechanical Monitoring of Bone Healing in a Dynamized Bone Defect in Sheep

U. Eberli, R. Schwyn, M. Ernst, M. Windolf, V. Stadelmann;
AO Research Institute, Davos Platz, SWITZERLAND.

M60 Application of Synchronized Immersive Virtual Reality on Postural Balance Assessment And Training

H. Ay, D. Petit, N. Berme, S. Z. Barnes;
Bertec Corporation, Columbus, OH.

M61 A new measurement device to detect bending stress at the human foot during footwear conditions

T. Stief¹, K. Peikenkamp²;
¹German Association of Orthopedic Footwear Technology, Hannover, GERMANY, ²University of Applied Sciences Muenster, GERMANY.

M62 Tracking Accuracy of Two Motion-Capture Systems Assessed Using Accurately Presented Circular Motion.

B. S. R. Armstrong¹, B. C. Tesch¹, T. P. Kusik², R. T. Barrows², K. M. O'Connor¹;
¹UW Milwaukee, WI, ²Metria Innovation, Milwaukee, WI.

M63 An Instrumented Skin Patch for Measuring Linear and Angular Kinematics in Sports Head Impacts

V. Nangia, L. C. Wu, D. B. Camarillo;
Stanford University, Stanford, CA.

BIOMECHANICS OF FLIGHT & SWIMMING

M64 A Study on the Flight Control of a Flapping Butterfly using Experiments and Numerical Models

K. Senda¹, N. Yokoyama¹, S. Lee¹, H. Yamamoto¹, T. Obara², T. Nishikata², N. Hirai³, M. Iima⁴;
¹Kyoto University, Kyoto, JAPAN, ²Kanazawa University, Kanazawa, JAPAN, ³Osaka Prefecture University, Sakai, JAPAN, ⁴Hiroshima University, Higashi-Hiroshima, JAPAN.

M65 Aerodynamic Ground Effect in Fruit Fly Takeoff

D. Kolomenskiy¹, M. Maeda², H. Liu², T. Engels³, K. Schneider³, J. C. Nave¹;
¹The Department of Mathematics and Statistics, McGill University, Montreal, QC, CANADA, ²Graduate School of Engineering, Chiba University, JAPAN, ³Laboratoire de Mécanique, Modélisation et Procédés Propres (M2P2), CNRS et Aix-Marseille Université, Marseille, FRANCE.

M66 Tuning of Flow-sensitive Hairs to Airflow Stimuli in the Desert Locust (*Schistocerca gregaria*)

F. McCorkell¹, M. Doube², G. Taylor¹, R. Bomphrey²;
¹University of Oxford, UNITED KINGDOM, ²Royal Veterinary College, London, UNITED KINGDOM.

M67 Wing wear and tear in dragonflies: How does the reduction of wingspan and chord length affect flight biomechanics and predation success?

M. K. Salcedo¹, S. A. Combes¹, D. E. Rundle¹, J. M. Iwasaki²;
¹Harvard University, Cambridge, MA, ²University of Otago, Dunedin, NEW ZEALAND.

M68 Biomechanical Analysis of the Underwater Gliding and Dolphin Kick Movement in Competitive Swimmers

T. Wada¹, N. Yamamoto², T. Isaka³, Y. Shintaku⁴, Y. Kashiwagi⁵;
¹Kokushikan University, Tokyo, JAPAN, ²Japanese Red Cross Hokkaido College of Nursing, Kitami, JAPAN, ³Ritsumeikan University, Kusatsu, JAPAN, ⁴Biwako Seikei Sport College, Ootsu, JAPAN, ⁵Nippon Sport Science University, Tokyo, JAPAN.

BIOMEMS & BIOSENSORS

M69 An improvement of the Paramecium's motion control accuracy

A. Ito, H. Yoshizawa;
Tokyo Denki University, JAPAN.

M70 Assessing Fall-Detection Technology for Use in Clinical Trials

S. Patel¹, A. Puiatti², J. Niemi³, L. Williamson⁴, A. Nelson⁴, R. Roubenoff⁴, J. Goldhahn⁴, P. Bonato¹;

¹Harvard Medical School, Charlestown, MA, ²University of Applied Sciences and Arts of Southern Switzerland, Manno, SWITZERLAND, ³Wyss Institute for Biologically Inspired Engineering, Harvard University, Boston, MA, ⁴Translational Medicine, Novartis Institutes for Biomedical Research, Cambridge, MA.

BONE

M71 An algorithm to map elastic constants in the human femur

F. Levrero Florencio¹, E. Sales¹, P. Srivastava², P. Jenkins¹, P. Pankaj¹, H. Simpson¹;

¹The University of Edinburgh, UNITED KINGDOM, ²Snow and Avalanche Study Establishment, Manali, INDIA.

M72 Assessment of anisotropic viscoelastic and viscoplastic mechanical behavior of human cortical bone by nanoindentation.

S. JARAMILLO-ISAZA, P. MAZERAN, K. EL KIRAT, M. HO BA THO;

University of Technology of Compiègne, FRANCE.

M73 A study on the quantitative relationship between mineral density and Young's Modulus of Chinese cancellous bone

D. Wang¹, F. Wang², J. Wang², Y. Li¹, Q. Wang²;

¹School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, CHINA, ²First People's Hospital Affiliated to Shanghai Jiao Tong University, Shanghai, CHINA.

M74 Finite element analysis in metastatic bone disease: An in vivo sensitivity analysis on yield definitions.

L. C. Derix¹, Y. M. van der Linden², A. Snyers¹, T. Rozema³, D. Janssen¹, B. H. W. Schreuder¹, R. S. Kaatee⁴, N. Verdonschot¹, E. Tanck¹;

¹Radboud university medical center, Nijmegen, NETHERLANDS, ²Leiden University Medical Center, NETHERLANDS, ³Instituut Verbeeten, Tilburg, NETHERLANDS, ⁴Radiotherapeutic Institution Friesland, Leeuwarden, NETHERLANDS.

M75 Modelling of Fracture Accumulation in Microstructured Cortical Bone During High Strain Rate Loading

S. Li, A. M. J. Bull;

Imperial College, London, UNITED KINGDOM.

M76 Strontium Ranelate Fully Prevents Alteration of Bone Mechanical Properties in Response to Cyclical Loading

P. Ammann, R. Rizzoli;

Division of Bone Diseases, University Hospital Geneva, SWITZERLAND.

M77 A Longitudinal Study of Biomechanical Modifications in Women with Normal and Compromised Bone Health

L. A. Burt¹, H. M. Macdonald², D. A. Hanley³, S. K. Boyd¹;

¹Department of Radiology, Faculty of Medicine, McCaig Institute for Bone and Joint Health, University of Calgary, AB, CANADA, ²Department of Orthopaedics, Child & Family Research Institute, University of British Columbia, Vancouver, BC, CANADA, ³CaMos Centre Director, Departments of Medicine, Community Health Sciences, and Oncology, University of Calgary, AB, CANADA.

M78 Weight Optimization of a Total Knee Replacement (TKR) Implant Using Numerical Simulation

G. R. Srinivas¹, A. Deb¹, M. N. Kumar²;

¹Indian Institute of Science, Bangalore, INDIA, ²Hosmat Hospital, Bangalore, INDIA.

M79 A computational simulation of Resident's ridge formation due to anterior cruciate ligament force

Y. Takahashi¹, H. Fujie², K. Nakata³, K. Shino⁴, S. Hashimoto¹;

¹Kogakuin University, Tokyo, JAPAN, ²Tokyo Metropolitan University, Tokyo, JAPAN, ³Osaka University Medical School, JAPAN, ⁴Osaka Yukioka College of Health Science, JAPAN.

M80 A natural, seaweed derived, mineral supplement (Aquamin F) preserves bone structure, composition and strength in an ovariectomised rat model of osteoporosis

O. Brennan¹, A. Widaa¹, D. O'Gorman², F. J. O'Brien¹;

¹Royal College of Surgeons in Ireland, Dublin, IRELAND, ²Marigot Ltd, Cork, IRELAND.

M81 An invitro study of apoptosis, RANKL production and OPG production after the application of a planar defect to represent microdamage.

C. M. Dooley, D. Taylor;

Trinity College Dublin, IRELAND.

M82 Subchondral Bone Stresses under Impact Loading: Three-Dimensional Micro-Computed Tomography Image-Based Finite-Element Modeling

F. Malekipour, D. Oetomo, P. Vee Sin Lee;

The university of Melbourne, AUSTRALIA.

M83 Age and Sex Differences in Femoral Neck Strength are Explained by Specific Patterns of Femur Shape and BMD Distribution

T. L. Bredbenner¹, A. E. Nicholls¹, D. E. Moravits¹, J. A. K. Harris², S. M. Levine², T. D. Eliason¹, L. M. Havill², D. P. Nicolella¹;

¹Southwest Research Institute, San Antonio, TX, ²Texas Biomedical Research Institute, San Antonio, TX.

M84 Synchronization between left and right prefrontal oxyhaemoglobin fluctuations investigated by wavelet coherence analysis in elderly subjects with hypertension

Z. Li¹, M. Zhang², R. Cui¹, W. Li¹, Q. Han¹, Y. Gao¹;
¹Shandong University, Jinan, CHINA, ²The Hong Kong Polytechnic University, Hong Kong, CHINA.

CARDIOVASCULAR FLUIDS

M85 A Prospective Study of the Relationship Between Wall Shear Stress and Atherosclerotic Plaque Transformation

D. Molony¹, L. Timmins¹, E. Rasoul-Arzumly², M. McDaniel², H. Samady², D. Giddens¹;
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA.

M86 An Experimental Evaluation of emboli Trajectories and Dynamics Within the Circle of Willis Under Pulsatile Flow Conditions

P. G. Fahy¹, J. Thornton², P. McCarthy³, N. Hynes⁴, S. Sultan⁴, E. McCarthy¹, P. Delassus¹, L. Morris¹;
¹Galway Mayo Institute Of Technology (GMIT), Galway, IRELAND, ²Neuro-radiology Beaumont Hospital, Dublin, IRELAND, ³University Hospital Galway, IRELAND, ⁴Western Vascular Institute, Galway, IRELAND.

M87 Assessing Arteriovenous Fistula Maturation using Magnetic Resonance Imaging and Computational Fluid Dynamics

L. D. Browne, K. Bashar, P. Griffin, S. Walsh, M. Walsh;
University of Limerick, IRELAND.

M88 The thermodynamic analysis of vasomotion

Y. Liu¹, J. Lu²;
¹The Hong Kong Polytechnic University, Kowloon, HONG KONG, ²City University of Hong Kong, Kowloon, HONG KONG.

M89 Are carotid plaques with intraplaque hemorrhage different in plaque size, distribution and shear stress?

Z. Kassar, L. Speelman, F. Gijzen, M. Selwaness, M. Cibis, A. van der Steen, A. van der Lugt, J. J. Wentzel;
ErasmusMC, Rotterdam, NETHERLANDS.

M90 A Novel Framework for Classifying Wall Shear Stress Phenotypes in Arterial Disturbed Blood Flow

Y. Shimogonya¹, K. Valen-Sendstad², D. A. Steinman²;
¹University of Hyogo, JAPAN, ²University of Toronto, ON, CANADA.

M91 A Hybrid Experimental/Computational Approach to Modelling Microhaemodynamics

J. M. Sherwood¹, S. Balabani²;
¹Imperial College London, UNITED KINGDOM, ²University College London, UNITED KINGDOM.

M92 Assessment of Arteriovenous Fistula Functionality using Hemodynamic Based Diagnostic Parameters

E. Rajabi-Jaghargh, R. Banerjee; Mechanical and Materials Engineering Department, University of Cincinnati, OH.

M93 Approaching Diastolic Dysfunction with a MRI-based Analysis of Aortic Morphometry

D. Gallo¹, O. Vardoulis², D. Piccini³, P. Monney⁴, G. Bonanno³, J. Schwitter⁵, N. Stergiopoulos², U. Morbiducci¹;
¹Politecnico di Torino, Turin, ITALY, ²École Polytechnique Fédérale de Lausanne EPFL, Lausanne, SWITZERLAND, ³University of Lausanne and University Hospital, Lausanne, SWITZERLAND, ⁴Siemens Healthcare, Lausanne, SWITZERLAND, ⁵Centre Hospitalier Universitaire Vaudois, Lausanne, SWITZERLAND.

M94 Effect of Flow Characteristics on Hemolysis in Medical Device Models

L. Herbertson¹, R. Breithaupt¹, S. Olia², A. Paraloglou¹, A. Daly², M. Li¹, M. Kameneva², R. Malinauskas¹;
¹U.S. Food & Drug Administration, Silver Spring, MD, ²University of Pittsburgh, PA.

CARDIOVASCULAR SOLIDS

M95 A Three-Dimensional Regional Strain Computation Method with Displacement ENcoding with Stimulated Echoes in Non-Ischemic Dilated Cardiomyopathy Patients and Healthy Subjects Validated in Reference to Tagged MRI

J. Kar, A. K. Knutsen, B. P. Cupps, M. K. Pasque;
Washington University, St. Louis, MO.

M96 A Cylindrical Model of Left Ventricle Based on a Kinetic Model of Cardiac Muscle

F. A. Syomin, A. K. Tsaturyan;
Institute of Mechanics, Lomonosov Moscow State University, RUSSIAN FEDERATION.

M97 A Modified Holzapfel-Ogden Law for a Residually Stressed Finite Strain Model of the Human Left Ventricle in Diastole

X. Y. Luo¹, H. M. Wang², H. Gao¹, B. E. Griffith³, B. Colin¹, R. W. Ogden¹, T. Wang⁴;
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M98 An Experimental and Modeling Study of the Biomechanical Behavior of Arterial Elastin in Glucose

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M99 An Experimental and a Simulation Study of an Aortic Aneurysm in a Zebrafish Heart

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M100 Adhesion Strength of Plaques in a Collagen VIII Deficient Mouse Model of Atherosclerosis

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M101 A mechanistic model of dissection of human ascending thoracic aorta

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M102 A Novel Micro-to-Macro Approach for Cardiac Tissue Mechanics Modeling

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M103 Aortic Cell and Tissue Micromechanics in a Mouse Model of Marfan Syndrome

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CARTILAGE

M104 The Effects of Collagen Fibril Orientation and Superficial Collagen Layer on the Fluid Pressure of Articular Cartilage

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M105 ACL Multi-Planar Alignment Affects the Risk of Post-Traumatic Osteoarthritis Following ACL Surgery: An In Vivo Large Animal Study

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M106 Finite Element Implementation of a Model for Finite Deformable, Biphasic Biological Tissues with Transversely Isotropic Statistically Distributed Fibers

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M107 Ambulation Ground Reaction Force Correlates with Articular Cartilage Metabolism

M. K. Seeley, W. M. Denning, M. B. Pardo, J. G. Winward, A. C. Parcell, C. S. Reese, J. T. Hopkins;
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M108 Tribology of Osteochondral Graft Implantation

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M109 Determination of mechanical properties of equine menisci during compressive loading

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University of Veterinary Medicine, Vienna, AUSTRIA.

M110 Articular Cartilage Consolidation Increases after Acetabula Labrum Tear

Y. Kim, S. Park, D. Lee, K. Hong, Y. Song;
Korea University, Seoul, REPUBLIC OF KOREA.

CELL MOTILITY & NUCLEUS

M111 A mechanical model of the periodic motion of lamellipodia

S. He, B. Ji;
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M112 Actomyosin pulls to advance the nucleus in a migrating tissue cell

J. Wu, I. A. Kent, N. Shekhar, T. Chancellor, A. Mendonca, R. B. Dickinson, T. P. Lele;
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M113 Positional Fluctuations of Interphase Chromatin

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COLLAGEN STRUCTURE & MECHANICS

M114 A Computational Analysis of the Effect of Hydroxyproline on Bound Water and the Stability of Collagen

M. Unal, O. Akkus;
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COMPUTATIONAL BIOMECHANICS

M115 A Simulated Shared Achilles Tendon Alters Plantarflexor Muscle Function

J. R. Franz, D. Thelen;
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M116 3D parametric model of the proximal femur incorporating geometric and material properties: Patient-specific prediction of fracture risk

M. A. Perez, Mrs.¹, M. Remacha¹, A. Alberich-Bayarri²;
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M117 Analysis of the Path-Dependent Nature of Thermo-Mechanical Stress in Cryopreservation Via Vitrification

D. P. Eisenberg, Y. Rabin;
Carnegie Mellon University, Pittsburgh, PA.

M118 A Virtual Dynamic Model of a Hip Joint Simulator to Predict the Severity of Edge Loading of the Head on the Rim of the Cup due to Variation in the Surgical Positioning

J. Leng, M. Al-Hajjar, R. K. Wilcox, A. L. Jones, D. C. Barton, J. Fisher;
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M119 A new methodology to obtain the biomechanical behavior of the human liver

F. Martínez-Martínez¹, M. Rupérez¹, M. Lago¹, C. Monserrat¹, J. Martín-Guerrero², E. Pareja³, S. Brugger³, R. López-Andújar³;
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M120 Towards Simulation of Whole Bone Microstructure Adaptation

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M121 Mechanical regulation of outside-in activation of I-domain-containing leukocyte integrins

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M122 A computational biomechanics study to investigate the effect of myoelectric stimulation on peroneal muscles in preventing inversion-type ankle ligamentous sprain injury

S. Ha, D. Fong, K. Chan;
The Chinese University of Hong Kong, HONG KONG.

M123 The Effect of Subject-Specific MRI-based Models and Wrapping Surfaces on Hip Contact Forces

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M124 Transferring Anatomical Texture-Map between Bone Models based on Registration in Object Space and Parametric Space

C. Phan, S. Koo;
Chung-Ang University, Seoul, REPUBLIC OF KOREA.

M125 A numerical simulation of an osmotically-swollen/shrunk red blood cell

S. li, S. Wada;
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M126 A computational investigation of sacroiliac joint dislocation fixation <!-- EndFragment-->

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M127 An Automated Method for Feature Extraction and Subject-Specific Finite Element Modeling of the Lumbar Spine

J. Q. Campbell, A. J. Yoder, A. J. Petrella;
Colorado School of Mines, Golden, CO.

M128 Coupled Eulerian-Lagrangian Analysis of Needle Insertion into Biological Soft Tissue Accounting for Material Rupture

K. Li, B. Nandi, J. Yao, J. Hurtado, V. Oancea;
SIMULIA, Providence, RI.

M129 A Comparison of a Finite Element Model versus In Vitro Cases of a Lumbar Segment L3-L5 for Arthroplasty Applications

G. Albiter-Rodriguez, A. Vidal-Lesso, R. Lesso-Arroyo, R. C. Ramos-Santillano;
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M130 3D finite element lumbar spine modeling from 2-D images and statistical correlations

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M131 Evaluation of Nasal Airflow and Resistance by Numerical Modeling

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M132 A User Subroutine to be used with Abaqus to Solve Biphase Contact Problems

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M133 Analytical Models Used to Predict Fatigue in OpenSim

M. A. Samaan, J. T. Weinhandl, S. A. Hans, S. Y. Bawab, S. I. Ringleb;
Old Dominion University, Norfolk, VA.

M134 Reliability of 3D Ultrasound for Measuring Parameters of Intrinsic Foot Muscle Models

E. Bell, J. Hibbert, P. Rider, A. Kulas, Z. Domire;
East Carolina University, Greenville, NC.

COMPUTATIONAL METHODS

M135 Analysis and Design of a Novel Stent for Tracheobronchial Cancer Treatment

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M136 Anatomically-Based Model Registration Using MRI and Structure Light Surface Data Reconstruction

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M137 Analysis of Knee Osteoarthritis Ground Reaction Vertical Force During Stair Ascent: A Neural Network Approach

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M138 Evaluation of foot type classification from static foot pressure distribution data using discriminant analysis technique

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M139 Application of Data Mining in the Preparations for Marathon

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M140 Mechanical behavior of Gastroesophageal Reflux Disease; A Computational Modeling of Lower Esophageal Sphincter along with Stomach

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M141 2DOF Fixator System for Correcting Three-Dimensional Clubfoot Deformity

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¹Carnegie Mellon University, Pittsburgh, PA, ²Bone and Joint Center, Magee Women's Hospital, Pittsburgh, PA.

M142 A comparison of asymmetric and symmetric finite element model of cervical spine

I. Zafarparandeh, U. C. Cakmak, D. Senyuz, E. Koch, I. Lazoglu, A. F. Ozer, D. U. Erbulut;
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M143 Turbulence Quantification of Stenotic Blood Flow Using Image-Based CFD: Effect of Different Interventions

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M144 A Statistical Shape Atlas of the Surgically Reconstructed Aortic Arch in Patients with Hypoplastic Left Heart Syndrome

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M145 Fracture Modeling of Layered Ceramics Materials System

Z. Zhang, M. C. Thompson, W. Li, E. Li, M. Guazzato, C. Field, M. V. Swain, Q. Li;
The University of Sydney, NSW, AUSTRALIA.

M146 An Assessment of the Mechanical Properties of Human Vertebrae Trabecular Bone Using X-ray Microtomography and Finite Element Analysis: Direct Mechanics Approach

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CYTOSKELETON & CYTOSKELETAL MECHANICS

M147 Cell Blebs Induced By Nanoparticles

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M148 Transformation of Filopodia into Tunneling Nanotubes Involves Attenuation of Actin Dynamics and Adherens Junction Assembly

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M149 A High Content Microscopy Investigation of the Role of the Cytoskeleton in Mechanotransduction and Cell Morphology on Biocompatible Surfaces

K. K. McKayed, J. C. Simpson;
University College Dublin, Belfield, IRELAND.

DENTAL, ORAL, & MAXILLOFACIAL BIOMECHANICS

M150 Biomechanical Characterization of Abutment-Free Implant-Supported Fixed Dental Protheses

M. Karl, W. Winter;
University of Erlangen-Nuremberg, Erlangen, GERMANY.

M151 Diffusion Properties of a Novel Tooth Organ Culture Model for Periodontal Research

S. Junaid, R. El-Gendy, S. K. L. Lam, K. M. Elson, E. Ingham, J. L. Tipper, R. M. Hall, J. Kirkham;
University of Leeds, UNITED KINGDOM.

M152 Adaptation of the Mastication Mechanics to Small Differences in Food Consistencies: Insights from a Combined Jaw Kinematics/Electromyography Study.

B. J. D. Le Révérend, F. Saucy, M. Moser, C. Loret;
Nestle Research Center, Lausanne, SWITZERLAND.

ERGONOMICS AND HUMAN FACTORS

M153 Accuracy of a Modified Facepiece for Metabolic Data Collection From Firefighters

R. M. Kesler, E. T. Hsiao-Wecksler, R. W. Motl, G. P. Horn;
University of Illinois at Urbana-Champaign, IL.

M154 An Investigation of Leaning Behaviours During One-Handed Exertions with Extended Reaches

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M155 Characterization of Lower Extremity Joint Powers During Walking While Carrying Heavy Loads

J. F. Seay, S. G. Sauer, P. N. Frykman, R. E. Fellin;
U.S. Army Research Institute of Environmental Medicine, Natick, MA.

M156 Patient Mobility in Hospital Beds With and Without Side Rails

C. R. Wilson, J. Morse, N. Godfrey, A. Doig, M. Christman, D. Bloswick, A. Merryweather;
University of Utah, Salt Lake City, UT.

EXPERIMENTAL METHODS

M157 Blood Flow in a Bifurcation and Confluence Microchannel: Effect of the Cell-Free Layer in Velocity Profiles

D. Pinho¹, D. Bento¹, R. Rodrigues², C. Fernandes², V. Garcia², R. Lima¹;
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M158 A Novel Device for Application of Cyclic Stretch During Live Cell Imaging

J. Imsirovic, T. Wellman, E. Bartolak-Suki, B. Suki;
Boston University, MA.

FLUID-SOLID INTERACTIONS

M159 Transition Layer of Microvascular Flow and Implications for Mechanotransduction Through the Endothelial Surface Layer

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M160 Assessing cement injection behavior in vertebroplasty: An in-vitro study using flow models

A. Bou Francis¹, A. López², C. Persson², R. M. Hall¹, N. Kapur¹;
¹University of Leeds, UNITED KINGDOM, ²Uppsala University, SWEDEN.

M161 Use of Fluid-Structure Coupling to Investigate the True Physiological Hemodynamics Experienced by Endothelial Cells in Synthetic Grafts

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¹Manchester Metropolitan University, UNITED KINGDOM,
²University of Manchester, UNITED KINGDOM.

GENERAL ANIMAL LOCOMOTION

M162 3D Reconstruction of Octopus Arm Swimming Motion

A. Kazakidi¹, S. Stefanou¹, X. Zabulis¹, M. Kuba², J. A. Ekaterinaris³, T. Flash⁴, B. Hochner², D. P. Tsakiris¹;
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M163 How Well can we Estimate Muscle Power from In-vitro Measurements?

R. Woledge, N. Curtin, T. West, R. Piercy, D. Goodwin;
Royal Vet College, London, UNITED KINGDOM.

M164 Landing on a Wall: Tail-mediated Transitions Stabilize Hard Landings in Lizards.

A. Jusufi¹, G. T. Byrnes², R. J. Full³;
¹University of Cambridge, UNITED KINGDOM, ²Siena College, Loudonville, NY, ³University of California at Berkeley, CA.

M165 Are turtles dynamically similar while walking at different submergence levels in water?

N. Mazouchova, S. Hsieh;
Temple University, Philadelphia, PA.

GROWTH & REMODELING

M166 A Mechanical and Biochemical Model of Intimal Hyperplastic Lesions

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M167 A computational model for vein graft growth and remodeling: Response to altered hemodynamics

A. B. Ramachandra¹, S. Sankaran¹, J. D. Humphrey², A. L. Marsden¹;
¹University of California San Diego, La Jolla, CA, ²Yale University, New Haven, CT.

M168 A novel mathematical model for the micro-structural adaption of the collagen fabric during aneurysm evolution

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¹University of Oxford, UNITED KINGDOM, ²University of Sheffield & INSIGNEO, UNITED KINGDOM.

M169 Investigating the Role of Cell Signalling on Intracranial Aneurysm Evolution: A Novel Chemo-Mechanobiological Mathematical Model

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M170 An Inverse Finite Element Procedure for Subject-Specific Prediction of Bone Density Distribution in the Proximal Femur

A. Vahdati, J. Vander Sloten, G. H. van Lenthe;
KU Leuven, BELGIUM.

M171 Active Agonist Induced Contraction Affects Structural and Functional Remodeling of Large Elastic Arteries

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¹Yale University, New Haven, CT, ²Karolinska Institutet, Stockholm, SWEDEN.

M172 Agent-based model of skeletal muscle tissue predicts immobilization-induced remodeling

K. S. Martin, S. Salinas Blemker, S. Peirce-Cottler;
University of Virginia, Charlottesville, VA.

HEART & HEART VALVES

M173 A Comparative Study of the Bending Properties of Porcine Mitral, Tricuspid, Aortic, and Pulmonary Valve Leaflets

B. Brazile, B. Wang, G. Wang, R. Bertucci, R. Prabhu, S. Patnaik, X. Shi, R. Butler, A. Claude, E. Brinkman-Ferguson, L. Williams, J. Liao;
Mississippi State University, MS.

M174 A Proper Orthogonal Decomposition-based Real-time Modelling of the Heart

R. R. Rama, S. Skatulla, B. D. Reddy;
University of Cape Town, SOUTH AFRICA.

M175 Afterload dependent increasing in crossbridge formation in ejecting rat heart

J. Shimizu¹, T. Miyasaka²;
¹Hiroshima International University, Higashi-Hiroshima, JAPAN, ²Shonan Institute of Technology, Fujisawa, JAPAN.

M176 A New Approach to Diagnosing Severity of Left-Ventricular Pressure Overloading Conditions: The Cardiovascular Efficiency Index

R. Simon-Walker, M. Dong, L. P. Dasi;
Colorado State University, Fort Collins, CO.

M177 A New Reinforced Fibrin Collagen Glycosaminoglycan Material to Resist Tissue Retraction in Heart Valves

C. M. Brougham¹, T. C. Flanagan², F. J. O'Brien¹;
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²University College Dublin, IRELAND.

M178 A Computational Paradigm for Modeling the Functional Mitral Valve (MV) and MV Surgical Repair

C. Lee¹, J. Rabbah², A. P. Yoganathan², R. Amini³, J. H. Gorman, 3rd⁴, R. C. Gorman⁴, M. S. Sacks¹;
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IMPLANTS

M179 A New Osteosynthesis with Variable Stiffness: Implant Dimensioning and It's Application in Sheep

M. Krämer¹, R. Pfeifer², C. Müller¹, S. Decker¹, C. Hurschler¹;
¹Hannover Medical School, GERMANY, ²Laer Zentrum Hannover e.V., GERMANY.

M180 Unique stability of femoral neck fractures treated with the novel method of biplane double-supported screw fixation. A biomechanical study

O. Filipov¹, M. Ernst², B. Gueorguiev²;
¹Orthopaedic Hospital Vitosha, Sofia, BULGARIA, ²AO Research Institute Davos, SWITZERLAND.

M181 Modelling of cardiovascular stents as lattice structures during deployment and recoil

A. Bonfanti, A. Bhaskar;
University of Southampton, UNITED KINGDOM.

M182 A biomechanical analysis of the distal bones in the radiocarpal arthroplasty under a physiological load condition

J. Miguel, A. Completo, A. Ramos;
University of Aveiro, PORTUGAL.

M183 Measuring micromotion in cementless arthroplasty using a digital volume correlation technique

C. Sukjamsri¹, D. M. Geraldès¹, T. Gregory², U. Hansen¹;
¹Imperial College London, UNITED KINGDOM, ²Georges Pompidou European Hospital, Paris, FRANCE.

M184 A new CT scan protocol for studies of loosening of shoulder implants

U. Hansen¹, T. Gregory²;
¹Imperial College London, UNITED KINGDOM, ²George Pompidou Hospital, Paris, FRANCE.

INJURY BIOMECHANICS

M185 Determination of high risk impact sites on a Hybrid III headform by finite element analysis

K. L. Taylor;
University of Ottawa, ON, CANADA.

M186 A New Shortcoming of HIC, HIP and Improved Head Injury Criteria

S. Mansoor-Baghaei¹, P. Saboori², A. sadegh¹;
¹The City College of New York, NY, ²Manhattan College of New York, NY.

M187 A Comparison of Strength, ROM, Laxity, and Static Postural Control Between Those At-Risk and Healthy

E. Rullestad¹, H. Boley², S. Carey², M. Quinlevan², M. Terada², P. Gribble²;
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M188 Age Comparison of muscle activation patterns between pre-pubescent and post-pubescent female soccer players while performing unanticipated cutting maneuvers: Relevance to non-contact Anterior Cruciate Ligament (ACL) injuries

A. Fairfax, M. Del Bel, L. Stebeleski, S. Landry;
Acadia University, Wolfville, NS, CANADA.

M189 The influence of compliance on dynamic impact response and resulting brain tissue response.

M. Kendall¹, E. W. Walsh¹, M. D. Gilchrist², T. B. Hoshizaki¹;
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M190 Assessment of Ground Cover for Head Injury Prevention on a Playground

G. P. Danchik, C. D. DiDomenico, E. A. Kennedy;
Bucknell University, Lewisburg, PA.

M191 Weight-Bearing Dorsiflexion Range of Motion and Landing Biomechanics in Individuals with Chronic Ankle Instability

M. C. Hoch¹, K. E. Farwell¹, S. L. Gaven², J. T. Weinhandl¹;
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M192 Effect of Impact Location on Pre-Recoil Head Rotation Pattern and Brain Shear Strain

J. T. Eckner, Y. K. Oh, K. M. Curtis, M. S. Joshi, J. A. Ashton-Miller;
University of Michigan, Ann Arbor, MI.

M193 Difference between Human and BioRID-II Responses during Low Speed Rear-end Collision Simulation

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M194 A Cadaveric Study to Investigate the Loss of Anterior Shoulder Stability Due to Combined Bony Defects

P. Walia¹, R. M. Patel², M. Kuklis², A. Miniaci², M. H. Jones², S. D. Fening³;
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M195 Novel Numerical Methods to Assess Penetrating Injury via Finite Element Analyses

T. P. Harrigan, T. Nissley, C. Carneal, A. Golman, J. Zhang, A. Merkle;
Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

M196 A Comparison of Cadaver Heads and Standard Headforms in Helmet Testing

S. J. Bonin¹, J. F. Luck², C. R. D. Bass², J. C. Gardiner³, A. Onar-Thomas⁴, S. S. Asfour¹, G. P. Siegmund⁵;
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M197 A novel cervical spine (head/neck) musculoskeletal model for dynamic load analysis during rugby scrummaging.

D. Cazzola, T. P. Holsgrove, E. Preatoni, K. A. Stokes, S. Gheduzzi, A. W. Miles, H. S. Gill, G. Trewartha;
University of Bath, UNITED KINGDOM.

M198 A hyper-reactivity of the central nervous system to unloading reaction in functional ankle instability

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¹University of Kansas Medical Center, Kansas City, KS, ²University of Kansas, Lawrence, KS.

M199 Alteration and Failure of Cerebral Artery Internal Elastic Lamina following Mechanical Insult

M. Converse, T. Sommer, K. L. Monson;
University of Utah, Salt Lake City, UT.

M200 Assessment of Arm Motions with Fall Direction in Human Subjects

B. Krishnan, S. E. Wilson;
University of Kansas, Lawrence, KS.

M201 Assessment of Muscle Activity and Kinematics During a Controlled Descent on Outstretched Arms in Young Women.

L. J. Lattimer, J. L. Lanovaz, T. T. Treen, C. M. Arnold;
University of Saskatchewan, Saskatoon, SK, CANADA.

M202 A Multi-Modality Image Set for the Development of a 5th Percentile Female Finite Element Model

M. L. Davis, J. D. Stitzel, F. S. Gayzik;
Virginia Tech – Wake Forest University School of Biomedical Engineering, Winston Salem, NC.

M203 Progressive Validation of a High-Fidelity Human Lumbar Spine Finite Element Model

J. Zhang, R. Armiger, A. Merkle, C. Carneal, E. Ward, K. Ott, A. Wickwire, C. Dooley, T. Harrigan, J. Roberts;
The Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

JOINTS

M204 Bilateral Differences in Lower Extremity Loading during Sit-to-Stand in Unilateral Hip OA Patients Before and After Total Hip Arthroplasty

V. Vardaxis¹, V. Nguyen¹, A. Huegel¹, L. Covill¹, J. Nettrour², C. Mahoney²;
¹Des Moines University, IA, ²Mercy Medical Center, Des Moines, IA.

M205 Knee Simulator that Substitutes in-vivo Measurement Experiment

S. Hirokawa¹, T. Murakami¹, K. Kiguchi¹, M. Fukunaga²;
¹Kyushu University, Fukuoka, JAPAN, ²Ariake National College of Technology, Omuta, JAPAN.

M206 A Model-based Study on the Kinematics of the Rat Knee

Q. Wei¹, T. G. Sandercock², M. Tresch²;
¹George Mason University, Fairfax, VA, ²Northwestern University, Chicago, IL.

M207 Patient Specific Mechanical Response of the Sacroiliac Joint under Compressive and Transverse Loads

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¹Baylor University, Waco, TX, ²University of Missouri, Columbia, MO, ³Logan University, Chesterfield, MO.

M208 A Microstructural Model for the Measurement of Cell-Level Deformations of Tendon

T. M. Grant, M. S. Thompson;
University of Oxford, UNITED KINGDOM.

LIGAMENT & TENDON

M209 All-Inside Anterior Cruciate Ligament Reconstruction Graft Link: A Comparative Biomechanical Study
R. Mayr, C. H. Heinrichs, M. Eichinger, V. Smekal, R. El Attal, W. Schmoelz;
Medical University Innsbruck, Innsbruck, AUSTRIA.

M210 Therapeutic Effects of Doxycycline on Biomechanics of Spontaneous Repair in Lacerated Achilles Tendon
Q. T. Nguyen¹, C. Eckstein¹, A. Graver¹, M. Drakos², D. A. Grande¹, N. O. Chahine¹;
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²Hospital for Special Surgery, Orthopedics, Manhasset, NY.

M211 AE Detection of Microdamage in Rabbit Patellar Tendon under Tensile Load at Various Strain Rates
F. MATSUOKA¹, T. SAKAI¹, S. WAKAYAMA¹, E. YAMAMOTO²;
¹Tokyo Metropolitan University, JAPAN, ²Kinki University, Wakayama, JAPAN.

M212 Analysis of ACL Fibrocartilage Entesis in Estrogen Receptor Beta Deficient Mice
J. Gordon¹, M. Xu², J. Chen², H. Lu³, S. Wadhwa²;
¹Columbia University College of Dental Medicine, New York, NY, ²Department of Orthodontics, Columbia University College of Dental Medicine, New York, NY, ³Columbia University Biomedical Engineering, New York, NY.

MECHANOBIOLOGY, RESPONSES TO MECHANICAL STRESS, AND MECHANOTRANSDUCTION

M213 Identification of Placental Growth Factor as a Mechanically Augmented Gene with a Pro-osteogenic Role in Mesenchymal Stem Cells
R. J. McCoy, A. Widaa, K. M. Watters, M. Wuerstle, R. L. Stallings, G. P. Duffy, F. J. O'Brien;
Royal College of Surgeons in Ireland, Dublin, IRELAND.

M214 Application of a Microfabricated Transwell Chamber with Integrated PDMS Micropost Arrays to Study the Mechanobiology During Transepithelial Migration of Leukocytes
J. Moeller, J. Sim, R. E. Wilson, W. I. Weis, A. R. Dunn, W. Nelson, B. L. Pruitt;
Stanford University, Stanford, CA.

M215 3-D Cell Geometry Regulates Podocyte Differentiation
E. U. Azeloglu¹, A. Ron², M. Hu², Y. Chen¹, P. Y. Chuang¹, R. E. Gordon¹, J. C. He¹, J. C. Hone², R. Iyengar¹;
¹Icahn School of Medicine at Mount Sinai, New York, NY,
²Columbia University, New York, NY.

M216 A coupled flow and vascular remodelling model for the study of vessel regression during angiogenesis
M. O. Bernabeu¹, J. M. Osborne²;
¹University College London, UNITED KINGDOM, ²University of Oxford, UNITED KINGDOM.

M217 Application of a Post-Exercise Massage-Mimetic Induces a Temporal Shift of the Inflammatory Response Following Repeated Eccentric Contractions
C. Waters-Banker¹, S. M. Abshire¹, E. E. Dupont-Versteegden¹, J. Sunday², T. A. Butterfield¹;
¹University of Kentucky, Lexington, KY, ²Clemson University, Clemson, SC.

MEDICAL DEVICES

M218 A Novel PEEK Total Knee Replacement for Long Term Bone Preservation: Evaluation of Femoral Bone Strains using Digital Image Correlation and Numerical Modelling
K. Rankin¹, A. S. Dickinson¹, A. Briscoe², M. Browne¹;
¹University of Southampton, UNITED KINGDOM, ²Invisio Ltd, Thornton Cleveleys, UNITED KINGDOM.

M219 A Novel Large Diameter Femoral Head for Soft-tissue Relief Maintains Load Bearing Contact Area, Frictional Characteristics and Wear Performance in Ceramic on Poly Articulation
M. P. Duffy, K. M. Varadarajan, T. Zumbunn, K. Wannomae, D. Chan, B. Micheli, H. E. Rubash, A. F. Freiberg, H. Malchau, O. K. Muratoglu;
Massachusetts General Hospital, Boston, MA.

M220 Severe Edge Loading and Increased Wear due to Surgical Mal-Positioning of Hip Joint Replacement Bearings
M. Al-Hajjar¹, S. Williams¹, L. M. Jennings¹, J. Thompson², E. Ingham¹, J. Fisher¹;
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M221 Mini-Plating Can Influence Compression Achieved In Long Bone Fracture Fixed With Dynamic Compression Plating (DCP)
J. Li¹, C. Schwartzbach¹, I. Iliev², R. Westbrook¹, M. Theiss¹;
¹Inova Fairfax Hospital, Falls Church, VA, ²Marshall University, School of Medicine, Huntington, WV.

M222 A quantitative ultrasound device to assess dental implant stability
R. Vayron, G. Haiat;
CNRS, Creteil, FRANCE.

M223 Application of Anatomical Based Biomedical Bench Model in Medical Device Development

H. Zhang, L. Wang;
Medtronic Corporation, Minneapolis, MN.

M224 A Scalable Actuator for the Dynamic Palpation of Soft Tissue for use in the Assessment of Prostate Tissue Quality

P. Scanlan¹, S. J. Hammer¹, D. W. Good², W. Shu¹, R. L. Reuben¹, S. Phipps², G. D. Stewart², S. A. McNeill²;
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M225 Mechanical properties sensing using compressed sensing MRI

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³TMU, Arakawa-ku, Tokyo, JAPAN.

MICRO & NANO DEVICES

M226 A medium throughput device to study the effects of combinations of surface strains and fluid-flow shear stresses on cells

R. Sinha, S. Le Gac, N. Verdonschot, A. van den Berg, B. Koopman, J. Rouwkema;
University of Twente, Enschede, NETHERLANDS.

M227 A Drop-on-Demand Droplet Generator

C. Wang;
National Taiwan University, Taipei, TAIWAN.

M228 Nanotechnology-based Approach to Restoring Endothelial Glycocalyx and Combating Atherosclerosis

M. Cheng;
Northeastern University, Boston, MA.

MOLECULAR BASIS OF CARTILAGE MECHANICS

M229 Finite Element Analysis Reveals that the Regions of a Zebrafish Jaw under Maximal Strain Correspond to Regions of High Wnt Signalling

L. H. Brunt, E. Rayfield, C. Hammond;
University of Bristol, UNITED KINGDOM.

MOTOR CONTROL

M230 Adapting Gait Symmetry With Visually Guided Locomotor Training: 'Virtual' Split-Belt Walking Adaptation

J. T. Choi¹, P. Jensen², J. B. Nielsen²;
¹University of Massachusetts Amherst, MA, ²University of Copenhagen, DENMARK.

M231 A time-frequency approach for classification of transition direction and type during locomotion

D. Joshi, M. E. Hahn;
University of Oregon, Eugene, OR.

M232 Able Bodied Persons and Individuals with Transtibial Amputation Employ Similar Control Strategies in the Frontal Plane during Treadmill Walking

J. H. Rylander¹, J. M. Wilken², J. P. Cusumano³, J. B. Dingwell¹;
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M233 Age-related Changes in Trunk Neuromuscular Activation Patterns During a Controlled Functional Transfer Task

D. A. Quirk, C. L. Hubble-Kozey;
Dalhousie University, Halifax, NS, CANADA.

M234 Aging-related changes in neural function for grip relaxation: intracortical inhibition and spinal motoneuron excitability

B. Motawar, N. J. Seo;
University of Wisconsin-Milwaukee, WI.

M235 Assessment of Corticospinal Excitability of the Supraspinatus Muscle

Y. Lin, A. Christie, A. Karduna;
University of Oregon, Eugene, OR.

M236 The Control of Step Ascent During Walking: Effect of Movement Strategy

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M237 Control of Five Times Sit-to-Stand in Healthy and Diabetic Older Adults

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M238 A combinatorial optimization based method to minimize the tests required for the normalization of EMG values at the shoulder joint.

P. Marion, F. Dal Maso, M. Begon, T. Alenabi;
Université de Montréal, Laval, QC, CANADA.

M239 Transient Response of the Head Kinematics - Influence of a Disturbed Visual Flow

B. Sandoz¹, C. Provost¹, J. LE COZ², S. Laporte¹;
¹Arts et Metiers ParisTech, Paris, FRANCE, ²Renault, Boulogne-Billancourt, FRANCE.

M240 Adaptation of Muscle Synergies While Learning to Direct Pedal Forces

S. Park¹, C. J. Hasson², G. E. Caldwell¹;
¹University of Massachusetts Amherst, Amherst, MA,
²Northeastern University, Boston, MA.

M241 Tuning of Volitional and Locomotor Muscle Synergy Structures Post-Stroke

A. Q. Tan, Y. Y. Dhafer;
Northwestern University, Chicago, IL.

M242 Effects of Focus of Attention and Task Difficulty on Dart Throwing

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M243 Effects of degrees of freedom on dart throwing under task constraints

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¹National Changhua University of Education, Changhua, TAIWAN, ²National Taiwan University of Physical Education and Sport, Taichung, TAIWAN.

M244 Age- and fatigue-related modifications to the magnitude and periodicity of neuromuscular noise

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¹Eidgenössische Technische Hochschule (ETH) Zürich, SWITZERLAND, ²Humboldt-Universität zu Berlin, GERMANY.

M245 Tracking Motor Unit Firings during Dynamic Cyclic Contractions

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¹Boston University, MA, ²Delsys, Inc., Natick, MA.

M246 Anticipatory Locomotor Adjustments Targeting Maneuverability May Enhance Stability

M. Wu, J. Matsubara, K. E. Gordon;
Northwestern University, Chicago, IL.

M247 A reflex-based model of the neuromuscular control of 3D human locomotion

S. Song, H. Geyer;
Carnegie Mellon University, Pittsburgh, PA.

M248 A virtual reality-based adaptive response technology for post-stroke motor learning under multi-level electrotherapy: a conceptual study

A. Dutta¹, U. Lahiri², A. Das³, M. A. Nitsche⁴, D. Guiraud¹;
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M249 Assessing Learning to Balance in Inverted Stance: Traditional and Non-Linear Methods

G. M. Blenkinsop, M. G. T. Pain, M. J. Hiley;
Loughborough University, UNITED KINGDOM.

M250 A Quantitative Analysis of the Mechanisms that Control the Center of Pressure Movement in Unperturbed Upright Stance

P. A. Federolf;
Norwegian University of Science and Technology, Trondheim, NORWAY.

M251 Walking Stability during Cognitive Tasks in Healthy Adults

P. Kao¹, K. Seymour¹, M. Kamedrde², C. Higginson², J. Higginson¹;
¹University of Delaware, Newark, DE, ²Loyola University of Maryland, Baltimore, MD.

MULTI-CELL BEHAVIORS

M252 Agent-based modelling to simulate the early atheroma formation in hypercholesterolemia virtual patients with and without statins treatments

A. Olivares, A. Malandrino, J. Noailly;
Institute for Bioengineering of Catalonia, Barcelona, SPAIN.

MULTI-SCALE MODELING

M253 A 3D continuum model for smooth muscle excitation-contraction process

B. Sharifimajid, J. Stålhand;
Linköping University, SWEDEN.

M254 Multiscale Modelling of Bone Fracture Healing: Oxygen and Angiogenesis as Key Regulators of Non-Unions

A. Carlier¹, L. Geris², N. van Gastel¹, G. Carmeliet¹, H. Van Oosterwyck¹;
¹KU Leuven, BELGIUM, ²U Liège, BELGIUM.

M255 An Information-Theoretic Approach to Integrated Mechanistic-Empirical Modeling of Cellular Response based on Intracellular Signaling Dynamics

M. N. Mayalu, H. Asada;
Massachusetts Institute of Technology, Cambridge, MA.

M256 A biomechanical exploration of collagen fibre realignment associated with cancer spread using a three-dimensional multiscale finite element procedure

P. A. Wijeratne, V. Vavourakis, J. Hipwell, D. Hawkes;
University College London, UNITED KINGDOM.

**MUSCULOSKELETAL BIOMECHANICS AND
MUSCLES & MOTOR CONTROL**

M257 A 3D electro-mechanical continuum model for simulating skeletal muscle fatigue.

J. Grasa, M. Sierra, F. J. Miana-Mena, M. J. Muñoz, B. Calvo; Universidad de Zaragoza, SPAIN.

M258 Are Subject-Specific Musculoskeletal Models Robust to Parameter Identification? A Case Study using a Probabilistic Modeling Framework

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M259 Can Knee Biomechanics during Gait Predict Change in Pain One Year Later in Knee OA?

N. Brisson¹, N. Arora¹, K. Calder¹, S. Acker², M. R. Maly¹;
¹McMaster University, Hamilton, ON, CANADA, ²University of Waterloo, ON, CANADA.

M260 Carpal Tunnel Tissue Interaction during Wrist Flexion and Finger Loading

J. L. Gordon, J. N. Gabra, T. L. Marquardt, Z. Li; Cleveland Clinic, OH.

M261 Active Muscle Force is influenced by Muscle Compression

T. Siebert¹, O. Till², N. Stutzig¹, M. Günther¹, R. Blickhan²;
¹University of Stuttgart, GERMANY, ²Friedrich-Schiller University, Jena, GERMANY.

M262 A Generalized Method for Predicting Maximum 3D Neck Moments

J. B. Fice¹, G. P. Siegmund², J. S. Blouin¹;
¹University of British Columbia, Vancouver, BC, CANADA, ²MEA Forensic Engineers & Scientists, Richmond, BC, CANADA.

M263 A Novel Method for Functionally Dividing the Deltoid In Vivo

F. T. Sheehan¹, H. Im¹, S. Brochard², C. Pons², K. E. Alter¹;
¹National Institutes of Health, Bethesda, MD, ²Rehabilitation Medicine Department, University Hospital of Brest, FRANCE.

M264 A Modal Approach for Soft Tissue Artefact Mathematical Representation and Compensation

T. Bonci¹, V. Camomilla¹, R. Dumas², L. Cheze², A. Cappozzo¹;
¹University of Rome "Foro Italico", Rome, ITALY, ²Université Lyon 1, IFSTTAR, Lyon, FRANCE.

M265 Age-Related Differences in Upper Body Reactions to Unexpected Slips

Z. Merrill, R. Cham, A. Chambers; University of Pittsburgh, PA.

M266 Non-invasive quantification of Triceps Surae muscle passive local stiffness: undergoing study in healthy subjects and patients with spasticity

I. Masson, A. Baron, P. Portero; University Paris-Est Creteil & Rothschild Hospital (AP-HP) Paris, Creteil, FRANCE.

M267 Pathway to Quantify the Effects of Peripheral Soft-Tissue and Capsule on Knee Joint Response

T. F. Bonner, J. P. Halloran, A. Erdemir, R. W. Colbrunn; Cleveland Clinic, OH.

M268 Are differences between marmosets and humans in average power output during the push-off in jumping reflected in muscle contractile properties determined in vitro?

R. L. C. Plas¹, H. Degens², I. H. C. H. Philippens³, M. F. Bobbert¹, R. T. Jaspers¹;
¹VU University Amsterdam, NETHERLANDS, ²Manchester Metropolitan University, UNITED KINGDOM, ³Biomedical Primate Research Centre, Rijswijk, NETHERLANDS.

M269 Reliability of the Initial and Final Root Mean Square and Spectral Median Frequency from Surface Electromyogram of the Erector Spinae Muscle

R. G. T. Mello, L. F. Oliveira, J. Nadal; Federal University of Rio de Janeiro, BRAZIL.

MISCELLANEOUS BIOMECHANICS

M270 Uncertainty Quantification of Boundary Conditions for the CFD Simulation of a Rabbit Aorta

N. Ashton; University of Manchester, UNITED KINGDOM.

M271 A Robotic Neuromusculoskeletal Simulator for Spine Research

R. Colbrunn¹, T. Bonner¹, P. Mageswaran², R. McLain¹, L. Gilbertson³;
¹Cleveland Clinic, OH, ²Ohio State University, Columbus, OH, ³Tulane University, New Orleans, LA.

M272 Women with Urinary Incontinence Demonstrate Altered Postural Stability

J. L. McCrory, C. Mancinelli, K. D. Harrison, S. Rondini, K. L. Thomas; West Virginia University, Morgantown, WV.

M273 A coupled human model of the circulation and the left ventricle

W. Chen¹, H. Gao¹, B. E. Griffith², X. Luo¹, N. A. Hill¹;
¹University of Glasgow, UNITED KINGDOM, ²New York University, NY.

M274 Ankle Joint Biomechanics During First Step of Stair Ascent is Different from Later Steps

T. Standifird, M. Arwood, S. Zhang;
University of Tennessee Knoxville, Knoxville, TN.

M275 Accurate Static and Dynamic Calibration Method of an Instrumented Treadmill

H. Lu¹, H. Hsieh², H. Lin³, T. Chen¹, T. Lu¹;
¹National Taiwan University, Taipei, TAIWAN, ²Department of Mechanical and Automation Engineering, Kao-Yuan University, Kaohsiung, TAIWAN, ³School of Physical Therapy, China Medical University, Taichung, TAIWAN.

M276 1D Modelling of Blood Flow in the Human Vascular Network

S. Safaei, V. Suresh, C. Bradley;
University of Auckland, NEW ZEALAND.

M277 Accounting for Scaling of Posture and Stance Parameters with Size and Speed

J. Usherwood, T. Hubel;
The Royal Veterinary College, Hatfield, UNITED KINGDOM.

M278 Achieving Accurate Finite Element Models of Thin Cortical Structures: A New Toolbox of Methodologies Validated in the Craniofacial Skeleton

A. Pakdel, J. Fialkov, C. Whyne;
University of Toronto, Toronto, ON, CANADA.

M279 Scaling of Human Lung Anatomy based on Anthropometric and Demographic Data

C. Carneal¹, Y. Otake², D. Kleissas¹, A. Merkle¹, M. Armand¹, M. Uy¹, G. Thawait³, J. Carrino³, B. Corner⁴, M. Carboni⁴, B. DeCristofano⁴, M. Maffeo⁴;
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M280 The evaluation of bone remodeling around two types of acetabular cups

Y. Wang¹, M. Hobatho², T. Guo¹;
¹Harbin Institute of Technology Shenzhen Graduate School, shenzhen, CHINA, ²UTC, Compiègne, FRANCE.

M281 Assessing spatiotemporal gait parameters based on vertical ground reaction force measurements

L. Veilleux¹, M. Raison², L. Ballaz³;
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M282 A Finite Element Modelling Approach to Predict Clinically Relevant Hip Fractures

M. I. Z. RIDZWAN, B. PAL, U. N. HANSEN;
Imperial College London, UNITED KINGDOM.

M283 Adaptation of Exoskeleton-Assisted Walking for Non Ambulatory Spinal Cord Injury: Preliminary Results

E. M. Johnsen, A. Ramanujam, E. Garbarini, R. Lamb, G. Forrest;
Kessler Foundation, West Orange, NJ.

M284 Lower limb muscle activity and trunk stability while wearing unstable shoes.

A. C. Clansey¹, M. L. Lake²;
¹Queens University, Kingston, ON, CANADA, ²Liverpool John Moores University, UNITED KINGDOM.

M285 Mechanochemistry of Bone Marrow: Characterizing the Mesenchymal Stem Cell Niche

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¹MIT, Cambridge, MA, ²SMART BioSystems & Micromechanics, SINGAPORE.

OCULAR & EYE BIOMECHANICS

M286 A method for estimating the mechanical state of the individual human eye on the basis of standard static measurement procedures

A. A. Stein, I. N. Moiseeva, G. A. Lyubimov;
Institute of Mechanics, Moscow State University, RUSSIAN FEDERATION.

M287 3D reconstruction and finite element analysis of cat optic nerve head based on in vivo experiment

X. Qian, K. Zhang, Q. Zhao, J. Luo, Z. Liu;
Capital Medical University, Beijing, CHINA.

ORTHOPAEDIC BIOMECHANICS

M288 Transfer Effects of a Treadmill Gait Training Program Using Learner's Focus of Attention Instructions in Controlling Knee Hyperextension Pattern in Young Women

P. Teran-Yengle¹, K. Cole², H. Yack²;
¹University of South Florida, Tampa, FL, ²University of Iowa, Iowa City, IA.

M289 Typical pattern of pelvic insufficiency fractures reproduced by a finite element model

Y. Kiriya¹, F. Yoshimine², Y. Toyama³, T. Nagura³;
¹Kogakuin University, Tokyo, JAPAN, ²Ohkubo Hospital, Tokyo, JAPAN, ³Keio University, Tokyo, JAPAN.

M290 Effect of microseparation on contact mechanics in metal-on-metal hip joints: Finite element analysis

F. Liu, S. Williams, J. Fisher;
Institute of Medical and Biological Engineering, School of Mechanical Engineering, University of Leeds, UNITED KINGDOM.

M291 A Novel Methodology for Determining Subject Specific Ligament Properties in the TKA Knee.

J. Ewing¹, M. Cullen¹, E. Hutter¹, J. Granger², M. Beal³, R. Siston¹;
¹The Ohio State University, Columbus, OH, ²Department of Orthopedic Surgery, The Ohio State University, Columbus, OH, ³Department of Orthopedic Surgery, Northwestern University, Evanston, IL.

M292 A simple analytical tool to optimise locking plate configuration

A. R. MacLeod, P. Pankaj;
University of Edinburgh, UNITED KINGDOM.

M293 A Novel Approach for Determining Bone Mass and Its Relationship to Ambulatory Level in Children With Spina Bifida

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M294 An Accurate and Repeatable Method to Study Knee 3D Pseudo-Kinematics Using Low-Dose Stereo-Radiography

M. K. Kanhonou¹, T. Cresson¹, J. Clément¹, F. Lavoie², N. Hagemeister¹, J. A. de Guise¹;
¹Laboratoire de recherche en imagerie et orthopédie, École de technologie supérieure, Centre de recherche du CHUM, Montréal, QC, CANADA, ²Centre Hospitalier Universitaire de Montréal, QC, CANADA.

M295 A Biomechanical Analysis of Stair Ascent using a Combined Custom-Fit Valgus Knee Brace and Custom-Made Lateral Wedge Foot Orthotic

R. Moyer, T. Birmingham, K. Marriott, K. Leitch, J. R. Giffin;
Western University, London, ON, CANADA.

M296 A retrospective analysis of peak plantar shear and diabetic ulceration sites

M. Yavuz¹, S. A. Richards², K. Garfield², S. T. Gray², A. E. Jensen², N. Rao², N. Delvadia², R. W. Brem¹;
¹University of North Texas Health Science Center, Ft. Worth, TX, ²Kent State University College of Podiatric Medicine, Independence, OH.

M297 Biomechanical Adaptations to Ankle-Foot Orthosis Stiffness during Walking in Patients with Lower Limb Trauma

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M298 Barbed suture material for flexor tendon repair: a biomechanical comparison ex vivo.

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M299 A New Multi-joint Kinetic Profile of Foot Function in People with Diabetes and Peripheral Neuropathy: A Pilot Study

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M300 Accuracy of Quantifying Seated Spinal Curvature Using Fiber Optic Technology versus Optoelectronic Markers

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M301 Biomechanical evaluation of a newly developed flexible PCL brace with regard to the effectiveness

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M302 Assessment of stiffness of proximal femoral fractures fixed by DHS and PFN fixation systems - FE analyses for clinical practice

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M303 A Method for Validation of Finite Element Models in Scoliosis Bracing Simulation

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M304 Do Biomechanical Exam Variables Predict Response to Conservative Treatment of Non-Chronic Plantar Fasciitis?

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M305 A Bandwidth Limitation in Joint Motion Simulator Control

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M306 Effects of ligature pretension in interspinous process spacer on stability and spinous process fracture risk

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M307 Application of computational lower extremity model to investigate muscle activities and joint force patterns in knee osteoarthritis patients during walking

A. Dorj, K. Kim, Y. Kim;
Kyung Hee University, Yongin, REPUBLIC OF KOREA.

M308 Altered Biomechanics of a Perthes' Hip Investigated by Contact Modeling

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M309 Caliper Method vs Digital Photogrammetry for Assessing Arch Height Index in Pregnant Women

K. Harrison, J. L. McCrory;
West Virginia University, Morgantown, WV.

M310 The Effect of Different Thumb Orthoses on Thumb Stabilization and Hand Function in Individuals with Carpometacarpal Osteoarthritis

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M311 Loading rate during gait and stair descent for individuals with focal cartilage defects in the knee

L. M. Thoma, M. P. McNally, D. C. Flanigan, A. M. Chaudhari, R. A. Siston, T. M. Best, L. C. Schmitt;
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M312 Altered Landing Mechanics in Professional Athletes with Patellofemoral Pain

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¹Imperial College London, UNITED KINGDOM, ²Northumbria University, Newcastle, UNITED KINGDOM, ³Cardiff University, UNITED KINGDOM.

M313 Understanding Knee Functionality: Simultaneous Assessment of Whole Body Kinematics, Videofluoroscopic Tibiofemoral Implant Kinematics, EMG and Ground Reaction Forces during Daily Activities

P. Schütz, H. Gerber, M. Hitz, S. Ferguson, W. R. Taylor, R. List;
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M314 The Effect of Bone Preparation on Cementless Femoral Component Micromotion in Total Knee Arthroplasty

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M315 A Comparison of Upper Extremity Joint Demands during Pediatric Lofstrand Crutch and Walker-Assisted Gait

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M316 A Method for Assessing Accuracy in Tracking Foot Bones with Biplanar Videoradiography

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¹Harvard Medical School, Cambridge, MA, ²Rhode Island Hospital, Providence, RI, ³Rhode Island Hospital / Brown University, Providence, RI.

M317 A Preliminary Evaluation of Shoulder Mechanics Using a Novel Wheelchair: The Influence of Pain

P. W. Hovis, M. D. Brown, C. J. Hass, M. D. Tillman;
University of Florida, Gainesville, FL.

M318 Nanoindentation Modulus and Mineral Volume Fraction Relationships in the Human Vertebral Endplate

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¹Univ of Colorado, Boulder, CO, ²Boston University, MA.

SPECIAL TOPICS – GAIT, MOTION, PROSTHETICS, & INJURY

M319 Does the GRF Pass through the COM during Gait?

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University of Kentucky, Lexington, KY.

M320 Treadmill Walking is Problematic for the Study of Gait Smoothness in Older Adults

T. J. Kataras, M. M. Ruwitch, B. Row Lazzarini;
Willamette University, Salem, OR.

M321 A Novel Technique Quantifying Phalangeal Cylinder Reaction Forces During Gripping

E. W. Sinsel¹, D. L. Gloekler², B. M. Wimer¹, C. M. Warren¹, J. Z. Wu¹, F. L. Buczek¹;
¹National Institute for Occupational Safety and Health, Morgantown, WV, ²Georgetown University School of Medicine, Washington, DC.

M322 A Comparison of Gait Parameters between Patients with Peripheral Arterial Disease and Patients with Chronic Obstructive Pulmonary Disease.

E. J. Pisciotta¹, S. R. Wurdeman², J. M. Yentes¹, I. I. Pipinos³, J. M. Johanning¹, S. A. Myers¹;
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M323 A Review of Passive and Powered Leg Prostheses for Walking

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University of Colorado at Boulder, CO.

M324 Age-gender comparison of acceleration attenuation at the upper body during walking

H. Jeon, Y. Ho, Y. Kwon, J. Kim, G. Eom;
Konkuk University, Choogju-si, REPUBLIC OF KOREA.

M325 A Comprehensive Data Set for Testing Muscle Forces Predicted by Subject-Specific Musculoskeletal Simulations

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M326 Arm Swing, Thorax-Pelvis Coordination and Angular Momentum Regulation During Walking

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¹St. Ambrose University, Davenport, IA, ²University of Massachusetts Amherst, MA.

M327 Alterations in the Tridimensional Scapular Kinematics in Women with Fibromyalgia.

M. A. Avila, P. R. Camargo, T. F. Salvini;
Federal University of Sao Carlos, BRAZIL.

M328 A Comprehensive, Cross-Sectional Investigation of Postural Sway as an Assessment of Fall Risk for Older Adult Women

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¹Mayo Clinic, Rochester, MN, ²Whitaker International Program, Chiang Mai University, Chiang Mai, THAILAND.

M329 Amputee Step Activity is Correlated to Stride-to-Stride Fluctuations at the Ankle.

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University of Nebraska at Omaha, NE.

M330 Subject Influence on the Error Prediction of Hand Grasping Postures with Artificial Neural Networks

M. C. Mora, J. Andrés, J. L. Sancho-Brú;
University Jaume I, Castellón, SPAIN.

M331 Comparison of Gait Score Methodologies in Assessing Amputee Rehabilitation Progress

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M332 A unified modelling of oriented movement in plants

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M333 Integration of Flexible and Thin Sensor System of Contact Pressure and Shear-stress for Application to Haptic Display

S. Sato, K. Sasagawa;
Hirosaki University, JAPAN.

M334 An Exploratory Analysis of the Effect of Fatigue on Wrist Variability Utilizing Different Propulsion Styles

L. A. Zukowski¹, E. A. Christou¹, C. J. Hass¹, M. D. Tillman²;
¹University of Florida, Gainesville, FL, ²Troy University, AL.

M335 Biomechanics Research for the Warrior Injury Assessment Manikin Project: Human Biofidelity Response and Injury Prediction for Under-Body Blast

A. Merkle¹, L. Voo¹, J. Zhang¹, M. Kleinberger¹, F. Pintar², N. Yoganandan², C. Bass³, R. Salzar⁴, J. Rupp⁵, J. Stitzel⁶, J. Bolte⁷, J. Cavanaugh⁸, C. Bir⁸, K. Ott¹, R. Coates⁹;

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SPECIAL TOPICS – BIOFLUID MECHANICS

M336 A Doppler Spectrum Model for Improved Ultrasound Assessment of Maximum Velocity in Blood Flow

S. Ricci, R. Matera;
University of Florence, Firenze, ITALY.

M337 3D Printed Model of the Cervical Spine for Simulation of Cerebrospinal Fluid Motion: Comparison of In Vitro and Computational Fluid Dynamics Simulation Results

S. THYAGARAJ¹, S. Heidari Pahlavian¹, M. Vatani¹, J. Choi¹, M. Goodin², A. Bunck³, T. Yiallourou⁴, F. Loth¹, B. Andrew Martin¹;

¹The University of Akron, OH, ²Simutech Group, Hudson, OH, ³University of Munster, GERMANY, ⁴Swiss Federal Institute of Technology, Lausanne, SWITZERLAND.

M338 An Investigation into the Flow Behaviour of Breast Cancer Cells within the Lymphatic System using both Numerical and Microfluidic Experimental Methods.

S. T. Morley, D. Newport, M. T. Walsh;
University of Limerick, IRELAND.

SPECIAL TOPICS – SOFT TISSUE BIOMECHANICS

M339 Dynamic instrumented palpation for ex vivo and in vivo assessment of the prostate

S. J. Hammer¹, D. W. Good², P. Scanlan¹, W. Shu¹, R. L. Reuben¹, S. Phipps², G. D. Stewart³, A. S. McNeill²;

¹Heriot-Watt University, Edinburgh, UNITED KINGDOM, ²Western General Hospital, Edinburgh, UNITED KINGDOM, ³University of Edinburgh, UNITED KINGDOM.

M343 Anisotropic behaviour of human gallbladder walls

X. Luo¹, W. G. Li¹, N. A. Hill¹, R. W. Ogden¹, A. Smith², A. W. Majeed², N. Bird²;

¹University of Glasgow, UNITED KINGDOM, ²University of Sheffield, UNITED KINGDOM.

M344 Tumor characterization in mice using magnetic resonance elastography

Y. Feng¹, E. H. Clayton², R. J. Okamoto², J. Engelbach², J. R. Garbow², P. V. Bayly²;

¹University of Texas at Austin, TX, ²Washington University in St. Louis, MO.

M321 Median Nerve Circularity Increases during Medial-Lateral Compression of the Wrist

T. L. Marquardt, J. N. Gabra, Z. Li;
Cleveland Clinic, OH.

M332 Study on the Suture Line Response of Arterial End-to-side Anastomosis

P. C. Roussis¹, A. E. Giannakopoulos², H. P. Charalambous¹;

¹University of Cyprus, Nicosia, CYPRUS, ²University of Thessaly, Volos, GREECE.

M333 Analytical Investigation of the Influence of Elastic Mismatch on the Response of End-to-side and Side-to-side Arterial Anastomosis

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¹University of Cyprus, Nicosia, CYPRUS, ²University of Thessaly, Volos, GREECE.

REHABILITATION

M345 Adaptation and Prosthesis Effects on Stride-to-Stride Fluctuations

S. R. Wurdeman¹, S. A. Myers¹, A. L. Jacobsen², N. Stergiou¹;

¹University of Nebraska at Omaha, NE, ²Veterans Affairs Medical Center, Omaha, NE.

M346 A user-controlled powered ankle exoskeleton to drive gait modifications post-stroke

K. Z. Takahashi¹, M. D. Lewek², G. S. Sawicki¹;

¹North Carolina State University, Raleigh, NC, ²University of North Carolina at Chapel Hill, Chapel Hill, NC.

M347 Can the Kinect Measure In Vivo Joint Angles as well as a Marker-Based System?

A. Schmitz, M. Ye, R. Shapiro, R. Yang, B. Noehren;
University of Kentucky, Lexington, KY.

M348 A Novel Rehabilitation Robotic Platform for Over-ground Gait Training

K. Mun, H. Yu;
National University of Singapore, SINGAPORE.

M349 A Portable Knee Ankle Foot Robot for Stroke Rehabilitation

G. Chen, Z. Guo, H. Yu;
National University of Singapore, SINGAPORE.

M350 Virtual Reality Based Feedback Methods to Improve Efficiency of Service Members with Amputation

E. M. Nottingham, A. L. Pruziner, E. J. Wolf;
Walter Reed National Military Medical Center, Bethesda, MD.

M351 Lower Extremity Sensory Impairment Influences Static and Dynamic Balance in People Post Stroke and People With Peripheral Neuropathy

C. Wutzke, V. Mercer;
University of North Carolina at Chapel Hill, NC.

M352 Quadriceps Strengthening Does Not Change Quadriceps and Knee Biomechanics During Stair Ascent and Descent in Adults With Knee Osteoarthritis

P. DeVita¹, J. Leonardis¹, M. Henriksen², C. Bartholdy², P. Rider¹, L. Jørgensen², H. Bliddal², S. Rabideau¹, J. Aaboe²;
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M353 A Solid-State Smart-Material Based Prosthetic Arm

M. A. Levenstein, B. Ketterer, M. Guzman, T. Teates, D. Park, S. Vasquez, P. Jelenek, G. Clark, B. Lefebvre, C. Karaoz, J. Gongloff, M. Pollard, O. Bilgen;
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M354 Evaluation of a Powered Ankle-Foot Prosthetic System during Inclined Walking

C. A. Rabago, J. M. Whitehead, A. E. Ferris, J. M. Wilken;
Brooke Army Medical Center, JBSA Fort Sam Houston, TX.

M355 Virtual Reality Based Training of Service Members with Unilateral Transtibial Amputation

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M356 A perturbation rejection controller for seated balance after spinal cord injury

M. L. Audu, L. Marinis, R. J. Triolo;
Case Western Reserve University, Cleveland, OH.

M357 Ankle function and biomechanical improvements after a combined strengthening, stretching and functional training program for diabetic neuropathic patients: a randomized controlled trial

C. D. Sartor, R. Watari, L. P. Cacciari, M. K. Butugan, R. H. Hasue, I. C. N. Sacco;
University of Sao Paulo, BRAZIL.

M358 Trunk-Pelvis Motion and Lumbar Loads during Walking in Individuals with Transtibial Amputation

A. J. Yoder, A. K. Silverman, A. J. Petrella;
Colorado School of Mines, Golden, CO.

M359 Amount of step width variability is increased in patients with peripheral arterial disease.

B. Arnold¹, S. R. Wurdeman¹, J. M. Yentes¹, J. M. Johanning², I. I. Pipinos², S. A. Myers¹;
¹University of Nebraska at Omaha, NE, ²Omaha Veterans' Affairs Medical Center; University of Nebraska Medical Center, Omaha, NE.

M360 IMU Data Based Reconstruction of Limb Movement Trajectory through Spectral and EMD Analysis

J. Huang, M. Pan;
National Central University, Jhongli, TAIWAN.

M361 Training Effect of Wheelchair Dance on Aerobic Fitness in Bedridden Individuals with Severe Cerebral Palsy

K. Terada¹, A. Satonaka², Y. Terada³, N. Suzuki⁴;
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M362 Antagonistic co-contraction at the wrist in patients with Parkinson's disease

Y. Kwon, J. Kim, Y. Ho, H. Jeon, G. Eom;
Konkuk University, Choogju, REPUBLIC OF KOREA.

M363 Altered single leg squatting control in people with Anterior Cruciate Ligament injury compared to healthy controls.

R. van Deursen, K. Button, P. Roos;
Cardiff University, UNITED KINGDOM.

M364 Analysis of muscle activities and joint motion of the shoulder and the elbow during wheelchair propulsion

J. John, G. Arnold, R. Abboud, W. Wang;
Dundee University, UNITED KINGDOM.

M365 A New System for Rehabilitation of Lower Limbs Based on Inertial Sensors and Feedbacks: A Validation Study by Gait Analysis

G. Lullini, L. Berti, A. Leardini;
Istituto Ortopedico Rizzoli, Bologna, ITALY.

M366 A User-Modulated Control Strategy for Sit-to-Stand Transitions Using a Powered Knee-Ankle Prosthesis

A. M. Simon, N. P. Fey, K. A. Ingraham, S. B. Finucane, E. G. Halsne, L. J. Hargrove;
Rehabilitation Institute of Chicago, IL.

M367 A Step Towards Reducing Freezing of Gait in Parkinson's Disease: Using a Portable Powered Orthosis

M. N. Petrucci¹, C. D. MacKinnon², E. T. Hsiao-Wecksler¹;
¹University of Illinois Urbana-Champaign, IL, ²University of Minnesota, Minneapolis, MN.

M368 Arm Movement Analysis via Marker Tracking with a Single-Camera System: Validation with a Motion Analysis System in Stroke and Healthy Subjects

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M369 Arch Height Mediation of Obesity-related Walking in Adults

S. V. Gill, J. M. DeSilva;
Boston University, MA.

M370 Acute Effects of Cadence Manipulation on Knee Loading During Gait Following ACL Reconstruction

P. E. Lin, K. A. Pratt, M. R. Pucciarelli, S. M. Sigward;
University of Southern California, Los Angeles, CA.

M371 Analyzing Control of Lateral Weight Shifting after Neurotrauma with an Inverted Pendulum Model

M. W. Kennedy, J. P. Schmiedeler;
University of Notre Dame, South Bend, IN.

M372 Aspects regarding the correlation between the biomechanical model of the elbow and the rehabilitation orthosis with two freedom degrees

C. Oprisan, E. Budescu, P. Paraschiv;
Technical University of Iasi, ROMANIA.

M373 Ankle Range of Motion and Ankle Power: Key Contributors to Gait Efficiency in Children with Cerebral Palsy.

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M374 Age-related changes in reflex kinematics to electrical stimulation to the dorsum of the foot during walking.

S. R. Hundza, R. Brodie, D. Commandeur, A. Gaur, M. Klimstra;
University of Victoria, BC, CANADA.

RESPIRATORY & LUNG BIOMECHANICS

M375 An Efficient Computational Model for Simulating Gas Exchange in the Lung

W. Kang, A. Clark, M. Tawhai;
Auckland Bioengineering Institute, NEW ZEALAND.

M376 The comparison of flow patterns in OSA upper airways between successful and failed surgeries

M. Lu¹, Y. Liu¹, J. Ye²;
¹The Hong Kong Polytechnic University, Kowloon, HONG KONG, ²Capital Medical University, Beijing, CHINA.

M377 A Model of Lung Parenchyma Stress Relaxation Using Fractional Viscoelasticity

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RHEOLOGY & ELASTICITY

M378 A Non-Linear Model to Evaluate Cells' Poisson's Ratio and Young's Modulus in Microindentation Experiments

L. Guillou, D. Gonzalez-Rodriguez, J. Lafaurie-Janvove, A. Babataheri, E. De Langre, A. Barakat, J. Husson;
Ecole Polytechnique, Palaiseau, FRANCE.

M379 Development of Simplified Rheological and Physiological Blood Analogue Solutions

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SPINE BIOMECHANICS

M380 Age Effects On Spine Motion During Ambulatory Activities

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M381 Accumulation of Advanced Glycation End-products in the Intervertebral Discs of Type 2 Diabetic Rodents Increases Susceptibility to Mechanical Damage

A. C. Abraham¹, R. Fuchs², D. Burr², S. Y. Tang¹;
¹Washington University in St. Louis, MO, ²Indiana University, Indianapolis, IN.

M382 A Biomechanical Analysis of Growing Rods Used in the Management of Early Onset Scoliosis (EOS).

M. E. Quick, C. J. Adam, G. N. Askin, R. D. Labrom, M. J. Pearcy;
QUT/Mater Paediatric Spine Research Group, Institute of Health and Biomedical Innovation, Queensland University of Technology and Mater Health Services, Brisbane, AUSTRALIA.

M383 A Physically-based Haptics Simulator for Spine Surgery Simulation

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M384 Composition-Based Tissue Modelling to Assess the Sensitivity of Cell Nutritive Environment To Extracellular Matrix Changes within the Intervertebral Disc

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M385 Cervical Muscle Length Changes in Forward Head Posture

S. Khayatzadeh¹, D. Schuit², W. Sears³, R. M. Havey¹, M. G. Muriuki¹, L. I. Voronov¹, A. J. Ghanayem¹, A. G. Patwardhan¹;
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M386 Active Muscle Modeling In Combination With Intervertebral Disc Swelling In A L3-S1 Lumbar Spine Model Captures The Importance Of Night Rest

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Institute for Bioengineering of Catalonia, Biomechanics and Mechanobiology, Barcelona, SPAIN.

M387 An Evaluation of the Distribution and Architecture of Trabecular Bone Displaced during Kyphoplasty

P. Purcell¹, F. Mc Evoy¹, S. Tiernan¹, S. Morris²;
¹TT Dublin, IRELAND, ²National Spinal Injuries Unit, Mater Misericordiae University Hospital, Dublin, IRELAND.

M388 A Stepwise Multiple Regression Analysis of Pedicle Screws in the Thoracolumbar Spine

K. M. Albanese, N. Ordway, W. Lavelle, S. Albanese;
SUNY Upstate Medical University, Syracuse, NY.

M389 3D analysis of the canal microstructure in a rabbit lumbar vertebral endplate

Y. Nishigaki¹, T. Yamaguchi¹, M. Kishimoto¹, S. Goto¹, N. Inoue²;
¹Doshisha University, Kyoto, JAPAN, ²Rush University Medical Center, Chicago, IL.

SPORTS BIOMECHANICS & HUMAN PERFORMANCE

M390 Adaptability of Stride-to-Stride Control in Human Walking and Running

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M391 TURNING KINETICS DURING INTENSE WHEELCHAIR PROPULSION

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M392 Relationships between Trunk Accelerations and Trunk and Lower Limb Positions during Shuttle Run Cutting

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M393 Ultrasonographic and Kinematic Analysis of Ulnar Nerve at The Elbow in Baseball Pitchers

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M394 A Comparison of 2D and 3D Hip and Knee Torques in Conventional Squat Exercises

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M395 Trunk And Lower Limb Kinematics And Muscle Activation Pre And Post Eccentric Hip Extensor Fatigue

T. H. Nakagawa, R. S. Silva, A. F. Santos, G. C. Lessi, J. E. Cunha, F. V. Serrão;
Federal University of São Carlos, São Paulo, BRAZIL.

M396 A Novel Approach for Predicting In-Vivo Lumbar Spine Loads and Kinematics Based on Motion Analysis

M. Eltoukhy, M. Ziff, S. Elmasry, F. Travascio, S. Asfour;
University of Miami, Coral Gables, FL.

M397 An Assessment of the Effect of the New Rugby Union Engagement Laws on the Spinal Kinematics of the Hooker

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¹Cardiff University, UNITED KINGDOM, ²Bournemouth University, UNITED KINGDOM.

M398 A Comparison of Older and Younger Distance Runners Over 400 miles of Shoe Wear

H. A. Orloff, M. Thompson, J. Higa;
University of Puget Sound, Tacoma, WA.

M399 Joint angles, moments and muscle activities in Nordic walking in comparison with walking

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M400 Kinematic analysis magnitude of acceleration for braking and propulsion phases during foot contact phase at maximal speed sprinting

Z. Sha, K. Sato;
East Tennessee State University, Johnson City, TN.

M401 Balance control and response to perturbations in various dance positions: a balance study in dance using a moving platform

E. Huh, M. T. G. Pain;
Loughborough University, UNITED KINGDOM.

M402 Patellofemoral Joint Stress of Female Ballet Dancers with and without Patellofemoral Pain during Consecutive Jumping and Landing

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M403 An Investigation of Power-assisted Sit-to-stand Movement: It is Timing That Matters

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M404 Relationship Between Isokinetics Strength of Elbow and Throwing Performance in Handball

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¹Chinese Culture University, Taipei, TAIWAN, ²National Taiwan University of Physical Education and Sport, Taichung, TAIWAN.

M405 A Novel Approach to Map the Center of Pressure Measured by Insole Pressure Sensor Technology onto the Shoe Coordinate System

B. T. Weaver, J. E. Braman, R. C. Haut;
Michigan State University, East Lansing, MI.

M406 Changes in Running Kinematics Following Bilateral Isolated Lower Extremity Joint Fatigue

D. Dickin, H. Wang, J. Estes, K. Weiss;
Ball State University, Muncie, IN.

M407 Alterations of In-Shoe Plantar Loading Patterns During Running at Different Simulated Gravity Levels on a Lower-Body Positive Pressure Treadmill

J. M. Smoliga, L. A. Wirfel, M. Doarnberger, K. R. Ford;
High Point University, High Point, NC.

M408 The analysis of defense against clinch holds of wrestling on plantar pressure

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M409 Influence of Compression Apparel on Hip Joint Mechanics, Soft-Tissue Vibrations, and Muscle Activations during Drop Jumps

W. Fu, Y. Liu, R. Xia, L. Huang;
Key Laboratory of Exercise and Health Sciences of Ministry of Education, Shanghai University of Sport, Shanghai, CHINA.

M410 Sprint mechanics of able-bodied and amputee sprinters in men's 100-m sprint

H. Hobara, Y. Kobayashi, M. Mochimaru;
National Institute of Advanced Industrial Science & Technology, Tokyo, JAPAN.

M411 The Electromyography Analysis of Riding the Innovative Stepping

H. T. PENG¹, Y. H. WANG¹, Z. R. CHEN¹, T. Y. HSU²;
¹Chinese Culture University, Taipei, TAIWAN, ²National Taichung University of Education, Taichung, TAIWAN.

M412 A 5% Shorter Stride Decreases Patellofemoral Loading as much as using a Mid/forefoot Strike

E. R. Boyer, T. R. Derrick;
Iowa State University, Ames, IA.

M413 A study on biomechanical behavior of the lumbar spine in relation to saddle height during cycling exercise

A. R. Kang, S. J. Lee;
Inje University, Gimhae, REPUBLIC OF KOREA.

M414 Trunk position and shank angle alter the biomechanics of the lead and support limb during the forward lunge exercise

C. Hofmann¹, D. Holyoak², P. Juris³;
¹Cybox Research Institute, Medway, MA, ²University of Connecticut, Storrs, CT, ³University of Massachusetts, Amherst, MA.

M415 1000 Norms Project: Clinical Catalogue of Lower Limb Biomechanical Variation

M. J. McKay, J. N. Baldwin, M. Simic, P. Ferreira, N. Vanicek, N. Moloney, C. Hiller, J. Nightingale, J. Burns, K. Refshauge;
The University of Sydney, AUSTRALIA.

M416 Effect of Core Stability Training on Jumping and Changing-Of-Direction Abilities in Female Basketball Players

S. Wang¹, L. Liaw¹, C. Yang², L. Guo¹;
¹Kaohsiung Medical University, TAIWAN, ²Tzu-Chi University, Hualien, TAIWAN.

M417 Correlation Between Functional Movement Screen Deep Squat Scores Using Raters from Different Movement Science Disciplines and 3D Kinematic Data

E. P. Scibek¹, S. L. Edmond², M. F. Moran¹;
¹Sacred Heart University, Fairfield, CT, ²Rutgers University, Newark, NJ.

M418 Subject-Specific Musculoskeletal Model To Estimate Muscle Contribution To The Acceleration Phase Of The Sprint

A. P. Veloso, S. Cabral, F. João, V. Moniz-Pereira;
Univ Lisboa, Fac Motricidade Humana, CIPER, LBMF, Lisboa, PORTUGAL.

M419 Acute static and unstable balance after a 3 mile running bout in varying shod conditions.

M. Bohne, N. Allphin;
Utah Valley University, Orem, UT.

TISSUE ENGINEERING

M420 Sterilisation Effects on the Biomechanical Properties of Acellular Porcine Super Flexor Tendons

A. Herbert, G. L. Jones, E. Ingham, J. Fisher;
University of Leeds, UNITED KINGDOM.

M421 A Structural and Computational Fluid Dynamics Analysis to Quantify the Variability of Rapid-Prototyping Scaffolds

A. M. Campos Marin, D. Lacroix;
INSIGNEO Institute for in silico medicine, Department of Mechanical Engineering, University of Sheffield, UNITED KINGDOM.

M422 3D Imaging and Analysis of Fibrillar Networks Within Collagen Hydrogels Using Focused Ion Beam Milling and Scanning Electron Microscopy

S. Reese, N. Farhang, R. Polson, J. Weiss;
University of Utah, Salt Lake City, UT.

M423 Development and Characterization of a Decellularised Xenogeneic Mitral Valve Scaffold

M. Granados, L. Morticelli, P. Yablonski, A. Hilfiker, I. Tudorache, S. Cebotari, A. Haverich, S. Korossis;
Department of Cardiothoracic, Transplantation and Vascular Surgery, Hannover Medical School, GERMANY.

M424 Application of Ionic Microenvironment Modulators to Improve the Biomechanical Properties of Engineered Cartilage

J. K. Lee, C. A. Gegg, J. C. Hu, P. H. Kass, K. A. Athanasiou;
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M425

A Novel In Vitro Blood Brain Barrier Platform

C. Hovell¹, G. Barabino², Y. Kim¹, L. Taite¹;
¹Georgia Institute of Technology, Atlanta, GA, ²City College of New York, NY.

M426 Mechanotransduction events in bone marrow mesenchymal stem cells after fluid flow exposure

S. Rath, S. Van Gulden, S. Ramaswamy;
Florida International University, Miami, FL.

M427 A novel biomechanoreactor for dynamic conditioning and biomechanical characterization of tissue tubular structures.

N. Bono¹, M. Soncini¹, M. Ramella², M. Piola¹, F. Consolo¹, F. Boccafoschi², G. Fiore¹;

¹Politecnico di Milano, ITALY, ²Università del Piemonte Orientale "A. Avogadro", Novara, ITALY.

M428 A Novel Viscoelastic Collagen-Elastin Bilayered Tubular Scaffold for Vascular Graft Tissue Engineering.

A. J. Ryan, F. J. O'Brien;

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M429 3D microstructuring type I collagen to reconstitute in vitro models of small intestinal tissue

M. Verhulsel, S. Descroix, L. Malaquin, D. M. Vignjevic, J. Viovy;

Institut Curie, Paris, FRANCE.

VASCULATURE

M430 Patient specific abdominal aortic aneurysm segmental elastic materials properties in finite element modeling of rupture risk

A. P. Tierney¹, A. Callanan², T. M. Mcgloughlin¹;

¹University of Limerick, IRELAND, ²The University of Edinburgh, UNITED KINGDOM.

M431 A Combined Experimental and Computational Study of the Impact of Anesthesia on Pulse Wave Velocity Measurements in Mice

F. Cuomo¹, J. Ferruzzi², J. D. Humphrey², C. Figueroa¹;

¹King's College London, UNITED KINGDOM, ²Yale University, New Haven, CT.

M432 A novel approach to evaluating the radial distensibility of the large pulmonary artery branches

J. D. Henningsen, A. Bellofiore, A. Roldan-Alzate, H. B.

Kellihan, D. Consigny, C. J. Francois, N. Chesler;

University of Wisconsin-Madison, WI.

ADHESION

T1 Computational Analysis of Airway Opening during Inflammatory Otitis Media in Children with Cleft Palate

J. E. Malik, S. Ghadiali;
The Ohio State University, Columbus, OH.

BIOIMAGING & BIO-OPTICS

T2 Dynamic Ultrasound Imaging of Cervical Spine Intervertebral Discs

M. Zheng¹, A. Masoudi², D. Buckland³, N. Yoganandan⁴, B. Stemper⁴, T. Szabo¹, B. Snyder⁵;
¹Boston University, MA, ²Center for Advanced Orthopaedic Studies, Beth Israel Deaconess Medical Center & Harvard Medical School, Boston, MA, ³Massachusetts Institute of Technology, Cambridge, MA, ⁴Medical College of Wisconsin, Milwaukee, WI, ⁵Boston Children's Hospital, MA.

T3 Automated Laser Registration for Computer Assisted Orthopaedic Surgery

S. V. Joshi, P. J. Rowe;
University of Strathclyde, Glasgow, UNITED KINGDOM.

T4 Decrease in Circumferential Cyclic Strain is Independent of Aortic Expansion in Elastase-Induced Rat Aneurysms

A. A. Yrineo, E. H. Phillips, C. J. Goergen;
Purdue University, West Lafayette, IN.

T5 Automated determination of zone thicknesses of articular cartilage based on chondrocyte shapes

M. J. Turunen, J. S. Jurvelin, R. K. Korhonen;
University of Eastern Finland, Kuopio, FINLAND.

T6 Correlation of T1 ρ and T2 relaxation times values with Glycosaminoglycan Articular Cartilage

A. Hosseini¹, Y. Wang², M. Torriani¹, A. J. Grodzinsky², G. Li¹;
¹Massachusetts General Hospital/Harvard Medical School, Boston, MA, ²Massachusetts Institute of Technology, Cambridge, MA.

T7 Model-based Validation of a Biplane Fluoroscopy System

J. Iaquinto¹, Q. Vu¹, R. Tsai¹, D. Haynor², B. Sangeorzan¹, W. Ledoux¹;
¹RR&D Center of Excellence, VA Puget Sound, Seattle, WA, ²University of Washington, Seattle, WA.

BIO-INSPIRED DESIGN

T8 Biomimetic Total Knee Arthroplasty with Anterior Cruciate Ligament Preservation Restores Normal Kinematics and Reduces Implant Wear

T. Zumbunn, K. Mangudi Varadarajan, H. Rubash, H. Malchau, G. Li, B. Micheli, K. Wannomae, O. Muratoglu;
Massachusetts General Hospital, Boston, MA.

T9 Using Bioinspired Bending Minimization for the Finite Element Based Structural Optimization

R. Gößling, B. Bender, U. Witzel;
University of Bochum, GERMANY.

T10 Bio-Inspired Design of CNT-Modified Composite Hierarchical Fractal Interfaces

Y. Jiang¹, G. Ehlert², J. Baur², Y. Li¹;
¹University of New Hampshire, Durham, NH, ²Air Force Research Laboratory, Wright Patterson Air Force Base, OH.

BIOMATERIALS

T11 Biomechanical and Biological Properties of Acellular Porcine Superflexor Tendon Following Chemical and Irradiation Sterilisation

J. H. Edwards, A. Herbert, J. Fisher, E. Ingham;
Institute of Medical and Biological Engineering, University of Leeds, UNITED KINGDOM.

T12 Comparative Study of Visco-elastic Behaviour of Hernia Meshes

M. G. Kirilova, D. L. Pashkouleva, V. I. Kavardzhikov;
Institute of Mechanics, Bulgarian Academy of Sciences, Sofia, BULGARIA.

T13 Biological Evaluation of Collagen Reinforced Calcium Phosphate Bone Cements

I. Palmer¹, J. Nelson¹, W. Schatton², N. J. Dunne¹, F. J. Buchanan¹, S. A. Clarke¹;
¹Queen's University, Belfast, UNITED KINGDOM, ²KliniPharm GmbH, Frankfurt am Main, GERMANY.

T14 Effect of Dose Level Ranged from 5 Mrad to 100 Mrad on the Oxidation and Mechanical Properties of Shelf-aged Cross-linked Ultra-high Molecular Weight Polyethylene (UHMWPE)

L. Zhang, T. Yamaguchi, T. Morita, T. Murakami, H. Yang, Y. Sawae;
Kyushu University, Fukuoka, JAPAN.

T15 Corrosion behavior of AZ31 magnesium alloy micro tubes in a pulsatile fluid flow field

Y. Ohumura¹, S. Yoshihara¹, Y. Soya¹, E. Galvin², B. J. Mac Donald²;
¹University of Yamanashi, Kofu, JAPAN, ²Dublin City University, IRELAND.

T16 Effect of specimen geometries on corrosion behavior of AZ31 magnesium alloy tube in fluid flow field

Y. Soya¹, S. Yoshihara¹, Y. Ohmura¹, E. Galvin², B. J. Mac Donald²;
¹University of Yamanashi, Kofu, JAPAN, ²Dublin City University, IRELAND.

T17 Compressive Fatigue Properties of Acidic Calcium Phosphate Cement

I. Ajaxon, C. Öhman, C. Persson;
Division of Applied Materials Science, Department of Engineering Sciences, Uppsala University, SWEDEN.

T18 Contactless Measurement of In Vitro Engineered Muscle Tissue (X-MET) Contraction by Digital Image Correlation

S. Carosio, E. Rizzuto, L. Barberi, C. Nicoletti, Z. Del Prete, A. Musarò;
University of Rome, La Sapienza, ITALY.

T19 Chitosan-based Nanofibers for Wound Healing

E. Mak, W. Leung;
Hong Kong Polytechnic University, HONG KONG.

T20 Determining Appropriate Adverse Testing for Coated Metal-on-Polyethylene Hip Bearings

D. de Villiers¹, A. Kinbrum², A. Traynor², S. N. Collins², S. Banfield³, J. Housden³, J. C. Shelton¹;
¹Queen Mary, University of London, UNITED KINGDOM, ²Corin, Ltd, Cirencester, UNITED KINGDOM, ³Tecvac, Ltd, Cambridge, UNITED KINGDOM.

T21 Complementary Effects of Two Growth Factors in Multifunctionalized Silk Nanofibers for Nerve Reconstruction.

T. M. DINIS¹, G. Vidal¹, R. Elia², P. Vigneron¹, D. L. Kaplan², C. Egles¹;
¹Université de Technologie de Compiègne, FRANCE, ²Biomedical Engineering of Tufts University, Boston, MA.

T22 Durability and Performance of Hyaluronan Enhanced Polyethylene Heart Valves

D. Bark, Jr, R. Simon, L. Taylor, J. Cavicchia, J. Vaughn, J. Emch, K. Papat, S. P. James, L. P. Dasi;
Colorado State University, Fort Collins, CO.

T23 Composite Hydrogels for Tissue Engineering Scaffolds

M. L. Oyen;
University of Cambridge, UNITED KINGDOM.

T24 Multiscale Properties of a Macro-Porous Bioceramic Bone Scaffold Fabricated at Two Sintering Temperatures

J. Vivanco¹, J. Slane¹, W. Ault¹, A. Aiyangar², H. L. Ploeg¹;
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BIOMECHANICAL INSTRUMENTATION

T25 Design and manufacture of a patient-specific surgical device for sagittal split osteotomy

Y. Z. Arslan, F. Turan, E. Cansiz;
Istanbul University, İstanbul, TURKEY.

T26 Development of a Novel Gait and Foot Slip Detection Algorithm for Future Humanoids

N. Okita, H. Sommer, III;
The Pennsylvania State University, University Park, PA.

T27 Effect of Sagittal Plane Translation of a Cervical Artificial Disc Replacement

D. U. Erbulut, I. Zafarparandeh, C. R. Hassan, A. F. Ozer;
KOC University, Istanbul, TURKEY.

T28 Effect of augmentation techniques on the failure of pedicle screws under cranio-caudal cyclic loading

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¹Medical University Innsbruck, Innsbruck, AUSTRIA, ²University Hospital of Duesseldorf, GERMANY.

T29 Comparison of Strain Measurement in the Vertebrae Using In Vitro and In Situ Experimental Techniques

G. Tozzi¹, L. Cristofolini²;
¹School of Engineering, University of Portsmouth, Portsmouth, UNITED KINGDOM, ²School of Engineering and Architecture, University of Bologna, ITALY.

T30 Cyclic- and Impact-Based Reference Point Indentation Measurements Are Moderately Correlated with Each Other in Human Cadaveric Tibia

L. Karim, M. Van Vliet, M. L. Boussein;
Beth Israel Deaconess Medical Center, Boston, MA.

T31 Using a Force Platform and Inverse Dynamics to Identify Torque-Velocity and Power-Velocity Relationships in Healthy Old Adults

R. Tatarski¹, R. Brady¹, C. Beijersbergen², P. Rider¹, P. DeVita¹, T. Hortobagyi²;
¹East Carolina University, Greenville, NC, ²University of Groningen, NETHERLANDS.

T32 Comparison between EMG Electrodes Placement Using the SENIAM Guidelines and Electrical Stimulation

D. S. Catelli, G. Mantovani, M. Lamontagne;
University of Ottawa, ON, CANADA.

T33 Developing a machine for cyclic loading test of ankle-foot prosthesis

H. Lai¹, C. Chou², H. Wu³, C. Yu³;
¹R&D, TEH LIN PROSTHETIC & ORTHOPAEDIC INC, New Taipei City, TAIWAN, ²Department of Human Physiology, University of Oregon, Eugene, OR, ³Department of Physical Therapy & Assistive Technology, National Yang-Ming University, Taipei, TAIWAN.

T34 Daily Physical Activity Measurement of Older Adults in the Free-Living Environment.

E. Fortune, S. Amin, K. Kaufman;
Mayo Clinic, Rochester, MN.

T35 Comparative Assessment of Different Physical Activity Monitors

F. A. Storm¹, S. Pancani¹, B. W. Heller², C. Mazzà¹;
¹Department of Mechanical Engineering and INSIGNEO Institute for in Silico Medicine, University of Sheffield, UNITED KINGDOM, ²Centre for Sports Engineering Research, Sheffield Hallam University, UNITED KINGDOM.

T36 Balance Board with Tunable Time Delay and Torsional Stiffness to Diagnose and Improve Balance Instabilities

D. R. Cruise, J. Chagdes, A. Raman;
Purdue University, West Lafayette, IN.

T37 Development of Empirical Method to Assess Residual Limb Motion beneath Prosthetic Socket

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¹Michigan State University/Mary Free Bed Rehabilitation Hospital, Grand Rapids, MI, ²Mary Free Bed Rehabilitation Hospital, Grand Rapids, MI, ³Michigan State University, Lansing, MI.

T38 Developmental Changes in Whole Body Center of Mass Movement in Young Children during Walking: Comparison of Two Measurement Methods

W. Hsu¹, D. L. Miranda¹, D. Young¹, E. C. Goldfield²;
¹Wyss Institute for Biologically Inspired Engineering at Harvard Univ., Boston, MA, ²Boston Children's Hospital, MA.

T39 Development and verification of a mathematical model to quantify the humeroulnar joint space

R. Müller¹, K. Glatzeder¹, B. Hollinger², W. Potthast¹;
¹Institute of Biomechanics and Orthopaedics, German Sport University Cologne, GERMANY, ²ARCUS Sports Clinic, Pforzheim, GERMANY.

T40 Development of a confined permeability tester for articular cartilage

R. Nakamura, H. Fujie;
Tokyo Metropolitan University, JAPAN.

T41 Biomechanical evaluation on a novel design of femoral stem for non-traumatic avascular necrosis

Y. Lai, W. Chen, C. Cheng;
National Yang Ming University, Taipei, TAIWAN.

T42 Blood Flow Responses to Loading in Patients with Leg Wounds and Healthy People: Interpretations for Skin Ulcers.

W. Pan, J. P. Drost, M. D. Basson, T. R. Bush;
Michigan State University, East Lansing, MI.

BIOMECHANICS OF FLIGHT

T43 Birds of prey: nature's guided missiles?

C. H. Brighton, A. L. R. Thomas, G. K. Taylor;
Oxford University, UNITED KINGDOM.

BIOMEMS & BIOSENSORS

T44 Cell Stiffness Profiling of Individual Bacteria Using Microfluidic Devices

X. Sun, W. D. Weinlandt, M. Wu, C. J. Hernandez;
Cornell University, Ithaca, NY.

T45 Cell Micropattern Formation Technique for Cellular Tissue Formation

Y. HIKICHI¹, Y. NAKASHIMA¹, W. SENOH², K. MINAMI², Y. NAKANISHI¹;
¹Kumamoto Univ., JAPAN, ²Yamaguchi Univ., JAPAN.

T46 Developing a Microfluidic Three-Dimensional Cell Culture Platform

M. Keays¹, T. Dalton¹, P. A. Kiely²;
¹Stokes Institute, University of Limerick, IRELAND, ²Department of Life Sciences, and Materials and Surface Science Institute, University of Limerick, IRELAND.

T47 Development of force transducers for biomechanical assessment of aortic root surgery

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BONE

T48 Comparison of Mechanical and Geometrical Properties with Mineral Density in Human Femoral Neck Cortical Bone

L. Coutts¹, T. Jenkins¹, R. Oreffo¹, D. Dunlop², C. Cooper¹, N. C. Harvey¹, P. Thurner³;
¹University of Southampton, UNITED KINGDOM, ²Southampton University Hospitals NHS Trust, UNITED KINGDOM, ³Vienna University of Technology, AUSTRIA.

T49 Convergence Study for Large-scale Finite Element models of Cancellous Bone Tissue

Y. Chen¹, M. Pani², F. Taddei², X. Li¹, M. Viceconti¹;
¹University of Sheffield, UNITED KINGDOM, ²Istituto Ortopedico Rizzoli, Bologna, ITALY.

T50 Can Direct Measurements of Trabecular Bone Microarchitecture Be Performed In Vivo using the Next Generation of High Resolution Peripheral QCT Scanners?

S. L. Manske¹, Y. Zhu¹, C. Sandino¹, J. L. Bhatla², S. K. Boyd¹;
¹University of Calgary, AB, CANADA, ²University of British Columbia, Vancouver, BC, CANADA.

T51 Can non-axial loading improve failure prediction at the distal radius?

E. Zapata¹, F. Duboeuf², R. Ellouz², S. Boutroy², D. Mitton³, H. Follet²;
¹INSERM - IFSTTAR - Université de Lyon, FRANCE, ²INSERM - Université de Lyon, FRANCE, ³IFSTTAR - Université de Lyon, FRANCE.

T52 Crack Propagation Analysis in Carbon Nanotube Reinforced Bone Tissue

S. M. Rajaai;
Ryerson University, Toronto, ON, CANADA.

T53 Development and Validation of a Subject-specific Finite Element Model of The Functional Spinal Unit

C. Lee¹, P. Landham², R. Eastell¹, M. Adams², P. Dolan², L. Yang¹;
¹The University of Sheffield, UNITED KINGDOM, ²The University of Bristol, UNITED KINGDOM.

T54 Effect of the testing condition on the strain experienced by the vertebral body

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¹School of Engineering and Architecture, University of Bologna, ITALY, ²IDMEC, Instituto Superior Técnico, Universidade de Lisboa, PORTUGAL.

T55 Can a Collagen Hydroxyapatite Scaffold Enhance Bone Healing in a Rat Femur Fracture Model?

C. Perdikouri¹, P. Bosemark¹, J. Gleeson², F. O'Brien², M. Tägil¹, H. Isaksson¹;
¹Lund University, SWEDEN, ²Royal College of Surgeons, Dublin, IRELAND.

T56 Deformation Response Analysis of Individual Trabeculae using Microradiography Techniques

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T57 Bone Remodeling Simulations: Challenges, Problems and Applications

N. Garijo, M. A. Pérez, J. M. Garcia-Aznar;
Multiscale in Mechanical and Biological Engineering
University of Zaragoza, SPAIN.

T58 Effect of Demineralization on Impact Fracture Characteristics of Bovine Cortical Bone Tissue

K. Fujisaki, H. Yokoyama, A. Hasegawa, K. Sasagawa;
Hirosaki University, JAPAN.

T59 Can Morphology Based Anisotropy Improve Finite Element Models of the Proximal Femur in a Side-ways Fall Loading Configuration?

W. S. Enns-Bray¹, O. R. Ariza², S. M. Gilchrist², P. J. Vogt¹, H. Pálsson³, R. P. Widmer¹, P. Guy², S. K. Boyd⁴, S. J. Ferguson¹, P. A. Cripton², B. Helgason¹;
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T60 Bone surface distribution across a wide porosity range in mammalian bone tissue

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T61 Assessment of the physicochemical modifications to bone mineral caused by storage, sterilization and deproteinization methods

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T62 Comparison of Musculoskeletal Adaptations of Oscillatory Electrical Muscle Stimulation and Dynamic Hydraulic Flow Stimulation in a Rat Functional Disuse Model

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T63 Brain Viscoelasticity is Associated With Cranial Venous Drainage Paths

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T64 Do Sulci Influence Mechanical Response of the Brain to High-Rate Impact?

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CARDIOVASCULAR FLUIDS

T65 Effect of in vivo flow dynamics on angiogenesis by computational modeling

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T66 Comparison of Hemodynamics and Thrombus Progression in Human Abdominal Aortic Aneurysms

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T67 Concentration Polarization of lipids may affect the accelerated genesis of atherosclerosis in venous grafts: A numerical study

Z. Fan, X. Liu, Z. Wang, P. Zhao, X. Deng;
Beihang University, Beijing, CHINA.

T68 Bicuspid Aortic Valves Are Associated with Increased Turbulence and Wall Shear Stress Compared to Trileaflet Aortic Valves

N. Saikrishnan, I. Okafor, A. Yoganathan;
Georgia Institute of Technology, Atlanta, GA.

T69 Does Unified Low and High WSS Cerebral Aneurysm Rupture Risk Model Better Predict Aneurysm Rupture Status than Low WSS Alone Model?

J. Xiang, N. Varble, K. Snyder, E. Levy, A. Siddiqui, H. Meng;
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T70 Dissecting the Aortic Pressure Waveform: A Computational Approach

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T71 Determination of Flow Distribution in Aortic Valve Bypass: A Mathematical Modeling Approach

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T72 Effect of Flow Patterns at Stented Coronary Bifurcations on Coronary Artery Restenosis

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T73 Characteristic impedance: A comparison between time and frequency domain methods

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T74 Dynamics of Blood Platelet Aggregation

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T75 Calculating spatial correlations of arterial disease with local risk factors using autocorrelation-preserving surrogate data and bootstrapping

E. M. Rowland, Y. Mohamied, K. Y. Chooi, E. L. Bailey, P. D. Weinberg;
Imperial College London, UNITED KINGDOM.

T76 Doppler Ultrasound Measurements of Transition to Turbulence for Porcine Blood in a Straight Pipe

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CARDIOVASCULAR SOLIDS

T77 Correlating Regional Matrix Mechanics and Vessel Wall Composition in a Murine Model of Dissecting Aortic Aneurysm

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T78 Direct Automated Aortic Structured Finite Element Mesh Generation from Medical Images

S. Bayat, D. Neculescu, M. Labrosse;
University of Ottawa, ON, CANADA.

T79 Deformation Gradient Jump Based Tissue Segmentation: Method and Application to an Aortic Plaque

C. Witzenburg, R. Y. Dhume, V. H. Barocas;
University of Minnesota, Minneapolis, MN.

T80 Biomechanical Wall Stress and USPIO Uptake in Abdominal Aortic Aneurysms

N. Conlisk¹, O. McBride¹, J. M. J. Richards¹, B. J. Doyle², T. J. MacGillivray¹, S. I. K. Semple¹, C. D. Gray¹, D. E. Newby¹, P. R. Hoskins¹;
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T81 Biaxial Mechanical Behaviour of the Abdominal Aortic Aneurysm Obtained from the Xenograft Model in Rat

L. Marais, J. Dai, E. Allaire, M. Zidi;
Université Paris Est Créteil, FRANCE.

T82 Development of Computational Simulations of Magnetic Resonance Elastography for Abdominal Aortic Aneurysms

L. Hollis, L. E. J. Thomas-Seale, N. Conlisk, N. Roberts, P. Pankaj, P. R. Hoskins;
University of Edinburgh, UNITED KINGDOM.

T83 Unilateral nephrectomy in the rabbit: a model for studying effects of blood flow on endothelial permeability

E. Bazigou, E. Bailey, P. Sowinski, K. H. Fraser, K. Chow, P. D. Weinberg;
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T84 Diverse roles of glycosaminoglycans in arterial wall mechanics and mechanobiology

S. Roccabianca, J. D. Humphrey;
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T85 Confocal Imaging of Collagen to Assess Relationship between Fiber Orientation and Biomechanics in Pericardial Tissue

A. Munnely, A. Moy, J. S. Dove;
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T86 Regional Variation of the Mechanical Properties of Murine Aorta

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CARTILAGE

T87 Body Fat Explains Contralateral Limb Osteoarthritis Damage in Obese Rats

K. H. Collins, R. A. Reimer, W. Herzog;
University of Calgary, AB, CANADA.

T88 Development of FEM-DEM Analysis Methodology to Predict the Mechanical Damage of Articular Cartilage Caused by the Meniscal Injury

S. Yamamoto, E. Nakamachi, Y. Morita;
Doshisha University, Kyoto, JAPAN.

T89 Cartilage Deformation and Cell Viability During Rapid Impact Reveal a Protective Surface

L. Bartell, L. J. Bonassar, I. Cohen;
Cornell University, Ithaca, NY.

T90 Depth-Dependent Shear Behavior of Human Ankle and Knee Cartilage: Implications for Osteochondral Transplant Surgery

C. R. Henak¹, K. A. Ross², L. R. Bartell¹, M. P. Prado², L. A. Fortier¹, J. G. Kennedy², I. Cohen¹, L. J. Bonassar¹;
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T91 Comparison of a Traumatic ACL Rupture Model and Modified Transection Model to Study Post-Traumatic Osteoarthritis

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T92 Contrast-Enhanced Computed Tomography Attenuation using a Cationic Contrast Agent Correlates with the Equilibrium Indentation Modulus of Mouse Tibial Plateau Cartilage

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T93 Cartilage-Cartilage Integration Improvements using Hydroxyapatite: Healthy versus Osteoarthritic Conditions

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T94 Biomechanical Stability of Tissue-Engineered Cartilage Constructs as Configuration of Surgical Sites during Microfracture Surgery

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T95 Comparison of Creep Indentation and Stress Relaxation Compressive Testing Modalities

J. K. Lee, D. D. Cissell, J. C. Hu, K. A. Athanasiou;
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T96 Biotribology of articular cartilage: influence of lubricant viscosity and (bio)polymer content

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T97 Changes in serum cartilage oligomeric matrix protein (COMP) in relation to knee joint loading

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T98 Dynamic simulation of stimulation modes for engineered cartilage culture bioreactor

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T99 Direct Measurement of In Vivo Deformation in Human Knee Articular Cartilage

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T100 Determination of the Mechanical Properties of the Porcine Temporomandibular Joint Disc in Unconfined Compression at Slow Strain Rate.

R. J. Mortimer, J. R. Lowe, A. J. Almarza;
University of Pittsburgh, PA.

T101 Deformation Patterns of Cracked Articular Cartilage Under Compression

Y. Al-Saffar¹, B. Murphy¹, W. Herzog²;
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T102 Cyclic Compression and Shear Influences the Response of Chondrocytes Seeded in 3D Constructs

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T103 Convergence of Representative Volume Elements for Prediction of Chondrocyte Mechanics in Multiscale Simulations of Cartilage

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¹The University of Akron, OH, ²The Cleveland Clinic, OH.

CELLULAR BIOMECHANICS

T104 Effect of Shear Gradient and Wall on Capsule Lateral Migration

S. Nix, Y. Imai, T. Yamaguchi, T. Ishikawa;
Tohoku University, Sendai, JAPAN.

T105 Controlling Lamellipodial Crawling During Germ Band Retraction Using Photoactivation of Rac1.

M. Lacy, M. Hutson, A. Page-McCaw, K. LaFever;
Vanderbilt University, Nashville, TN.

COLLAGEN STRUCTURE & MECHANICS

T106 Thrombospondin 2 contributes to whole bone mechanical properties by modulating collagen matrix formation and mineralization

E. Manley, Jr., J. E. Perosky, B. Khoury, K. M. Kozloff, A. I. Alford;
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COMPUTATIONAL BIOMECHANICS

T107 Does Task-Level, Torque-Driven Feedback Control Predict Shoulder and Elbow Kinematics During Upper Extremity Functional Tasks?

D. L. Crouch, A. C. Santago, K. R. Saul;
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T108 Development of a Viscoelastic Muscle Model

S. L. Smith¹, D. D. Cook¹, E. J. Hunter²;
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T109 Dynamic Time Warping - A Functional Metric for Validation of Musculoskeletal Models Via EMG

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T110 Dynamic Parallel Simulation of Neurovascular Coupling

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¹University of Canterbury, Christchurch, NEW ZEALAND, ²Massey University, Palmerston North, NEW ZEALAND.

T111 Dynamic analysis of a patellar tendon reflex using an activation model of a stretch reflex

M. J. Kang, H. H. Yoo;
Hanyang University, Seoul, REPUBLIC OF KOREA.

T112 Do Muscle Excitation Timings in Forward Dynamic Simulations of Pedaling Better Validate Against Electromyograms When Using Image-Based Models Over Scaled Generic Models?

C. Smith, M. L. Hull;
University of California, Davis, CA.

T113 Development and Validation of a Finite Element Model of the Ovine Hindlimb for the Investigation of Microgravity Loading on Skeletal Tissue Healing

B. C. Gadowski, Z. F. Lerner, R. C. Browning, C. M. Puttlitz;
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T114 Computational Modeling of Patho-physiologic Responses to Exercise in Fontan Patients

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T115 Detailed musculoskeletal model of thoracolumbar spine with articulated rib cage

D. Ignasiak, G. Spreiter, S. J. Ferguson;
ETH Zurich, SWITZERLAND.

T116 Developing a Dynamic Thumb Model to Quantify Pinch Forces

S. J. Wohlman, W. M. Murray;
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T117 Cortical Bone Adaptation: A Finite-Element Study of the Mouse Tibia

A. Pereira¹, S. Shefelbine²;
¹Imperial College London, UNITED KINGDOM,
²Northeastern University, Boston, MA.

T118 Can the Force-Velocity Curve Predict Realistic Muscle Forces for High-Speed Athletic Movements?

E. L. Lawrence, F. J. Valero-Cuevas;
University of Southern California, Los Angeles, CA.

T119 Biomechanical system of surgical treatment for human heart diseases: a step towards patient-specific surgical planning

I. V. Kirillova, A. A. Golyadkina, L. Y. Kossovich, A. V. Polienko, N. O. Chelnokova, E. L. Kossovich;
Saratov State University, RUSSIAN FEDERATION.

T120 Biomechanics of Aortic Dissection: Role of Static Pressure Differences in Collapse of the True Lumen

A. I. Crispin Corzo, N. Wood, X. Y. Xu;
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T121 Assessment of the Biomechanical Environment in the Ascending Aorta of Marfan Patients after Implantation of a Personalised External Aortic Root Support

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T122 Differences in the Measured and Optimized Values of Preferred Fiber Angle in a Microstructural Constitutive Model

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T123 Computational modeling of coronary tortuosity

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T124 Biomechanical effects of suture placement of distal plantar fascia on partial foot

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²State Key Lab of Virtual Reality Technology and Systems, Beihang University, Beijing, CHINA.

T125 Calculating intra-discal forces in thoracic spine joints from thoracic-lumbar spine musculoskeletal simulation

Y. Kim, S. Koo;
Chung-Ang University, Seoul, REPUBLIC OF KOREA.

T126 Development of a detailed continuum neck muscle model.

I. Han, Y. Kim;
Dankook University, Yong-in, REPUBLIC OF KOREA.

T127 Development of a numerical model for analysis of ciliary motions

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T128 Development of an Automated Validation Report For Musculoskeletal Models

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T129 Dynamic Stress Distribution in a Model of Implanted Mandible: Numerical Analysis of Viscoelastic Bone

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T130 Development of Subject-Specific Lumbar Spine Musculoskeletal Models in OpenSim using CT-Based Muscle Measurements and Trunk Extension Strength

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T131 Using Abaqus and Isight to simultaneously determine muscle forces, joint kinematics and strain/stresses in soft tissues during walking

J. Yao, P. Saraswat, M. Chinnakonda, V. Oancea, J. Hurtado, S. Sett;
SIMULIA, Providence, RI.

T132 CMR-based Simulations in Mitral Valve Surgery: Finite Element and Mass-Spring Models

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T133 Characterization of avian embryonic cardiac outflow hemodynamics through 3D-0D coupling

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T134 Comparison of Subject-Specific vs. Scaled Parameters Predicting Biceps Femoris Long Head Moments

A. S. Kulas, K. J. Reynolds, Z. J. Domire;
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T135 Using Optimization to Maximize Clinical Relevance of a Gait Quality Index

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T136 Development and Validation of Finite Element Model of 10 Year-old Thoracic Spine with and without Rib-cage

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T137 Computational modelling of the coil insertion in cerebral aneurysms and its validation

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T138 Development of a Fluid-Filled Tube Model to Study Vascular Response to Blast

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T139 Understanding the Relationships between Tissue Scaffold Geometric Structure and Mechanical Behavior Using Computational Modeling

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T140 Comparison of the Effect of Banana and Bullet Tliff Interbody Fixation Constructs on Lordosis Angle and Biomechanics of the Lumbar Spine Segment

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COMPUTATIONAL METHODS

T141 Computer Simulation of the Mechanical Behaviour of Implanted Biodegradable Stents in a Remodelling Artery

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NUI Galway, IRELAND.

T142 Correlation of Cementless Femoral Component Micromotion Under Different Bone Preparations to a Physical Test Using an FE Model

R. Davignon, A. Gopalakrishnan;
Stryker Corporation, Parsippany, NJ.

T143 Using Neural Networks for the Semi-Automatic Analysis of Complex Biomechanical Datasets

I. Weber, U. H. Hartmann;
University of Applied Sciences Koblenz, Remagen, GERMANY.

T144 Can in-vitro intra-articular pressure measurements in the ankle be used for validation of FE-model based calculation of pressure distribution?

T. Natsakis, F. Burg, G. Dereymaeker, I. Jonkers, J. Vander Sloten;
KU Leuven, BELGIUM.

T145 Differences in Joint Torques During Walking Due to Standardized vs. Subject-Specific Segmental Inertial Parameters, Magnitude of Obesity, and Walking Speed.

A. M. H. Tullock, P. Rider, J. Willson, Z. Domire, J. Van Meter, P. DeVita;
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T146 Computational Comparison of a Spiral and a non-Spiral Peripheral Bypass Graft

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T147 Using Quaternions in Lower Limb Inverse Dynamics: Quantifying the Effect of an Improved Numerical Method on Maximum Joint Moment During Walking

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Imperial College London, UNITED KINGDOM.

T148 Comparison of Plantar Pressure Profiles during Gait using Finite Element and Discrete Element Methods.

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T149 Biomechanical Optimization of Open-Porous Titanium Scaffolds for Femoral Bone Defects

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T150 Bone Interface Strain Variations in Cementless Total Hip Replacements (THR) Using FURLONG® EVOLUTION Femoral Stems

J. Shi¹, M. Browne¹, M. Heller¹, Y. Suchier², F. Lefebvre², P. Young³, L. King⁴, D. G. Dunlop⁴, M. Boettcher⁵, E. Draper⁵, M. T. Bah¹;
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T151 Automated Pre-Processing of Scratch/Scrape Damage for FEA Wear Computations

K. M. Kruger, A. D. Heiner, T. E. Baer, T. D. Brown;
University of Iowa, Iowa City, IA.

T152 Dual-Quaternion Analysis of Shoulder and Upper-Extremity Motion for Calculation of Angular Velocity Joint Axis

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T153 Comparison of gait patterns between adults and children from 4 to 7 years old

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T154 Universal Method for Correction of Anterior Superior Iliac Spine Marker Occlusion

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T155 Development of a Simplified and Computational Efficient Human Body Finite Element Model

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CYTOSKELETAL MECHANICS

T156 Dynamics in Steady State in-Vitro Acto-Myosin Networks.

Y. Roichman, A. Sonn-Segev, H. Diamant;
Tel Aviv University, ISRAEL.

T157 Development of Mechanical Stability of Primitive Erythroblasts During Mammalian Erythropoiesis

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¹University of Rochester, NY, ²University of Rochester Medical Center, NY.

DENTAL, ORAL, & MAXILLOFACIAL BIOMECHANICS

T158 Biomechanics of the All-On-Four Concept in the Maxilla - A Numerical Analysis

L. Keilig, S. Hersey, I. Hasan, C. Bouraueil;
University of Bonn, GERMANY.

T159 Design and finite element analysis of a novel dental implant abutment with micro-motion capability

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T160 Biomechanical Analysis of Orthodontic Treatments in Patients with Periodontitis

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T161 Distribution of stress in three human facial biotypes from chewing and its relation to Le Fort fractures using finite element analysis

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T162 Computational Evaluation of the Mechanical Environment in the Maxilla During the Treatment for Rapid Expansion

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T163 Biomechanics analyses of occlusal loads in mandibular body

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T164 Biomechanical analysis of isolated and combined asymmetry in pushing

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ERGONOMICS & HUMAN FACTORS

T165 Biomechanical Changes during Walking Following a Sustained Maximal Effort Task with a 25 kg Load

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U.S. Army Research Institute of Environmental Medicine, Natick, MA.

T166 Effect of Load on Standing Weight-Bearing and Erector Spinae Muscle Activation Asymmetries

R. F. Reiser, II, J. C. Nelson, K. W. Carter, E. A. Dalton, J. D. Pault;
Colorado State University, Fort Collins, CO.

T167 CARRYING ASYMMETRIC LOADS DURING STAIR NEGOTIATION

J. Wang, J. C. Gillette;
Iowa State University, Ames, IA.

T168 Bilateral Trapezius Activation Following Computer Work with a Self-Selected Posture

K. A. Szucs, K. Moyes, M. Molnar;
Duquesne University, Pittsburgh, PA.

T169 Comparison of Task Completion Time, Finger Joint Angles, and the Pressure Applied by the Fingers for 7 Common Gestures on a Touchscreen Computing Device

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T170 Biomechanical Factors Contributing to Localised Muscle Fatigue during Robotic Surgery

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T171 Differentiating Fallers and Non-fallers using Gait and Postural Characteristics

J. Zhang, R. Soangra, T. E. Lockhart;
Virginia Tech, Blacksbrug, VA.

T172 Dynamic Shoulder Strength Prediction for Ergonomic Applications

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T173 Upper Extremity Motor Variability during Computer Mouse Use Changes across Individuals and Workstation Configurations

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T174 Certain Gait Adaptations Lead to Improved Stepping Accuracy While Wearing Multifocal Lens Glasses

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T175 Deep muscles do not provide any additional insight into the role of muscle in LBP during sitting

D. E. De Carvalho, J. P. Callaghan;
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T176 Characterization of Neck Muscle Response to Vehicle Collision Using a Driving Simulator

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EXPERIMENTAL METHODS

T177 Determination of cellular axial strain threshold and preferential axial strain from cell orientation behavior in a non-uniform strain field

Y. Morita, S. Watanabe, Y. Ju, S. Yamamoto;
Nagoya University, JAPAN.

GENERAL ANIMAL LOCOMOTION

T178 Comparison of simulated equine cervical vertebral kinematic variables based on the movement of healthy horses and of horses with cervical neuropathy

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T179 Biomechanics of Insects Traversing Vertical Compliant Beam Obstacles

C. Li, R. S. Fearing, R. J. Full;
University of California, Berkeley, CA.

T180 Differential impacts of limb loss on locomotor performance in running ghost crabs

J. A. Pfeiffenberger, T. Hsieh;
Temple University, Philadelphia, PA.

T181 Dynamic gait stability is not decreased obese versus non-obese adults

W. Board, Z. Lerner, R. Browning;
Colorado State University, Fort Collins, CO.

T182 Biomechanics and bioenergetics of human locomotion in simulated low-gravity

G. Pavei, C. M. Biancardi, A. E. Minetti;
University of Milan, ITALY.

T183 Balance Response to Lateral Perturbations during Walking is Directionally Asymmetric

X. Fu, A. D. Kuo;
University of Michigan, Ann Arbor, MI.

GROWTH & REMODELING

T184 Biological Stability and Adaptivity of Arteries Subject to Stress-Mediated Growth and Remodeling

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Yale University, New Haven, CT.

T185 Development of an In Vivo Rabbit Ulnar Loading Model

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T186 Deposition stretch affects density and length in a computational model of remodeling

H. P. Wagner, V. H. Barocas;
University of Minnesota, Minneapolis, MN.

T187 Bone adaptation in young and elderly patients following short-stem hip implantation

M. Cilla, G. Duda, S. Checa;
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HEART & HEART VALVES

T188 Characterization of Biomechanical Properties of Aged Human and Ovine Mitral Valve Chordae Tendineae

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T189 Biomechanical Evaluation of Mitral Annuloplasty Ring Shape

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T190 Bicuspid Aortic Valve Hemodynamics Contribute to Acute Remodeling in Porcine Ascending Aortas

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University of Notre Dame, South Bend, IN.

T191 Effect of Multi-directional Papillary Muscle Displacement in Ischemic Mitral Regurgitation

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T192 Cardiac Mechanics of Diet-Induced Obese Mice: A Complex Time Course of Dysfunction

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T193 Cardiac Mechanics of Left Ventricular NonCompaction by Finite Element Modeling

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T194 Characterization of wall motion and hemodynamics on an idealized left ventricle phantom using multiple medical imaging and laboratory-level modalities for validation of FSI simulations

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T195 Coupling PIV Measurements and Numerical Modelling of RBCs Mechanics to Predict Thrombogenicity of Mechanical Prosthetic Heart Valves

R. Toninato, G. Fadda, F. M. Susin;
University of Padova, ITALY.

T196 Design and optimization of a chronic cavopulmonary assist for the failing Fontan circulation

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T197 Differential effects of proximal and distal pulmonary artery remodeling on right ventricular function during pulmonary arterial hypertension development

Z. Wang, D. A. Schreier, G. Song, T. A. Hacker, N. C. Chesler; University of Wisconsin at Madison, WI.

T198 Determination of the Fatigue Properties of the Mitral Valve Chordae Tendinae

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T199 Biomechanics of Trans Apical Mitral Implantation (TAMI): In Vitro Results

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T200 Asymmetrical Pattern of Collagen Network in Aortic Valve Leaflets Compensates for Unequal Leaflet Sizes

P. E. Hammer¹, C. A. Pacak¹, R. D. Howe², P. J. del Nido¹; ¹Boston Children's Hospital, MA, ²Harvard School of Engineering and Applied Sciences, Cambridge, MA.

T201 Effect of Coronary Flow and Implications of Trans-Catheter Aortic Valve Implantation on Sinus Flow

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IMPLANTS

T202 CT-based FE Analyses of the Bone-implant Interaction to Identify Prosthesis Outcome in Uncemented Hip Implants: a Preliminary Study in 18 Patients

S. Paletti¹, E. Schileo¹, M. Mannisi¹, B. Bordini¹, M. O. Heller², J. Shi², A. Toni¹, F. Taddei¹; ¹Istituto Ortopedico Rizzoli, Bologna, ITALY, ²University of Southampton, UNITED KINGDOM.

T203 Contact analysis of the radial head and radial head implants with experimental validation

S. Kim¹, M. C. Miller²; ¹University of Pittsburgh, PA, ²Allegheny General Hospital, Pittsburgh, PA.

INJURY BIOMECHANICS

T204 Constitutive Modeling of Aorta for Traumatic Rupture from High Rate Uniaxial Extension Tests

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T205 Effective Impact Mass of Elbow-to-Head and Shoulder-to-Head Collisions in Ice Hockey

P. Rousseau, T. B. Hoshizaki; University of Ottawa, ON, CANADA.

T206 Differences in Leg-Rearfoot Coupling Variability during Stair Descent in Patellofemoral Pain Subgroups

S. Aliberti¹, J. Freedman Silvernail², B. Mezencio³, A. C. Amadio³, J. C. Serrão³, J. Hamill², L. Mochizuki³; ¹University of Sao Paulo/CAPES Foundation, BRAZIL, ²University of Massachusetts, Amherst, MA, ³University of Sao Paulo, BRAZIL.

T207 Drop Test Reconstruction of an American Football Head Impact

F. Hernandez, D. Camarillo; Stanford University, Palo Alto, CA.

T208 Biofidelity Evaluation of Thoracic Biomechanical Surrogates in Sports Projectile Impacts

N. Dau, C. Bir; Wayne State University, Detroit, MI.

T209 Development of an Animal Model of Post-Traumatic Stiffness and Joint Contracture of the Elbow

R. M. Castile, L. M. Galatz, S. P. Lake; Washington University, St. Louis, MO.

T210 Effect of the Anterolateral Ligament on Internal Tibial Rotation and ACL Strain during a Simulated Pivot Landing

Y. K. Oh, M. L. Beaulieu, J. A. Ashton-Miller, E. M. Wojtys; University of Michigan, Ann Arbor, MI.

T211 Cervical Muscle Responses to Multidirectional Perturbations

J. M. Ólafsdóttir¹, K. Brodin¹, J. S. Blouin², G. Siegmund³; ¹Chalmers University of Technology, Gothenburg, SWEDEN, ²University of British Columbia, Vancouver, BC, CANADA, ³MEA Forensic Engineers & Scientists, Richmond, BC, CANADA.

T212 Comparison of Upper Extremity Muscle Activation Levels During Isometric and Dynamic MVC Protocols

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T213 Valgus Bending of the Knee Reduces the Tibiofemoral Compression Required to Cause ACL Injury

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T214 Biofidelic assessment of head-neck surrogate response to dynamic overpressure
R. J. Murphy, I. D. Wing, A. S. Iwaskiw, R. S. Armiger, C. M. Carneal, A. C. Merkle;
Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

T215 Biceps femoris long head aponeuroses widths differ but do not change over the course of a season
N. Fiorentino, S. S. Blemker;
University of Virginia, Charlottesville, VA.

T216 Comparison of plantar pressures distribution patterns in kyphosis and healthy individuals
R. Mimar, H. Nabavinik;
Kharazami University, Tehran, ISLAMIC REPUBLIC OF IRAN.

T217 Changes in Muscle Activation Following Hip and Trunk Neuromuscular Training in Elite Female Hockey Players: Implications for ACL Injury Risk
G. J. Weir;
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T218 Between Gender Differences in Head Impact Exposure Sustained by High School and Collegiate Hockey Players
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T219 Development and Validation of a Child FE Body Model
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T220 Does Age Affect the Impact Properties of Helmet Foam Liners?
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T221 Development and Validation of Human Head-Neck FE Model for Simulating Soft Tissue Injury in Cervical Spine
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Wayne State University, Detroit, MI.

T222 Effect of Fit Condition on Helmet Blunt Impact Performance
Q. Luong, L. Voo, T. Jackson, S. Swetz, A. Merkle;
The Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

T223 Lumbar Loads while Operating Vehicles in an Industrial Environment
C. Y. Chang, D. M. Desautels, K. White, E. R. Serina;
Talas Engineering, Inc., Hayward, CA.

INTERNATIONAL SOCIETY OF BIOMECHANICS

T224 Changes in plantar pressure distribution and gait characteristics after bariatric surgery: A 2-year longitudinal study
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JOINTS

T225 Determination of Patellar Rotational Axis throughout Knee Flexion
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T226 Automatic Segmentation of the Thumb Carpometacarpal Joint
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T227 Comparison of in vivo patellofemoral contact patterns under passive and active loading
J. Kaiser, A. Monawer, K. Choi, R. Kijowski, D. Thelen;
University of Wisconsin - Madison, WI.

T228 Comparison of 3D Kinematics, 3D Kinetics and EMG of the Lower Limbs During Quasi-static and Dynamic Squats
J. Clément, N. Hagemester, R. Aissaoui, J. A. de Guise;
École de Technologie Supérieure, Montréal, QC, CANADA.

T229 Effect of Mass and Location of Load on Lower Leg Net Muscle Activation During Kneeling Transitions
D. Mines, S. Acker;
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T230 Biomechanics of Prolong Squatting with Body Shifting
F. Metelues, M. Hefzy, C. Armstrong;
University of Toledo, OH.

T231 Design and Biomechanical Evaluation of a Novel Hip Prosthesis

S. WEI, D. WANG, X. LI, Z. LEI, C. WANG;
Shanghai Jiao Tong University, CHINA.

T232 Co-Contraction of Latissimus Dorsi and Pectoralis Major Measured by an Experimental Shoulder Simulator

D. Lange, L. Gossweiler, B. Schmid, D. Baumgartner;
Zurich University of Applied Sciences, Winterthur,
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LIGAMENT & TENDON

T233 Early Ovariohysterectomy Affects the Creep Behaviour of Ligaments

G. M. Thornton, C. R. Reno, D. A. Hart, I. K. Y. Lo;
University of Calgary, AB, CANADA.

T234 Demonstration and Direct Measurement of Interfibrillar Shear Stress in Tendon via Notch Tension Testing

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T235 Do cells contribute to tendon and ligament biomechanics?

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M. F. X. Wagner², A. Boldt¹;
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T236 Crack-induced stress concentrations in annulus fibrosus depend on crack orientation and loading configuration

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University of Pennsylvania, Philadelphia, PA.

MECHANOBIOLOGY & RESPONSES TO MECHANICAL STRESS

T237 Effect of Oxidative Stress on the Actin Filamentous Structure and the Compressive Damage Threshold of C2C12 Cells

Y. Yao, L. Bian, S. Wong, A. Mak;
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T238 Computational Study of the External Mechanical Stimulation of Bone Healing: a Mechanobiological Approach

S. C. Alonso, R. A. F. Garcia, L. A. G. Torres;
Universidade Federal dos Vales de Jequitinhonha e Mucuri,
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T239 Biomateriomic Investigations in Cell and Tissue Engineering

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T240 BK channel is involved in mechanical stretch modulated smooth muscle cell differentiation

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T241 Effect of shear stress on water and LDL transport through cultured endothelial cell monolayers

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MEDICAL DEVICES

T242 Biomechanical Evaluation using Infrared Thermography of a New CF/Flax/epoxy Composite Plate versus a Traditional Metal Plate for Femur Fractures

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T243 Deformation of stented femoropopliteal artery based on three-dimensional CT reconstruction

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T244 Effect of Lumen Design on Pressure Measurement Accuracy and Response Time Using Fluid-Filled Catheters

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T245 Catheter Stabilizer Glove Design

A. Basha, A. Zelenak, S. Kuehn, A. Macintyre;
Wayne State University, Detroit, MI.

T246 Effect of Mal-Alignment and Aging on the Wear of Artificial Patella-Femoral Joint

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UNITED KINGDOM.

T247 Customization of Hip Implants based on Geometry and pre-operative Physiological Condition of Bone.

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T248 Design of a Mechanically Correct Self-Expanding Endovascular Stent: A Look at Radial Force Inconsistencies

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T249 Continuously Adjustable Intramedullary Nail: Prototype and Biomechanical Test Results

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T250 Bearing Surface Damage Analysis of Total Shoulder Replacement Retrievals with Varying Fixation Designs

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T251 Biomechanical Performance of Standalone U-shaped Implant in Cervical Arthroplasty

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T252 Differences in Ankle Angle during Gait with a Powered Ankle Exoskeleton

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T253 Determination of Optimat Delivery Parameters for Intramyocardial Injection of Therapeutic Loaded Hydrogels

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T254 Computational Modeling of Localized Hypothermia in a Canine Stroke Model Using Variable Properties

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MICRO & NANO DEVICES

T255 Device Concept and Simulations for Passive Ocular Drug Delivery

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T256 Determination of elastic properties of biological materials by measuring the Debye-Waller factor

N. Sasaki, H. Shirakawa, T. Nozoe, U. Saitoh, K. Furusawa;
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T257 Dynamic Control of Vascular Endothelial Permeability in a Microvessel-on-a-Chip

Y. J. Sei, Y. Kim;
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MOTOR CONTROL

T258 Decision Making: Cost Analysis of Step Rate Preference in Treadmill Walking

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T259 CPG-Like Motor Control Model for Periodic Arm Motion

R. Sharif Razavian, J. McPhee;
University of Waterloo, ON, CANADA.

T260 Differences in Whole-body Angular Momentum between Healthy Younger and Older Adults during Steady-State Walking

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T261 Associating kinematic and kinetic synergies with movement control strategies in drop landing

A. D. Nordin, J. S. Dufek;
University of Nevada, Las Vegas, NV.

T262 Effect of Age and Fall Histories on Center of Mass Control During the Turning Phase of the Timed Up and Go Test

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T263 Effectiveness of a Reinforcement Learning Approach for Gait Training

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T264 Dynamical Analysis of Error-Correcting Control Yields Coordinate-Invariant Measures of Motor Variability

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T265 Effect of a Concurrent Mental Task on Stepping Characteristics in Older Tai Chi and Non-Tai Chi Practitioners

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T266 Effect of Dual Tasking on Inter-muscular Coherence of Finger Muscles in Older Tai Chi and Non-Tai Chi Practitioners

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T267 Consistent Power Production During Walking is Maintained by Structuring Joint Torque Variance to Modulate Trailing Leg Forces

M. Toney, Y. Chang;
Georgia Institute of Technology, Atlanta, GA.

T268 Cortical Rhythms During Static and Dynamic Manipulation

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T269 Would Stable and Unstable Ankle Use Different Balance Strategy?

M. Y. Chen, H. Y. Chang, C. N. Chen;
Chung Shan Medical University School of Physical Therapy, Taichung, TAIWAN.

T270 Balance Recovery Simulation Using a Novel Biologically-Inspired Musculoskeletal Control System

M. Mansouri Boroujeni, J. A. Reinbolt;
University of Tennessee, Knoxville, TN.

T271 Coordination of muscles to control the foot position during over-ground walking in healthy elderly and stroke survivors

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T272 Changes in total mechanical work explain why metabolic cost tracks locomotor adaptation during split-belt treadmill walking.

M. Thajchayapong, G. Cho, M. Toney, Y. Chang;
Georgia Institute of Technology, Atlanta, GA.

T273 Effect of Body-Weight Support on Joint Power Absorption During Slow Walking

L. Worthen-Chaudhari¹, J. P. Schmiedeler², M. Basso¹;
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T274 Effect of pelvic position feedback on maintenance of seated pelvic posture

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T275 Effect of training paradigm on traditional measures of postural stability in response to positive- and negative-feedback surface perturbations.

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T276 Effect of increasing treadmill velocity on vertical ground reaction force variability.

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T277 Diminished Motor Flexibility and Lateralization Could Lead to Bradykinesia and Akinesia in Persons with Parkinson's Disease

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¹Ohio University, Athens, OH, ²Robert Wood Johnson Medical School, Piscataway, NJ.

T278 Distraction in visuospatial attention while approaching an obstacle reduces toe-obstacle clearance

O. Lo, L. Chou;
University of Oregon, Eugene, OR.

T279 Development of Pendulum Mechanism: a Combination of Different Gait Strategies?

M. Bisi, R. Stagni;
DEI, University of Bologna, Cesena, ITALY.

T280 Augmenting sEMG-Based Speech Recognition by Non-Invasively Tracking Lingual Biomechanics

G. S. Meltzner¹, J. T. Heaton², Y. Deng¹;
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T281 Using principal component analysis in the study of 3D movement reorganization when learning a complex motor skill such as racewalking

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¹Sport Science Department, Qatar University, Doha, QATAR,
²CIAMS Research Unit, Paris-Sud University, Orsay, FRANCE.

T282 Changes in Task Demand Influence Adaptation of the Preferred Gait Pattern During Human Walking.

A. Herrmann, J. C. Dean;
Medical University of South Carolina, Charleston, SC.

T283 Carryover of motor adaptation to resistance load applied to leg in children with cerebral palsy

M. Wu, J. Kim, P. Arora, D. J. Gaebler-Spira, B. D. Schmit, Y. Zhang;
Rehabilitation Institute of Chicago, IL.

T284 Asymmetrically Loaded Warfighters Exhibit Reduced Segmental Coordinative Adaptability in a Dynamic Marksmanship Task

S. W. Ducharme¹, C. J. Palmer², L. Rosado¹, M. Busa¹, J. Lim¹, D. Simon¹, A. Amado¹, R. E. A. Van Emmerik¹;
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T285 Characterization of Neck Muscle Response to Vehicle Collision Using a Driving Simulator

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³State Key Laboratory of Vehicle NVH and Safety Technology, Chongqing, CHINA.

MULTI-CELL BEHAVIORS

T286 Change in membrane-actin cortex bond strength mediate alterations in cell mechanics during stem cell differentiation

K. Sliogeryte, S. D. Thorpe, L. Botto, M. M. Knight;
Queen Mary University of London, UNITED KINGDOM.

MULTISCALE MODELING

T287 Development of Multi-scale and Multi-physics Finite Element Analyses for Integrated Functional Evaluation of Articular Cartilage

T. Noma, E. Nakamachi, Y. Morita;
Doshisha University, Kyoto, JAPAN.

T288 Biomimetic Heart Valve Tissue Virtual Experiments

S. Huang, H. Huang;
North Carolina State University, Raleigh, NC.

T289 Topological influence of different load cases in femur adaptation

D. M. Geraldes, A. T. M. Phillips;
Imperial College, London, UNITED KINGDOM.

T290 Development of Age and Sex-Specific Thorax Finite Element Models

S. Schoell, A. Weaver, J. Stitzel;
Virginia Tech- Wake Forest University, Winston-Salem, NC.

MUSCLE & MOTION CONTROL

T291 Combining eccentric rheology with FT-rheology to characterise large strain in anisotropic soft biological tissues

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T292 Shear wave elastography provides a measure of active muscle stiffness in the feline soleus

D. B. Lipps, E. M. Baillargeon, S. S. M. Lee, B. Wang, E. J. Perreault, T. G. Sandercock;
Northwestern University, Chicago, IL.

T293 Collagen content does not contribute to passive stiffness in fibrotic skeletal muscle of mdx mice

L. R. Smith, E. R. Barton;
University of Pennsylvania, Philadelphia, PA.

T294 Unique activation of the rectus femoris during knee extension with or without hip extension: implications for the training specificity of the quadriceps femoris

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¹Graduate School of Sport Sciences, Waseda University, Tokorozawa, JAPAN, ²Faculty of Sport Sciences, Waseda University, Tokorozawa, JAPAN.

T295 Effect of Muscle Fatty Atrophy and Revision Surgery on the Passive Mechanical Properties of Lumbar Multifidus Muscle

J. J. Su, A. Tomiya, R. L. Lieber, S. R. Ward;
University of California, San Diego, La Jolla, CA.

T296 Changes in Length and Orientation of Muscle Fascicles and Aponeuroses During Passive Changes in Length of Human Gastrocnemius Muscles

R. Herbert¹, M. Heroux¹, J. Diong², S. Gandevia¹, L. Bilston¹, G. Lichtwark³;

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T297 Dystrophic Diaphragm Muscle Sarcomeres are Longer and More Uniform than in Healthy Diaphragm Muscles

C. C. Henry, K. S. Martin, B. Ward, G. Handsfield, E. Blais, J. Kokinos, D. Webber, S. Peirce-Cottler, S. Blemker; University of Virginia, Charlottesville, VA.

T298 Do Age and Physical Activity Status Affect Distribution of Joint Moment Powers at the Ankle, Knee, and Hip During Walking?

H. H. Buddhadev, T. Janssen, P. E. Martin; Iowa State University, Ames, IA.

T299 Body Armor-Induced Changes in Control of Sagittal Plane Trunk Motion

M. Phillips, B. Bazrgari, R. Shapiro; University of Kentucky, Lexington, KY.

T300 Effect of mechanical stretching to 3-D fascicle-like muscle tissue

H. Kim, D. Neal, H. Asada; Massachusetts Institute of Technology, Cambridge, MA.

T301 Coherence and Phase-shift of Monopolar EMG-currents Measured Along and Transversal to the Muscle Fibers of the Medial Gastrocnemius Muscle.

V. von Tscharner, Sr.; University of Calgary, AB, CANADA.

MUSCULOSKELETAL BIOMECHANICS

T302 Comparison and Refinement of Hip Joint Centre Prediction Methods on a Large Contemporary Population

J. Zhang¹, J. Hislop-Jambrich², T. Besier¹;
¹Auckland Bioengineering Institute, University of Auckland, NEW ZEALAND, ²Clinical Applications Research Centre, Toshiba Medical, Sydney, AUSTRALIA.

T303 Construction of lower limb subject-specific bone geometry using statistical shape modelling

K. Y. Zhang, A. E. Kedgley, A. M. J. Bull; Imperial College London, UNITED KINGDOM.

T304 Changes in Post-stroke Muscle Architecture Compared to Healthy Adults

J. W. Ramsay, T. S. Buchanan, J. S. Higginson; University of Delaware, Newark, DE.

T305 Can Botulinum Toxin Offer a Previously Unconsidered Therapeutic Effect?

A. N. Turkoglu, S. Umur, F. Ates, C. A. Yucesoy; Bogazici University, Istanbul, TURKEY.

T306 Effect of Diabetes and Peripheral Neuropathy on Joint moments and work Ascending Stairs

S. J. Brown¹, J. C. Handsaker¹, A. J. M. Boulton², C. N. Maganaris³, F. L. Bowling², N. D. Reeves¹;
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T307 Biomechanical Consequences of Cervical Muscle Fat Infiltration in Whiplash-Associated Disorders (WAD)

R. Abbott¹, J. Elliott², A. Acosta², T. Murphey¹;
¹Northwestern University, Evanston, IL, ²Northwestern University, Chicago, IL.

T308 Comparison of Static Optimization and Joint Reaction analysis between available Musculoskeletal Models from different Simulation Software packages

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T309 Comparison of the Achilles Tendon Length Change Obtained between Direct and Indirect Measurement

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¹Ritsumeikan University, Kusatsu, JAPAN, ²Juntendo University, Inzai, JAPAN, ³Kurashiki University of Science and the Arts, Kurashiki, JAPAN.

T310 Changes in Lower Limb Muscle Architecture Post a 8-week Dance Program in Female Elderly

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¹Federal University of Paraná, Curitiba, BRAZIL, ²Positivo University, Curitiba, BRAZIL.

T311 Developing Discrete Measures from Normalized EMG which Correlate with PC Scores

A. Moslehi, D. A. Quirk, C. L. Hubble-Kozey; Dalhousie University, Halifax, NS, CANADA.

MISCELLANEOUS BIOMECHANICS

T312 Effect of Shear Stress and Nutrient Concentration on the Cell Growth Rate at the Surface of a Circular Tissue Scaffold Strand

M. S. Hossain, D. J. Bergstrom, X. - Chen; University of Saskatchewan, Saskatoon, SK, CANADA.

T313 Characterization of Microstructural Changes of Hindlimb Rat Muscle by Low-Field NMR and Microscope Image

Q. Ni¹, S. Lee²;

¹Southwest Research Institute, San Antonio, TX, ²Texas A&M University at San Antonio, TX.

T314 Dual Tasking Leads to Anti-persistence of Postural Sway Velocity in Older Adults

H. Kang;

California State Polytechnic University, Pomona, CA.

T315 Development of a human whole body finite element model with 3D geometry and activation of individual muscles for prediction of injuries related to human motions under impact situations

M. Iwamoto, Y. Nakahira;

Toyota Central R&D Labs. Inc., Nagakute, Aichi, JAPAN.

T316 Calcium Signaling Pathway in Early or Late Differentiated Osteoclasts under Fluid Flow

B. Huo;

Beijing Institute of Technology, CHINA.

T317 Balance- and Proprioception-Specific Exercises are Required to Elicit Continued Improvement in Static Balance in Adults with Multiple Sclerosis

C. S. Shaw¹, K. Carr¹, R. Colomba², S. Horton¹, C. A. Sutherland¹, N. R. Azar¹;

¹University of Windsor, ON, CANADA, ²Xanadu Health Club, Lakeshore, ON, CANADA.

T318 Different Running Shoe Heel Designs Influence Force Distribution at the Heel upon Impact

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¹University of Calgary, AB, CANADA, ²Mizuno Corporation, Osaka, JAPAN.

T319 Digital Anatomical Measurements of Safe Screw Placement and Design of Anatomical LCP at Superior Border of the Arcuate Line for Acetabular Fractures

Y. Jiang¹, D. Wang¹, X. Ji², C. Bi², X. Xu¹, Z. Lei¹;

¹Shanghai Jiao Tong University, CHINA, ²First People's Hospital Affiliated to Shanghai Jiaotong University, CHINA.

T320 Effect of shear stress on proliferation and osteogenic differentiation of human periodontal ligament cells

L. Zheng, D. Alamoudi, Y. Chen, L. Chen, M. Liu, Y. Huang, X. Jia, W. Song, X. Gong, Y. Fan;

Key laboratory for Biomechanics and Mechanobiology of Ministry of Education, School of Biological Science and Medical Engineering, Beihang University, Beijing, CHINA.

T321 Bird Wing Design: Adaptation, Form and Function

A. L. R. Thomas, G. K. Taylor;

Oxford University, UNITED KINGDOM.

T322 Edge Loading Challenges Posed To Hip Replacements: The Relative Influence Of Design, Positioning & Patient Activity.

F. Donaldson, J. Coburn;

US FDA, Silver Spring, MD.

T323 Changes in Muscle-Tendon Unit Mechanical Properties Due to a Chronic Stretching Program

C. C. Peixinho, J. Machado, L. F. de Oliveira;

Federal University of Rio de Janeiro, BRAZIL.

T324 Deep Brain Stimulation Does Not Improve Gait Initiation in Individuals with Essential Tremor

M. Terza, C. Hass, M. S. Okun, P. Zeilman;

University of Florida, Gainesville, FL.

T325 Cortical Thickness Measurement using a 3D Modeling Method from 2D DXA Images

L. Humbert¹, M. Steghöfer¹, Y. Martelli¹, S. Di Gregorio², L. Del Río Barquero²;

¹Galgo Medical, Barcelona, SPAIN, ²CETIR Grup Mèdic, Barcelona, SPAIN.

T326 Deviations from optimal alignment in TKA: is there a biomechanical difference between femoral or tibial component malalignment?

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T327 Fluidity as a mechanical property of the fully suspended cell

J. Maloney¹, E. Lehnhardt², A. F. Long³, K. Van Vliet¹;

¹Massachusetts Institute of Technology, Cambridge, MA, ²Arizona State University, Tempe, AZ, ³Carleton College, Northfield, MN.

T328 Effect of Material Properties of Peripapillary Sclera Material Properties on Lamina Cribrosa Strain Fields

A. Ayyalasamayajula, F. Danford, J. P. Vande Geest;

University of Arizona, Tucson, AZ.

ORTHOPAEDIC BIOMECHANICS

T329 Correlation Between Induced Posterolateral Fusion and Strain in Spinal Instrumentation: An In Vitro Sheep Study

D. S. Munro, J. Magas;

University of Portland, OR.

T330 Assistive Orthosis Design using Spring Steel to Help Open Post-Stroke Paretic Hands

G. P. Slota¹, D. G. Kamper², N. Seo³;
¹Shriners Hospital for Children - Houston, TX,
²Rehabilitation Institute of Chicago, IL, ³University of Wisconsin - Milwaukee, WI.

T331 Tibial Tray Migration of Two Cementless Knee Designs

S. M. VanValkenburg¹, S. Bhimji², B. Barrick¹, F. W. Werner¹;
¹SUNY Upstate Medical University, Syracuse, NY, ²Stryker Orthopaedics, Mahwah, NJ.

T332 Development And Validation Of A Pediatric Femur Finite Element Model Using Orthogonal Digital Radiographs.

D. S. Angadi, D. E. T. Shepherd, R. Vadivelu, T. Barrett;
University of Birmingham, UNITED KINGDOM.

T333 Effect of Loading Conditions, Bone Quality and Interface Parameters on Micromotion of Uncemented Femoral Knee Component: a Finite Element Study.

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¹Radboud umc, Nijmegen, NETHERLANDS, ²DePuy Synthes Joint Reconstruction, Leeds, UNITED KINGDOM.

T334 Understanding the Kinematic Design of the Wrist: A Cadaveric Study Examining the Relationship between the Scaphoid, the Midcarpal Joint, and Wrist Axes of Rotation

J. Nichols¹, M. Bednar², R. Havey³, W. Murray¹;
¹Northwestern University, Evanston, IL, ²Loyola University, Maywood, IL, ³Edward Hines Jr. VA Hospital, Hines, IL.

T335 Biomechanical Study of Artificial Elbow Joint - Stress analysis produced in bony tissue around joint stem-

N. Inou¹, K. Kobayashi¹, H. Kimura¹, R. Kadowaki¹, J. Ikeda², K. Inagaki²;
¹Tokyo Institute of Technology, JAPAN, ²Showa University, Tokyo, JAPAN.

T336 Does screw locking element promote secondary bone healing without compromising the system stability? In vitro and in vivo tests

A. YÁNEZ, Sr.;
Las Palmas de Gran Canaria University, SPAIN.

T337 Can free moment be used as a measure to effectively challenge subjects' rotational loading at the knee?

A. S. Lanier¹, K. Manal¹, T. S. Buchanan²;
¹University of Delaware, Newark, DE, ²Delaware Rehabilitation Institute, Newark, DE.

T338 Cartilage Safety During Arthroscopic Creation of an Anatomically Based Femoral ACL Tunnel

R. Wozniak¹, J. Andrish², J. Halloran²;
¹Rensselaer Polytechnic Institute, Troy, NY, ²Cleveland Clinic, OH.

T339 Biomechanical and Biological Properties of Different Topographic Locations of the Ankle Joint

N. K. Paschos, E. A. Makris, J. C. Hu, K. A. Athanasiou;
University of California Davis, CA.

T340 Biomechanical Model of Triaxial Wrist Dynamics During Tasks of Daily Living

P. Roscher¹, J. Fritz², G. Harris³;
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T341 Changes in patellofemoral joint loads and loading rate during a prolonged run

J. D. Willson, R. W. Willy, P. DeVita;
East Carolina University, Greenville, NC.

T342 Comparison of Anatomical Parameters of Cam Femoroacetabular Impingement from CT Images and from Segmented Three-dimensional Models

K. G. Ng, M. R. Labrosse, P. E. Beaulé, M. Lamontagne;
University of Ottawa, ON, CANADA.

T343 Automatically generated 3D shape, density and finite element analysis of proximal femur from a DXA image

S. P. Väänänen¹, L. Grassi², J. S. Jurvelin¹, H. Isaksson²;
¹University of Eastern Finland, Kuopio, FINLAND, ²Lund University, SWEDEN.

T344 Balance control following surgical management of cervical spondylotic myelopathy

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T345 Drift removal of gyro sensor for accurately measuring human gait from acceleration and angular velocity data

R. Takeda¹, G. Lisco², T. Fujisawa¹, H. Tohyama¹, S. Tadano¹, L. Gastaldi², S. Pastorelli²;
¹Hokkaido University, Sapporo, JAPAN, ²Politecnico di Torino, ITALY.

T346 Development of in vitro methods for testing nucleus replacement procedures.

S. M. Tarsuslugil, D. E. Miles, R. K. Wilcox;
University of Leeds, UNITED KINGDOM.

T347 Development of a New OpenSim Spine Model to Determine the Influence of the Ribs and Sternum on Estimates of Thoracic and Lumbar Vertebral Loading

A. G. Bruno¹, M. L. Bouxsein², D. E. Anderson²;
¹MIT, Cambridge, MA, ²Harvard Medical School, Boston, MA.

T348 Characterisation and Validation of Sawbones™ Artificial Composite Femur material

D. Gilroy¹, A. M. Young², A. Phillips², M. Wheel¹, P. E. Riches¹;
¹University of Strathclyde, Glasgow, UNITED KINGDOM,
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T349 Biomechanical Evaluation of Total Knee Arthroplasty developed newly for Realization of High Deep Flexion in Physiological Loading Condition of Stand-Sit-Stand Motion

D. Lim¹, Y. Jang¹, S. Lee²;
¹Sejong University, Seoul, REPUBLIC OF KOREA, ²Inje University, Seoul, REPUBLIC OF KOREA.

T350 Computational Biomechanical Study of the Position of the Screws on a Polymer Intramedullary Nail in Calves

G. D. Santana, Sr., L. Gonzalez Torres;
Universidade Federal do Vale do Jequitinhonha e Mucuri,
Diamantina, BRAZIL.

T351 Distribution of Material Properties Throughout a Porcine Tibial Plateau

M. Armengol¹, A. P. Price¹, P. A. Hulley¹, H. S. Gill²;
¹University of Oxford, UNITED KINGDOM, ²University of Bath, UNITED KINGDOM.

T352 Do rocker soles reduce the bending load acting on the forefoot during walking and slow jogging?

K. Peikenkamp, T. Stief, M. Seeßle, N. Dawin;
University of Applied Sciences, Steinfurt, GERMANY.

T353 Dynamic Plantar Loading Index Detects Altered Foot Function in Patients with Rheumatoid Arthritis but not Orthosis Induced Changes

S. Telfer¹, E. Baeten², K. Gibson³, D. Turner⁴, J. Woodburn⁴, G. Hendry⁴;
¹University of Washington, Seattle, WA, ²Thomas More, Mechelen, BELGIUM, ³University of East London, UNITED KINGDOM, ⁴Glasgow Caledonian University, UNITED KINGDOM.

T354 Biomechanical Performance of PLIF Standalone Expandable Cages is Better than TLIF Cage in Stabilizing the Spine

M. Kodigudla¹, A. Agarwal¹, D. Desai¹, A. Agarwal¹, V. Goel¹, N. Momeni¹, C. Schultz²;
¹The University of Toledo, OH, ²Apex Spine, Munich, GERMANY.

T355 Biomechanical Stability of Total Knee Arthroplasty Developed Newly during High Deep Flexion through Evaluation of Contact Pressure, Stress/Strain Distribution Patterns, Micromotion

D. Lim¹, Y. Jang¹, J. Kim²;
¹Sejong University, Seoul, REPUBLIC OF KOREA, ²Konyang University, Nonsan, REPUBLIC OF KOREA.

T356 Contribution of the Anterior Lateral Ligament to Knee Joint Stability Following simulated Anterior Cruciate Ligament Injury.

T. A. Burkhart, L. Spencer, M. N. Tran, A. J. Rezansoff, S. Catherine, A. M. Getgood;
Western University, London, ON, CANADA.

T357 Classification of Knee Function in Patients with Osteoarthritis and Total Knee Replacement.

D. Watling¹, C. Holt¹, C. Wilson², G. Whatling¹;
¹School of Engineering, Cardiff University, UNITED KINGDOM, ²University Hospital of Wales, Cardiff, UNITED KINGDOM.

T358 Effect of Distal Biceps Tendon Repair Technique on Forearm Mechanics

B. T. Brown¹, B. Williams², J. Rubright², P. Schimoler¹, C. C. Schmidt², M. C. Miller¹;
¹University of Pittsburgh, PA, ²Orthopaedic Specialists - UPMC, Pittsburgh, PA.

T359 Development of a novel method to detect the pivot shift within the knee using angular velocity and acceleration measurements

K. Okuzumi, R. Takeda, K. Sasaki;
Hokkaido University, Sapporo, JAPAN.

T360 Effect of a Strengthening Program of Hip and Trunk Muscles on the Kinematics of Lower Limb During Step Down Task

V. L. L. Araujo, V. O. C. Carvalhais, A. C. Cruz, T. R. Souza, T. R. T. Santos, S. T. Fonseca;
Universidade Federal de Minas Gerais, Belo Horizonte, BRAZIL.

SPECIAL TOPICS – GAIT, MOTION, & DISEASE

T361 Can Biomechanical Principles Solve Prevalent Problems in Crop Science?

D. Robertson, S. Smith, M. Julias, D. Cook;
New York University - Abu Dhabi, UNITED ARAB EMIRATES.

T362 Changes in GRF and Leg Muscle EMG with Heel Lifts during Walking

F. Wei, J. E. Braman, R. C. Haut;
Michigan State University, East Lansing, MI.

T363 Development of an Automatic Tracking Software for Out of Water and Underwater Motion Analysis

Z. Sawacha, F. Minelle, A. Scarton, C. Cobelli;
University of Padova, ITALY.

T364 Uncontrolled Protease Activity and Receptor Cleavage as Molecular Mechanisms for Diverse Cell Dysfunctions in Disease.

G. W. Schmid-Schoenbein;
University Of California, San Diego, La Jolla, CA.

T365 Biomechanical Evaluation of Therapeutic Footwear in Able-bodied Persons

Q. Wang¹, F. Gao²;
¹Texas Woman's University, Denton, TX, ²UT Southwestern Medical Center, Dallas, TX.

T366 Do Older Runners Lose the Spring in Their Step?

O. N. Beck¹, J. M. Roby², A. L. Turney¹, M. E. Batliner², A. M. Grabowski², R. Kram², J. D. Ortega¹;
¹Humboldt State University, Arcata, CA, ²University of Colorado, Boulder, CO.

T367 Does the chosen experimental test procedure affect the outputs? A pilot study to observe patella-femoral joint mechanics.

S. Pianigiani¹, G. Gervasi², P. Antinolfi³, A. Speziali³, W. Pascale¹, G. Cerulli², B. Innocenti⁴;
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T368 Discovering deformation: a new method for studying shape change trajectories

L. Teresi¹, V. Varano¹, S. Gabriele¹, P. Piras², I. L. Dryden³;
¹University Roma Tre, ITALY, ²Sapienza-University of Rome & University Roma Tre, ITALY, ³University of Nottingham, UNITED KINGDOM.

T369 Eccentric Muscle Actions Appear to be Affected Less by Fatigue than Concentric Contractions

C. A. Sutherland, N. J. La Delfa, J. R. Potvin;
McMaster University, Hamilton, ON, CANADA.

T370 Use of a system to provide independent fields of views to both eyes equipped with a function to control cameras in saccadic patterns

F. Mizuno¹, T. Hayasaka², T. Yamaguchi²;
¹Tohoku Institute of Technology, Sendai, JAPAN, ²Tohoku University, Sendai, JAPAN.

T371 Characterization of Gait Over Irregular Terrain to Inform a Virtual Reality Rehabilitation Environment

M. C. Hunt, L. Smith, B. Foreman, M. Minor, A. Merryweather;
University of Utah, Salt Lake City, UT.

SPECIAL TOPICS – BIOFLUID MECHANICS

T372 Bone Marrow Rheology Depends on Cell-Cell Adhesion

T. A. Metzger, G. L. Niebur;
University of Notre Dame, IN.

T373 Computational Model of IgA Transport into the Mesangium

S. Hunt, Y. Segal, K. Dorfman, V. Barocas;
University of Minnesota, Minneapolis, MN.

T374 Oxygen Level in Thermoplastic Microfluidic Devices.

A. Pavesi¹, C. J. Ochs¹, J. Kasuya², R. D. Kamm³;
¹Singapore MIT Alliance for Research and Technology, BioSystems and Micromechanics, SINGAPORE, ²Massachusetts Institute of Technology, MechanoBiology Laboratory, Department of Biological Engineering, Cambridge, MA, ³Massachusetts Institute of Technology, MechanoBiology Laboratory, Department of Biological Engineering, Cambridge, MA.

SPECIAL TOPICS – SOFT TISSUE MECHANICS

T375 Diffusion Tensor Imaging Enhanced Anisotropic MRE of the Brain

G. Geng¹, M. Green¹, C. Rae¹, R. Sinkus², R. Henry³, L. Bilston¹;
¹NeuRA, Sydney, AUSTRALIA, ²King's College London, UNITED KINGDOM, ³Univ. of California, San Francisco, CA.

T376 Designing Experiments for Identifying Mechanical Properties of Soft Tissues

T. P. Babarenda Gamage, C. P. Bradley, M. P. Nash, P. M. F. Nielsen;
Auckland Bioengineering Institute, NEW ZEALAND.

T377 Effect of Post-Mortem Time and Storage Condition on the Mechanical Properties of Immature and Adult Ovine Sclera

J. M. Saffioti, B. Coats;
University of Utah, Salt Lake City, UT.

T378 Biomolecular and Mechanical Characterization of Human Bone Marrow

T. Kaushik;
National University of Singapore, SINGAPORE.

REHABILITATION

T379 Development of a Kinect(R)-Based System for Markerless Analysis of Upper Extremity Kinematics during Standardized Pediatric Functional Assessment

J. R. Rammer¹, J. J. Krzak², S. A. Riedel¹, G. F. Harris¹;
¹Marquette University, Milwaukee, WI, ²Shriners Hospitals for Children-Chicago, IL.

T380 EEG-Controlled Orthotic Hands for Rehabilitation of Stroke Patients

M. Ju¹, W. Jaung¹, C. K. Lin², S. Chen³;
¹Dept. of Mechanical Eng., National Cheng Kung University, Tainan, TAIWAN, ²Dept. of Neurology, National Cheng Kung University Hospital, Tainan, TAIWAN, ³Dept. of Physical Medicine & Rehabilitation, National Cheng Kung University Hospital, Tainan, TAIWAN.

T381 Changes in Gait with Anteriorly Added Mass: a Pregnancy Simulation Study

M. Ogamba, S. V. Gill, C. L. Lewis;
Boston University, MA.

T382 The Acute Effect of a Sensory Integration Therapy Intervention on Postural Stability and Gaze Patterns of Children with Autism Spectrum Disorder: A Feasibility Trial

S. I. Smoot, K. Bigelow, K. Jackson;
University of Dayton, OH.

T383 Effect of Compliant Flooring on Postural Stability and Functional Movements in Fall Risk Populations

R. Beach, K. Jackson, K. Bigelow;
University of Dayton, OH.

T384 Concussion Affects Dual-Task Gait Balance Control Differently Between Adolescents and Young Adults

D. Howell, L. Osternig, L. Chou;
University of Oregon, Eugene, OR.

T385 Biomechanical Variability with Changing Cognitive Demands during Ambulation for Service Members with Lower Limb Amputations

B. D. Hendershot, E. J. Wolf, A. L. Pruziner;
Walter Reed National Military Medical Ctr, Bethesda, MD.

T386 Use of Low Cost Emerging Tools for Transtibial Socket Fabrication

L. Hsu¹, M. Tzeng²;
¹National Cheng Kung University, Tainan, TAIWAN, ²National University of Tainan, TAIWAN.

T387 Determination of the Optimal Location of Kinect Sensor for Upper-Limb Virtual Reality

M. F. Firoozabad, P. Hur, N. J. Seo;
University of Wisconsin-Milwaukee, WI.

T388 The Acute Effect of Myofascial Release Intervention on Shoulder Range of Motion, Muscle Strength, Proprioception for Softball Players: A Pilot Study

C. N. Chen, H. Y. Chang, M. Y. Chen, Y. H. Lin;
Chung Shan Medical University, Taichung, TAIWAN.

T389 Usability evaluation of a low-cost virtual reality rehabilitation game for stroke patients with upper limb impairment using Kinect and P5 Glove

J. Arunkumar, P. Hur, K. Lakshminaryanan, N. Seo;
UWM, Milwaukee, WI.

T390 Differences in Handrim Biomechanics between People with Tetraplegia and Paraplegia during Overground Propulsion.

N. S. Hogaboom, Y. Lin, A. M. Koontz, M. L. Boninger;
University of Pittsburgh, PA.

T391 Can Kinematic Data Collected During Active Forward Bending Be Used to Identify Patients with Non-Specific Low Back Pain?

P. Wattananon, W. Sung, B. Spinelli, D. Ebaugh, S. P. Silfies;
Drexel University, Philadelphia, PA.

T392 Backward walking impairs locomotor coordination in persons with Parkinson's disease

C. J. Hass¹, E. Stegemoller², R. Roemmich³, L. Altmann¹;
¹University of Florida, Gainesville, FL, ²Iowa State University, Ames, IA, ³John Hopkins University, Baltimore, MD.

T393 Effect of walking velocity on the amplitude and coordination of limb movement in individuals with Parkinson's disease

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¹Department of Physical Therapy and Rehabilitation Science, University of Maryland School of Medicine, Baltimore, MD, ²Center for Neurorehabilitation, Department of Physical Therapy and Athletic Training, College of Health and Rehabilitation Science: Sargent College, Boston University, MA.

T394 Effect of ankle joint motion on popliteal vein blood flow

F. Low¹, H. Yap¹, J. Lim², C. Yeow¹;
¹National University of Singapore, SINGAPORE, ²National University Hospital, SINGAPORE.

T395 Effect of Physical Training on Aerobic Fitness and Body Mass Index in Mentally Challenged Teenagers

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T396 Dynamic Muscle Force Production in Children with Cerebral Palsy Before and After Gait Training

A. K. Hegarty¹, M. J. Kurz², W. Stuber², A. K. Silverman¹;
¹Department of Mechanical Engineering, Colorado School of Mines, Golden, CO, ²Physical Therapy Department, Munroe-Meyer Institute, University of Nebraska Medical Center, Omaha, NE.

T397 Balance measures in skates and post-skating amongst people living with Parkinson disease

J. Doan, N. Yorgason, P. Bartoszyk, M. Fruman, N. de Bruin, C. Steinke, L. A. Brown;
University of Lethbridge, AB, CANADA.

T398 Cooling over plantar sole changes plantar mechanoreceptor sensation but not postural control in upright standing

C. R. Yang¹, S. Lee¹, L. Guo²;
¹Department of Physical Therapy, College of Medicine, Tzu-Chi University, Hua-Lien, TAIWAN, ²Faculty of Sports Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, TAIWAN.

T399 Does anti-spasticity medication facilitate locomotor training in people with chronic spinal cord injury?

L. Duffell¹, X. Niu², M. Kindig², D. Varoqui², L. Ness², M. M. Mirbagheri²;
¹Northwestern University, Chicago, IL, ²Rehabilitation Institute Chicago, IL.

T400 Does Elliptical Training Affect Gait Symmetry in People with Medial Compartment Knee Osteoarthritis?

A. R. Zucker-Levin¹, M. R. Paquette², P. DeVita³;
¹The University of Tennessee Health Science Center, Memphis, TN, ²The University of Memphis, TN, ³East Carolina University, Greenville, NC.

T401 Corticomotor Excitability of the Biceps after Tendon Transfer in Spinal Cord Injury

C. L. Peterson¹, L. M. Rogers¹, J. P. M. Mogk², M. S. Bednar³, E. J. Perreault⁴, W. M. Murray⁵;
¹Rehabilitation Institute of Chicago, IL, ²Autodesk Research, Toronto, ON, CANADA, ³Loyola University, Chicago, IL, ⁴Northwestern University, Evanston, IL, ⁵Edward Hines Jr. VA Hospital, Hines, IL.

T402 Development of a Low-Cost Upper Extremity Rehabilitation Robot Suitable For Home Use

A. D. Davidson¹, R. P. Jenkins¹, N. J. Siddoway¹, D. M. Smith¹, T. K. Stephens¹, R. L. Toole¹, J. D. Redding², S. K. Charles¹;
¹Brigham Young University, Provo, UT, ²Lockheed Martin Procerus Technologies, Vineyard, UT.

T403 Upper Body Kinematic Range-of-Motion and Variability of Transradial Prosthesis Users Performing Goal-Oriented Tasks

M. J. Major¹, C. Heckathorne¹, R. Stine², S. Fatone¹, S. A. Gard³;
¹Northwestern University, Chicago, IL, ²Jesse Brown VA Medical Center, Chicago, IL, ³Northwestern University and Jesse Brown VA Medical Center, Chicago, IL.

T404 Dynamic Balance Training Improves the Variability of Postural Control in Persons with Moderate Fall Risk

S. Vallabhajosula, C. Johansson;
Elon University, Elon, NC.

T405 Correlation of approximate entropy values calculated from a Wii Balance Board and a mobile-device mounted accelerometer.

K. M. Ake¹, D. Williams², R. J. Reed-Jones³, G. Dedrick¹, B. A. Windsor¹, S. Sawyer¹, D. W. Powell¹;
¹Campbell University, Buies Creek, NC, ²Virginia Commonwealth University, Richmond, VA, ³University of Prince Edward Island, Charlottetown, PE, CANADA.

T406 Differences in Hip Rotation Range of Motion between Sitting and Supine

E. Foch, A. Khuu, A. Williamson, C. Lewis;
Boston University, MA.

T407 Assistive System for the Shoulder Joint

E. Scheuner, B. Heinlein;
Zurich University of Applied Sciences, Winterthur, SWITZERLAND.

T408 Direction-Dependent Adaptations to Visual Perturbations in Human Walking

A. C. Dragunas, S. N. Bailey, E. C. Hardin;
Advanced Prosthetics and Virtual Reality Laboratories, Louis Stokes Cleveland VA Medical Center, Cleveland, OH.

T409 Effect of instruction of deep abdominal setting during reaching on balance control

Chen¹, S. Lin², P. Li², Y. Tsai²;
¹National Cheng Kung University, Tainan, TAIWAN.

T410 Development of a Sensor to Test Indian Dance as an Interactive Arts Feedback to Promote Motor Learning in Children Who Show Toe-Walking

J. T. Pitale, L. Worthen-Chaudhari, J. Bolte, IV;
The Ohio State University, Columbus, OH.

T411 Development of a Global Gait Symmetry Score

S. Cabral¹, R. Resende², S. Selbie³, A. P. Veloso¹;
¹Faculdade de Motricidade Humana - Universidade de Lisboa, PORTUGAL, ²Universidade Federal de Minas Gerais, Belo Horizonte, BRAZIL, ³HAS Motion, Inc., Kingston, ON, CANADA.

T412 Can the Portapres® provide valid and reliable measurements of toe arterial blood pressure during rest and lower limb movements?

J. Goreham, D. Kimmerly, M. Ladouceur;
Dalhousie University, Halifax, NS, CANADA.

T413 Compensatory Gait Dynamics with Disease Progression in Duchenne Muscular Dystrophy

K. Heberer¹, S. Sienko Thomas², C. E. Buckon², A. Bagley³, M. D. Sussman², E. Fowler¹;
¹UCLA, Los Angeles, CA, ²Shriners Hospitals for Children Portland, OR, ³Shriners Hospitals for Children Northern California, Sacramento, CA.

T414 Lower Limb Movement Related Increases in Simulated Arterial Pressure during Cycling

B. J. Ewig¹, J. A. Goreham², D. D. Sherriff¹, M. Ladouceur²;
¹The University of Iowa, Iowa City, IA, ²Dalhousie University, Halifax, NS, CANADA.

REPRODUCTION & WOMEN'S HEALTH

T415 Dynamics of the Gravid Human Uterus in Labor

R. Miftahof;
Arabian Gulf University, Manama, BAHRAIN.

T416 Cervical Tissue Remodeling and Collagen Crosslinks in Infection and Non-Infection Based Preterm Birth Mouse Models

K. Yoshida¹, H. Jiang², M. Mahendroo³, S. Cremers², J. Vink², R. Wapner², K. Myers¹;
¹Columbia University, New York, NY, ²Columbia University Medical Center, New York, NY, ³University of Texas Southwestern Medical Center at Dallas, TX.

RESPIRATORY & LUNG BIOMECHANICS

T417 Dynamics of Airflow in a Short Inhalation

A. J. Bates¹, R. Cetto², H. Calmet³, A. Gambaruto³, N. S. Tolley², G. Houzeaux³, R. C. Schroter¹, D. J. Doorly¹;
¹Imperial College London, UNITED KINGDOM, ²Imperial College Healthcare Trust, London, UNITED KINGDOM, ³Barcelona Supercomputing Center, Barcelona, SPAIN.

T418 Dynamics of Pulmonary Liquid Boluses Using in vitro Airway Microfluidics

M. K. Mulligan¹, Y. Friedman¹, J. B. Grotberg², M. Filoche³, D. Waisman⁴, J. Sznitman¹;
¹Technion - Israel Technical University, Haifa, ISRAEL, ²University of Michigan, Ann Arbor, MI, ³PMC, Ecole Polytechnique, Paris, FRANCE, ⁴dRappaport Faculty of Medicine, Technion - Israel Institute of Technology, Haifa, ISRAEL.

T419 Direct Numerical Simulation of unsteady sniff

H. Calmet¹, A. Gambaruto¹, A. Bates², G. Houzeaux¹, D. Doorly²;
¹Barcelona Supercomputing Center, SPAIN, ²Imperial College London, UNITED KINGDOM.

T420 Effective Diffusivity of Carbon Dioxide by Intermittent Oscillatory Flow in a Pipe with Circumferential Grooves Imitated from Periodic Cricoid of Trachea

A. Shimizu¹, R. Hayashi¹, M. Shimizu², M. Sugawara³;
¹Tokyo National College of Technology, JAPAN, ²Professor Emeritus of Tokyo Institute of Technology, JAPAN, ³Chiba University, JAPAN.

T421 Computation Fluid Dynamics Model Endpoints Correlate to Clinical Improvement in Obstructive Sleep Apnea Syndrome Severity following Adenotonsillectomy Surgery

H. Luo¹, S. Sin², J. M. McDonough³, C. R. Isasi², R. Arens², D. M. Wootton¹;
¹Cooper Union, New York, NY, ²Albert Einstein College of Medicine, Bronx, NY, ³Children's Hospital of Philadelphia, Philadelphia, PA.

T422 Effect of Surfactant on Bubble Split at A Bifurcation During Airway Reopening

H. Fujioka, D. P. Gaver, III;
Tulane University, New Orleans, LA.

T423 Dynamic Multi-scale Model of the Lung

J. Ryans¹, H. Fujioka², D. Halpern³, D. P. Gaver III¹;
¹Department of Biomedical Engineering, Tulane University, New Orleans, LA, ²Center for Computational Science, Tulane University, New Orleans, LA, ³Department of Mathematics, University of Alabama, Tuscaloosa, AL.

T424 Does (Airway) Size Matter? Investigating the Bronchodilatory Response of Small and Large Airways to Deep Inspirations.

A. J. Zollinger, H. M. Peterson, B. C. Harvey, H. Parameswaran, K. R. Lutchen;
Boston University, MA.

SMART BIOSYSTEMS & MICROMECHANICS

T425 Closing Mechanism of Leaflet of Sensitive Plant (Mimosa Pudica)

H. Kobayashi¹, T. Yamauchi², K. Horikawa¹;
¹Osaka University, Toyonaka, JAPAN, ²Niigata University, JAPAN.

SPINE BIOMECHANICS

T426 Changes in Muscle Activation Level Modify Erector Spinae Muscle Fibre Orientation

A. B. Harriss, S. H. M. Brown;
University of Guelph, ON, CANADA.

T427 Comparing the Local Dynamic Stability of Trunk Movements between Varsity Athletes with and without Non-Specific Low Back Pain

R. B. Graham¹, L. Y. Oikawa², G. B. Ross²;

¹Nipissing University, North Bay, ON, CANADA, ²Queen's University, Kingston, ON, CANADA.

T428 Comparative Analysis of Selected Model Species used in Intervertebral Disc Research

L. A. Monaco, D. Gregory, S. DeWitte-Orr;

Wilfrid Laurier University, Kitchener, ON, CANADA.

T429 Deficits in Foot Skin Sensation Are Related to Alterations in Balance Control in Chronic Low Back Pain Patients Experiencing Sciatica

L. R. Frost, M. J. Bijman, N. D. J. Strzalkowski, L. R. Bent, S. H. M. Brown;

University of Guelph, ON, CANADA.

T430 Development and Validation of a Nonlinear, Three-Dimensional Lumbar Spine Finite Element Model

A. M. Ellingson, H. Giambini, C. Zhao, A. Nassr, K. An; Mayo Clinic, Rochester, MN.

T431 Development and Testing of a New Method for Semi-automated Assessment of Intervertebral Disc Height from Lateral CT Scout Views

B. Allaire¹, A. G. Bruno², M. C. DePaolis¹, D. E. Anderson¹, M. L. Bouxsein¹;

¹Beth Israel Deaconess Medical Center, Boston, MA,

²Harvard-MIT Health Sciences and Technology Program, Cambridge, MA.

T432 Barriers to Growth Factor Therapy for Intervertebral Disc Degeneration: a Quantitative Analysis on the Effectiveness of Exogenous IGF-1 Administration

F. Travascio, S. Elmasry, S. Asfour;

University of Miami, Coral Gables, FL.

T433 Using Micro-CT Derived Boundary Conditions to Evaluate Structural Stability of Multiple Myeloma Infiltrated Vertebrae.

N. Roberts¹, N. Brandolini¹, N. Kapur², C. Whyne³, R. Hall¹;

¹Institute of Biological & Medical Engineering, Leeds, UNITED KINGDOM, ²Institute of Engineering Thermofluids, Surfaces and Interfaces, Leeds, UNITED KINGDOM,

³Institute of Biomaterials and Biomedical Engineering, Toronto, ON, CANADA.

T434 Diffusion tensor imaging detects the spatial variation in fiber angle and lamellar number in intact human discs

R. N. Alkalay¹, D. Meier², C. Westin², D. B. Hackney¹;

¹Beth Israel Deaconess Medical Center, Boston, MA,

²Brigham and Women's Hospital, Boston, MA.

T435 Comparing three calcium phosphate bone substitutes from the biomechanical and histological aspects using a rat posterolateral lumbar fusion model

M. Hu¹, W. Chen², P. Lee¹, J. Hu¹;

¹National Cheng Kung University, Tainan, TAIWAN, ²Feng Chia University, Taichung, TAIWAN.

T436 Cervical circumferential antero-posterior instrumentation versus a novel anterior-only transpedicular screw-plate fixation technique

W. Schmoelz¹, D. Malekzadeh¹, M. Mayer², H. Koller³;

¹Medical University Innsbruck, AUSTRIA, ²Paracelsus Medical University, Salzburg, AUSTRIA, ³German Scoliosis Center, Werner Wicker Klinik, Bad Wildungen, GERMANY.

T437 CT based semiautomatic generation of FEM model of the human spine

M. Otáhal¹, J. Kuželka², T. Brima³;

¹Faculty of Physical Education, Charles University in Prague, CZECH REPUBLIC, ²Faculty of Mechanical Engineering, CTU in Prague, CZECH REPUBLIC, ³Albert Einstein College of Medicine, Yeshiva University, Bronx, NY.

T438 Cervical spine range of primary and coupled motions by 3D- inertial sensors: a test-retest reliability study

R. Portero¹, I. Masson², D. Garric², P. Portero²;

¹University Paris-Est Créteil, FRANCE, ²Hôpital Rothschild (AP-HP), Service de Rééducation Neuro-Orthopédique, Paris, FRANCE.

T439 Cervical Spine Response to Underbody Blast Loading

C. Cox¹, B. Bigler¹, J. K. Shridharani¹, A. Schmidt¹, J. F. Luck¹, J. R. Kait¹, L. Voo², A. E. Knight¹, A. A. Alonso¹, C. R. Bass¹;

¹Duke University, Durham, NC, ²Johns Hopkins Applied Research Laboratory, Lauren, MD.

SPORTS BIOMECHANICS & HUMAN PERFORMANCE

T440 Differences in Muscle Force Distribution Patterns During Squatting and Lunging Maneuvers Between Genders.

R. Hale, R. Gonzalez;

University of Texas at El Paso, TX.

T441 Biomechanics of Running on Forefoot-spring Footwear

J. Low, C. Yeow;

National University of Singapore, SINGAPORE.

T442 Biomechanical Analysis of Resisted Running

R. Dattero, T. Wu, E. Robinson;

Bridgewater State University, MA.

T443 Biomechanical Characteristics of Exercise Machine Training

G. E. Caldwell¹, D. Frayne¹, B. C. Muir², B. R. Umberger¹;
¹University of Massachusetts, Amherst, MA, ²Purdue University, West Lafayette, IN.

T444 Differences in Running Mechanics Between Obese and non-Obese Children.

K. Roles, B. Bowser;
South Dakota State University, Brookings, SD.

T445 Association between Offensive versus Defensive Actions and Non-Contact Lower Extremity Injuries in High School Sports

S. M. Monfort¹, R. D. Comstock², C. L. Collins³, J. A. Onate¹, T. M. Best¹, A. M. Chaudhari¹;
¹The Ohio State University, Columbus, OH, ²Colorado School of Public Health, Aurora, CO, ³The Research Institute at Nationwide Children's Hospital, Columbus, OH.

T446 Conversion of Horizontal to Vertical Momentum in Realistic Contexts: Volleyball Blocking

C. D. Ramos, J. McNitt-Gray;
University of Southern California, Los Angeles, CA.

T447 Does Footfall Pattern in Forefoot Runners Change over a Prolonged Run?

C. Jewell, K. Boyer, J. Hamill;
University of Massachusetts Amherst, MA.

T448 Challenging walking increases knee moments in patients after ACL reconstruction

E. H. Hartigan¹, T. Murray², B. Shaw², M. Lawrence¹;
¹University of New England, Portland, ME, ²OA Centers for Orthopaedics, Portland, ME.

T449 Differences in Estimated Knee Ligament Forces in Landing from a Barrier Jump between Anterior Cruciate Ligament Reconstruction (ACL-R) Participants and Healthy Controls

T. W. Kernozek, S. Leissring, S. Bootsma, S. Lopez, B. Heinert, D. Hong, R. Ragan, R. Ragan;
University of Wisconsin-La Crosse, WI.

T450 Dynamic tracking of the scapula during slow circumduction

L. S. Persad, T. Eftaxiopoulou, A. M. J. Bull;
Imperial College London, UNITED KINGDOM.

T451 Body Armor Configuration Impacts Minimum Foot Clearance on Obstacle Negotiation

K. L. Loverro, T. N. Brown, J. M. Schiffman;
Natick Soldier Research Development and Engineering Center, Natick, MA.

T452 Use of a Virtual Reality Overhead Goal Improves Vertical Jump Performance and Biomechanics

K. R. Ford, J. B. Taylor, A. Nguyen, E. J. Hegedus;
High Point University, High Point, NC.

T453 Validating Inertial Measurement Units as a Method for Determining Rifle Aiming Performance

S. P. Davidson, R. S. McGinnis, R. V. Vitali, S. M. Cain, N. C. Perkins, S. G. McLean;
University of Michigan, Ann Arbor, MI.

T454 Dynamic Postural Control Ability of Professional Golfers during Golf Swing

A. Choi¹, H. Kim¹, J. H. Mun²;
¹The University of Texas Health Science Center at Houston, TX, ²Sungkyunkwan University, Suwon, REPUBLIC OF KOREA.

T455 Comparison of Head Impact Exposure between Skill and Line Position Players in Middle School Football

R. W. Daniel, II, S. Rowson, S. Duma;
Virginia Tech, Blacksburg, VA.

T456 Biomechanical Adjustments During an Exhaustive Run: Comparison of Compression Tights and Running Shorts

B. Schornstein, G. Heise;
University of Northern Colorado, Greeley, CO.

T457 Changes in lower extremity stiffnesses according to different hopping frequencies

J. Son¹, B. Jeong¹, J. Han², Y. Kim¹;
¹Yonsei University, Wonju-si, REPUBLIC OF KOREA, ²Hansung University, Seoul, REPUBLIC OF KOREA.

T458 Biomechanical Analysis of Three Different Catcher's Throwing Motion

J. Chen, H. Lee;
National Taiwan Normal University, Taipei, TAIWAN.

T459 Effect of Age on Fluctuation of Sustained Sub-Maximal Grip Contraction

K. Li¹, N. Wei²;
¹Institute of Biomedical Engineering, Shandong University, Jinan, CHINA, ²Qilu Hospital, Shandong University, Jinan, CHINA.

T460 Does Functional Movement Screen Performance Correlate with Measures of Core and Lower Extremity Stability?

C. M. Butowicz, M. Pontillo, C. E. Milner, D. Ebaugh, S. P. Silffies;
Drexel University, Philadelphia, PA.

T461 Comfortable and Uncomfortable Footwear: Do we feel the Difference?

S. Hoerzer, B. M. Nigg;
University of Calgary, AB, CANADA.

T462 Effect of Eight Weeks Whole Body Periodic Acceleration Training on Postural Stability in Elders

A. J. Y. Lee¹, K. W. C. Chen², W. Lin³;

¹National HsinChu University of Education, HsinChu City, TAIWAN, ²Chang Gung University of Science and Technology, TaoYuan, TAIWAN, ³National ChiaYi University, ChiaYi County, TAIWAN.

T463 Can Meniscus Injuries change the Kinematics of the Anterior Cruciate Ligament (ACL) Deficient Knees?

A. Hosseini, J. Li, T. J. Gill, IV, G. Li;

Massachusetts General Hospital/Harvard Medical School, Boston, MA.

T464 Awareness of a Difference Across Shoe Weights Affects Performance in Basketball Movements.

M. Mohr, M. Trudeau, S. Nigg, B. M. Nigg;

University of Calgary, AB, CANADA.

T465 Changes in Landing Strategy During Different Landing Types

J. E. Hibbert, P. M. Rider, J. R. Patteson, C. N. Byrd, P.

DeVita, Z. J. Domire;

East Carolina University, Greenville, NC.

T466 Effect of Simulated Meniscus under Pedal Force on Muscle Activity at Tibio-femoral Joint during Cycling: A Simulation Study

Y. WEN, M. Li, B. Yang;

National Chiao Tung University, Hsinchu, TAIWAN.

T467 Breast Support Implications for Larger-Breasted Female Athletes during Vertical Jumping

J. White, C. Mills, J. Scurr;

University of Portsmouth, UNITED KINGDOM.

T468 Athlete Configuration as a Mean to Optimize Energy Transfer to the Racing Wheelchair

G. C. Masson, S. Pelletier, E. Langelier, C. Smeesters, F.

Berrigan, D. Rancourt;

Université de Sherbrooke, QC, CANADA.

T469 Changes in Focused Landing Biomechanics due to Knee Extensor Fatigue

C. N. Byrd, J. R. Patteson, J. E. Hibbert, P. M. Rider, P.

DeVita, Z. J. Domire;

East Carolina University, Greenville, NC.

T470 Biomechanics of Bodyweights Single-Leg Squat Variations: Implications for Movement Screening and Assessment

C. J. Chapman¹, T. A. Beach¹, D. M. Frost¹, M. Ionno², R. F.

Escamilla³, J. R. Andrews⁴;

¹University of Toronto, ON, CANADA, ²Washington University, St. Louis, MO, ³California State University, Sacramento, CA,

⁴Andrews Research and Education Institute, Gulf Breeze, FL.

T471 Biomechanical and physiological effects of walking versus running training in older adults

C. Alcantara¹, R. Castanharo¹, L. A. Riani Costa², F. Freire³,

C. L. M. Forjaz², M. Duarte¹;

¹Universidade Federal do ABC, Santo Andre, BRAZIL,

²Universidade de São Paulo, BRAZIL, ³Flavio Freire -

Assessoria Esportiva, São Paulo, BRAZIL.

T472 Effect of the weighted shoes on the impact forces as landing on the ground in heel-toe running

C. Kung, P. Deng, H. Chiu;

Institute of Physical Education, Health and Leisure Studies,

National Cheng Kung University, Tainan, TAIWAN.

T473 Different preference of the weighted shoes between the females and males subjects

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Normal University, Taipei, TAIWAN, ²Institute of Physical

Education, Health and Leisure Studies, National Cheng

Kung University, Tainan, TAIWAN.

T474 Center of mass characteristics during stair-to-floor transition in Tai-Chi elderly

C. F. Huang, T. H. Yang, Y. Y. Hsieh;

National Taiwan Normal University, Taipei, TAIWAN.

T475 Can the swing leg kinetics be described by springy-pendulum in human walking?

H. Song, S. Park;

KAIST, Daejeon, REPUBLIC OF KOREA.

T476 Effective Foot Mass during Impact Loading of Drop Jump

C. Chen¹, Y. Wu¹, Y. Tsai²;

¹National Taiwan University of Physical Education and Sport,

Taichung, TAIWAN, ²Department of Sport, National

Changhua University of Education, TAIWAN.

T477 Upper Body Behavior in Human Walking Based on Inverted Double Pendulum

T. Honjo, T. Isaka;

Ritsumeikan University, Kusatsu, JAPAN.

T478 Comparisons of Knee Joint Loading Between Forward and Backward Pedaling on an Instrumented Cycling Ergometer Using 3D Fluoroscopy Method

J. Li¹, Y. Wu¹, T. Lu¹, T. Lin¹, M. Kuo², C. Lin¹, Y. Liu¹, H.

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Orthopaedics, China Medical University Hospital, Taipei,

TAIWAN.

T479 Can the Way We Move Predict Patellar Tendon Loading? The Relationship Between Trunk and Lower Extremity Sagittal Plane Kinematics and Patellar Tendon Loading.

D. Glisic, T. Beach, D. Frost, D. Richards;
University of Toronto, ON, CANADA.

T480 Changes in Running Kinetics Following Bilateral Isolated Lower Extremity Joint Fatigue

N. C. Francksen, K. D. Dahl, J. Estes, D. C. Dickin;
Ball State University, Muncie, IN.

T481 Peak Force and Vertical Velocity in a Novel Countermovement

J. Fox, A. Jagodinsky, L. Smallwood, C. Wilburn, W. H. Weimar;
Auburn University, AL.

T482 Use of an Oar Mounted Gyroscopic Sensor as a Field Based Measurement System to Determine Oar Kinematics in Rowing

S. Blades, R. Brodie, M. Klimstra;
Canadian Sport Institute, Victoria, BC, CANADA.

T483 Comparison of the Kinematics of Young and Elderly Runners

T. R. T. Santos, A. C. Pinheiro, C. V. Barros, V. O. C. Carvalhais, V. L. Araújo, S. T. Fonseca, J. M. D. Dias;
Universidade Federal de Minas Gerais, Belo Horizonte, BRAZIL.

TISSUE ENGINEERING

T484 Cartilage Mimicking Woven Collagen Scaffold for Cartilage Tissue Engineering

M. Younesi, A. Islam, V. M. Goldberg, O. Akkus;
Case Western Reserve University, Cleveland, OH.

T485 Using tissue-engineered cartilage as a precursor of endochondral ossification for bone defect repair

A. Matsiko¹, E. M. Thompson¹, J. P. Gleeson¹, D. J. Kelly², F. J. O'Brien¹;
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²Trinity College Dublin, IRELAND.

T486 Effect of Decellularisation on the Biomechanical Properties of Porcine Meniscus: Experimental and Computational Study

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T487 Construction of tissue-engineered blood vessels using plastically compressing smooth muscle cell-seeded collagen gel membranes

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T488 Bio rapid prototyping project: Consideration on spheroids building system for regenerative medicine

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²Saga University, JAPAN,
³Cyfuse Biomedical K.K, Tokyo, JAPAN,
⁴Kyoto University, JAPAN,
⁵Ehime University, JAPAN,
⁶Kyushu University, Fukuoka, JAPAN.

T489 Computational Design and Analysis of a Tissue Engineering Femoral Head Replacement

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¹University of Missouri, Columbia, MO,
²University of Georgia, Athens, GA.

T490 Effect of hepatocytes on capillary morphogenesis in a three-channel microfluidic device

M. Ajoudanian, K. Yasuda, R. Sudo;
Keio University, Yokohama, JAPAN.

VASCULATURE

T491 Computer Model of ATP/ADP transport in the human aorta

P. Zhao, X. Liu, X. Deng;
Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education, School of Biological Sc, Beijing, CHINA.

T492 Comparison of Foot-finding Methods for Doppler and

Photoplethysmographic Signals

J. P. Phillips;
City University London, UNITED KINGDOM.

T493 Characterizing Collagen Fiber Angles in Mouse Aortas Using Second-Harmonic Generation Microscopy

S. R. Watson, M. A. Sutton, S. M. Lessner;
University of South Carolina, Columbia, SC.

T494 Development of an anatomically detailed arterial network for one-dimensional blood flow simulations

P. J. Blanco, S. M. Watanabe, R. A. Feijóo;
National Laboratory for Scientific Computing, Petropolis, BRAZIL.

ARTIFICIAL ORGANS

W1 Effects of adhesion to wall on thrombus formation in blood flow using modified Lattice Boltzmann Method with surface tension model
M. TAMAGAWA;
Kyushu Institute of Technology, Kitakyushu, JAPAN.

BIOIMAGING/BIO-OPTICS

W2 Elastic Tensor Imaging: a new ultrasound modality for mapping the structure of fibrous soft tissues
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²NeuroSpin, CEA Commissariat à l'Énergie Atomique, Gif-sur-Yvette, FRANCE.

W3 Endoscopic High Speed PIV and Digital Holography for vessel dynamics characterization
L. A. Arévalo Díaz, E. Roche, V. Palero, M. A. Martínez, M. Arroyo;
Universidad de Zaragoza, SPAIN.

W4 Implant Tracking Using a High-Speed Stereo Radiography System
A. J. Cyr, M. D. Harris, V. Kefala, M. H. Gordon, P. J. Rullkoetter, B. S. Davidson, K. B. Shelburne;
University of Denver, CO.

W5 Feasibility Study of Intravascular Optical Coherence Elastography for Porcine Carotid Artery Deformation Measurement
C. Sun, B. Vuong, B. Standish, X. Gu, V. Yang;
Ryerson University, Toronto, ON, CANADA.

BIO-INSPIRED DESIGN

W6 Kinematic and Energetic Effects of a Soft Active Exosuit for Gait Assistance
S. M. M. De Rossi¹, A. T. Asbeck¹, H. Pei¹, R. J. Dyer¹, A. F. Larusson¹, I. Galiana¹, K. G. Holt², J. Bae¹, C. J. Walsh¹;
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BIOMATERIALS

W7 Injectable Methylcellulose-based Hydrogels as Mechanically Functional and Cytocompatible Soft Tissue Fillers
G. T. Gold, C. Rivera, D. M. Varma, S. B. Nicoll;
The City College of New York, NY.

W8 Experimental and Computational Analysis of Degradation and Mechanical Properties Changes for a Biodegradable Polymer
R. N. Shirazi¹, Y. Rochev², P. E. McHugh¹;
¹Biomedical Engineering, College of Engineering and Informatics, NUIG, Galway, IRELAND, ²National Centre for Biomedical Engineering Science, NUIG, Galway, IRELAND.

W9 Fabrication of Collagen Sheets with Tunable Stiffness Anisotropy
A. Islam, M. Younesi, S. Cotey, O. Akkus;
Case Western Reserve University, Cleveland, OH.

W10 Engineering Three-Dimensional Cellular Mechanical Microenvironment with Magnetic Microscale Hydrogels
Y. Li¹, G. Huang¹, L. Wang¹, T. Lu², F. Xu¹;
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W11 Validation Techniques for Characterizing Nonlinear Elastic Materials in Equibiaxial Tension
S. Wrisley, E. DeBartolo;
Rochester Institute of Technology, Rochester, NY.

W12 Friction of PEEK and Carbon Fibre Reinforced PEEK Bearing Couples under Contact Conditions Typical of the Cervical Spine
P. Hyde, J. Fisher, R. M. Hall;
University of Leeds, UNITED KINGDOM.

W13 Gold-Chitosan Nanocomposites for Biomedical Applications: Processing, Nanomechanical Characterization, and Biocompatibility
N. G. Patel, C. D. Woodworth, P. A. Yuya;
Clarkson University, Potsdam, NY.

W14 In-vivo measurement of soft tissue with applications towards quantifying mechanical properties of marine mammal skin
K. A. Shorter¹, T. Hurst², M. Moore², R. S. Wells³, J. Rochon-Levine⁴, M. Johnson⁵;
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W15 In Vitro Fabrication Of 3D Cell-Laden Microenvironment Through Gelatin-Derived Hydrogel Photo-Mold Patterning
P. Occhetta¹, L. Russo², C. Arrigoni³, R. Visone³, A. Redaelli¹, L. Cipolla², M. Moretti³, M. Rasponi¹;
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W16 Estimation of material properties of tissue spheroids biofabricated from human adipose tissue derived mesenchymal stem cells before and after their induced directed chondrogenic differentiation and tissue maturation

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W17 Iron-based materials useable for biodegradable implants? - a comparison of mechanical values related to degradation

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W18 Investigation of Hardness and Porosity of Degradable Metallic Biomaterials Manufactured from Cold Gas Dynamic Spray

R. Barua¹, H. Aydin¹, P. Vo², S. Yue¹, D. L. Frost¹, O. F. Bertrand³, R. Mongrain¹;

¹McGill University, Montreal, QC, CANADA, ²National Research Council of Canada, Boucherville, QC, CANADA, ³Quebec Heart Lung Institute, Laval University, Quebec City, QC, CANADA.

BIOMECHANICAL INSTRUMENTATION

W19 Evaluation of a Low-Cost Thin Film Sensor for Head Impact Exposure Monitoring

J. G. Beckwith, J. J. Chu, D. S. Leonard, R. P. Bolander, A. T. Buck, R. M. Greenwald; Simbex, Lebanon, NH.

W20 Evaluation of Kinematic Properties of the Computer Assisted Rehabilitation Environment (CAREN) System

B. M. Potvin, D. L. Benoit; University of Ottawa, Ottawa, ON, CANADA.

W21 Gait Analysis Based on Image Processing with Caterpillar Type Transparent Treadmill

Y. Iijima, T. Shiina, T. Ishikawa, H. Takemura, H. Mizoguchi; Tokyo university of science, Noda, JAPAN.

W22 Validation of Generic Bone Models for RSA Fluoroscopy Use for the Medial Longitudinal Arch

A. Valevicius, M. Balsdon, T. Jenkyn; University of Western Ontario, London, ON, CANADA.

W23 Validation of a Device for Measuring Seated Pelvic Position

J. Lewis¹, G. Freisinger¹, M. McNally¹, S. T. Jamison², D. Givens³;

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W24 Every sample counts: precision and filtering in time-varying signals.

M. Scholz; Northern Digital Inc., Waterloo, ON, CANADA.

W25 Estimation of Ulna Bending Strength by Mechanical Response Tissue Analysis (MRTA)

L. Bowman¹, E. R. Ellerbrock¹, J. R. Cotton², M. J. Dennis¹, G. C. Hausfeld¹, T. D. Law, Jr.¹, A. B. Loucks¹;

¹Department of Biological Sciences, Ohio University, Athens, OH, ²Department of Mechanical Engineering, Ohio University, Athens, OH.

W26 Estimating the Vertical Ground Reaction Force and Fore-Aft Center of Pressure in walking with Low-Cost Instrumented Insoles

D. Jacobs, D. Ferris; University of Michigan, Ann Arbor, MI.

BIOMECHANICS OF FLIGHT & SWIMMING

W27 Experimental and numerical investigations of asymmetric flapping flight

S. Krithivasan, S. Ansumali, K. Sreenivas; Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, INDIA.

W28 From Flapping of Four Wings: Instantaneous Aerodynamic Forces of a Free-Flying Dragonfly

J. Melfi, Jr.¹, H. Lin², A. Leonardo², J. Wang¹;

¹Cornell University, Ithaca, NY, ²Janelia Farms, Ashburn, VA.

W29 Hovering Nectar Feeding Bats Produce Bilateral Vortex Loops

J. Håkansson; Biology, Lund, SWEDEN.

W30 Frequency and Phase Control of Indirect Muscle Activations during Flapping Flight in Hawkmoths

N. Ando, R. Kanzaki; RCAST, The University of Tokyo, JAPAN.

W31 Leading edge vortex structure in freely flying hummingbird hawkmoth.

C. Johansson, S. Engel, A. Kelber, M. Klein Heerenbrink, A. Hedenström; Lund University, Lund, SWEDEN.

W32 Lift and Efficiency of 1-DoF Hummingbird Wing Models

H. Tanaka, K. Suga, I. Kitamura, M. Maeda, H. Liu;
Chiba University, Chiba, JAPAN.

W33 Efficiency of Lift Production in Flapping and Gliding Flight of Swifts

P. Henningsson¹, A. Hedenström¹, R. J. Bomphrey²;
¹Lund University, SWEDEN, ²Royal Veterinary College, London, UNITED KINGDOM.

W34 Fish actively control head movements during undulation to increase swimming performance

O. Akanyeti, J. C. Liao;
University of Florida, St. Augustine, FL.

BIOMEMS & BIOSENSORS

W35 Evaluation of glioma invasion using glioma-initiating cells in a microfluidic device

S. Taki;
Keio University, Yokohama, JAPAN.

W36 Gene Expression Analysis on A Gravity Driven Microfluidic Platform

C. E. McCarthy, T. Dalton;
Stokes Institute, Limerick, IRELAND.

W37 Evaluating Optimal Placement of a Wireless Gait Analysis Sensor for Balance Disorders

B. Nukala¹, A. Rodriguez², J. Tsay¹, T. Nguyen¹, S. Zupancic², D. Y. C. Lie¹;
¹Texas Tech U, Lubbock, TX, ²Texas Tech U Health Sciences Center, Lubbock, TX.

W38 Higher Strains in Extension than Flexion Might Partially Explain the Mechanism of Distal Radius Fractures

J. E. Johnson, K. L. Troy;
Worcester Polytechnic Institute, Worcester, MA.

BONE

W39 Influence of Fatigue Induced Microdamage on the Fracture Resistance of Cortical Bone

L. Fletcher¹, J. Codrington¹, I. Parkinson²;
¹School of Mechanical Engineering, The University of Adelaide, AUSTRALIA, ²SA Pathology, Adelaide, AUSTRALIA.

W40 Evaluation of a Disease Model for Avascular Necrosis of the Femoral Head using Homogenous Material Properties

J. Anderson¹, J. Fisher¹, A. Jones¹, G. Isaac², S. Williams¹;
¹Institute of Medical and Biological Engineering, Leeds, UNITED KINGDOM, ²DePuy Synthes Joint Reconstruction, Leeds, UNITED KINGDOM.

W41 In Situ Micropillar Compression Tests of Lamellar Bone Show a Remarkable Strength and Ductility but No Damage at the Microscale

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W42 Failure Morphology in Human Trabecular Bone - a Systematic Classification

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W43 Effects of Gamma Radiation on the High Cycle Fatigue Behavior of Cortical Bone

A. Islam, E. Moore, J. Ford, K. Chapin, C. Rimnac, O. Akkus;
Case Western Reserve University, Cleveland, OH.

W44 Estimating Orthotropic Elastic Material Properties Using Clinically Available Imaging Parameters

M. Nazemi, M. Amini, D. Cooper, J. Johnston;
University of Saskatchewan, Saskatoon, SK, CANADA.

W45 Fracture Healing: A Novel Approach to in Silico Model Validation Using Longitudinal in Vivo Data

D. C. Betts¹, S. Stanger¹, G. A. Kuhn¹, S. Hofmann¹, K. M. R. Nuss², R. Müller¹;
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W46 Extracting Accurate Strain Data From Cadaver Human Femora Using High-Speed Digital Image Correlation

L. Grassi¹, S. P. Väänänen², S. Amin Yavari³, H. Weinans⁴, J. S. Jurvelin², A. A. Zadpoor³, H. Isaksson¹;
¹Lund University, SWEDEN, ²University of Eastern Finland, Kuopio, FINLAND, ³Delft University of Technology, NETHERLANDS, ⁴Utrecht University, NETHERLANDS.

W47 Investigating New Characteristics of Bone Quality in the Ovariectomized Rat Model of Osteoporosis.

N. Mathavan¹, M. Turunen², M. Tägil¹, H. Isaksson¹;
¹Lund University, SWEDEN, ²University of Eastern Finland, Kuopio, FINLAND.

W48 Establishing the Mechanical Response of Trabecular Tissue Using a Poro-Viscoelastic Model Based on Micro-CT Images

C. Sandino, D. D. McErlain, S. K. Boyd;
University of Calgary, AB, CANADA.

W49 Fabric-Microarchitecture Predicts Both Elastic and Yield Shear Behavior of Anisotropic Trabecular Bone

P. E. Palacio-Mancheno, M. Mejia, M. Souzanchi, S. Cowin, L. Cardoso;
The City College of New York, Manhattan, NY.

W50 HAp Crystal Strain and Elastic Modulus of Single Trabecula of Bovine Cancellous Bone

S. YAMADA, S. FUKUDA, S. TADANO;
Hokkaido University, Sapporo, JAPAN.

W51 Investigation of mouse skeletal phenotypes using μ CT and mechanical testing

S. Mohamad, G. Tozzi, J. Tong;
University of Portsmouth, UNITED KINGDOM.

W52 Machine learning and morphometric analysis of asymptomatic and symptomatic Type 1 Chiari malformation patients

M. Wransky¹, D. McQuaide¹, J. Strahle², C. Maher², M. Espanol³, F. Loth¹, B. Martin¹;
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W53 Investigating mild blast-induced traumatic brain injury: a multi-modal approach

S. Assari, K. Laksari, S. Dyer, R. Ansari, I. Obeid, M. Barbe, K. Darvish;
Temple University, Philadelphia, PA.

CARDIOVASCULAR FLUIDS

W54 Image-Based Modelling of Water and LDL Transport in the Rat Aortic Wall

A. Comerford¹, Y. Chooi², P. D. Weinberg², S. J. Sherwin¹;
¹Department of Aeronautics, Imperial College London, UNITED KINGDOM, ²Department of Bioengineering, Imperial College London, UNITED KINGDOM.

W55 Fast sensitivity analysis for blood flow simulations in the human coronary arteries using machine learning
S. Sankaran, L. Grady, C. A. Taylor;
HeartFlow, Inc., Palo Alto, CA.

W56 Illustration-inspired Visualization of Blood Flow Dynamics

P. Coppin¹, J. Harvey¹, K. Valen-Sendstad², D. A. Steinman²;
¹Ontario College of Art and Design University, Toronto, ON, CANADA, ²University of Toronto, ON, CANADA.

W57 Effects of Pulsatility on High Shear Thrombus Formation

L. D. C. Casa, D. N. Ku;
Georgia Institute of Technology, Atlanta, GA.

W58 Hemodynamic effects of the anastomoses in modified Blalock-Taussig shunt: a multiscale numerical study using OD/3D coupling method.

X. Zhao;
Beijing University of China, Beijing, CHINA.

W59 Influence of Uterine Artery Flow on Abdominal Aortic Hemodynamics in a Patient Population of Uterine Fibroids

E. Iffrig¹, J. Oshinski¹, W. Taylor²;
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA.

W60 Influence of vessel dynamics and compliance on hemodynamics of stenosed coronary artery: a computational study

T. Fujiwara¹, F. Liang², K. Tsubota¹, Y. Fan², H. Liu¹;
¹Graduate School of Engineering, Chiba University, Chiba, JAPAN, ²Shanghai Jiao Tong University, Shanghai, CHINA.

W61 Elevated filtration rate of venous graft wall may account for its accelerated atherogenesis

Z. Wang, X. Liu, A. Sun, X. Deng;
School of Biological Science & Medical Engineering, Beihang University, Beijing, CHINA.

W62 Fast pressure drop calculation with lumen specific assumptions for the Navier-Stokes equations in atherosclerotic human coronary arteries

J. T. C. Schrauwen¹, D. J. Koeze¹, F. N. van de Vosse², J. J. Wentzel¹, A. F. W. van der Steen¹, F. J. H. Gijsen¹;
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W63 Investigation of the relationship between hemodynamics and ultrastructure of aneurysm walls in human unruptured cerebral aneurysms using CFD and TEM

Y. Tobe¹, T. Sugiura¹, K. Kawamura², T. Yagi¹, Y. Iwabuchi¹, M. Yamanashi¹, K. Takamura¹, M. Umezu¹, Y. Hayashi³, H. Yoshida³, K. Nishitani³, Y. Okada³, S. Kitahara³;
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W64 Examination of Differences between Regional and Local Analysis Methods When Assessing Human Coronary Artery Hemodynamics

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W65 Virtual Evaluation of Aortic Cannulation Strategy Based on Mesh Morphing and Computational Hemodynamics

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W66 Inlet Flow Rates for Image-based Aneurysm CFD Models: Where to Begin?

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¹University of Toronto, ON, CANADA, ²Emory University, Atlanta, GA.

W67 Impact of Development Time on Boundary Conditions for Flow Experiments Using Piston Pumps

R. A. Chaudhury, M. Herrmann, D. H. Frakes, R. J. Adrian;
Arizona State University, Tempe, AZ.

W68 Influence of the Renal Artery Ostium Flow Diverter on Hemodynamics and Atherogenesis

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¹Lafayette College, Easton, PA, ²Laboratory of Cardiac Energetics, National Institutes of Health, Bethesda, MD.

CARDIOVASCULAR SOLIDS

W69 Ex Vivo Determination of the Physiological Axial Pre-stretch of Porcine Aortas

M. F. J. Peters, R. G. P. Lopata, F. N. van de Vosse, M. C. M. Rutten;
Eindhoven University of Technology, Eindhoven, NETHERLANDS.

W70 Effects of Axial Stretch on the Collapse of Arteries under Transmural Pressure

H. C. Han, J. R. Garcia, D. Evans;
University of Texas at San Antonio, TX.

W71 Impact of Arterial Grafting on the Mechanical Properties of Mouse Inferior Vena Cava.

M. J. Collins¹, Y. Ji², G. A. Meininger¹, W. P. Fay², M. A. Hill¹;
¹University of Missouri, Columbia, MO, ²University of Missouri Medical School, Columbia, MO.

W72 Experimental validation of a structurally motivated constitutive model for the arterial wall

S. Polzer¹, T. Gasser², M. Tichy³, K. Novak¹, V. Man¹, P. Skacel¹, J. Bursa¹;
¹Brno University of Technology, Brno, CZECH REPUBLIC, ²Royal Institute of Technology, Stockholm, SWEDEN, ³St. Anne's University Hospital, Brno, CZECH REPUBLIC.

W73 Failure mechanisms during dissection of human ascending aorta

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W74 Effects of Stent Oversizing on Arterial Stresses Based on Finite Element Analyses

C. Gokgol¹, N. Diehm², P. Büchler¹;
¹University of Bern, Bern, SWITZERLAND, ²Inselspital, University Hospital Bern, Bern, SWITZERLAND.

W75 Endovascular shear strain elastography can detect and characterize atherosclerotic plaque severity

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W76 Finite element modeling of mechanical behavior of abdominal aortic aneurysms in xenograft rat model

D. Djellouli¹, A. Bouaricha², N. Zeghib², E. Allaire³, M. Zidi³;
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W77 Including wall thickness in the stress analysis of abdominal aortic aneurysms: the good and the bad

R. Aburashed, G. Martufi, A. Satriano, R. Moore, E. Di Martino;
University of Calgary, AB, CANADA.

W78 Feature-Based 4D Left Ventricular "Integral" Radial Strain for the Identification of Myocardial Scar: Validation in Patients Undergoing Cardiac Resynchronization Therapy

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W79 Estimation of In-Vivo Stresses of the Mitral Valve and Implications for Bioprosthetic Heart Valve Fatigue Response

K. R. Feaver¹, W. Zhang¹, C. Lee¹, H. Tam², M. Lee³, J. R. McGarvey³, N. Kondo³, R. C. Gorman³, J. H. Gorman, III³, N. Vyavahare², M. S. Sacks¹;
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CARTILAGE

W80 First integrated ultrasonic thickness and stress-relaxation testing for non-invasive, automated characterization of cartilage tissue

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W81 Hip finite element modelling with biphasic cartilage - verification, sensitivity testing and validation

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W82 FE simulations of cartilage mechanics and growth around a localized defect-filling metal implant

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W83 High Resolution Mapping of the Elastic Modulus of Mouse Knee Cartilage Matrix

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W84 Fixed charge density within articular cartilage determined by creep indentation test and nonlinear triphasic theory

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¹University of Delaware, Newark, DE, ²Vrije Universiteit Brussel, BELGIUM.

CELLULAR BIOMECHANICS

W85 Fluorescence Lifetime Fluctuations as a New Method for In Situ Measurement of Membrane Bending Modulus

P. J. Butler, H. Muddana, C. Huang, S. Zhang; Penn State University, University Park, PA.

W86 Fluid Flow Induced Migration of Raw264.7 Cells is Regulated by Calcium Signaling Pathways

C. Liu, S. Li, B. Ji, B. Huo; Beijing Institute of Technology, Beijing, CHINA.

W87 Enhanced swimming of African trypanosome in small capillaries and heterogeneous environment

D. Alizadehrad, H. Stark; Institute of Theoretical Physics, Technische Universität Berlin, GERMANY.

W88 Effects of geometric confinement on cell mechanobiology and motility

S. Kollimada, A. Kulkarni, N. Gundiah; Indian Institute of Science, Bangalore, INDIA.

W89 Interaction of Mechanical Stretch and Cell Morphology on Actin Organization and Nuclear Shape

S. Wen, P. Chao; National Taiwan University, Taipei, TAIWAN.

W90 In situ Pericellular Matrix Deformations during Mechanical Compression of Cartilage at 4 weeks following ACL Transection

S. Han¹, S. Turunen², R. Madden¹, R. Korhonen², W. Herzog¹;

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W91 Effects of Local Substrate Stiffness on Cell Sensitivities using Micro-Mechanical Methods

S. Lee, S. Yang; Florida Institute of Technology, Melbourne, FL.

W92 Extracellular Matrix Integrity Affects the Mechanical Behaviour of In-Situ Chondrocytes under Compression

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COLLAGEN STRUCTURE & MECHANICS

W93 In Situ Fibril Stretch In Mouse Supraspinatus Tendons is Location-Dependent

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COMPUTATIONAL BIOMECHANICS

W94 Fracture Healing in Mice Lacking Pten in Osteoblasts: A Micro-Computed Tomography Image-Based Analysis of Bone Strength

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W95 Geometrical Parameters Influencing the Kinematics of a Lower Limb Multi-Body Model

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W96 Experimental and Computational Investigation of Micro-circulation for Cell Separation Devices

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W97 Load Analysis of the Hip Joint for Occupational Activities

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W98 Hand Gesture Classification Using Similarity Measures

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W99 Validation of Nitinol Peripheral Stents Risk of Fatigue Fracture Through in Vitro Cyclic Axial Tests

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W100 Have Biomechanical Models Become too Complex to Influence Clinical Decisions?

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New York University - Abu Dhabi, UNITED ARAB EMIRATES.

W101 Validation of Finite Element Models Simulating the Mechanical Response of the Proximal Femur During Dynamic Drop-Tower Testing

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W102 Estimating Total Knee Replacement Joint Load Ratios from Kinematics

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W103 Inter-operator Dependence of Subject Specific CFD Modeling of Cerebrospinal Fluid Dynamics at the Craniocervical Junction

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W104 Introducing Force Dependant Kinematics in the Anybody Shoulder Model

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W105 In-vitro Validation of Patient-Specific Hemodynamic Simulations in Coronary Aneurysms Caused by Kawasaki Disease

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W106 Extending motor control models of grasp stability in humans: A wrench and perturbation theory based approach

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W107 FSI analysis of a stented rabbit trachea: CT-images, computer simulations and experimental study

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W108 Finite Element Analysis of Human Lower Extremity Subjected to Underbelly Blast Loading

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W109 Improved Sensitivity From Periprosthetic Femoral Fracture Models Using Relaxed Boundary Conditions

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W110 Integration Scheme for Efficient Computation of Continuous Fiber Distributions for Modeling Biological Tissues

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Columbia University, New York, NY.

W111 Effects of walking speed on hip joint forces

B. S. Irmischer, Z. A. Sievert, J. T. Weinhandl;
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W112 Influences of the location of the axis for axial rotation on the lumbar spine during spinal manipulation

W. Park¹, K. Kim¹, J. Yang², Y. Kim¹;
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W113 Effects of tensile stress on degradation of Poly (lactic-co-glycolic acid) stents

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W114 Integrating Histology, Confocal Microscopy and Finite Element Modeling for Predicting Skin Light Reflectance

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University of Auckland, NEW ZEALAND.

W115 Haptic feedback based three dimensional Virtual nasal surgery and Numerical Analysis

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¹Konkuk University, Seoul, REPUBLIC OF KOREA, ²Samsung Seoul Hospital, Seoul, REPUBLIC OF KOREA.

W116 Finite Element Modeling of Congenital Diaphragmatic Hernias

B. J. Ellis, A. J. Merrell, J. A. Weiss, G. Kardon;
University of Utah, Salt Lake City, UT.

W117 FE analyses of transcatheter aortic valve: a biomechanical investigation on the influence of aortic leaflet calcification

A. Dimasi¹, M. Stevanella¹, F. Sturla², E. Votta¹, F. Piatti¹, G. Burriesci³, A. Redaelli¹;
¹Politecnico di Milano, ITALY, ²Università degli Studi di Verona, ITALY, ³University College of London, UNITED KINGDOM.

W118 Investigations on the bending stiffness of nanoworms assembled by DNA-functionalized gold nanoparticles using coarse-grained molecular dynamics method

Y. Zhou, Y. Liu;
Lehigh University, Bethlehem, PA.

W119 Validation of a functional method for joints parameters assessment in gait analysis using subject-specific human modeling

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W120 Isometric Strength of Neck Muscles During Flexion and Extension: Finite Element Study

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W121 Improved Multibody Modeling of Human Knee Meniscus

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¹University of Texas at El Paso, TX, ²University of Missouri, Columbia, MO.

W122 Humans Walking on Shaky and Shaking Surfaces: Application to Oscillating Treadmills and the London Millennium Bridge

V. Joshi, M. Srinivasan;
The Ohio State University, Columbus, OH.

W123 Geometrical multiscale approach of blood flow simulation: Coupling 2-D Navier Stokes ,0-D lumped parameter models

A. Jafari, R. G. Owens;
Montreal University, QC, CANADA.

W124 Validation of an Accelerometer Based Method of Human Gait Analysis

O. Nwana, A. J. van den Bogert;
Cleveland State University, Cleveland, OH.

W125 Identifying Mechanisms of Passive Knee Stability through Subject-Specific Comparison of Model Predictions with Experimentally-Measured Kinematics and Ligament Forces

M. Kia, K. Stone, K. Schafer, D. Green, A. Pearle, T. Wickiewicz, J. Lipman, T. Wright, C. Imhauser;
Hospital for Special Surgery, New York, NY.

COMPUTATIONAL METHODS

W126 Is computational bone assessment comparable with mechanical and micro-CT measures?

D. Sreenivasan¹, M. Watson¹, P. Tu¹, M. Dickinson¹, A. Blaise², R. Das¹, J. Cornish¹, J. Fernandez¹;
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W127 Effects of collateral ligament incisions in relative kinematics of tibia and femur during knee joint model articulation

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W128 Flow Simulation through Arterial Stenosis under Constant Power Input

A. Slotosch, B. Frohnafel;
Institute of Fluid Mechanics, Karlsruhe Institute of Technology, Karlsruhe, GERMANY.

W129 Validation of the high-pass-filter cut-offs for filter-based fatigue index in various muscles

J. Kim¹, S. Park¹, J. Han², Y. Kim¹;
¹Yonsei University, Wonju, REPUBLIC OF KOREA, ²Hansung University, Seoul, REPUBLIC OF KOREA.

W130 Electromyographic Image using Computed Tomography (EMG-CT) Method of Forearm with Multi Surface Electrodes; Muscle Activation in Forearm during Finger Motion

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W131 Evaluation of a Magnesium Based ACL Interference Screw Design to Improve the Screw Drive: A Finite Element Analysis

J. R. Flowers¹, K. E. Kim¹, S. L. Woo¹, M. B. McCullough²;
¹University of Pittsburgh, PA, ²North Carolina A&T State University, Greensboro, NC.

W132 How Combinations of Average Model Parameters Can Yield Non-Average Results

D. Robertson, D. Cook;
New York University Abu Dhabi, New York, NY.

W133 Is there a need for patient stratification in the use of short femoral stems?

An analysis of the primary stability of FURLONG® EVOLUTION femoral stems across a spectrum of patients

M. T. Bah¹, J. Shi¹, M. Browne¹, Y. Suchier², F. Lefebvre², P. Young³, L. King⁴, D. G. Dunlop⁴, M. Boettcher⁵, E. Draper⁵, M. O. Heller¹;
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W134 Impact of the Actin Cytoskeleton on the Mechanical Properties of Cells And Tissues

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W135 Fractal dimension of microtubules: effects of stretch pattern

C. L. N. Oliveira, H. Parameswaran, E. Bartolák-Suki, B. Suki;
Boston University, MA.

DENTAL, ORAL, & MAXILLOFACIAL BIOMECHANICS

W136 Investigating the Effect of Bracket/Archwire Misalignment when Exposed to Torque during Orthodontic Treatment

D. L. Romanyk, P. W. Major, J. P. Carey;
University of Alberta, Edmonton, AB, CANADA.

W137 Improvement of Biting Forces with Implant-Supported Overdentures for the Lower Jaw: Numerical and Clinical Studies

I. Hasan¹, I. Hensch¹, F. Heinemann², C. Bourauel¹;
¹University of Bonn, GERMANY, ²University of Greifswald, GERMANY.

W138 Effects of tongue elevation on the airflow in oral cavity and the sound generation of sibilant /s/

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ERGONOMICS AND HUMAN FACTORS

W139 Effects of Upper Limb Posture and Hand-Rung Friction Condition on a Person's Pull Strength Related to Preventing Falling from a Fixed Ladder

S. Salehi, G. P. Slota, K. Boschorner, N. J. Seo;
University of Wisconsin Milwaukee, WI.

W140 Kinematical analysis of the trunk, upper limbs and fingers during minimal access surgery when using an armrest

M. Jafri, S. Brown, G. Arnold, R. Abboud, W. Wang;
Dundee University, UNITED KINGDOM.

W141 Estimating 3D ground reaction forces and L5/S1 moments during asymmetric trunk bending using an inertial/magnetic sensor suit

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¹MOVE Research Institute Amsterdam, NETHERLANDS,
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W142 Influence of Stair Height and Step on Toe Vertical Displacement Variability

T. Ajisafe, J. Wu;
Georgia State University, Atlanta, GA.

W143 Identifying Compensation and Recovery Strategies for Fatigue in the Shoulder Complex During Repetitive Work.

A. C. McDonald, C. T. F. Tse, P. J. Keir;
McMaster University, Hamilton, ON, CANADA.

W144 Effects of Knee Exoskeleton Mass, Joint Design, and Stiffness Level on the Metabolic Cost of Gait

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W145 Virtual coherences of cross-axis responses in whole-body vibration

Y. Huang;
University of Portsmouth, UNITED KINGDOM.

W146 Electromyographic and Physiological Responses during Load Carriage in Graded Uphill Walking

S. Paul, D. Bhattacharyya, T. Chatterjee, M. Pal, D. Majumdar;
Defence Institute of Physiology and Allied Sciences, DRDO, Delhi, INDIA.

W147 Effects of Moderately Heavy Military Load Carriage on the Trunk Angle, Temporal Spatial Parameters and Ground Reaction Forces during Level Walking

A. Pramanik, D. Majumdar, M. Pal, B. Chowdhury, D. Majumdar;
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W148 Gait Differences Between Inside a Laboratory and Outdoors

J. M. Scanlon, III, M. A. Nussbaum, M. L. Madigan;
Virginia Tech, Blacksburg, VA.

W149 Integration of Human-User Behavior Models in Controlled System for Improvement of Assistive Devices Design

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W150 Influence of Input Hardware and Work Surface Angle on Upper Limb Kinematics

D. C. Kingston, M. F. Riddell, C. D. McKinnon, K. M. Gallagher, J. P. Callaghan;
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W151 Effects of Sloped Surfaces on the Postural Control in Standing Workers after Prolong Standing

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W152 Evaluation of an Ergonomic Laparoscopic Handle Design and Upper Extremity Musculoskeletal Disorder Risk Factors

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W153 Effects of Core Muscle Activation on Injury Risks in Mining Lifting for Healthy Population

R. Haddas, J. Yang;
Texas Tech University, Lubbock, TX.

W154 Enhanced construction technology for ergonomic clothing: a new approximation of the body and system for garment construction.

R. Lindqvist, C. Thornquist;
University of Borås, SWEDEN.

W155 Examining the Effects of Experience and Habituation on Lower Limb Integrated Surface Electromyography While Standing in Simulated Maritime Environments.

C. A. Duncan¹, W. E. McIlroy², A. Mansfield³, J. M. Byrne¹;
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FLUID-SOLID INTERACTIONS

W156 Incorporating MRI-Measured Arterial Wall Motion in Numerical Simulations

J. Lantz, T. Ebbers;
Linköping University, SWEDEN.

W157 Haemodynamics Simulation of Cerebral Aneurysms

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GENERAL ANIMAL LOCOMOTION

W158 Illuminating the evolution of bipedalism in modern birds via synthesis of experimental and computer simulation methods

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W159 In vivo gait analysis during bone transport

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W160 Grip or Slip on Smooth Surfaces: Froghoppers Vary in Tarsal Morphology and Jump Performance

H. H. Goetzke¹, C. J. Clemente², W. Federle¹;
¹University of Cambridge, UNITED KINGDOM, ²University of Queensland, Brisbane, AUSTRALIA.

W161 Energetics and Optimality in Curvilinear Locomotion.

G. Brown, M. Srinivasan;
The Ohio State University, Columbus, OH.

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W162 Influence of effective hip mass and stiffness on the strength of the head-neck taper junction

A. Krull, M. Vollmer, M. M. Morlock, N. E. Bishop;
Hamburg University of Technology, Hamburg, GERMANY.

W163 Influence of Kinematic Analysis, Joint Definition and Scaling on Lower Limb Muscle Moment Arm Estimates in Children with Cerebral Palsy

H. Kainz, L. Modenese, C. P. Carty, D. J. Saxby, D. G. Lloyd;
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GROWTH AND REMODELING

W164 Intrauterine Endotoxin Causes Persistent Increases in Pulmonary Artery Stiffness and Remodeling in Infant Rats

R. B. Dodson, E. Mandell, G. Seedorf, S. H. Abman;
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W165 Etiology of human hip dysplasia: a finite element study.

C. A. Narváez-Tovar¹, D. A. Garzón-Alvarado²;
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W166 In vivo Tracking of Cortical Bone Remodeling - Feasibility of Synchrotron Phase Contrast Micro-CT for Longitudinal Studies in the Rat.

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HEART AND HEART VALVES

W167 Imaging-based Wave Intensity Analysis Providing Insight into Congenital Heart Defects: A Single Center Experience

G. Biglino¹, H. Ntsinjana¹, J. A. Steeden¹, P. Ciliberti², A. Giardini², T. Hsia², K. H. Parker³, A. M. Taylor¹, S. Schievano¹;
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W168 Investigation of physiologic flow-structure evolution in mechanical valve closure

J. Mousel, V. Govindarajan, H. S. Udaykumar, K. B. Chandran;
The University of Iowa, Iowa City, IA.

W169 Human left ventricular modelling using an immersed boundary-finite element method based on in-vivo CMR

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W170 Image-based finite element/immersed boundary fluid-structure interaction model of the human mitral valve

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W171 Frequency-domain and time-domain analysis of pressure-flow data in patients with pulmonary arterial hypertension performing incremental exercise

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W172 Hydrodynamic Assessment of New Polymeric Heart Valves Prototypes under Continuous and Pulsatile Flow Rate

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W173 In Vitro Validation of an Aortic Valve Remover for Trans Apical Aortic Valve Replacement

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W174 In-plane Mechanical Properties of Porcine Tricuspid Valve Anterior Leaflet

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IMPLANTS

W175 Finite Element Analysis of the Placement of a Fixation Lag Screw in Different Intertrochanteric Hip Fracture Angles

A. C. T. Choh, D. Y. R. Chong;
National University of Singapore, SINGAPORE.

W176 Influences of textured surfaces on the wear properties of load bearings in artificial joints

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W177 How Does the Articular Contact Kinematics of the Knee change Before and After Cruciate Retaining Total Knee Arthroplasty?

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W178 How much Hip Extension does Really Occur during Gait in Patients with Total Hip Arthroplasty?

T. Tsai, J. Li, D. Scarborough, H. Rubash, G. Li, Y. Kwon;
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W179 Influence of the Cup Support Conditions on the Contact Profile of a Hip Prosthesis

G. A. Mulas, S. Mantovani, A. Baldini, A. Strozzi, F. Catani;
University of Modena and Reggio Emilia, Modena, ITALY.

W180 In vivo kinematics: How Total Hip Arthroplasty affects hip joint six degrees of freedom during the stair up activity.

D. Dimitriou, T. Tsai, G. Li, Y. Kwon;
MGH, Cambridge, MA.

INJURY BIOMECHANICS

W181 Linear and rotational acceleration characterization of traumatic brain injury from falls

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W182 Energy Absorption Mechanisms of Four Common Mountain Biking Helmets

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W183 Knee Kinematics and Muscular Activity Adaptations in ACL-Reconstructed (ACLR) Handball Players during Landing

F. Yousefnadarzi, M. Damavandi;
Hakim Sabzevari University, Sabzevar, ISLAMIC REPUBLIC OF IRAN.

W184 FMVSS No. 218 Compliance Testing: Lateral Impact Evaluation of Acceleration and Brain Injury

N. Merrier, S. D. Shimada;
Biomechanical Consultants of California, Davis, CA.

W185 Gender comparison of muscle activation patterns in pre- or early pubescent soccer players while performing unanticipated cutting maneuvers: Relevance to non-contact ACL injuries.

M. Del Bel, A. Fairfax, L. Stebeleski, S. Landry;
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W186 Video-Based Motion Capture to Calculate 3D Knee Kinematics and Kinetics during Landing

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W187 Lateral falls on the hip: the influence of body mass index on impact dynamics

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W188 Endothelial glycocalyx degradation in severely injured trauma patients

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W189 Evaluation of Acute Biomechanical and Neuromuscular Effects of Prophylactic Knee Brace Use Following Exercise.

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W190 Effects of Wrist Posture and Fingertip Force on Median Nerve Blood Flow Velocity

K. E. Wilson, J. Tat, P. J. Keir;
McMaster University, Hamilton, ON, CANADA.

W191 Gender Differences in Frontal Plane Gait Biomechanics During Declined Walking with a Heavy Load.

R. Krupenevich, J. Ridings, R. Tatarski, P. Rider, Z. J. Domire, P. DeVita;
East Carolina University, Greenville, NC.

W192 Evaluation of Climbing Helmets

D. A. Dainty, N. Yang;
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W193 Infrapatellar Straps Change Gait Kinematics In People Without Knee Pain

J. L. Lanovaz, T. J. Schatz, Q. S. Paterson, D. S. Kobylak;
University of Saskatchewan, Saskatoon, SK, CANADA.

W194 Evaluation of Stretch-injured Axon in Brain Neuronal Cell by Observation of β -Amyloid Precursor Protein

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W195 In vivo assessment of the mechanical properties of the child cortical bone using quantitative computed tomography

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W196 Female athletes with ACL reconstruction demonstrate similar muscle synergy patterns to healthy athletes during a drop vertical jump task

P. Malloy, C. M. Meinerz, A. M. Morgan, C. F. Geiser, K. Kipp;
Marquette University, Milwaukee, WI.

W197 Hip and knee sagittal plane angular displacements during jump landing are decreased in those with chronic patellar tendinopathy.

A. B. Rosen, J. P. Ko, K. J. Simpson, C. N. Brown Crowell;
University of Georgia, Athens, GA.

W198 Head Injury Risk in Oblique Frontal Motor Vehicle Crashes

R. Chen, H. C. Gabler;
Virginia Tech, Blacksburg, VA.

W199 Injury Characteristics and Contact Sources for Motorcycle Occupants in Single Vehicle Collisions

K. D. Kusano, H. C. Gabler;
Virginia Tech, Blacksburg, VA.

W200 Validation of Wearable Sensors for Measuring Football Head Impacts.

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W201 Evaluation of head loading and injury risk during moderately severe rear-end collisions

S. A. Rundell, A. Guiang;
Armstrong Forensic Engineers, Ann Arbor, MI.

W202 Evaluation of Crash Injury Risk Using the Vehicle Pulse Index and Event Data Recorders

A. H. Tsoi, H. C. Gabler;
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W203 Kinematics of Transhumeral Residual Bone and Prosthetic Socket Designs

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W204 Finite Element Investigation of the Upper Cervical Spine Injury Mechanism Due to Anterior-Posterior Impact Shear Loading.

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¹University of Alberta, Edmonton, AB, CANADA, ²Royal Military College, Kingston, ON, CANADA.

W205 Evaluating a Blast Headform Response by Finite Element Modeling

L. Zhang, R. Makwana, S. Sharma;
Wayne State University, Detroit, MI.

INTERNATIONAL SOCIETY OF BIOMECHANICS

W206 Knee Biomechanics on First Step of Stair Ascent is different from Second or Third Step

S. Zhang, T. Standifird, M. Arwood;
The University of Tennessee, Knoxville, TN.

W207 Evaluation of a Musculoskeletal Arm Model for Automobile Drivers using Electromyography

N. Mehrabi, J. McPhee;
University of Waterloo, ON, CANADA.

JOINTS

W208 Knee function continuously evaluated through the range of flexion: Implications for Clinical Exams

F. V. Arilla, K. M. Bell, A. Rahnama Azar, F. H. Fu, V. Musahl, R. E. Debski;
University of Pittsburgh, PA.

W209 Estimation of Contact Stress on Joint Surface Using the Axisymmetric Mechanical Model

M. Sakamoto, K. Kobayashi;
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W210 Estimation of knee ligaments origin and insertion (OIs) from CT images

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W211 Finite element analysis of ligament strains and contact pressure during physical tests for the diagnosis of sacroiliac joint pain

Y. Kim, Z. Yao, K. Kim, W. Park;
Kyung Hee Univ., Yongin, REPUBLIC OF KOREA.

W212 Influence of posterolateral corner structures in knee to the translational and rotational joint stabilities.

T. Purevsuren, K. Kim, Y. Kim;
Kyung Hee University, Yongin, REPUBLIC OF KOREA.

W213 Validation of Image Registration Technique for In Vivo Evaluation of Tibiofemoral Articular Contact

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LIGAMENT & TENDON

W214 Elastin Reduction Impairs the Mechanical Properties of Supraspinatus Tendon

Q. Wu, I. Stoilov, R. P. Mecham, S. P. Lake;
Washington University in St. Louis, MO.

W215 Error evaluation of the tendon excursion for determining the Achilles tendon moment arm by comparing the three-dimensional value

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W216 Length-dependent Achilles Tendon Modulus of Elasticity Estimation using Passive Dynamometry and Ultrasound Imaging

L. F. Oliveira, C. C. Peixinho, G. A. Silva, L. L. Menegaldo;
Universidade Federal do Rio de Janeiro, BRAZIL.

W217 Influence of ligament pre-strain on the knee contact forces and contact area - a sensitivity study

W. J. Zevenbergen, N. Famaey, J. Vander Sloten, I. Jonkers;
KU Leuven, Leuven, BELGIUM.

MECHANOBIOLOGY, RESPONSES TO MECHANICAL STRESS, & MECHANOTRANSDUCTION

W218 Insights on Alveolar Epithelium Function and Permeability Using Biomimetic Microfluidic Models of Distal Airways

J. Tenenbaum-Katan¹, S. K. Mahto¹, L. Minai¹, R. Fishler¹, B. Rothen-Rutishauser², J. Sznitman¹;
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W219 Frequency Response of Stem Cells to Gravity Loads

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W220 Evidence of hyperextensibility in α motoneurons of hemispheric stroke survivors

X. Hu, N. L. Suresh, M. Chardon, W. Z. Rymer;
Rehabilitation Institute of Chicago, IL.

W221 Extended Duration of torsional Loading reduced the survival of Nucleus Pulposus Cells of the Intervertebral Disc in a bovine Organ Culture Model

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W222 In Situ Expression of Primary Cilia Decreases During Mechanical Stimulation

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W223 Hydrophobicity impairs Mesenchymal Stem Cell Sensitivity to the stiffness on PDMS covalently functionalized with collagen-I

T. Razafiarison, J. G. Snedeker;
Swiss Federal Institute of Technology in Zurich (ETHZ) - Institute for Biomechanics, Zürich, SWITZERLAND.

W224 Verification of an Airflow-Induced Bio-Mimetic Bioreactor as a Platform for Studying Vocal Fold Mechanobiology and Tissue Engineering

N. Latifi¹, H. K. Heris¹, S. Sheibani¹, S. Kazemirad¹, N. Y. K. Li², L. Mongeau¹;
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W225 Effects of mechanical stretch on intracellular Ca²⁺ concentrations in human lung fibroblasts

N. Murata, S. Ito, Y. Hasegawa;
Nagoya University Graduate School of Medicine, JAPAN.

W226 Frequency-dependent effect of cyclic pressure on osteoblast differentiation of mesenchymal stem cells in 3D culture

B. H. McGowan, J. Nagatomi;
Clemson University, Clemson, SC.

W227 How is the clavicle growth? A mathematical Explanation

D. A. Garzon¹, A. Ramirez²;
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W228 LINCed Nucleus Enables sensing of High Frequency Vibrations but not Strain

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¹University of North Carolina, Chapel Hill, NC, ²Stony Brook University, Stony Brook, NY.

W229 Local neuronal loading modulates pERK expression in a neuron-collagen gel construct simulating facet capsule injury

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¹University of Pennsylvania, Philadelphia, PA, ²University of Minnesota, Minneapolis, MN.

W230 Validation of CFD simulated velocity profiles and wall shear stress in an orbiting culture dish with analytical solutions

A. Chakraborty, J. M. D. Thomas, R. Berson, M. Sharp;
University of Louisville, KY.

W231 Effects of stiffness, growth factors and long-term cyclic stretch on valvular interstitial cell traction force

H. Cirka, M. Shojaei, Q. Wen, K. L. Billiar;
Worcester Polytechnic Institute, Worcester, MA.

W232 Hydrostatic pressure induces endothelial cell cycle progression via ERK1/2-cyclin D1 pathway

D. Yoshino, K. Sato;
Tohoku University, Sendai, JAPAN.

W233 Flow-Induced Calcium Changes Within the Primary Cilium and Cytosol are Linked

K. L. Lee, M. D. Guevarra, C. R. Jacobs;
Columbia University, New York, NY.

MEDICAL DEVICES

W234 Implanted Engineering Mechanisms Improve Finger Movement Post Tendon-Transfer Surgery for High Median-Ulnar Palsy

K. L. Mardula¹, R. Balasubramanian¹, C. H. Allan²;
¹Oregon State University, Corvallis, OR, ²University of Washington, Seattle, WA.

W235 Implanted Adaptive Mechanism Improves Grasp Force Ability After Tendon-Transfer Surgery: A Cadaver-Based Study

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W236 Implanted Engineering Mechanism in Tendon-Transfer Surgery Improves Power-Grasping Capability

S. Chatterjee, K. L. Mardula, R. Balasubramanian;
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W237 Interaction of Trabecular Metal Coupled Tibial Cones with Tibial Baseplates - A Fretting Corrosion Evaluation

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W238 Instrumented Leggings for Knee Functional Monitoring

E. Papi, A. Khajuria, J. Bergmann, A. McGregor;
Imperial College London, UNITED KINGDOM.

W239 Effects of Coronal Plane Prosthetic Foot Stiffness on Turning Kinematics and Kinetics in Transtibial Amputees

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W240 Validation of a Clinical Aneurysm Flow Visualization Tool with Stereo-PIV

C. D. Martensen, N. Varble, J. Xiang, H. Meng;
University at Buffalo, NY.

W241 Evaluation of Flow-Diverter Assisted Endovascular Coiling using Virtual Deployment and Computational Fluid Dynamics in Patient-Specific Aneurysms.

R. Damiano, J. Xiang, E. Levy, H. Meng;
University at Buffalo, The State University of New York, Buffalo, NY.

W242 Impact of Heater Location and Ambient Conditions on Fusion Strength during Direct Heat Fusion

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W243 ISO 12189 standard for the preclinical evaluation of posterior spinal fixators: A parametric finite element analysis

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W244 Evaluation of a Novel Aortic Valve Prosthesis: Integration of Clinical Data with Experimental and Computational Tools

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W245 Variability of Taper Pull-Off Resistance in Impacted Versus Pressed Samples

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Deputy Synthes, Warsaw, IN.

W246 Improved Socket Performance And Fit For Transfemoral Amputees

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¹Providence VA Medical Center, Providence, RI, ²Liberating Technologies, Holliston, MA, ³QinetiQ North America Technology Solutions Groups, Waltham, MA.

W247 How to manage the variations of biomechanical characteristics when modelling a human joint

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Université de Bordeaux, Talence, FRANCE.

W248 Experimental Evaluation of Packing Density and Coil Uniformity in Aneurysm Embolization

J. Chueh¹, S. Vedantham¹, S. L. Carniato², C. Bzura¹, S. Coffin¹, A. K. Wakhloo¹, A. S. Puri³, A. A. Bogdanov¹, M. J. Gounis¹;
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MOLECULAR ENGINEERING & IMAGING

W249 Engineering Three-Dimensional Cell/Biomaterial Microarrays for Potential High-Throughput Screening Applications

G. Huang, J. Liu, K. Ling, D. Liu, T. Lu, F. Xu;
Xi'an Jiaotong University, Xi'an, CHINA.

W250 In silico design and experimental validation of Self-Assembled Oligopeptides (SAMs) for specific cell adhesion: preliminary study

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W251 Mechanotransduction of a Membrane Substrate on Functional β -cell Expansion

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W252 Massively Parallel Near-Equilibrium Single-Molecule Force Spectroscopy via Particle Tracking

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W253 Inter-Trial Dynamics in a Virtual Shuffleboard Experiment with Asymmetric Error

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MOTOR CONTROL

W254 How Does Ipsilateral Limb Push Off Affect Contralateral Limb Muscle Activation During Human Walking?

T. L. Norman, Y. Chang;

Georgia Institute of Technology, Atlanta, GA.

W255 Kinesiotape Application does not Improve Shoulder Joint Position Sense

L. M. Aarseth, D. N. Suprak, G. R. Chalmers, L. Lyon;
Western Washington University, Bellingham, WA.

W256 Evidence for Control of Center of Mass During Walking Turns

J. Armour Smith, K. Kulig;

University of Southern California, Los Angeles, CA.

W257 Estimating Energetic Cost during Non-steady State Walking

J. Selinger, M. Donelan;

Simon Fraser University, Burnaby, BC, CANADA.

W258 Frequency Analysis of Dystonic and Normal Muscle Electromyography

S. Go, K. Coleman Wood, K. Kaufman;

Mayo Clinic, Rochester, MN.

W259 Lateral stability at first step lift-off differentiates multiple from single step recovery responses to lateral perturbations of standing balance in older adults

M. Fujimoto¹, W. Bair¹, M. Prettyman¹, B. Beamer², M. Rogers¹;

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W260 Frequency domain analysis of ground reaction force in preadolescents with and without Down syndrome

J. Wu, M. Beerse, T. Ajisafe;

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W261 Evaluation of power-to-weight ratio of one-legged model utilizing pneumatic artificial muscle

J. Qiu, Z. Lin, Y. Change, W. Hsu, P. Lin, W. Shih;

National Taiwan University, Taipei, TAIWAN.

W262 Inter-joint Coordination of Overground versus Treadmill Walking in Young Adults

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W263 Hand-Wrist Action: Control with Referent Configurations Implemented by Complex Muscle Anatomy

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W264 Frequency Response of a Biological Muscle Tendon Unit

B. D. Robertson, G. S. Sawicki;

UNC Chapel Hill and NC State University, Raleigh, NC.

W265 Inter-segmental dynamics shape joint coordination during catching in typically developing children but not in children with Developmental Coordination Disorder

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W266 Evaluating the Utility of Motor Primitives for Simplifying Neural Control of Multidirectional Human Gait

K. E. Zelik¹, V. La Scaleia², Y. P. Ivanenko¹, F. Lacquaniti²;

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W267 Fractal Dynamics of Ground Reaction Force Time Series During a Repetitive Stepping-in-Place

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W268 Influence of decreased toe grasp strength on dynamic balance

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¹Hiroshima University, JAPAN, ²Kurashiki Heisei Hospital, Okayama, JAPAN.

W269 Examining the role of attention in steering using dual task paradigm.

V. Ambati¹, R. Reed-Jones²;

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W270 Evidence Refuting the Common Input Notion for Synchronization of Motor Unit Firings

J. C. Kline, C. J. De Luca;

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W271 Limit cycles in standing human posture are an indicator of neuromuscular impairment

J. R. Chagdes¹, S. Rietdyk¹, J. M. Haddad¹, H. N. Zelaznik¹, A. Raman¹, L. Denomme², M. E. Cinelli²;

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W272 Effects of Aging on Internal Forces During Static Prehension.

S. Solnik, V. M. Zatsiorsky, M. L. Latash;

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W273 Influence of visual cues on hand control ability in patients with Parkinson's disease and essential tremor

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W274 Effects of Resistance Training on Grasping Control in Humans

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W275 Identification of Feedback Control in the Inverted Pendulum System during Standing

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Cleveland State University, Cleveland, OH.

W276 Leg Muscle Activation Symmetry During Sit-to-Stand under Different Surface Stiffness

V. Zaika, S. Stecyk, J. Romack, K. Vrongistinos;

CSU Northridge, CA.

W277 Evaluating Post Stroke Margins of Stability in a Step Width Modification Task

M. E. Reissman, Y. Y. Dhaher;

Northwestern University, Chicago, IL.

W278 Endpoint force directions during arm-crank exercise at different crank loads

K. Sasaki;

Boise State University, Boise, ID.

MULTI-SCALE MODELING

W279 How robust are predictions of lesion size using numerical models of microwave ablation?

S. K. Hall, E. H. Ooi, S. J. Payne;

University of Oxford, Oxford, UNITED KINGDOM.

W280 Finite Element Model of the Mouse Cochlea Coupled to a Beam Model of the Organ of Corti

J. A. Soons¹, C. R. Steele², S. Puria²;

¹University of Antwerp, BELGIUM, ²Stanford University, CA.

W281 Kinetic modelling of chemomechanical behavior of ionic gels

S. Liu¹, P. Wang¹, G. Huang², W. Lin², J. Zhou¹, T. J. Lu¹, F. Xu²;

¹State Key Laboratory for Strength and Vibration of Mechanical Structures & Bioinspired Engineering and Biomechanics Center (BEBC), and ²Bioinspired Engineering and Biomechanics Center (BEBC) & MOE Key Laboratory of Biomedical Information Engineering, Xi'an Jiaotong University, Xi'an, CHINA.

W282 Influence of muscle activation and mucosal material property on esophageal transport: a study based on a fully-resolved computational model

W. Kou, J. E. Pandolfino, P. J. Kahrilas, N. A. Patankar;

Northwestern University, Evanston, IL.

W283 Image-Based Modeling of Tendon-to-Bone Attachment

J. Y. Liu¹, A. Black¹, A. G. Schwartz¹, V. Birman², S.

Thomopoulos¹, G. Genin¹;

¹Washington University in St. Louis, MO, ²MST, Saint Louis, MO.

W284 Vertex dynamics simulation of multicellular morphodynamics with visco-elastic-plastic large deformation

S. Okuda¹, Y. Inoue², M. Eiraku¹, T. Adachi², Y. Sasai¹;

¹Riken Center for Developmental Biology, Kobe, JAPAN,

²Institute for Frontier Medical Sciences, Kyoto University,

Kyoto, JAPAN.

W285 Finite Element Modeling of Cell Specific Cytoskeletal Mechanics and Focal Adhesion Forces

A. K. Schroer, M. I. Miga, W. Merryman;

Vanderbilt University, Nashville, TN.

MUSCLE & MOTION CONTROL

W286 Is there abnormal intermuscular force transmission in ankle contracture after stroke?

J. Diong¹, R. D. Herbert²;

¹Sydney Medical School, The University of Sydney, Lidcombe NSW, AUSTRALIA, ²Neuroscience Research Australia, Randwick NSW, AUSTRALIA.

W287 Increased number of perimysial collagen cables corresponds with increased stiffness in fibrotic skeletal muscle

A. Gillies, R. Lieber;

University of California San Diego, La Jolla, CA.

W288 Inverse Finite Element Analysis for Poroelastic Material Properties of Excised Skeletal Muscle

B. B. Wheatley¹, D. A. Morrow², G. M. Odegard³, K. R. Kaufman², T. L. Haut Donahue¹;

¹Colorado State University, Fort Collins, CO, ²Mayo Clinic, Rochester, MN, ³Michigan Technological University, Houghton, MI.

W289 Evaluation of Intramuscular Interstitial Fluid Flow Using Fluorescent Microspheres

L. Q. Evertz, S. M. Greising, D. A. Morrow, G. C. Sieck, K. R. Kaufman;

Mayo Clinic, Rochester, MN.

W290 Knee Extension Co-activation Index Reliability and Variability during Isometric Contractions Depends on the Combination of Muscle Segments Analyzed.

D. Katsavelis, N. B. Huben, A. J. Threlkeld;

Creighton University, Omaha, NE.

W291 Knee Joint Loading during Golf Swing, Cutting, and Drop-landing

J. Estes, K. Kmiecik, J. Park, R. Pruet, H. Wang;

Ball State University, Muncie, IN.

W292 Increased Achilles Tendon Compliance may Reduce Push-Off Power During Walking in Old Adults

M. I. V. Orsell¹, J. R. Franz², D. Thelen²;

¹University of São Paulo, BRAZIL, ²University of Wisconsin, Madison, WI.

W293 HAMSTRING SHEAR MODULUS BETWEEN ARCHITECTURALLY DIFFERENT MUSCLES

K. D. Seymore, J. E. Hibbert, Z. J. Domire, A. S. Kulas;

East Carolina University, Greenville, NC.

W294 A 3D finite element model to study the influence of muscle structure on performance with aging

H. Rahemi;

Simon Fraser University, Burnaby, BC, CANADA.

W295 Is the Neuromuscular Response During Seated and Standing Flexion Similar in the Lumbar and Thoracic Erector Spinae?

B. C. Nairn, C. Ang, A. Schinkel-Ivy, J. D. M. Drake;

York University, Toronto, ON, CANADA.

MUSCLO-SKELETAL BIOMECHANICS

W296 Functional Relevance of Muscle Architecture and Tendon Mechanical Properties for the Elderly

L. Stenroth¹, E. Sillanpää², J. S. McPhee³, D. A. Jones³, M. V. Narici⁵, H. Gapeyeva⁶, M. Pääsuke⁶, Y. Barnouin⁷, J. Hogrel⁷, G. Butler-Browne⁷, A. Bijlsma⁸, C. G. M. Meskers⁹, A. B. Maier⁹, T. Finni¹, S. Sipilä²;

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⁶Institute of Exercise Biology and Physiotherapy, University of Tartu, ESTONIA, ⁷Institute of Myology, GH Pitié-Salpêtrière, Paris, FRANCE, ⁸Department of Internal Medicine, Groene Hart Hospital, Gouda, NETHERLANDS,

⁹Department of Internal Medicine, Section of Gerontology and Geriatrics, VU University Medical Center, Amsterdam, NETHERLANDS.

W297 EMG Characteristics of Lower-Leg Musculature during Transitions between Locomotive States

B. H. Nakamura, D. Joshi, M. E. Hahn;

University of Oregon, Eugene, OR.

W298 Error Analysis of Cine Phase Contrast MRI Velocity Measurements Used for Strain Calculation

E. Jensen, D. Morrow, J. Felmlee, K. Kaufman;

Mayo Clinic, Rochester, MN.

W299 Joint contact forces while walking with vest-borne loads up to 55 kg

T. R. Derrick¹, R. E. Fellin², J. F. Seay²;

¹Iowa State University, Ames, IA, ²U.S. Army Research Institute of Environmental Medicine, Natick, MA.

W300 Experimental validation of an artificially activated muscle model

F. Romero¹, F. J. Alonso¹, P. L. Melo², M. T. Silva², D. Torres¹, U. Luján³;

¹University of Extremadura, Badajoz, SPAIN,

²IDMEC/Instituto Superior Técnico, Technical University of Lisbon, PORTUGAL, ³University of La Coruña, Ferrol, SPAIN.

W301 In-vivo Vastus lateralis Force-velocity Relationship at the Fascicle and Muscle Tendon Unit Level

H. D. Fontana¹, H. Roesler², W. Herzog³;
¹University of Calgary / State University of Santa Catarina, Florianópolis, BRAZIL, ²State University of Santa Catarina, Florianópolis, BRAZIL, ³University of Calgary, AB, CANADA.

W302 Joint-Space Metabolic Energy Expenditure Model with Cocontraction Bounds

D. Roberts¹, H. Hillstrom², J. H. Kim¹;
¹New York University, Brooklyn, NY, ²Hospital for Special Surgery, New York, NY.

W303 Finite Helical Axis and Muscle Power in the Squat and Swing

E. L. Bishop, G. Kuntze, J. L. Ronsky;
University of Calgary, AB, CANADA.

W304 Incorporating dynamic stereo-radiographic motion data improves patient-specific musculoskeletal models

L. Zheng¹, K. Li², S. Shetye³, C. D. Harner¹, X. Zhang¹;
¹University of Pittsburgh, PA, ²Rutgers, The State University of New Jersey, Piscataway, NJ, ³Colorado State University, Fort Collins, CO.

W305 Increased residual force enhancement in aged rat skeletal muscle fibers: possible mechanism for the preservation of eccentric strength in older adults

E. Lee¹, J. Lim²;
¹Korea Institute of Machinery & Materials, Daegu, REPUBLIC OF KOREA, ²Seoul National University Bundang Hospital, Sunnam, REPUBLIC OF KOREA.

W306 Hindlimb kinetics of upslope, downslope, and level walking in the cat with a trans-tibial osseointegrated prosthesis

J. Jarrell¹, B. Farrell¹, R. Kistenburg¹, J. F. Dalton², M. Pitkin³, B. Prilutsky¹;
¹Georgia Tech, Atlanta, GA, ²Georgia Hand, Shoulder, and Elbow, Atlanta, GA, ³Tufts University School of Medicine, Boston, MA.

W307 Evaluation of Hill and Huxley muscle models using experimental data obtained from rat m. Soleus in situ

K. K. Lemaire¹, R. T. Jaspers², G. C. Baan², A. J. van Soest¹;
¹MOVE Research Institute, Amsterdam, NETHERLANDS, ²Laboratory for Myology, MOVE Research Institute, Amsterdam, NETHERLANDS.

W308 Identifying Knee Muscle Synergies during a Force Control Task

M. Sharif Shourijeh, D. L. Benoit;
University of Ottawa, ON, CANADA.

W309 Hip Fracture Prediction using Finite Element Modeling and Machine Learning

P. Jiang, S. Missoum, Z. Chen;
University of Arizona, Tucson, AZ.

W310 Influence of different mechanical properties of running shoes on performance of highly trained runners under aerobic and anaerobic conditions

K. Karger, Jr., T. Milani, Sr.;
Technische Universität Chemnitz, GERMANY.

W311 Effects of a Six-Week Slackline Training on Dynamic Balance

A. M. C. Germano, D. Schmidt, T. L. Milani;
Technische Universität Chemnitz, GERMANY.

W312 Larger flexion angle of spine and hip during sit-to-stand in healthy volunteers wearing robotic suit for lower limb

M. Tojima¹, Y. Nakahara², H. Inokuchi³, Y. Ishikawa³, Y. Kumono², N. Ogata², Y. Sankai⁴, N. Haga³;
¹The University of Tokyo, Waseda University, Tokyo, JAPAN, ²The University of Tokyo Hospital, JAPAN, ³The University of Tokyo, JAPAN, ⁴The University of Tsukuba, JAPAN.

W313 Hydro-Chemo-Mechanical Behaviour of Annulus Fibrosus Tissue

A. Baldit¹, D. Ambard², F. Cherblanc², P. Royer²;
¹University of Sheffield, UNITED KINGDOM, ²University of Montpellier 2, FRANCE.

W314 kinematics and particle deposition in acinar region during lung respiration

T. Sera, M¹, L. Xiao², K. Uesugi³, N. Yagi³, S. Wada²;
¹Kyushu University, Fukuoka, JAPAN, ²Osaka University, JAPAN, ³Japan synchrotron radiation research institute, Sayo, JAPAN.

W315 Effects of Tai-Chi Exercise on Sit-to-Stand in the Elderly

C. C. T. Wu;
National Taiwan Normal University, New Taipei City, TAIWAN.

W316 Effects of Age and Obesity on the Likelihood of Tripping During Anterior Load Carriage

C. Rossi Garman, J. M. Scanlon, M. A. Nussbaum, M. L. Madigan;
Virginia Tech, Blacksburg, VA.

W317 Internal Friction Forces in an Implantable, Limb Lengthening Device.

D. Farley, H. Ploeg, M. Zinn;
University of Wisconsin-Madison, WI.

W318 Inelastic modeling of facial skin tissue: A finite element formulation and material parameter identification

J. Weickenmeier¹, M. Jabareen²;

¹Department of Mechanical and Process Engineering, Zurich, SWITZERLAND, ²Technion - Israel Institute of Technology, Haifa, ISRAEL.

W319 Osmotic Pressure-driven Tensile Stresses in Tendon Collagen

A. Masic¹, L. Bertinetti¹, R. Schuetz¹, S. Chang², H. Metzger¹, M. J. Buehler², P. Fratzl¹;

¹Dept. of Biomaterials, Max Planck Institute for Colloids and Interfaces, Potsdam, GERMANY, ²Laboratory for Atomistic & Molecular Mechanics, MIT, Cambridge, MA.

OCCULAR & EYE BIOMECHANICS

W320 Influence of the biomechanics and corneal pre-stress on the evaluated intraocular pressure

J. Escuer, M. Ariza, J. Rodriguez, B. Calvo;
University of Zaragoza, SPAIN.

W321 In-vivo characterization of a poly-lactic acid (PLA) and chitosan (CS) based methotrexate (MTX) sustained release micro-implant in normal rabbit eyes: A pilot study.

S. Manna¹, M. F. Al-Rjoub¹, A. M. Donnell², J. A. Landero², J. J. Augsburg³, Z. M. Correa³, R. K. Banerjee¹;
Departments of ¹Mechanical & Materials Engineering, ²Chemistry, and ³Ophthalmology, University of Cincinnati, OH,

ORTHOPAEDIC BIOMECHANICS

W322 Implant Augmentation in the treatment of osteoporotic distal femur fractures - Biomechanical investigations.

D. Wähnert¹, L. Fliri-Hofmann², M. Schulze¹, D. Gehweiler¹, M. Windolf², M. J. Rache¹;
¹Universital Hospital Muenster, GERMANY, ²AO Foundation, Davos, SWITZERLAND.

W323 Kinetic Differences at the Ankle Between Barefoot and Shod Walking in Children

S. M. Kung¹, P. W. Fink², S. P. Shultz¹;
¹Massey University, Wellington, NEW ZEALAND, ²Massey University, Palmerston North, NEW ZEALAND.

W324 Impacts of MCL and Medial Meniscus Injury on Ovine Knee Dynamics after Healing

R. J. Nesbitt¹, C. E. Voelkl¹, S. P. Harms², M. T. Galloway³, J. T. Shearn¹;
¹University of Cincinnati, OH, ²Othopaedic Associates of Duluth, MN, ³Cincinnati Sports Medicine & Orthopaedic Center, Cincinnati, OH.

W325 How Does High Tibial Osteotomy Affect Lower Limb Biomechanics?

G. M. Whatling¹, D. Watling¹, S. Forrest¹, C. Wilson², A. Metcalfe², S. Ismael², C. Holt¹;
¹Cardiff University, Arthritis Research UK Biomechanics and Bioengineering Centre, Cardiff, UNITED KINGDOM, ²University Hospital of Wales, Cardiff, UNITED KINGDOM.

W326 First filling up the bone defect in tibial depression fractures reduces the secondary loss of reduction: a biomechanical evaluation of two different operative techniques in a new synthetic bone fracture model

S. Doht, M. Jordan, C. Bonhoff, T. Blunk, R. H. Meffert;
University Clinics of Wuerzburg, GERMANY.

W327 Hip Joint Mechanics in Young Adults with Acetabular Dysplasia: Joint Angles, Moments, Muscle Forces, and Reaction Forces During Walking

M. D. Harris¹, B. A. MacWilliams², B. Foreman², C. L. Peters², J. A. Weiss², A. E. Anderson²;
¹University of Denver, CO, ²Univ. of Utah, Salt Lake City, UT.

W328 Foot type assessment: A comparison of arch height index and malleolus valgus index

J. Song¹, K. Choe¹, H. Hillstrom², M. Neary³, R. A. Zifchock³, J. Furmato¹, W. Brechue³;
¹Temple University School of Podiatric Medicine, Philadelphia, PA, ²Hospital for Special Surgery, New York, PA, ³United States Military Academy, West Point, NY.

W329 Internal Fixation of Proximal Humerus Fractures using Locked Plating and Tension Band

J. W. Roberts, S. I. Grindel, J. Shirk, T. Craft, M. Wang;
Medical College of Wisconsin, Milwaukee, WI.

W330 Evaluation of Mechanical Performance for Femoral Neck Fracture Treated with Two Types Implants using 3D Finite Element Method

K. ADACHI¹, D. TEZUKA¹, K. NAOI¹, M. NODA², M. MATSUDA¹;
¹Kobe University, JAPAN, ²KOHNAN HOSPITAL, Kobe, JAPAN.

W331 Electromyography Activation Values Measured Using Free Set-up and Isokinetic Device During Maximal Voluntary Isometric Contraction

G. Mantovani, D. S. Catelli, M. Lamontagne;
Ottawa University, ON, CANADA.

W332 High Heel Shoes and Heavier Mass Induce Similar Changes in Ambulatory Knee Function to Those Associated with Osteoarthritis

M. R. Titchenal, J. Favre, J. L. Asay, T. P. Andriacchi, C. R. Chu;
Stanford University, Stanford, CA.

W333 Failure Load of Ceramic Heads Paired with Re-used Stem Tapers after Head Fracture

J. Gührs, A. Krull, F. Witt, M. Morlock;
TUHH Hamburg University of Technology, GERMANY.

W334 Experimental Setup and Simulator Kinematic Inputs Influence the Wear of Knee Replacements

C. L. Brockett¹, A. Abdelgaied¹, T. Haythornthwaite¹, C. Hardaker², J. Fisher¹, L. M. Jennings¹;
¹University of Leeds, UNITED KINGDOM, ²DePuy Synthes, Leeds, UNITED KINGDOM.

W335 Gait and Strength Analyses in Persons with Distal Femoral Tumor Endoprostheses

J. Fritz¹, L. Rankine², D. Hackbarth², D. King², J. Neilson², C. Albert¹, S. Tarima², G. Harris¹;
¹Marquette University, Milwaukee, WI, ²The Medical College of Wisconsin, Milwaukee, WI.

W336 Evaluation of the in vivo impingement between components during stair-climbing in implanted knee

H. Yamashita¹, T. Shimoto¹, H. Higaki², S. Ikebe², K. Nishimatsu³, Y. Shiraishi³, H. Miura³, S. Hamai⁴, Y. Iwamoto⁴;
¹Fukuoka Institute of Technology, JAPAN, ²Kyushu Sangyo University, Fukuoka, JAPAN, ³Ehime University, Ehime, JAPAN, ⁴Kyushu University, Fukuoka, JAPAN.

W337 Hip Arthroplasty preparation: From CT-Scan to Patient-Specific FE Analysis

D. F. Almeida¹, R. B. Ruben², J. Folgado³, P. R. Fernandes³, B. Verhegge⁴, M. de Beule⁴;
¹IDMEC, Instituto Superior Técnico - University of Lisbon & IBiTech-bioMMeda, Ghent University, BELGIUM, ²CDRSP, ESTG, Polytechnic Institute of Leiria, PORTUGAL, ³IDMEC, Instituto Superior Técnico - University of Lisbon, PORTUGAL, ⁴IBiTech-bioMMeda, Ghent University, BELGIUM.

W338 In vivo Quantification of Glenoid Component Motion Using a Clinical CT after Total Shoulder Arthroplasty

B. Jun¹, Z. Li¹, E. Ricchetti¹, T. Patterson¹, M. J. Bey², J. P. Iannotti¹;
¹Cleveland Clinic, OH, ²Henry Ford Health Systems, Detroit, MI.

W339 Ex vivo precision of distal radial bone strength derived from two high resolution peripheral quantitative computed tomography based finite element modeling techniques

M. Amini, C. E. Kawalilak, D. M. Cooper, S. A. Kontulainen, J. D. Johnston;
University of Saskatchewan, Saskatoon, SK, CANADA.

W340 Gait parameter changes of TKA patients in both legs at 2 and 4 weeks after surgery

T. FUJISAWA¹, R. TAKEDA¹, K. TANAKA¹, G. LISCO², L. GASTALDI², S. PASTORELLI², J. GUO¹, H. TOHYAMA¹, S. TADANO¹;
¹Hokkaido University, Sapporo, JAPAN, ²Politecnico di Torino, ITALY.

W341 Experimental and Computational Micro-Mechanics of the Tibial Cement-Bone Interface

P. Srinivasan¹, M. A. Miller², N. Verdonschot¹, K. A. Mann², D. Janssen¹;
¹Radboud University Nijmegen Medical Center, Nijmegen, NETHERLANDS, ²SUNY Upstate Medical University, Syracuse, NY.

W342 Hip Accelerations and Femoroacetabular Impingement (FAI) Morphology in Ice Hockey Goaltenders

J. M. Deneweth, D. Whiteside, S. Pomeroy, J. Cowan, J. Ross, A. Bedi, G. C. Goulet, PhD;
University of Michigan, Ann Arbor, MI.

W343 Influence of PCL in a Patient-specific Total Knee Implant: A Biomechanical Study.

R. O'Shea¹, J. Leasure², W. Camisa², K. Tech², J. van Warmerdam³, W. McGann³;
¹SF Orthopaedic Residency Program, San Francisco, CA, ²The Taylor Collaboration, San Francisco, CA, ³St Mary's Medical Center, San Francisco, CA.

W344 In Vivo Hip Arthrokinematics Are Complex during Dynamic Tests to Diagnose Femoroacetabular Impingement

A. L. Kapron, S. K. Aoki, C. L. Peters, A. E. Anderson;
University of Utah, Salt Lake City, UT.

W345 How Does Lumbosacral Spine Geometry Affect Spinal Load-Sharing? Finite Element Analysis Using Personalized Geometries.

S. Naserkhaki, M. El-Rich, G. Kawchuk, J. L. Jaremko;
University of Alberta, Edmonton, AB, CANADA.

W346 Effects of a Latarjet Repair in the Presence of Combined Shoulder Bony Defects

P. Walia¹, R. M. Patel², M. Kuklis², A. Miniaci², M. H. Jones², S. D. Fening³;
¹Cleveland Clinic, Cleveland State University, OH, ²Cleveland Clinic, OH, ³Austen BioInnovation Institute, Summa Health, Akron, OH.

W347 Effects of Foot Placement on the Kinematics and Articular Contact Patterns of the Knee During Cycling Using 3D Fluoroscopy Method

H. Hsu¹, J. Li², S. Hong², Y. Wu², C. Lin², Y. Liu², T. Lu², M. Kuo³;

¹Department of Orthopaedics, China Medical University Hospital, Taichung, TAIWAN, ²Institute of Biomedical Engineering, National Taiwan University, Taipei, TAIWAN, ³Department of Physical Therapy, China Medical University, Taichung, TAIWAN.

W348 Kinematic Function of the Knee Joint is not Completely Restored in Posterior Cruciate Ligament Reconstructed Patients During Daily Activities

Y. Zhong¹, G. N. Duda¹, H. Boeth¹, T. Jung²;

¹Julius Wolff Institute, Charité—Universitätsmedizin Berlin, GERMANY, ²Sports Traumatology & Arthroscopy Service Center for Musculoskeletal Surgery, Charité Berlin, GERMANY.

W349 Influence of Ageing and Osteoporosis on the Mechanical Environment of the Distal Femur following Total Knee Arthroplasty: A Finite Element Study.

N. Conlisk¹, P. Pankaj¹, C. R. Howie²;

¹The University of Edinburgh, UNITED KINGDOM, ²Department of Orthopaedics, New Royal Infirmary of Edinburgh, UNITED KINGDOM.

W350 Factors Affecting Stem Junction Stress in Modular Femoral Components following Revision Total Knee Arthroplasty: A Finite Element Study.

N. Conlisk¹, P. Pankaj¹, C. R. Howie²;

¹The University of Edinburgh, Edinburgh, UNITED KINGDOM, ²Department of Orthopaedics, New Royal Infirmary of Edinburgh, Edinburgh, UNITED KINGDOM.

W351 Feasibility and reliability of assessing head-neck motor control during position tracking, force tracking and position stabilization tasks

J. M. Popovich, Jr.¹, N. P. Reeves¹, M. C. Priess², J. Cholewicki¹, J. Choi², C. J. Radcliffe²;

¹Michigan State University, Center for Orthopedic Research, College of Osteopathic Medicine, East Lansing, MI, ²Michigan State University, Center for Orthopedic Research, College of Engineering, East Lansing, MI.

SPECIAL TOPICS 1

GAIT, MOTION, PROSTHETICS, & EDUCATION

W352 Learning Effects and Intra-Day Reliability of Balance using the Posturomed® Device.

D. Schmidt, A. M. Germano, T. L. Milani; Technische Universität Chemnitz, GERMANY.

W353 Effects of Different Plantar Hypothermic Procedures on Quasi-Static Balance

T. Hess, A. Germano, T. Milani; Technische Universität Chemnitz, GERMANY.

W354 Gait Differences when Maximizing Efficiency versus Symmetry with a Transtibial Amputee Model

A. E. Martin, J. P. Schmiedeler; University of Notre Dame, South Bend, IN.

W355 Validity of a Hand-held Tablet Compared to 3-Dimensional Motion Analysis to Assess Landing Mechanics

D. King, E. Alderman, Z. Gabor, J. Jackson, E. Lewis, B. Belyea; Ithaca College, Ithaca, NY.

W356 Effects of Above-Knee Prosthesis Mass on Prosthetic Knee Torque and Hip Energetics Required for Normative Kinematics

Y. S. Narang, A. G. Winter, V; Massachusetts Institute of Technology, Cambridge, MA.

W357 Effects of Above-Knee Prosthesis Mass on Optimal Stiffness and Damping Parameters of Prosthetic Knees

Y. S. Narang, A. G. Winter, V; Massachusetts Institute of Technology, Cambridge, MA.

W358 Effects of Wearing Gumboots and Leather Lace-up Boots on Gait and Perceived Comfort when Walking on Simulated Underground Coal Mine Surfaces

J. A. Dobson, D. L. Riddiford-Harland, J. R. Steele; University of Wollongong, AUSTRALIA.

W359 Effects of Hand Carried Load on Gait Dynamics during Heavy Rucksack Carriage

A. Boynton; US Army Research Lab, Aberdeen Proving Ground, MD.

W360 Engaging Undergraduate Students via Journal Clubs in a Biomechanics Course

L. Kuxhaus, N. C. Corbiere, A. D. W. Throop; Clarkson University, Potsdam, NY.

W361 How Do Fall-Risk Assessments of Self-Initiated Movements Relate to Compensatory Stepping?

J. R. Crenshaw¹, K. A. Bernhardt¹, V. A. Lugade², S. Amin¹, K. R. Kaufman¹;

¹Mayo Clinic, Rochester, MN, ²Whitaker International Program, Chiang Mai University, THAILAND.

W362 EMG-angle relationship of hip flexor muscles during maximum isometric hip flexion

T. Kurihara, T. Jiroumaru, T. Isaka;
Ritsumeikan University, Kusatsu, JAPAN.

W363 Influence of experience in placing markers on gait parameters

S. K. Martello¹, J. C. Almeida¹, T. C. Firmino¹, R. Faucz², A. E. K. Ferreira², A. C. Pauleto², E. F. Manffra¹;
¹Pontifícia Universidade Católica do Paraná, Curitiba, BRAZIL, ²Centro Hospitalar de Reabilitação Ana Carolina Moura Xavier, Curitiba, BRAZIL.

W364 Feasibility of the Intuitive Control of Hand Prostheses through Dimensional Kinematics Reduction

J. Sancho-Bru¹, M. de Bruin², S. Wohlman², W. Murray², N. Jarque-Bou¹;
¹Universitat Jaume I, Castelló de la Plana, SPAIN, ²Rehabilitation Institute of Chicago. Northwestern University, Chicago, IL.

W365 Individuals with Parkinson's Disease Display Altered Dynamic Stability during Locomotor Adaptation

J. A. Roper¹, R. T. Roemmich², C. J. Hass¹;
¹University of Florida, Gainesville, FL, ²Johns Hopkins University School of Medicine, Baltimore, MD.

W366 Forward Lean Influences Gait Initiation Performance

C. Sarmiento, B. Fawver, C. J. Hass;
University of Florida, Gainesville, FL.

W367 Implementation of a Winding Filament Muscle Model into a Robotic Ankle Prosthesis

J. Tester, J. Petak, U. Tahir, R. LeMoyne, K. Nishikawa;
Northern Arizona University, Flagstaff, AZ.

W368 Failure to Clear a Stationary Visible Obstacle During Gait in Older Adults

M. J. H. Heijnen, S. Rietdyk;
Purdue University, West Lafayette, IN.

W369 Effects of tai chi movements on joint moment of force of lower extremity

J. Li, N. Law;
University of Ottawa, ON, CANADA.

W370 Fall Prevention and Identification with Video Cameras

E. Schlegel¹, R. Peindl², N. Zheng¹;
¹UNC Charlotte, Charlotte, NC, ²Carolina Healthcare System, Charlotte, NC.

W371 Fall Risk Assessment during Involuntary Movement Using IMU

Z. Xu¹, N. Zheng¹, R. Peindl², N. Habet², R. Seymour², J. Kellam²;
¹UNC Charlotte, NC, ²Carolina Healthcare System, Charlotte, NC.

W372 Implementation of an iPhone as a Wireless Gyroscope Platform for Gait Analysis

R. LeMoyne¹, A. Hessel¹, T. Mastroianni², K. Nishikawa¹;
¹Northern Arizona University, Flagstaff, AZ, ²Pittsburgh, PA.

W373 In-Vivo Tibial Fit Analysis of Patient-specific TKA System Versus Off-the-shelf TKA

G. Martin;
JFK Medical Center, Atlantis, FL.

SPECIAL TOPICS – BIOFLUID MECHANICS

W374 Effects of nitric oxide and lymphangion chain length on lymphatic pumping pressure in vivo.

T. S. Nelson, J. Dixon;
Georgia Institute of Technology, Atlanta, GA.

W375 In-Vitro Experimental Study of Collateral Circulation of the Circle of Willis

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W376 Incorporation of Stress Analysis into a Model of Lymph Transport Through a Single Lymphangion

A. W. Caulk, J. B. Dixon, R. L. Gleason, Jr.;
Georgia Institute of Technology, Atlanta, GA.

W377 Investigation of Post-Surgical Changes to Cerebrospinal Fluid Hydrodynamics in Type I Chiari Malformation Patients

N. Shaffer¹, B. A. Martin¹, S. Dombrowski², M. Luciano², J. Tew³, F. Loth¹;
¹University of Akron, OH, ²Cleveland Clinic Foundation, OH, ³Mayfield Clinic, Cincinnati, OH.

W378 Is Caveolin-1, a grade specific glioma marker?

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¹Mount Carmel College, Bangalore, INDIA, ²Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, INDIA.

SPECIAL TOPICS – SOFT TISSUE MECHANICS

W379 Evaluation of a Practical Method to Measure a True Modulus of Elasticity of Tubular Muscle Segments In Vitro and In Vivo
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W380 Investigating Age and Location Dependent Differences in the Microstructure and Mechanical Properties of the Porcine Recurrent Laryngeal Nerve

M. J. Williams¹, U. Utzinger¹, J. M. Barkmeier-Kraemer², J. P. Vande Geest¹;

¹University of Arizona, Tucson, AZ, ²University of California Davis, CA.

W381 Influence of indentation test parameters on the mechanical response of soft tissues

J. A. Isaza Lopez, J. F. Ramirez Patiño;
Universidad Nacional de Colombia, Medellin, COLOMBIA.

W382 Effects of Paclitaxel on Sensory Nerve Structure and Function

B. Bober, E. Gutierrez, A. Groisman, S. Shah;
University of California - San Diego, CA.

W383 Image Analysis Improve Hydro-Chemo-Mechanical Characterization

A. Baldit¹, D. Ambard², F. Cherblanc², P. Royer²;
¹University of Sheffield, UNITED KINGDOM, ²University of Montpellier 2, FRANCE.

W384 Effects of Neck Skin Elasticity on Modulating Upper Airway Patency

Y. An, X. Zhang, J. Wang, Y. Huang;
Capital Medical University, Beijing, CHINA.

W385 Viscoelastic characterization of the articular disc of the temporomandibular joint

M. Commisso, J. Mayo, J. Martínez-Reina;
University of Seville, SPAIN.

W386 Investigation of Nano-scale, 3D sound-induced displacement of the Tympanic Membrane by Digital Holography

M. Khaleghi¹, C. Furlong¹, J. Cheng², J. Rosowski³;
¹Worcester Polytechnic Institute, Worcester, MA, ²Massachusetts Eye and Ear Infirmary, Boston, MA, ³Harvard Medical School, Boston, MA.

REHABILITATION

W387 Identification of Clinically Relevant Knee Osteoarthritis Subgroups.

D. Kobsar, S. T. Osis, B. A. Hettinga, R. Ferber;
University of Calgary, AB, CANADA.

W388 Functional Ankle Instability: Objective Evaluation of 4-week Balance Training Intervention

T. K. Jain¹, C. N. Wauneka², W. Liu¹;
¹University of Kansas Medical Center, Kansas City, KS, ²University of Kansas, Lawrence, KS.

W389 Improving Elderly Gait Using a Structured Auditory Stimulus

M. L. Hough¹, S. A. Myers¹, S. J. Harrison¹, S. R. Wurdeman¹, D. McGrath², N. Stergiou¹;

¹University of Nebraska at Omaha, NE, ²University College Dublin, IRELAND.

W390 End-Range Dorsiflexion and Ankle Power associated with Pain and Function in Persons with Insertional Achilles Tendinopathy

R. L. Chimenti¹, A. S. Flemister², J. P. Ketz², J. McMahon¹, J. Tome³, J. R. Houck⁴;

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W391 Improvements in joint torques and powers before and after surgery for patients with peripheral arterial disease.

X. Liu¹, S. R. Wurdeman¹, I. I. Pipinos², J. M. Johanning², S. A. Myers¹;

¹University of Nebraska at Omaha, NE, ²Omaha Veterans' Affairs Medical Center; University of Nebraska Medical Center, Omaha, NE.

W392 Influence of Malalignment on Socket Reaction Moment Impulse While Walking in Transtibial Prosthesis

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Orthocare Innovations, Mountlake Terrace, WA.

W393 Effects of Elliptical Training on Pain, Motor Function, Muscle Strength and Knee Joint Kinetics During Walking in People with Knee Osteoarthritis

M. R. Paquette¹, A. Zucker-Levin², P. DeVita³, J. Hoekstra¹, W. Mihalko²;

¹University of Memphis, TN, ²University of Tennessee Health Science Center, Memphis, TN, ³East Carolina University, Greenville, NC.

W394 Evaluation of gait, balance and strength in patients following critical illness at 3 months post-discharge.

J. Kiriella;
York University, Mississauga, ON, CANADA.

W395 Effects of Remote Vibrotactile Noise on Fingertip Touch Sensation in Healthy Adults

K. Lakshminarayanan¹, J. G. Webster², N. J. Seo¹;
¹University of Wisconsin-Milwaukee, WI, ²University of Wisconsin-Madison WI.

W396 Effects of Lateral Shoe Wedges on the Biomechanics of Knee Osteoarthritis during Stationary Cycling

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¹Biola University, Buena Park, CA, ²The University of Tennessee, Knoxville, TN, ³University of Tennessee Medical Center, Knoxville, TN.

W397 Hybrid force-impedance control of an upper-limb stroke rehabilitation robot interacting with a musculoskeletal arm model

B. Ghannadi, N. Mehrabi, J. McPhee;
University of Waterloo, ON, CANADA.

W398 Effects of prosthetic socket modification on the gait of an individual with a transfemoral amputation

M. A. Finley¹, M. J. Habecker², R. Van Veld¹, N. Derry¹, K. Taylor¹;
¹University of Indianapolis, IN, ²Indiana Institute for Prosthetics, Zionsville, IN.

W399 Functional Gait Analysis Comparison of Patients with Delayed Transtibial Amputations and Limb Salvage

K. Sharp, B. Mazzone, T. Kingsbury, N. Thesing, M. Marks, M. Wyatt;
Navy Medical Center San Diego, CA.

W400 Identification of Dynamic Trunk Movement Control Impairments in Patients with Non Specific Low Back Pain Using a Novel Target Acquisition Test

W. Sung, P. Wattananon, B. Spinelli, S. P. Silfies;
Drexel University, Philadelphia, PA.

W401 Gait Biomechanics are not Improved Following Supervised Treadmill Exercise in Patients with Peripheral Arterial Disease.

B. C. Applequist¹, S. R. Wurdeman¹, I. I. Pipinos², J. M. Johanning², S. A. Myers¹;
¹University of Nebraska at Omaha, NE, ²Omaha Veterans' Affairs Medical Center; University of Nebraska Medical Center, Omaha, NE.

W402 Joint moment after-effects following walking on a split-belt treadmill in stroke individuals

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¹Université de Montréal et Centre de recherche interdisciplinaire en réadaptation du Montréal métropolitain (CRIR), Montréal, QC, CANADA, ²École de Technologie Supérieure, CRIR, Montréal, QC, CANADA.

W403 Effects of a stretching protocol for the pectoralis minor muscle on its resting length, shoulder pain and function, and scapular kinematics in subjects with impingement symptoms

P. R. Camargo¹, D. P. Rosa², J. D. Borstad³;
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W404 Field-Based Measures of Shoulder Elevation in Manual Wheelchair Users

M. M. B. Morrow, M. G. Van Straaten, K. D. Zhao, B. A. Cloud, K. R. Kaufman;
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W405 Estimation of arch deformation based on plantar skin image

T. Shiina¹, Y. Iijima¹, A. Obara¹, H. Takemura¹, H. Mizoguchi¹, S. Kosugi²;
¹Tokyo University of Science, Noda, JAPAN, ²Nara Prefectural Mimuro Hospital, Nara, JAPAN.

W406 In-field Gait Retraining and Mobile Monitoring to Reduce Risk of Tibial Stress Fracture and Patellofemoral Pain in High Risk Runners

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W407 Improved Prosthetic Gait Following Amputee-Specific Physical Therapy

W. Korgan, J. Renz, S. A. Myers, S. R. Wurdeman;
University of Nebraska at Omaha, NE.

W408 Fracture Creation in Cervine Vertebral Motion Segments via Eccentric Cyclic Loading

N. C. Corbiere, S. L. Zeigler, K. A. Issen, L. Kuxhaus;
Clarkson University, Potsdam, NY.

W409 Gravitational effect on the absolute stability conditions for a third-order inverted pendulum

C. Kennett, D. Piovesan;
Gannon University, Erie, PA.

W410 Validation of a Novel Clinical to Measure Frontal Plane Pelvis Motion during Walking

S. T. Jamison¹, M. P. McNally², J. A. Yedimenko², J. A. Onate²;

¹University of Delaware, Newark, DE, ²The Ohio State University, Columbus, OH.

W411 Identifying Yoga-Based Strengthening Exercises for Knee Osteoarthritis with Minimal Medial Knee Loads

H. S. Longpre, A. M. Johnson, M. R. Maly;
McMaster University, Hamilton, ON, CANADA.

W412 Improvement of the mouthpiece type remote controller of the tongue operation assistive system: "I-to-AS" for seriously disabled people.

S. G. Terashima;
Niigata Institute of Technology, Kashiwazaki, Niigata, JAPAN.

W413 Estimation of the Anatomical Shoulder and Elbow Angles using the ArmeoSpring Exoskeleton System

M. Y. Ozsecen, U. Della Croce, P. Bonato;
Harvard Medical School, Boston, MA.

W414 Kinematic Compensations of the Hip and Knee during a Drop Vertical Jump in Athletes with Femoroacetabular Impingement

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W415 Is Clinical Visual Examination Able to Differentiate Individuals with and without Scapular Dyskinesia?

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¹University of Sao Paulo, Ribeirao Preto, BRAZIL, ²Federal University of Sao Paulo, Santos, BRAZIL, ³University of Washington, Seattle, WA.

W416 Immediate Effects of Ankle Foot Orthoses on Balance in Individuals with Sensory Loss due to Peripheral Neuropathy

K. E. Bigelow, K. Jackson;
University of Dayton, OH.

W417 K-Level Assessment in Amputees Using Commercial Activity Monitors: A Validation Study

A. Rossi¹, C. Madden¹, C. Bortz¹, M. Galbraith¹, J. Lewis¹, J. Buckley¹, J. Horne²;
¹University of Delaware, Newark, DE, ²Independence Prosthetics and Orthotics, Newark, DE.

W418 Immediate Changes in Scapulothoracic Motor Control following 3D Real-time Kinematic Biofeedback Retraining

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REPRODUCTION & WOMEN'S HEALTH

W419 How does the nature of maternal blood flow affect the placenta?

A. R. Clark¹, R. Saghian¹, M. Tawhai¹, J. James²;
¹Auckland Bioengineering Institute, University of Auckland, NEW ZEALAND, ²Obstetrics & Gynaecology, Faculty of Medical and Health Sciences, University of Auckland, NEW ZEALAND.

RESPIRATORY & LUNG BIOMECHANICS

W420 Factors that affect the biomechanical motion of the human upper airway muscles during breathing

S. Cheng¹, A. Hatt², E. Brown², J. Butler², S. Gandevia², L. Bilston²;
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W421 In vivo Costovertebral Joint Kinematics and Modelling

B. Beyer, V. Feipel, V. Sholukha, F. Moiseev, P. Salvia, J. Coupier, O. Snoeck, S. Van Sint Jan, P. Dugailly, M. Rooze;
Université Libre de Bruxelles, BELGIUM.

W422 Elastic Waves and Viscoelasticity of the Surface Tissues in the Human Chest Wall

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W423 Experimental Evidence of Mechanical Isotropy in Porcine Lung Parenchyma

B. Weed, S. Patnaik, B. Brazile, R. Prabhu, J. Liao, L. Williams;
Mississippi State University, MS.

W424 Finite Element Image Registration Technique to Measure Distribution of Displacements Throughout an Isolated Airway Wall

B. C. Harvey, D. T. Seidl, P. E. Barbone, T. L. Szabo, H. Parameswaran, K. R. Lutchen;
Boston University, MA.

SPINE BIOMECHANICS

W425 In vitro Assessment of Micro-structural Properties of Intervertebral Disc using 1.5T Magnetic Resonance T2 and ADC Mappings.

D. Tien Tuan¹, v. Marc², P. Philippe¹, C. Fabrice³, I. Keita², H. Marie Christine¹;

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³ACRIM-Polyclinique St Côme, Compiègne, FRANCE.

W426 Interactions Between Force, Repetition And Posture On Intervertebral Disc Responses During Sub-Maximal, Cyclic Compressive Loading

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²University of Waterloo, ON, CANADA.

W427 Gravity-induced Coronal Plane Joint Moments in the Adolescent Scoliotic Spine

B. E. Keenan¹, M. T. Izatt¹, G. N. Askin¹, R. D. Labrom¹, G. J. Pettet², M. J. Pearcy¹, C. J. Adam¹;

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W428 Vertebral Fracture Load Predicted Using a FEM Based on Bi-planar Dual Energy X-rays Absorptiometry.

J. Choisine¹, C. Travert¹, J. Valiadis¹, A. Darbon², A. Laville¹, P. Rouch¹, W. Skalli¹;

¹Arts et Métiers ParisTech, Paris, FRANCE, ²EOS imaging, Paris, FRANCE.

W429 Influence of the Shape and Size of the Nucleus Pulposus in the Biomechanics of the Intervertebral Disc

L. GOMEZ, Sr.¹, J. J. GARCIA, Sr.²;

¹Universidad Libre de Colombia, Cali, COLOMBIA,

²Universidad del Valle, Cali, COLOMBIA.

W430 It Is Optimal to Use a Standing Reference Posture to Normalize Global Seated Spine Kinematics

B. D. Cotter, B. C. Nairn, J. D. M. Drake;

York University, Toronto, ON, CANADA.

W431 In vivo variability of lumbar intervertebral axes of rotation.

C. J. Simons, B. S. Davidson;

University of Denver, CO.

SPORTS BIOMECHANICS & HUMAN PERFORMANCE

W432 Functional Cluster Analysis of Frontal-Plane Knee Joint Torques

K. Kipp, S. Wenson, C. M. Meinerz, P. Malloy, C. F. Geiser, A. Morgan;

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W433 Extreme Kinematics and Moments in Hip Hop Dance Sequences

S. Bronner¹, S. Ojofeitimi², H. Woo³;

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W434 Validation of IMU-based Method for Tracking Warfighter Motion during Jumping Maneuver

R. S. McGinnis, S. M. Cain, S. Davidson, R. Vitali, S. G. McLean, N. C. Perkins;

University of Michigan, Ann Arbor, MI.

W435 Validation of IMU-based Method for Tracking Warfighter Torso Angle during Up-down Maneuver

R. S. McGinnis, S. M. Cain, S. Davidson, R. Vitali, S. G. McLean, N. C. Perkins;

University of Michigan, Ann Arbor, MI.

W436 Intrinsic foot muscle volume in experienced runners with and without plantar fasciitis

R. T. H. Cheung, K. Sze;

Hong Kong Polytechnic University, Hong Kong, CHINA.

W437 Influence of playing surfaces on knee loads for football

P. ROUCH¹, X. DREVELLE¹, P. THOREUX²;

¹LBM Arts et Métiers ParisTech, Paris, FRANCE, ²Service de Chirurgie orthopédique Hôpital Avicenne – Université Paris XIII, Bobigny, FRANCE.

W438 Implementing Stability Criteria and Wavelet Analysis to Assess Knee Stability and Muscle Excitation Patterns in Athletic Populations: Implications for ACL Injuries

K. D. Morgan¹, C. J. Donnelly², J. A. Reinbolt¹;

¹University of Tennessee, Knoxville, TN, ²University of Western Australia, Perth, AUSTRALIA.

W439 Higher Intra-Cyclic Variation of the Velocity Leads to Lower Mean Race Walking Velocity

P. G. Morouço¹, T. Barbosa²;

¹Polytechnic Institute of Leiria / Centre for Rapid and Sustainable Product Development, Marinha Grande, PORTUGAL, ²Nanyang Technological University, SINGAPORE.

W440 Examining the Dampening Effects of Varying Shoe Architecture during Gait

L. Knop, D. Rutkowski, B. Lawson, C. Goehler;

Valparaiso University, Valparaiso, IN.

W441 Kinematics of Single Leg Landing in Football Players: Risk Factors for ACL Injury?

N. W. Willigenburg¹, B. D. Roewer¹, J. R. Borchers^{1,2}, C. C. Kaeding^{1,3}, T. E. Hewett^{1,4};

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W442 Estimating Upper Extremity Joint Contributions in Functional Motions to Create a Metric for Injury Prevention using OpenSim

E. Honert, F. Aguilar, A. Kozlowski, C. Goehler; Valparaiso University, Valparaiso University, IN.

W443 Foot Stance Significantly Alters Knee Joint Motion and Loading during Golf Swing

C. Ertel¹, R. Escamilla², S. Winnier³, J. Andrews³, N. Zheng¹;
¹UNC Charlotte, NC, ²California State University at Sacramento, CA, ³Andrews Institute, Gulf Breeze, FL.

W444 Landing Mechanics of NCAA Division I Collegiate Football Players Who Sustain ACL Injuries

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W445 Intra-limb coordination of typically developing children during three types of locomotion tasks

T. Huang, R. Cherng, M. Hung, Y. Tsai, C. Cho; National Cheng Kung University, Tainan, TAIWAN.

W446 Kinematic Differences Between Stationary and Dynamic Launches During Soccer Throw-In

L. C. Hernandez Barraza, Sr., Y. Chen-Hua; National University of Singapore, SINGAPORE.

W447 Intra- and Inter-subject Variation in Lower Limb Coordination during Countermovement Jumps in Children and Adults

P. C. Raffalt, T. Alkjær, E. B. Simonsen; University of Copenhagen, DENMARK.

W448 Estimating the Kinetic Energy of a Passive Walker using an IMU

J. Hough, R. S. McGinnis, N. C. Perkins; University of Michigan, Ann Arbor, MI.

W449 How Humans Use Visual Optic Flow To Regulate Stepping Movements During Walking

M. M. Salinas, J. B. Dingwell; The University of Texas at Austin, TX.

W450 Effects of Load Carriage and Footwear on Spatiotemporal Parameters and Metabolic Cost of Walking

K. D. Dames, S. B. Richmond, S. M. Sommerville, J. D. Smith; University of Northern Colorado, Greeley, CO.

W451 Energy Absorptions of Lower Extremity Joints during a High-Demand Activity after Anterior Cruciate Ligament Reconstruction

Y. Lee, H. Lee; National Taiwan Normal University, Taipei, TAIWAN.

W452 Kinematics of Resistance Sprint Training

G. Hajder, T. Wu; Bridgewater State University, Swansea, MA.

W453 Influence of Strategy on the Whole-Body Mechanics and Energetics of Climbing

S. D. Russell, C. Zirker, S. Blemker; University of Virginia, Charlottesville, VA.

W454 Effects of Age on Variability of Frontal Plane Knee Motion in Runners

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¹Virginia Commonwealth University, Richmond, VA, ²Campbell University, Buies Creek, NC.

W455 Effects of Fatigue and Load Carriage on Firefighter Gait

F. F. Bradley¹, M. J. Angelini², R. M. Kesler³, M. N. Petrucci⁴, K. S. Rosengren⁵, G. P. Horn³, E. T. Hsiao-Wecksler²;
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W456 Effects of the Innovative Damping Material of Treadmill Running Deck on Lower Extremity Biomechanics

W. H. TAI, H. T. PENG, Y. H. WANG, Z. R. CHEN; Chinese Culture University, Taipei, TAIWAN.

W457 Increased Unilateral Foot Pronation Increases Knee Adduction Moment on the Contralateral Lower Limb

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W458 Hockey Skating Kinematics and the Effect of Treadmill Training

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¹Marquette University, Milwaukee, WI, ²DC Hybrid Skating, Milwaukee, WI, ³Easton Sports LLC, Van Nuys, CA.

W459 From bicycle chain ring shape to gear ratio: algorithm and examples

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VU University Amsterdam, NETHERLANDS.

W460 Identifying movement strategies: The effect of normalizing data when clustering

C. Richter¹, N. O'Connor¹, B. Marshall², K. Moran³;
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W461 Heavy Load Carriage on Soldier Metabolism and Physiology

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W462 Is Translational Science Needed to Sustain and Grow Sports Biomechanics Research?

M. T. G. Pain;
Loughborough University, UNITED KINGDOM.

W463 Hamstring loading maximized in late swing and early stance phases during sprinting

Y. Sun, Y. Liu, S. Wei, W. Fu;
Shanghai University of Sport, Shanghai, CHINA.

W464 Video analysis of at-risk movements related to ACL injury in soccer player

S. Kaneko¹, S. Sasaki², H. Koga³, N. Hirose¹, T. Krosshaug⁴, T. Fukubayashi¹;
¹Waseda University, Tokyo, JAPAN, ²Tokyo Ariake University of Medical and Health Sciences, JAPAN, ³Tokyo Medical and Dental University, JAPAN, ⁴Oslo Sports Trauma Research Center, NORWAY.

W465 Individual Limb Biomechanical Differences are Altered between Focused and Distracted Landing Tasks

P. Rider, J. Hibbert, J. Patteson, C. Byrd, P. Devita, Z. J. Domire;
East Carolina University, Greenville, NC.

W466 Knee range of motion during stair-to-floor transition in Tai-Chi elderly

T. H. Yang, C. F. Huang, C. L. Wu;
National Taiwan Normal University, Taipei, TAIWAN.

W467 Influence of the custom-made insole on the perception of belt speed change during treadmill running

H. Lu, H. Chiu;
Institute of physical education, health and leisure studies, National Cheng Kung University, Tainan, TAIWAN.

W468 Experimental Estimation of Energy Loss during Heel Strike in Human Walking.

P. M. Baines¹, A. L. Schwab¹, A. J. van Soest²;
¹Delft University of Technology, NETHERLANDS, ²Vrije University, Amsterdam, NETHERLANDS.

W469 Validation of a two-dimensional video method for measuring in-game softball bat velocity.

T. Ficklin, R. Lund;
University of Northern Iowa, Cedar Falls, IA.

TISSUE ENGINEERING

W470 In vitro Replication of the Time-Response Mechanical Properties Changes of Articular Cartilages Following in vivo Maturation

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W471 Generation of functional endothelium on sulfated silk fibroin scaffolds under physiological pulsatile flow culture conditions

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W472 In vitro procedure for the production of fixative-free cellularized porcine pericardium tissue patch for bio-prosthetic cardiac valve fabrication

F. Consolo¹, R. Santoro², M. Spiccia¹, F. Prandi², M. Piola¹, M. C. Vinci², M. Pesce², M. Soncini¹;
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W473 Effects of proliferation and ECM formation on the compressive behavior of collagen/ β -TCP composite scaffolds with mesenchymal stem cells

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¹Kyushu University, Kasuga, JAPAN, ²Fukuoka Dental College, Fukuoka, JAPAN.

W474 Effects of Subarachnoid Hemorrhage-Borne Factors on Vascular Contractility in Cerebral Vasospasm-on-a-Chip

E. S. Hald, K. E. Steucke, J. A. Reeves, P. W. Alford;
University of Minnesota-Twin Cities, Minneapolis, MN.

W475 In situ Polymerization of Thiol-acrylate Nanocomposite Foam for Bone Defects

A. Forghani, C. Chen, M. Smoak, D. Hayes, R. Devireddy;
Louisiana State University, Baton Rouge, LA.

W476 Investigation of the Effect of Different Flow Rates on the Cell Viability of Fresh Carotid Arteries in Vitro

L. Morticelli, P. Kalozoumis, J. Jentsch, U. Böer, M. Wilhelmi, S. Korossis;
Hannover Medical School, GERMANY.

W477 Frequency dependent viscoelastic properties of porcine upper airway

Y. LIU¹, J. Mitchell², W. Yim¹, Y. Chen¹, R. C. Wang²;
¹University of Nevada Las Vegas, NV, ²University of Nevada School of Medicine, Las Vegas, NV.

W478 Endurance testing of meniscal scaffolds with physiological loads, a biomechanical Model

J. Schwiesau, B. Fritz, S. Koenig, E. Odermatt, T. M. Grupp;
Aesculap AG, Tuttlingen, GERMANY.

W479 Electrospun Non-synthetic Biopolymer Vascular Grafts: Biomechanical Characterization and Comparison to a Porcine Coronary Artery

E. Tamimi, D. C. Ardila, R. Kellar, T. Doetschman, J. P. Vande Geest;
University of Arizona, Tucson, AZ.

W483 Effects of Systemic-to-pulmonary Shunts on the Local Hemodynamics in Two Multi-domain Patient-specific Single Ventricle Models

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W484 Hypoxia in Combination with a HUVEC/AFSC Co-Culture May Result in Enhanced Vessel Formation in Collagen-GAG Scaffolds

C. Lloyd-Griffith¹, T. M. McFadden¹, P. Murphy², R. E. Unger³, C. J. Kirkpatrick³, G. P. Duffy¹, F. J. O'Brien¹;
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W485 Parametric Study of the Morphological Effects on the Rupture of Abdominal Aortic Aneurysm using Simplified Axisymmetric Models

S. Yamamoto¹, H. Takeuchi¹, M. Oshima², K. Hoshina², T. Akai²;
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W486 Mapping of graduated compression socks pressure distribution and subsequent effect on peripheral and systemic hemodynamics during exercise.

J. Book, R. Villar, C. Prince, R. L. Hughson, S. D. Peterson;
University of Waterloo, ON, CANADA.

VASCULATURE

W480 Is Abdominal Aortic Aneurysm Rupture Risk Increased by Arm Elevation During CT Scans?

M. G. Doyle¹, D. Roy², C. Kauffmann³, G. Soulez³, C. Amon¹, L. Tse⁴;
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W481 Fibre Characterisation in an Arterial Bifurcation using Non-Invasive Diffusion Tensor Imaging and Finite Element Based Fibre Remodelling

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W482 Fluid Structure Interaction Simulation of Blood Flow Through A Patient-Specific Stanford Type-B Aortic Dissection

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¹University College London, UNITED KINGDOM, ²University College Hospital London, UNITED KINGDOM.

ADHESION

R1 Reinforcing endothelial junction proteins can prevent microvessel permeability increase and tumor cell adhesion

B. Fu, J. Yang, S. Shen, B. Cai, L. Zhang, W. Yen, M. Zeng;
The City College of the City University of New York, NY.

R2 Mimicking integrin-mediated cell adhesion with proteoliposomes

D. Brueggemann¹, J. Frohnmayer¹, C. Eberhard¹, C. Mollenhauer¹, J. P. Spatz²;

¹Max Planck Institute for Intelligent Systems, Stuttgart, GERMANY, ²Max Planck Institute for Intelligent Systems, Stuttgart and, Dept of Biophysical Chemistry, Univ. of Heidelberg, GERMANY.

BIOIMAGING & BIO-OPTICS

R3 Relationship of Supraspinatus Tendon Characteristics and Subacromial Space in Persons with Spinal Cord Injury

Y. Lin, M. L. Boninger, N. S. Hogaboom, A. M. Koontz;
University of Pittsburgh, PA.

R4 Volume of Rectus Femoris Muscle Phantom by Ultrasonography

D. S. Alves, L. F. Oliveira, W. C. A. Pereira;
Federal University of Rio de Janeiro, BRAZIL.

BIO-INSPIRED DESIGN

R5 Design of a Live Muscle Tissue Actuated Mechatronic Device

M. A. Akgün, C. Tutcu, A. Özdemirli;
Yeditepe University, Istanbul, TURKEY.

R6 Multi-joint Actuation Platform for Gait Biomechanics Studies of Lower Extremity Soft Exosuits

Y. Ding, I. Galiana, A. Asbeck, B. Quinlivan, S. M. M. De Rossi, C. Walsh;
Harvard University, Cambridge, MA.

R7 Respiratory flow simulations in anatomically realistic models of Japanese quails

M. Nakamura, K. Yahata, A. Urushikubo;
Saitama University, Saitama, JAPAN.

R8 Numerical and Experimental Study of Crack Propagation in Bone and Bone-Inspired Composite

F. Libonati, L. Vergani;
Politecnico di Milano, ITALY.

R9 Mechanics without Muscles: Rapid Motion of the Venus Flytrap and Bio-inspired Robots

Z. Chen¹, Q. Guo², H. Zheng³, W. Li², G. Su⁴, J. Lin⁴, Y. Ding⁵, W. Chen⁶, L. Taber¹;

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R10 Neuromechanics and Energetics of Walking with a Simple Passive Elastic Ankle Exoskeleton.

M. B. Wiggin¹, S. H. Collins², G. S. Sawicki¹;

¹North Carolina State University, Raleigh, NC, ²Carnegie Mellon University, Pittsburgh, PA.

R11 Modeling Hand Function for Evaluation and Design

S. Leitkam, T. R. Bush;

Michigan State University, East Lansing, MI.

BIOMATERIALS

R12 Novel Tissue Engineered Biomaterial for Regeneration of Focal Femoral Condyle Osteochondral Defects

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R13 Micro/Nano Analysis of Human Surgical Mesh Explants

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¹Department of Mechanical Engineering and NanoTech Institute, The University of Texas at Dallas, Richardson, TX, ²UT Southwestern Medical Center, Dallas, TX.

R14 Mechanical and Tribological Properties of Hybrid PVA Gels Prepared by Novel Lamination Methods

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R15 Real Time Analysis of Endothelial and Smooth Muscle Cell Growth Response toward Extracellular Matrix Materials

C. L. Meaney, G. T. Carroll, T. M. McGloughlin;
University of Limerick, IRELAND.

R16 Prediction and Validation of Post-Yield Behaviour of Trabecular Bone Using a Combined Plasticity and Damage Mechanics Approach

C. Chandel¹, R. Wallace², P. Mahajan³, P. K. Srivastava¹, P. Pankaj²;

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R17 Mechanical and Biological Characteristics of New Porous Magnesia- and Yttria-Stabilized Zirconia Ceramics

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University of Crete, Heraklio, GREECE.

R18 Reconciling Theoretical Prediction and Experimental Measurement Of Gold Nanoparticle Optical Properties For Biomedical Applications

Z. Qin¹, J. Randrianalisoa², W. Lipinski³, J. Bischof¹;
¹University of Minnesota, Minneapolis, MN, ²University of Reims, FRANCE, ³Australia National University, Canberra, AUSTRALIA.

R19 Peptide Grafted Aligned Collagen Fiber Scaffolds for Nerve Tissue Engineering

C. J. Lowe, D. I. Shreiber;
Rutgers University, Piscataway, NJ.

R20 Mechanical Evaluation of a Silver-Doped Antimicrobial Bone Cement

J. Slane, J. Vivanco, M. Squire, H. Ploeg;
University of Wisconsin-Madison, WI.

R21 Novel high strength lithium aluminosilicate (LAS)-based glass-ceramics for dental applications

A. Feteira;
Sheffield Hallam University, UNITED KINGDOM.

BIOMECHANICAL INSTRUMENTATION

R22 Marker based Method to measure Movement between Residual Limb and a Transtibial Prosthetic Socket

W. L. Childers¹, J. Lee², S. Siebert³;
¹Alabama State University, Montgomery, AL, ²Phoenix Nuclear Labs Inc., Madison, WI, ³Georgia Institute of Technology, Atlanta, GA.

R23 On Developing a Stability Assessment System for Activities of Daily Living

Y. Lee, B. Yang;
National Chiao Tung University, Hsinchu, TAIWAN.

R24 Real-time Spatial Tracking Enables Quantitative Touch Sensitivity Assays of *C. elegans*

E. A. Mazzochette, K. Jung, B. Huynh, M. B. Goodman, B. L. Pruitt;
Stanford University, Stanford, CA.

BIOMECHANICS OF FLIGHT & SWIMMING

R25 Measuring Induced Drag from the Wake of a Gliding Jackdaw (*Corvus monedula*)

M. Klein Heerenbrink;
Lund University, SWEDEN.

R26 Measuring and modeling wing deformation of a hovering hawkmoth *Agrius convolvuli*

R. Noda, M. Maeda, H. Liu;
Graduate School of Engineering, Chiba University, JAPAN.

R27 Multi-objective Optimization of Flight Morphology in Soaring Birds

G. K. Taylor, A. L. R. Thomas;
University of Oxford, UNITED KINGDOM.

R28 Predicting Fruit Fly's Sensing Rate From Insect Flight Simulations

J. Wang, S. Chang;
Cornell University, Ithaca, NY.

R29 Microtomographic reconstruction of the haltere kinematics of the blowfly

P. Christen, S. M. Walker, G. K. Taylor;
University of Oxford, UNITED KINGDOM.

R30 X-ray Based Reconstruction of Proximal Wing Muscle Tendon Unit Mechanics in Bat Flight

N. Konow, T. J. Roberts, S. M. Swartz;
Brown University, Providence, RI.

R31 Optimization of Flapping Wing Kinematics with a CFD-Informed Quasi-Steady Model

T. Nakata¹, H. Liu², R. J. Bomphrey¹;
¹The Royal Veterinary College, Hatfield, UNITED KINGDOM, ²Chiba University, JAPAN.

R32 Natural Variation and Biomechanical Modeling: Methodologies for Improving Our Simulations of Natural Phenomena

D. Cook, M. Julias, D. Robertson;
New York University Abu Dhabi, New York, NY.

R33 Volumetric Analysis of Fish Wake Momentum using Synthetic Aperture PIV

L. Mendelson, A. H. Techet;
Massachusetts Institute of Technology, Cambridge, MA.

R34 Multi-fin kinematics and hydrodynamics of pufferfish swimming

L. Li¹, G. Li², Z. Wang³, H. Liu²;
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BIOSENSORS

R35 Reduction of sEMG Crosstalk Contamination During Gait: Influence of Inter-electrode Spacing

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¹Boston University, MA, ²Delsys, Inc., Natick, MA.

BONE

R36 Mechanical Loading and Exposure to Big Endothelin-1 Increases Bone Formation in Ex Vivo Bovine Trabecular Cores

L. A. Meyer¹, M. G. Johnson¹, D. M. Cullen², J. F. Vivanco¹, E. L. Smith¹, H. Ploeg¹;
¹University of Wisconsin - Madison, WI, ²Creighton University, Omaha, NE.

R37 Local Ultrastructure Orientation of a Complete Bone Trabecula Assessed by 3D sSAXS and Integration into Finite Element Analysis

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R38 Modeling the Mechanical Behaviour of Paediatric Femora under Four-point Bending

X. Li¹, M. Viceconti¹, G. C. Reilly², M. J. Carré¹, A. C. Offiah³;
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R39 Multiscale Comparison of Brittle and Ductile Cortical Bone

N. Rodriguez-Florez¹, E. Garcia-Tunon¹, A. Carriero¹, Q. Mukadam¹, J. L. Bruse¹, E. Saiz¹, S. J. Shefelbine²;
¹Imperial College London, UNITED KINGDOM, ²Northeastern University, Boston, MA.

R40 Long Bone Alignment For Mechanical Testing: Optimisation From Geometrical Properties

V. S. Cheong, A. M. J. Bull;
Imperial College London, UNITED KINGDOM.

R41 Micromechanical Anisotropy in Mouse Cortical Bone Using Nanoindentation

M. Casanova¹, A. Balmelli¹, D. Courty², P. Schneider³, R. Müller¹;
¹Institute for Biomechanics, ETH Zurich, SWITZERLAND, ²Laboratory for Nanometallurgy, ETH Zurich, SWITZERLAND, ³Faculty of Engineering and the Environment, University of Southampton, UNITED KINGDOM.

R42 Mineral Density and Microhardness of Children Cortical Bone

E. LEFEVRE¹, F. DUBOEU², S. RIZZO², C. BARON¹, H. FOLLET², M. PITHIOUX¹;
¹Aix-Marseille Université, FRANCE, ²Pathophysiology, Diagnosis and Treatments of Bone Disease, University of Lyon, FRANCE.

R43 Real time simulations of bone remodeling predictions: an improvement of actual numerical analyses

M. Perez, Mrs., K. Mohaghegh, J. García-Aznar;
University of Zaragoza, SPAIN.

R44 Oscillatory fluid flow enhances production of mineralized matrix by mesenchymal progenitor cells on biodegradable electrospun scaffolds

S. Puwanun¹, R. D. Smith², S. MacNeil¹, G. Reilly³;
¹Kroto Research Institute, University of Sheffield, UNITED KINGDOM, ²Barts Cancer Institute, Queen Mary, University of London, UNITED KINGDOM, ³INSIGNEO institute for in silico medicine, University of Sheffield, UNITED KINGDOM.

R45 Plastics properties of cortical bone depend on collagen cross-links

J. Berteau¹, E. Gineyts², M. Pithioux¹, C. Baron¹, H. Follet², P. Lasaygues¹, P. Chabrand¹, G. Boivin²;
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R46 Mechanical Properties of Wild type and Craniosynostotic Mouse Skulls

M. Moazen¹, E. Pauws², E. Peskett², A. O. M. Wilkie³, M. J. Fagan¹;
¹University of Hull, UNITED KINGDOM, ²University College London, UNITED KINGDOM, ³University of Oxford, UNITED KINGDOM.

R47 Micro-CT study of trabecular fracture.

S. Tassani¹, G. K. Matsopoulos²;
¹Biomechanics and Mechanobiology, Institute for Bioengineering of Catalonia (IBEC), Barcelona, SPAIN, ²National Technical University of Athens, GREECE.

R48 Real Wet Density of Bone Tissue: does It depend on Tissue Type and Subject?

M. Baleani¹, R. Fognani¹, C. Fersini¹, C. Öhman², C. Spagnolo¹, G. Ridolfi³, S. Fazio³, F. Baruffaldi¹;
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R49 Rescuing Osteoporotic Bone in Spinal Cord Injury Patients

A. E. Draghici, S. J. Shefelbine;
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R50 RNASeq Analysis of Gene Expression in Murine Hind Limb Unloading Disuse Induced Bone Loss

J. M. Spatz¹, U. M. Ayturk², M. van Vliet³, D. J. Brooks³, R. Ellman³, M. L. Warman², M. L. Bouxsein³;
¹MIT, Cambridge, MA, ²Childrens Hospital, Boston, MA, ³Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, MA.

R51 Role of Density-Modulus Relationship in Predicting Tibial Subchondral Bone Stiffness Using Quantitative Computed Tomography based Finite Element Technique

S. M. Nazemi¹, M. Amini¹, S. A. Kontulainen¹, J. S. Millner², D. W. Holdsworth², D. R. Wilson³, J. D. Johnston¹;
¹University of Saskatchewan, Saskatoon, SK, CANADA, ²Robarts Research Institute, Western University, London, ON, CANADA, ³University of British Columbia and VCHRI Centre for Hip Health and Mobility, Vancouver, BC, CANADA.

R52 Multiple Freeze-Thaw Cycles Alter Nanoscale Viscoelastic Properties of Cancellous Bone

A. K. Landauer, S. Mondal, P. A. Yuya, L. Kuxhaus;
Clarkson University, Potsdam, NY.

R53 Relationship between in vivo and finite element analysis involving the alveolar bone mechanobiology in overload conditions - a pilot study in rats

A. R. Freire, A. C. Rossi, F. B. Prado, P. H. F. Caria;
Piracicaba Dental School, State University of Campinas - UNICAMP, Piracicaba, BRAZIL.

R54 Nanomechanics of ultrastructural deformation of bone under different loading conditions using synchrotron X-ray scattering techniques

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¹University of Texas at San Antonio, TX, ²Argonne National Laboratory, Lemont, IL.

R55 Relationship Between Kirschner (K-) Wire Extraction Force, Micro-indentation Parameters, and Bone Mineral Density (BMD)

A. Dincer¹, S. C. Denning¹, R. C. Pisano, III¹, T. R. Bowen², E. A. Kennedy¹, D. M. Ebenstein¹;
¹Bucknell University, Lewisburg, PA, ²Geisinger Health System, Danville, PA.

R56 Micro-scale modelling of crack propagation in brittle bone

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¹Imperial College London, UNITED KINGDOM, ²Northeastern University, Boston, MA.

R57 Reference Probe Indentation of Trabecular and Cortical Bone

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R58 On the Coherence of DIC-measured and MicroFE-predicted Displacement Fields in Human Trabecular Bone: a Preliminary Study

C. E. Lavecchia, M. Pani, L. Falco, G. Iori, E. Schileo, F. Baruffaldi, M. Baleani, F. Taddei;
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BRAIN

R59 Mechanism for retrograde flow of lymph in arterial basement membranes in the brain

M. K. Sharp¹, A. K. Diem², R. O. Weller², R. Carare²;
¹University of Louisville, KY, ²University of Southampton, UNITED KINGDOM.

CARDIOVASCULAR FLUIDS

R60 Wall Shear Stress Calculations based on 3D Cine Phase Contrast MRI and Computational Fluid Dynamics: a Comparison Study in Healthy Carotid Arteries

M. Cibis¹, W. Potters², F. J. H. Gijzen¹, H. Marquering², E. vanBavel², A. F. van der Steen¹, A. J. Nederveen², J. J. Wentzel¹;
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R61 Relative Constancy in Fetal Great Arterial Hemodynamic Wall Shear Environment

C. Yap¹, X. Liu², K. Pekkan³;
¹National University of Singapore, SINGAPORE, ²University of Pittsburgh School of Medicine, PA, ³Carnegie Mellon University, Pittsburgh, PA.

R62 Predicting Outcome of Type B Aortic Dissection with Patent False Lumen by Computational Flow Analysis

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R63 Quantification of coronary hemodynamic forces on atherosclerotic plaques in patient-specific models derived from CT, IVUS and FFR data

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¹HeartFlow, Inc., Redwood City, CA, ²Seoul National University Hospital, Seoul, REPUBLIC OF KOREA.

R64 Prediction of Post Surgery Rupture for Multiple Aortic Aneurysm by Computational Fluid Dynamics

Y. Otsuki¹, N. Bui Minh², H. Ohtake³, G. Watanabe³, T. Matsuzawa¹;

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R65 Predictive modeling of the flow in cerebral aneurysms following surgical procedures

V. L. Rayz, M. T. Lawton, A. Abla, V. Halbach, G. Acevedo-Bolton, D. Saloner;

University of California San Francisco, CA.

R66 Pulse Propagation in the Pulmonary Circulation

N. A. Hill¹, M. U. Qureshi¹, M. S. Olufsen², G. D. A. Vaughan¹, C. S. Peskin³, C. Sainsbury¹, M. Johnson⁴;

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R67 Quantification of Cardiac Afterload due to the Observation of Proximal Helical and Vortical Aortic Blood Flow with 4D Flow MRI

A. J. Barker, P. van Ooij, J. Garcia, A. Powell, K. Bandi, J. Collins, J. Carr, M. Markl, S. Malaisrie;

Northwestern University, Chicago, IL.

R68 Numerical Investigation on Hemodynamic Causes of Intraluminal Thrombus Formation

P. Di Achille¹, C. A. Figueroa², G. Tellides¹;

¹Yale University, New Haven, CT, ²King's College London, UNITED KINGDOM.

R69 Effect of Bifurcation Angle on the Functional Impact of Coronary Bifurcation Lesions

C. Pagiatakis, R. Mongrain;

McGill University, Montreal, QC, CANADA.

R70 Numerical Resolution Requirements for Convergence of Wall Shear Stresses in Intracranial Aneurysms

M. O. Khan, K. Valen-Sendstad, D. A. Steinman;

University of Toronto, ON, CANADA.

R71 Wall Shear Stress Distributions of Implantable Artificial Kidney Models

A. K. W. Buck¹, J. J. Groszek¹, S. Roy², W. Fissell¹;

¹Vanderbilt University, Nashville, TN, ²University of California, San Francisco, CA.

R72 On the Evolution of Pulsatile Flow Subject to a Transverse Impulse Body Force

G. Di Labbio, Z. Keshavarz-Motamed, L. Kadem;

Concordia University, Montréal, QC, CANADA.

R73 Patient specific modeling of intra-aneurysmal hemodynamics pre and post flow diversion using CFD and angiographic washout analysis

R. J. Dholakia, C. Sadasivan, D. J. Fiorella, H. H. Woo, B. B. Lieber;

Stony Brook University, Stony Brook, NY.

R74 Performance of Bileaflet Mechanical Heart Valves with Vortex Generators

M. Forleo, L. P. Dasi;

Colorado State University, Fort Collins, CO.

R75 Right Heart Vorticity in Subjects with Right Ventricular Diastolic Dysfunction

J. Browning¹, B. Fenster², J. Hertzberg¹, J. Schroeder²;

¹University of Colorado, Boulder, CO, ²National Jewish Health, Denver, CO.

R76 Numerical Analysis of the Effect of Aortic Valvular Flow on FFR Value of Stenosed Coronary Artery

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CARDIOVASCULAR SOLIDS

R77 Mechanical, Biological and Structural Characterisation of In Vitro Human Carotid Plaque Tissue

J. J. Mulvihill¹, E. M. Cunnane¹, H. E. Barrett¹, E. G.

Kavanagh², M. T. Walsh¹;

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R78 Myocardial Tissue Mechanics with Fibres Modelled as One-Dimensional Cosserat Continua

K. Sack¹, S. Skatulla¹, T. Franz¹, C. Sansour²;

¹University of Cape Town, SOUTH AFRICA, ²The University of Nottingham, UNITED KINGDOM.

R79 On the Influence of Invariants in Anisotropic Hyperelastic Modelling of Fibre Reinforced Materials

D. R. Nolan, A. L. Gower, M. Destrade, R. W. Ogden, P. McGarry;

NUI, Galway, IRELAND.

R80 Voxel Size and Anisotropy in Carotid MRI: Impact on Computing Peak Cap Stress

H. A. Nieuwstadt¹, Z. A. M. Kassab¹, A. van der Lugt¹, M. Breeuwer², A. F. W. van der Steen¹, J. J. Wentzel¹, F. J. H. Gijssen¹;

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R81 Patient Specific Modelling of Abdominal Aortic Aneurysms: Influence of Wall Thickness on Stress Distribution.

N. Conlisk, D. E. Newby, P. R. Hoskins;
The University of Edinburgh, UNITED KINGDOM.

R82 Mechanical Properties and Structural Characteristics of Healthy and Diseased Human Femoropopliteal Arteries From Multiple Age Groups

A. Kamenskiy¹, Y. Dzenis², K. Herber³, T. Woodford³, R. Bowen⁴, J. Kitson¹, I. Pipinos¹, N. Phillips⁴, B. Baxter¹, M. Moulton¹, J. MacTaggart¹;

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R83 Optimizing Textile Architectures to Improve the Mechanical Behaviour of Textile Aortic Prostheses

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R84 Relating Collagen Parameters and Material Properties in the Fibrous Cap of Atherosclerotic Plaques

G. R. Douglas, Z. Teng, J. H. Gillard, M. P. F. Sutcliffe;
University of Cambridge, UNITED KINGDOM.

R85 Modeling Of Blood Vessel Age-Dependent Properties

H. Xu, C. Martin, W. Sun;
Georgia Institute of Technology, Atlanta, GA.

R86 Regional Variations in the Biomechanics and Microstructure of Central Arteries from Fibulin-5 Null Mice

J. Ferruzzi¹, M. R. Bersi¹, H. Yanagisawa²;
¹Yale University, New Haven, CT, ²UT Southwestern Medical Center, Dallas, TX.

R87 Numerical analysis of the residual strain in artery wall

x. Xiao, t. Guo;
Harbin Institute of Technology Shenzhen Graduate School, Shenzhen, CHINA.

R88 Mechanical Characteristics of the Developing Cerebral Vasculature

K. Nye, K. Monson;
University of Utah, Salt Lake City, UT.

CARTILAGE

R89 Lower-extremity Joint Moments Can Be Used To Predict Articular Cartilage Metabolism Associated With Running

W. M. Denning, J. G. Winward, M. Becker Pardo, A. C. Parcell, J. T. Hopkins, C. S. Reese, M. K. Seeley;
Brigham Young University, Provo, UT.

R90 Nanomechanical Phenotype of BMP-2 Deficient Murine Meniscus Superficial Layer

Q. Li¹, L. W. Gamer², B. Doyran¹, K. Spiller¹, J. Yin³, A. J. Grodzinsky⁴, V. Rosen², L. Han¹;
¹Drexel University, Philadelphia, PA, ²Harvard School of Dental Medicine, Boston, MA, ³Temple University, Philadelphia, PA, ⁴Massachusetts Institute of Technology, Cambridge, MA.

R91 Novel Technique to Map the Biomechanical Properties of Entire Articular Surfaces Using Indentation to Identify Degenerated (Osteoarthritis-like) Cartilage

S. Sim¹, A. Chevrier¹, M. Garon², E. Quenneville², M. D. Buschmann¹;

¹École polytechnique de Montreal, QC, CANADA, ²Biomomentum Inc., Laval, QC, CANADA.

CELL MEMBRANE & MATRIX

R92 Probing the Bilayer-Cytoskeletal Interactions in Red Blood Cells by a Two-Component Dissipative Particle Dynamics Model

Z. Peng¹, X. Li², I. Pivkin³, G. Karniadakis²;

¹Massachusetts Institute of Technology, Cambridge, MA, ²Brown University, Providence, RI, ³University of Lugano, SWITZERLAND.

R93 Modeling Band-3 Diffusion in Defective Red Blood Cell Membrane

G. Lykotrafitis, H. Li;
University of Connecticut, Storrs, CT.

R94 Regulation of SK Channel Expression by Protein Kinase A

K. Abiraman, A. Tzingounis, G. Lykotrafitis;
University of Connecticut, Storrs, CT.

R95 The Effects of Age on Extracellular Matrix Remodeling in an Ex Vivo Artery Model

J. C. Kohn, J. Huynh, S. Bajpai, N. Nishimura, C. A. Reinhart-King;
Cornell University, Ithaca, NY.

COLLAGEN STRUCTURE & MECHANICS

R96 Mechanical Analysis of the Optimal Fibre Orientation in Human Iliac Arteries Using the κ - ρ Model

N. Qi¹, H. Gao¹, R. W. Ogden¹, N. A. Hill¹, G. A. Holzapfel², H. C. Han³, X. Y. Luo¹;

¹University of Glasgow, UNITED KINGDOM, ²Graz University of Technology, AUSTRIA, ³The University of Texas at San Antonio, TX.

R97 Multiscale Model of Glomerular Basement Membrane Mechanics

L. Gyoneva, M. Hadi, Y. Segal, K. Dorfman, V. H. Barocas; University of Minnesota, Minneapolis, MN.

R98 Monitoring Collagen Fibrillogenesis with Circular Dichroism Spectroscopy.

K. E. Drzewiecki, A. Parmar, V. Nanda, D. I. Shreiber; Rutgers University, Piscataway, NJ.

COMPUTATIONAL BIOMECHANICS

R99 Parameter estimation in patient-specific lumped parameter models of single-ventricle circulation

A. Baretta¹, D. Schiavazzi², A. Marsden², T. Hsia³, F. Migliavacca¹, G. Pennati¹;

¹Politecnico di Milano, ITALY, ²University of California San Diego, CA, ³Great Ormond Street Hospital, London, UNITED KINGDOM.

R100 Novel Virtual Surgery Method for the Development of Patient-Specific Finite Element Models to Assess Post-TKR Bone Remodeling

J. P. Spalazzi¹, C. Taff¹, B. Larson², W. Schmidt¹;

¹Stryker Orthopaedics, Mahwah, NJ, ²Alpine Orthopaedic Specialists, North Logan, UT.

R101 Modelling Large Deformation Mechanics of Ideally Incompressible Soft Tissues Using the Element-Free Galerkin (EFG) Method.

C. M. Goh, T. P. Babarenda Gamage, D. T. K. Malcolm, P. M. F. Nielsen, M. P. Nash;

Auckland Bioengineering Institute, University of Auckland, NEW ZEALAND.

R102 Quantifying Soft Tissue Artefacts on the Shoulder Complex Motion Using Bi-planar Videoradiography

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¹Auckland Bioengineering Institute, University of Auckland, NEW ZEALAND, ²University of Auckland, NEW ZEALAND, ³Warren Alpert Medical School of Brown University, Providence, RI.

R103 Muscle Force Alterations Due to ACL-Deficient Gait - A Simulation Approach

S. Horibata¹, A. Mahboobin², R. E. Debski², H. Fujie¹;

¹Tokyo Metropolitan University, JAPAN, ²University of Pittsburgh, PA.

R104 Novel Submodeling Approach to Investigate Local Cartilage Responses in a Knee Joint - Importance of Patient-Specific Collagen Architecture

L. P. Räsänen¹, M. E. Mononen¹, E. Lammentausta², M. Nieminen³, J. Jurvelin¹, R. Korhonen¹;

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R105 OPTIMAL INVERSE DYNAMIC SIMULATION APPLIED TO A HIP DYSPLASIA PATIENT

R. Fluit¹, M. S. Andersen², M. M. van der Krogt³, N. Verdonshot⁴, H. F. J. M. Koopman¹;

¹University of Twente, Enschede, NETHERLANDS, ²Aalborg University, DENMARK, ³VU University Medical Center, Amsterdam, NETHERLANDS, ⁴Radboud University Medical Centre, Nijmegen, NETHERLANDS.

R106 Quantitative Diagnosis of Prostate Cancer using Viscoelastic Characterization under Mechanical Palpation.

J. Palacio Torralba, R. L. Reuben, Y. Chen; Heriot-Watt University, Edinburgh, UNITED KINGDOM.

R107 Optimized patient-specific implants

M. Roland¹, T. Dahmen², T. Tjardes³, R. Otchwemah³, P. Slusallek², S. Diebels¹;

¹Saarland University, Saarbrücken, GERMANY, ²DFKI GmbH German Research Center for Artificial Intelligence, Saarbrücken, GERMANY, ³Kliniken der Stadt Köln, Köln, GERMANY.

R108 Probabilistic Evaluation of the Effects of Measurement Error and Parameter Uncertainty on Hip Joint Kinematics and Kinetics

C. A. Myers, P. J. Laz, K. B. Shelburne, B. S. Davidson; University of Denver, CO.

R109 Quantitative Validation of a Finite Element Model of the Upper Cervical Spine

J. S. Coogan¹, T. D. Eliason¹, T. L. Bredbenner¹, B. H. Thacker¹, B. D. Stemper², N. Yoganandan², F. A. Pintar², G. R. Paskoff³, B. S. Shender³, D. P. Nicoletta¹;

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R110 Predictive Models and Energy Optimizations for Ankle-Foot Prosthesis Design

M. L. Handford, M. Srinivasan;

The Ohio State University, Columbus, OH.

R111 Micro-mechanical Property & Micro-computed Tomography-based Finite Element Modeling of Woodpecker's Cranial Bone

Y. Ni, L. Wang, Y. Fan*;

Key Laboratory for Biomechanics and Mechanobiology of Ministry of Education, School of Biological Science and Medical Engineering, Beihang University, Beijing, CHINA.

R112 Prediction of In Vivo Knee Kinematics of a Knee Implant Using a Simplified Passive-Elastic Model and Force-Dependent Kinematics

V. Vanheule¹, M. S. Andersen², R. Wirix-Speetjens³, I. Jonkers⁴, J. Victor⁵, J. Vander Sloten¹;

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R113 Mechanics of hip dysplasia reduction in infants using the Pavlik harness on patient specific geometry

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¹University of Central Florida, Orlando, FL, ²Embry Riddle Aeronautical University, Daytona, FL, ³International Hip Dysplasia Institute, Orlando, FL.

R114 Robustness of policy learning for optimal control of motion of tendon-driven systems

J. Rocamora¹, J. Buchli², F. J. Valero-Cuevas¹;

¹University of Southern California, Los Angeles, CA, ²ETH, Zürich, SWITZERLAND.

R115 Predicting Unmeasured Muscle Excitations from Measured Muscle Synergies

N. A. Bianco, A. L. Kinney, B. J. Fregly;

University of Florida, Gainesville, FL.

R116 Muscle Contributions to Body Center-of-Mass Acceleration During Sloped Walking

N. T. Pickle¹, A. M. Grabowski², A. G. Auyang², A. K. Silverman¹;

¹Colorado School of Mines, Golden, CO, ²University of Colorado Boulder, CO.

R117 Pressure Increase after Stent intervention Treatment for a Giant Aneurysm Accompanied by a Stenosis

W. Fu¹, H. Lei², Z. Liu², E. Tian², A. Qiao³;

¹Beijing Union University; Beijing University of Technology, CHINA, ²Beijing Union University, CHINA, ³Beijing University of Technology, CHINA.

R118 Prophylactic Knee Bracing Alters Lower-limb Muscle Forces during a Stop-Jump, but Are They Effective in Preventing Injury?

K. A. Ewing¹, R. K. Begg², P. V. Lee¹;

¹University of Melbourne, AUSTRALIA, ²Victoria University, Melbourne, AUSTRALIA.

R119 Multi-scale skeletal muscle simulation with account of stochastic sarcomere kinetics

N. Yamamura, K. Shimizu, S. Takagi;

The University of Tokyo, Bunkyo-ku, JAPAN.

R120 Numerical investigations of military loadings: human body trauma related to blast loadings.

A. Awoukeng-Goumtcha¹, K. Thorai-Pierre², s. ROTH¹;

¹University of Technology of Belfort-Montbéliard, Belfort, FRANCE, ²CEDREM, Neung-sur-Beuvron, FRANCE.

R121 Multidimensional models for predicting structural parameters during isotonic and isokinetic movements in man

A. Randhawa, J. Wakeling;

Simon Fraser University, Burnaby, BC, CANADA.

COMPUTATIONAL METHODS

R122 Precise Marker Placement Produces Good Intra- and Inter-rater Reliability of Lower Extremity Joint Angles During Motion Analysis

J. Lester¹, E. Hartigan², M. Lawrence²;

¹University of New England, Biddeford, ME, ²University of New England, Portland, ME.

R123 Modelling the Mixing of Gases within the Dead Space of the Lungs

C. D. Harrison, P. Phan, A. D. Andrew, S. J. Payne;

University of Oxford, UNITED KINGDOM.

R124 Modeling stented compliant coronary arteries: a fluid-structure interaction study

C. Chiastra¹, M. Malvè², M. Á. Martínez³, F. Migliavacca¹;

¹Laboratory of Biological Structure Mechanics (LaBS), Chemistry, Materials and Chemical Engineering Department, Milan, ITALY, ²Departamento de Ingeniería Mecánica, Energética y de Materiales, Universidad Pública de Navarra, Pamplona, SPAIN, ³Aragón Institute of Engineering Research (I3A), Universidad de Zaragoza, SPAIN.

R125 Performance-based Cost Functions for Simulating Submaximal Pedaling

A. D. Gidley¹, B. R. Umberger¹, A. P. Marsh²;

¹University of Massachusetts, Amherst, MA, ²Wake Forest University, Winston-Salem, NC.

R126 On Integration of CAD Models with 3D Image Data for Biomedical Simulations

S. Paranjape¹, V. B. Xuan¹, D. Raymont¹, P. Young²;

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R127 Rapid Virtual Deployment of Flow-Diverter in Patient Specific Aneurysm

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¹University at Buffalo, The State University of New York, Buffalo, NY, ²School of Biomedical Engineering, Capital Medical University, Beijing, CHINA, ³Beijing Neurosurgical Institute, Beijing Tiantan Hospital, CHINA.

R128 Predicting Knee Joint Contact Pressure for Different Malalignment Deformities

F. Reisse¹, H. J. Hillstrom², R. W. Walker¹, D. Carpanen¹, M. W. Lenhoff², C. W. Imhauser², M. F. Koff², S. R. Rozbruch², J. K. Dowell³, R. Mootanah¹;

¹Anglia Ruskin University, Chelmsford, UNITED KINGDOM, ²Hospital for Special Surgery, New York, NY, ³Mid-Essex Hospital Services Trust, Chelmsford, UNITED KINGDOM.

R129 Modelling the Effects of Fluid Flow and Cell Seeding on Cell Proliferation in a Hollow Fibre Bioreactor

L. A. C. Chapman¹, R. J. Shipley², J. P. Whiteley¹, M. J. Ellis³, H. M. Byrne¹, S. L. Waters¹;

¹University of Oxford, UNITED KINGDOM, ²University College London, UNITED KINGDOM, ³University of Bath, UNITED KINGDOM.

R130 Optimal Marker Weightings In Local Optimization Are Subject- And Movement-Specific

M. Begon¹, T. Monnet², A. Thouz  ³, A. Arndt⁴, A. Lundberg⁴;

¹Universit   de Montr  al, Laval, QC, CANADA, ²Universit   de Poitiers, FRANCE, ³Universit   de Montr  al, QC, CANADA, ⁴Karolinska Institutet, Stockholm, SWEDEN.

R131 Risk of fracture modelling in healthy and osteoporotic tibia

M. K. Gislason¹, S. Coupaud², K. Sasagawa³, Y. Tanabe³, M. Purcell⁴, D. Allan⁴, E. Tanner⁵;

¹Reykjavik University, Reykjavik, ICELAND, ²University of Strathclyde, Glasgow, UNITED KINGDOM, ³Niigata University, JAPAN, ⁴Southern General Hospital, Glasgow, UNITED KINGDOM, ⁵University of Glasgow, UNITED KINGDOM.

R132 Portal Vein Hemodynamics During Eating Simulation Using MRI and CFD

L. M. Eckert, M. Sinha, S. M. George;
East Carolina University, Greenville, NC.

R133 Optimization of Revision Press-Fit Stem Design Based on Clinical and Mechanical Objectives.

F. Leszko¹, U. Ghosh², M. Heldreth¹;

¹DePuy Synthes Joint Reconstruction, Warsaw, IN, ²Tata Consultancy Services, Kolkata, INDIA.

R134 Nonlinear Derating Method for Estimating the HIFU Induced Temperature Rise in a Tissue Medium

S. A. R. Dibaji¹, M. R. Myers², J. E. Soneson², R. K. Banerjee¹;

¹University of Cincinnati, OH, ²U. S. Food and Drug Administration, Silver Spring, MD.

R135 Phosphoproteomic profiling of cell adhesion effects to signal transduction

D. S. Tzeranis¹, M. Ioannou¹, I. Preza¹, I. V. Yannas², L. G. Alexopoulos¹;

¹National Technical University of Athens, Zografou, GREECE, ²Massachusetts Institute of Technology, Cambridge, MA.

R136 Nitric Oxide Modulation of Vasoconstriction controls lymphatic pumping

C. Kunert¹, J. Baish², T. P. Padera¹, L. L. Munn¹;

¹Mass. General Hospital/ Harvard Medical School, Boston, MA, ²Bucknell University, Lewisburg, PA.

R137 Mathematical Modeling and Simulations of the Blood Flow Impact on Thrombus Growth

J. Pavlova¹, A. Fasano², J. Janela³, A. Sequeira⁴;

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R138 Polarity of actin depolymerization kinetics and mechanical reinforcement under cyclic tensile forces

H. Lee, C. Zhu, L. V. McIntire;

Georgia Institute of Technology, Atlanta, GA.

CYTOSKELETON

R139 Viscoelastic retraction of single stress fibers in myoblasts under oxidative stress

Z. Ma, Y. Wu, A. Mak;

The Chinese University of Hong Kong, HONG KONG.

R140 Mechano-chemical model for smooth muscle cells

H. Lopez-Mendez¹, J. F. Rodriguez²;

¹Aragon Institute of Engineering Research, University of Zaragoza, SPAIN, ²Aragon Institute of Engineering Research, University of Zaragoza / CIBER-BBN, SPAIN.

DENTAL, ORAL, & MAXILLOFACIAL BIOMECHANICS

R141 Modeling the Biomechanics of Reconstructive Plastic Surgery: A Simplified Model Enables Analysis of Anatomical Variability

J. M. Inouye, C. M. Pelland, K. Y. Lin, K. C. Borowitz, CCC-SLP, S. S. Blemker;

University of Virginia, Charlottesville, VA.

R142 Numerical Investigations of Lower Overdentures Supported by Conventional or Mini-Implants: Finite Element Study

I. Hensch¹, I. Hasan¹, F. Heinemann², L. Keilig¹, C. Bouraue¹;

¹University of Bonn, GERMANY, ²University of Greifswald, GERMANY.

R143 Photoelastic and finite element analyses in human elderly edentulous mandible under symphysis loads

F. B. Prado, A. R. Freire, L. S. M. Santos, F. C. Groppo, L. Correr Sobrinho, P. H. F. Caria, A. C. Rossi; Piracicaba Dental School, State University of Campinas - UNICAMP, Piracicaba, BRAZIL.

R144 Real-Time Cephalometrics Analysis for Planning and Guidance of Craniomaxillofacial Transplantation Surgery

E. Basafa¹, R. Murphy², G. Grant³, G. Santiago⁴, C. Gordon⁴, M. Armand²;

¹Johns Hopkins University, Baltimore, MD, ²Johns Hopkins University Applied Physics Laboratory, Laurel, MD, ³Walter Reed National Military Medical Center, Bethesda, MD, ⁴Johns Hopkins University School of Medicine, Baltimore, MD.

ERGONOMICS AND HUMAN FACTORS

R145 Muscular Activity while Sitting on a Novel Dynamic Office Chair

R. P. Kuster, S. Schelldorfer, D. Baumgartner, J. Kool; ZHAW Zurich University of Applied Sciences, Winterthur, SWITZERLAND.

R146 Obesity-related Differences in Postural Stability during Lifting

M. Pajoutan¹, X. Xu², L. A. Cavuoto¹;

¹University at Buffalo, NY, ²Liberty Mutual Research Institute for Safety, Hopkinton, MA.

R147 Low Back and Shoulder Demand and its Association with Pain Reporting Among Baristas

S. Dainty¹, E. Alcorn¹, C. Ferguson², D. Gregory¹;

¹Wilfrid Laurier University, Waterloo, ON, CANADA, ²McMaster University, Hamilton, ON, CANADA.

R148 Low Back Pain Development During Standing Predicts Future Clinical Low Back Pain in Previously Asymptomatic Individuals

E. Nelson-Wong¹, J. P. Callaghan²;

¹Regis University, Denver, CO, ²University of Waterloo, ON, CANADA.

R149 Muscle Activity during Balance Perturbations in Occupational Footwear

H. Chander¹, C. Wade², J. Garner¹, C. Allen¹, V. Cazas¹, J. Lundahl¹;

¹University of Mississippi, University, MS, ²Auburn University, Auburn, AL.

R150 Obesity Increases Fall Risk After Slipping Among Young Adults

L. J. Allin, X. Wu, M. A. Nussbaum, M. L. Madigan; Virginia Tech, Blacksburg, VA.

R151 Quantification of 3D Trunk Posture in Daycare Workers - Preliminary Results

A. Labaj¹, T. Diesbourg¹, G. Dumas¹, A. Plamondon², H. Mercheri², C. Larue²;

¹Queen's University, Kingston, ON, CANADA, ²IRSST, Montreal, QC, CANADA.

R152 Plantar Sensitivity is Impaired among Young Adults with High BMI

X. Wu, M. L. Madigan, M. Nussbaum; Virginia Tech, Blacksburg, VA.

R153 Maximum Acceptable Efforts for High Duty Cycle Tasks Based on a Psychophysical Study

M. Sonne, J. R. Potvin;

McMaster University, Hamilton, ON, CANADA.

R154 Postural Adaptation Strategies During Braced Exertions with Extended Reaches

J. A. M. Cappelletto, J. R. Potvin;

McMaster University, Hamilton, ON, CANADA.

R155 Maximum Resultant Shoulder Strength and the Prediction of Manual Arm Strength

N. J. La Delfa, J. R. Potvin;

McMaster University, Hamilton, ON, CANADA.

R156 Postural Demands of Police Work: A Field Investigation

M. M. Girouard¹, M. M. Rae¹, J. Croll¹, J. P. Callaghan², W. J. Albert¹;

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R157 Risk factors of Low Back Injury during Patient Handling Tasks

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R158 Lumbar Angle during Extension in Lifting can be Altered through Training

A. E. Riley, T. D. Craig, S. E. Wilson;

University of Kansas, Lawrence, KS.

R159 Quality considerations for the applied use of Laser Scan-extracted Anthropometric Measurements in Biomechanics and Ergonomics
I. Westhaver, M. Ladouceur, S. Grandy, J. W. Kozey;
Dalhousie University, Halifax, NS, CANADA.

R160 Lumbar Angle in the Extension Phase of Repetitive Lifting Increases Over Time
T. D. Craig, A. E. Riley, S. E. Wilson;
University of Kansas, Lawrence, KS.

R161 Minimum Time to Collision at Braking from the 100-Car Naturalistic Driving Study
J. Montgomery, K. D. Kusano, H. C. Gabler;
Virginia Tech, Blacksburg, VA.

EXPERIMENTAL METHODS

R162 New Microindentation Technique and Application to the Mechanics of Cell Membrane Rupture
D. Gonzalez-Rodriguez, L. Guillou, J. Lafaurie-Janvone, A. Babataheri, E. De Langre, A. I. Barakat, J. Husson;
Ecole Polytechnique, Palaiseau, FRANCE.

R163 Platforms for Investigating the Regulation of the Shape of Human Cardiomyocytes Differentiated from iPS Cells
A. K. Denisin¹, A. J. S. Ribeiro¹, Y. Ang², D. Srivastava², B. L. Pruitt¹;
¹Stanford University, Stanford, CA, ²Gladstone Institute of Cardiovascular Disease & University of California, San Francisco, CA.

R164 Optical Clearing of Collagen- and Proteoglycan-Rich Osteochondral Tissues
C. Neu, T. Novak, A. Ready, K. Fites, R. Main, S. Calve;
Purdue University, West Lafayette, IN.

FLUID-SOLID INTERACTIONS

R165 Numerical modeling of the upper airway narrowing with MR-elastography-inferred compliances
R. Fodil¹, P. Hagot², T. Doel³, E. Lamain⁴, L. Darrasse², X. Maître²;
¹CNRS UMR 8246 Inserm U1130, University-UPMC / ISBS, University-UPEC, Paris, FRANCE, ²University Paris-Sud, Orsay, FRANCE, ³University of Oxford, UNITED KINGDOM, ⁴University Paris-Sud, Hôpital Bicêtre, Le Kremlin-Bicêtre, FRANCE.

GENERAL ANIMAL LOCOMOTION

R166 Metabolic Efficiency in Four-Legged Locomotion-Respiration Coupling
K. R. Boldt, A. Killick, W. Herzog;
University of Calgary, AB, CANADA.

R167 Mechanics of Changing Speeds while Walking
N. Seethapathi, M. Srinivasan;
The Ohio State University, Columbus, OH.

R168 Mechanics of Confined Space Frictional Legged Crawling
K. Jayaram¹, D. I. Goldman², R. J. Full¹;
¹University of California Berkeley, CA, ²Georgia Institute of Technology, Atlanta, GA.

R169 Mechanical work at the ankle: a limit to walking capacity in chronic heart failure?
F. Panizzolo¹, A. J. Maiorana², L. H. Naylor¹, L. Dembo³, D. G. Lloyd⁴, D. J. Green¹, J. Rubenson¹;
¹The University of Western Australia, Perth, AUSTRALIA, ²Curtin University, Perth, AUSTRALIA, ³Envision Medical Imaging, Perth, AUSTRALIA, ⁴Griffith University, Gold Coast, AUSTRALIA.

R170 Model-based tools for decoupling the effects of internal and external forces on dynamic maneuvers.
T. Libby, R. J. Full;
Univ. California at Berkeley, CA.

R171 Pelvic limb joint loads in broiler chickens across ontogeny: implications for walking ability and lameness
H. Paxton, J. W. Rankin, J. R. Hutchinson;
Royal Veterinary College, Hatfield, UNITED KINGDOM.

GROWTH & REMODELING

R172 Numerical Modeling of the Aneurysmal Abdominal Aortic Wall
I. Karšaj¹, L. Virag², J. D. Humphrey³, G. A. Holzapfel¹;
¹TU Graz, AUSTRIA, ²University of Zagreb, CROATIA, ³Yale University, New Haven, CT.

R173 Mixed Porohyperelastic Transport Finite Element Model with Chemically-Driven Growth
M. Hine, J. Harper, B. Simon, J. Vande Geest;
University of Arizona, Tucson, AZ.

R174 Modelling the reorientation of endothelial cells in carotid bifurcation due to arterial flow
P. Saez¹, M. Malve², E. Peña¹, M. A. Martinez¹;
¹University of Zaragoza, SPAIN, ²Public University of Navarra, Pamplona, SPAIN.

R175 Parametric Investigation of Bone Remodeling Simulation in the Proximal Femur
Z. Lei¹, D. Wang¹, Y. Jiang¹, C. Wang², S. Chen²;
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HEART & HEART VALVE

R176 Parameter Estimation of Heart Valve Leaflet Hyperelastic Mechanical Behavior Using an Inverse Modeling Approach

A. Aggarwal, M. Sacks;
University of Texas at Austin, TX.

R177 Oscillatory Fluid-Induced Shear Stresses in Moving Engineered Valvular Tissues

M. Salinas, S. Ramaswamy;
Florida International University, Miami, FL.

R178 Patient specific multi-scale modeling of single ventricle heart mechanics.

A. Meoli¹, E. Cutri¹, A. Baretta¹, F. Migliavacca¹, A. L. Marsden², A. L. Dorfman³, A. M. Hlavacek⁴, A. M. Taylor⁵, R. S. Figliola⁶, G. Pennati¹;
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R179 PIV MEASUREMENTS OF A LEAKAGE FLOW NEAR-HINGE IN A SCALLED-UP ST. JUDE MEDICAL BILEAFLET MECHANICAL HEART VALVE HINGES MODEL

E. M. Klusak, N. J. Quinlan;
National University of Ireland, Galway, IRELAND.

R180 Post-infarct Mechanical Behaviour of Rat Myocardial Tissue under Biaxial Tension, Compression and Shear Loads

M. S. Sirry¹, R. Butler², S. S. Patnaik³, B. Brazile³, R. Bertucci³, A. Claude², R. McLaughlin², N. H. Davies¹, J. Liao³, T. Franz¹;
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R181 Prediction of Regional Wall-shear Stress on the Aortic Valve Leaflets Using Three-dimensional Fluid-structure Interaction Modeling

K. Cao, P. Sucosky;
University of Notre Dame, IN.

R182 Mechanical Stress Maybe a Predictor for Pulmonary Valve Replacement Surgery Outcome: A Multi-Patient Study Based on Pre- and Post-Operation Cardiac Magnet Resonance Image Data from Patients with Repaired Tetralogy of Fallot

H. Zuo¹, D. Tang², K. Billiar³, K. Billiar⁴, C. Yang⁵, T. Geva⁶, X. Huang⁷, R. Rathod⁶, V. Gooty⁶, A. Tang⁶, Z. Wu¹, P. Nido⁸;
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IMPLANTS

R183 Pre-clinical development of a modular hip spacer implant.

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R184 Reverse Engineering Nature to Design Biomimetic Total Knee Arthroplasty Implants

K. Mangudi Varadarajan, T. Zumbunn, H. Rubash, H. Malchau, O. Muratoglu, G. Li;
Massachusetts General Hospital, Boston, MA.

R185 Numerical Study of the Influence Of Mouth Aperture In Fossa Component Of TMJ Replacement

A. Ramos, M. Mesnard;
University of Aveiro, Mangualde, PORTUGAL.

R186 Prediction of Bone Density Distribution Around The Compress® Implant: Effect of Idealized Versus Subject-Specific Geometry

P. Pellikaan¹, A. Vahdati¹, R. Wirix-Speetjens², F. Sinnaeve³, I. Samson³, G. H. van Lenthe¹, J. Vander Sloten¹;
¹KU Leuven, Heverlee, BELGIUM, ²Materialise N.V., Leuven, BELGIUM, ³University Hospitals Leuven, Pellenberg, BELGIUM.

R187 Roboter-Aided Measurement of Patellar Stability in the Native Knee and after Total Knee Arthroplasty without and with Patellar Resurfacing

A. Lorenz, A. D. Müller, E. Bobrowitsch, N. Wülker, U. G. Leichtle;
University Hospital Tübingen, GERMANY.

R188 Preliminary Analysis of the Influence of Textured Surfaces on the Fluid Film Behavior in Hip Replacements via a Mass-Conserving Complementarity Algorithm

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INJURY BIOMECHANICS

R189 Pelvic injuries and the motorcycle fuel tank

L. Meredith, J. Brown;

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R190 Muscle Fascicle Shortening in Denervated Feline Soleus Muscle during Stance Phase of Walking

R. Mehta¹, H. Maas², R. J. Gregor³, B. I. Prilutsky¹;

¹Georgia Institute of Technology, Atlanta, GA, ²VU University, Amsterdam, NETHERLANDS, ³University of Southern California, Los Angeles, CA.

R191 Risk of Sustaining a Concussion in Women's Field Lacrosse

J. M. Clark, T. B. Hoshizaki;

University of Ottawa, Ottawa, ON, CANADA.

R192 Painful Whole Body Vibration Increases Serum Cytokines: Potential Biomarkers of Painful Injury

P. Pall, M. Zeeman, S. Kartha, H. Baig, B. Winkelstein;

University of Pennsylvania, Philadelphia, PA.

R193 Porcine Eye Response to Primary Blast Overpressure

V. D. Alphonse, A. R. Kemper, S. M. Duma;

Virginia Tech, Blacksburg, VA.

R194 Modelling the Propagation of Aortic Dissection

L. Wang, S. Roper, X. Luo, N. Hill;

University of Glasgow, UNITED KINGDOM.

R195 Peak force, Contact Area and Pressure During Impacts to the Hip are Affected by Elements of Body Geometry and Soft Tissue Distribution

I. C. Levine, S. Bhan, A. C. Laing;

University of Waterloo, ON, CANADA.

R196 Novel Approach to Quantify Hip Kinematics in Ice Hockey Goaltenders

R. J. Frayne, J. P. Dickey;

University of Western Ontario, London, ON, CANADA.

R197 Micro-Mechanics of Neuronal Compression: It's About Time

A. Fournier¹, J. D. Hogan¹, L. Rajbhandari², S. Shrestha², A. Venkatesan², K. Ramesh¹;

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R198 Viscoelastic Passive Lumbar Tissue Loadings during Trunk Bending: an in vivo Study

X. Ning, J. Zhou;

West Virginia University, Morgantown, WV.

R199 Morphological Changes of the Regenerated Semitendinosus and Gracilis Following ACL

S. M. Suydam, T. S. Buchanan;

University of Delaware, Newark, DE.

R200 Mechanically Damaged Collagen Fibrils are Recognized by Phagocytes

S. P. Veres¹, E. P. Brennan-Pierce², J. M. Lee³;

¹Saint Mary's University, Halifax, NS, CANADA, ²Colorado State University, Fort Collins, CO, ³Dalhousie University, Halifax, NS, CANADA.

R201 Parametric Finite Element Analysis of Surrogate Response During Vertical Accelerative Loading

A. Golman, K. Ott, R. Armiger, T. Harrigan, C. Carneal, A. Merkle;

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R202 Post-ACLR Knee Joint Contact Forces during Stair Negotiation

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R203 Quantitative Comparison of Dummy Headform Shape and Implications on Laboratory Testing of Football Helmets

B. R. Cobb, A. MacAlister, T. J. Young, A. R. Kemper, S. Rowson, S. M. Duma;

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R204 Quantifying Uncertainty in Distribution Analyses of Biomechanical Data with Random Error

B. R. Cobb, S. Rowson, S. M. Duma;

School of Biomedical Engineering & Sciences, Virginia Tech-Wake Forest University, Blacksburg, VA.

R205 Nerve palsy and gait impairment after blast injuries: a novel experimental model

T. Eftaxiopoulou, W. Macdonald, D. Britzman, A. M. J. Bull;

Imperial College London, UNITED KINGDOM.

R206 Normal and Shear Loads and Their Influence on Blood Flow and Tissue Deformation: A Pressure Ulcer Study

A. Manorama, T. Reid Bush;
Michigan State University, East Lansing, MI.

INTERNATIONAL SOCIETY OF BIOMECHANICS

R207 Relationships Between Knee Adduction Moment Patterns Extracted Using Principal Component Analysis And The Knee Adduction Moment Peak And Impulse

G. Hatfield, W. Stanish, C. Hubley-Kozey;
Dalhousie University, Halifax, NS, CANADA.

JOINTS

R208 Microstructure of the Meniscotibial Ligaments and Their Function

J. Y. S. Li, E. J. Blain, S. L. Evans, C. A. Holt;
Cardiff University, UNITED KINGDOM.

R209 Long-term Effects of Injury and Surgical Repair on Radiocarpal Joint Mechanics for Wrists with Scapholunate Ligament Injury

I. Chappell¹, J. Johnson¹, Q. Zheng¹, P. Lee², T. McIff², E. Toby², K. Fischer¹;
¹University of Kansas, Lawrence, KS, ²University of Kansas Medical Center, Kansas City, KS.

R210 Postoperatively Change Of The In Vivo Measured Friction During Walking In 9 Patients With Total Hip Joint Replacement

P. Damm, A. Bender, G. Bergmann;
Julius Wolff Institute, Berlin, GERMANY.

R211 Morphological Origins of the Damage Tolerance of Irregular Suture Joints in Nature

Y. Li¹, Y. Jiang¹, L. Liu¹, E. Lin², C. Ortiz², M. Boyce³;
¹University of New Hampshire, Durham, NH,
²Massachusetts Institute of Technology, Cambridge, MA,
³University of Columbia, New York, NY.

LIGAMENT & TENDON

R212 Regional Mechanical Properties of the Plantar Aponeurosis

V. Isvilanonda, J. M. Iaquinto, W. R. Ledoux;
University of Washington, Seattle, WA.

R213 Mechanical Testing of Rat Patella Tendons Following Injury and Treatment with PRP Gel and Substance P

N. Zheng¹, J. Zhang², J. Wang²;
¹UNC Charlotte, NC, ²University of Pittsburgh, PA.

R214 Mechanical Properties and Fiber Alignment of Postnatal Mouse Supraspinatus Tendons in Mohawk Knockout Mice

M. W. Hast¹, A. Zuskov¹, J. Weibel², R. Schweitzer², L. J. Soslowsky¹;
¹University of Pennsylvania, Philadelphia, PA, ²Oregon Health & Science University, Portland, OR.

MECHANICS OF CELL-BIOMATERIAL INTERFACES

R215 Multiscale Optimization of Surface Morphology for Enhancing Osseointegration

W. Li, J. Chen, M. V. Swain, Q. Li;
The University of Sydney, NSW, AUSTRALIA.

MECHANOBIOLOGY & RESPONSES TO MECHANICAL STRESSES

R216 Plasticity of Tumor-Repopulating Cells Is Controlled by Matrix Softness

Y. Tan¹, A. Tajik¹, J. Chen², F. Chowdhury¹, Y. Poh¹, R. Singh¹, N. Wang¹;
¹University of Illinois at Urbana-Champaign, Urbana, IL,
²Huazhong University of Science and Technology, Wuhan, CHINA.

R217 Modelling of Focal Adhesions Considerably Affects the Predicted Intracellular Strain Field

L. Dubuis, N. H. Davies, J. Green, T. Franz;
University of Cape Town, SOUTH AFRICA.

R218 Modelling the Effect of Collagen Fibers in Wound Contraction

C. Valero¹, E. Javierre², J. M. García-Aznar¹, M. J. Gómez-Benito¹, A. Menzel³;
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R219 Nucleus Pulposus Matrix Triggers an Autoimmune Response

S. Dudli¹, S. J. Ferguson¹, D. Haschtmann²;
¹ETH Zurich, SWITZERLAND, ²Schluthess Clinic, Zurich, SWITZERLAND.

R220 Purinergic signaling regulates the chondrogenic response of MSCs to hydrostatic pressure

A. J. Steward¹, D. J. Kelly², D. R. Wagner¹;
¹University of Notre Dame, IN, ²Trinity College Dublin, IRELAND.

R221 Low magnitude mechanical vibrations reduce the proliferation of aggressive breast cancer cells

E. Ozcivici, M. Olcum;
Izmir Institute of Technology, TURKEY.

R222 Regulating Valvular Interstitial Cell Phenotype by Boundary Stiffness

M. H. Kural, K. L. Billiar;
Worcester Polytechnic Institute, Worcester, MA.

R223 Real-Time Deformation of Bone Marrow Stem Cell Microstructures Evaluated by In Situ Fluorescent Microscopy

S. Behdad, S. Rath, B. Boesl, S. Ramaswamy;
Florida International University, Miami, FL.

R224 Collagen-Based, Thin-Film Scaffold to Identify the Mechanotransductive Mechanisms of Bone Repair

S. Barreto, G. J. Miller, R. T. Brady, A. Cameron, F. O'Brien;
Royal College of Surgeons in Ireland, Dublin, IRELAND.

R225 Myofiber Reorientation in the Left and Right Ventricle

M. Pluijmer¹, W. Kroon¹, F. W. Prinzen¹, T. Delhaas¹, P. H. M. Bovendeerd²;
¹Maastricht University, NETHERLANDS, ²Eindhoven University of Technology, NETHERLANDS.

R226 Nonlinear nanomechanics of murine articular cartilage

M. Azadi, H. Tavakoli Nia, A. Grodzinsky, C. Ortiz;
MIT, Cambridge, MA.

R227 Regulation of Mitochondrial Membrane Potential by Fluctuations in Cycle by Cycle Stretch in Live Vascular Smooth Muscle Cells

E. Bartolak-Suki, B. Suki;
Boston University, MA.

R228 Mechanical Biomarkers of Embryo Viability

L. Zarnescu, J. Han, B. Behr, R. Reijo Pera, D. Camarillo;
Stanford University, Stanford, CA.

MEDICAL DEVICES

R229 Monitoring Renal Denervation Procedure with High Accuracy Pressure Drop Measurements

O. M. Rotman, D. Weiss, S. Einav;
Tel-Aviv University, ISRAEL.

R230 Primary Stability of Variable Length Humeral Stems Under Anatomic and Reverse Loading

J. E. Bischoff, C. L. Penninger;
Zimmer, Inc, Warsaw, IN.

R231 Population-based Assessment of Spring Assisted Cranioplasty Biomechanics

A. Borghi¹, R. McNicholas², M. Shanmuganathan², S. Schievano¹, D. Dunaway², O. Jeelani²;
¹Institute of Child Health, London, UNITED KINGDOM, ²Great Ormond Street Hospital, London, UNITED KINGDOM.

R232 Mimicking Pulsatile Flow Profiles from Cardiovascular Systems for In Vitro Use

C. F. Brake, C. R. Johnston;
Dalhousie University, Halifax, NS, CANADA.

R233 Mimicking Physiological Rollover Shape in a Prosthetic Foot With a Single Degree-of-Freedom, Constant Stiffness Ankle Joint

K. Olesnavage, A. G. Winter, V;
Massachusetts Institute of Technology, Cambridge, MA.

R234 Wear simulation beyond the ROM of lumbar disc implants

J. Schwiesau¹, J. J. Yue², R. Garcia³, B. Fritz¹, T. M. Grupp¹;
¹Aesculap AG, Tuttlingen, GERMANY, ²Dept. of Orthopaedics & Rehabilitation, Yale University School of Medicine, New Haven, CT, ³Orthopedic Care Center, Aventura, FL.

R235 Prediction of reperfusion injury with organ machine perfusion system for liver transplantation

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MICRO & NANO DEVICES

R236 Radiofrequency Heating of Magnetic Nanoparticle Cryoprotectant Solutions for Improved Cryopreservation Protocols

M. L. Etheridge, Y. Xu, J. Choi, J. C. Bischof;
University of Minnesota, Minneapolis, MN.

R237 Protease Activity Assay of Single Circulating Tumor Cell Through Jetting Microfluidics

T. Jing¹, R. Ramji², M. Warkiani³, C. Lim¹, J. Han³, C. Chen¹;
¹National University of Singapore, SINGAPORE, ²Yale University, New Heaven, CT, ³Massachusetts Institute of Technology, Cambridge, MA.

R238 Nano Injection Molding: An Enabling Technology for Manufacturing Next Generation Microfluidic Devices

N. Zhang, D. J. Browne, M. D. Gilchrist;
University College Dublin, IRELAND.

R239 Metastatic Cancer Cell Migration in 3D Collagen Microtracks

A. Rahman, C. M. Kraning-Rush, S. P. Carey, C. A. Reinhart-King;
Cornell University, Ithaca, NY.

MOTOR CONTROL

R240 Modeling Trial-to-Trial Control Strategies Used by Subjects During Redundant Reaching

H. P. Nguyen¹, J. B. Dingwell¹, J. P. Cusumano²;
¹University of Texas, Austin, TX, ²Pennsylvania State University, University Park, PA.

R241 Patients with COPD Walk with a More Periodic Step Width Pattern as Compared to Healthy Controls

J. M. Yentes¹, S. I. Rennard², D. Blanke¹, N. Stergiou¹;
¹University of Nebraska at Omaha, NE, ²University of Nebraska Medical Center, Omaha, NE.

R242 Abnormal Breathing Strengthens Locomotor Respiratory Coupling

J. Yentes¹, S. I. Rennard², D. Blanke¹, N. Stergiou¹;
¹University of Nebraska at Omaha, NE, ²University of Nebraska Medical Center, Omaha, NE.

R243 Model of Lateral Stabilization for One-Legged Balance.

A. R. Wu, A. D. Kuo;
University of Michigan, Ann Arbor, MI.

R244 Movement Variability and Inter-Trial Task Dynamics Near Goal Equivalent Manifolds

J. P. Cusumano¹, J. John¹, J. M. Mahoney¹, J. B. Dingwell²;
¹Penn State University, University Park, PA, ²University of Texas, Austin, TX.

R245 Relationship of Multi-planar Knee Laxity and Dynamic Patterns in Gait during Treadmill Walking

M. W. Wittstein, T. J. Day, H. M. Wang, S. J. Shultz, R. J. Schmitz, C. K. Rhea;
University of North Carolina at Greensboro, NC.

R246 Precision Pinch Joint Mechanics in relation to Digit Endpoint Compliance

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R247 Phase space analysis of whole body movement for different human lower limb SSC

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R248 Modular Organization in Healthy and Post-Stroke Hemiparetic Gait Across Changing Task Demands.

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¹The University of Texas at Austin, Austin, TX, ²Medical University of South Carolina, Charleston, SC.

R249 Manual dexterity and steadiness in manipulating low- and high-friction touch screen surfaces.

M. N. Joshi, K. G. Keenan;
University Of Wisconsin - Milwaukee, WI.

R250 While Still Able to Manipulate Unstable Objects, Individuals with Parkinson's Disease Exhibit Distinct Neural Control Strategies

N. Ko, E. L. Lawrence, B. E. Fisher, F. J. Valero-Cuevas;
University of Southern California, Los Angeles, CA.

R251 Movement Accuracy and Muscle Activation During a Reaching Task in Healthy Population- Pilot Data

V. Subramanian, R. J. Schmitz, S. J. Shultz;
The University of North Carolina at Greensboro, NC.

R252 Motor Control of Balance Recovery in Post-Stroke Hemiparetic Gait

B. Sharafi, Y. Y. Dhafer;
Northwestern University, Chicago, IL.

R253 Motor Coordination Adapted for Torque-Production Required Grasping Task is Grip Type Dependent in Carpal Tunnel Syndrome

W. Zhang¹, V. Kaykaty¹, M. Ross², P. Parikh³, M. Santello³;
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R254 Whole Body Vibration Induced Changes in Jumping Force Perception

K. Słomka, G. Juras, T. Skowronek, J. Błaszczyk;
Academy of Physical Education in Katowice, POLAND.

R255 Proprioceptive Feedback Contributes to Adaptation toward an Economical Gait Pattern

B. Bennett, J. Hubbuch, J. Dean;
Medical University of South Carolina, Charleston, SC.

R256 Postural Sway Biomechanical Parameters Show Evidence of Postural Instability in Parkinson's Disease Patients Prior to Clinical Presentation

A. N. Barnds¹, M. A. McVey¹, S. L. Amundsen¹, K. E. Lyons², R. Pahwa², C. W. Luchies¹;
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R257 Movement strategy during turn-over in subjects with functional ankle instability

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R258 Novel Balance Platform: A Feasibility Study to Collect Normative Data

B. Schmid, R. P. Kuster, D. Baumgartner;
ZHAW, Winterthur, SWITZERLAND.

MULTI-CELL BEHAVIORS

R259 Physical Forces and Fluidization in Asthmatic Airway Epithelial Cells

J. H. Kim¹, N. T. Qazvini¹, J. Park¹, M. McGill², R. L. Steward¹, S. Burger², D. Khabibullin³, D. Medvetz³, S. H. Randell⁴, J. P. Butler¹, E. P. Henske⁵, J. M. Drazen¹, J. J. Fredberg¹;

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MULTISCALE MODELING

R260 Modeling strain-protected enzymatic degradation of collagen at the fiber and tissue level: Implications for remodeling

T. K. Tonge, T. D. Nguyen;
The Johns Hopkins University, Baltimore, MD.

R261 Mapping to Muscle Protein Families to Parameters in an Updated "Living" Hill-Type Muscle Model

J. M. Winters;
Marquette University, Milwaukee, WI.

R262 Medial Meniscectomy Causes Elevated Chondrocyte Fluid Pressure in Human Knee Joint During Walking

P. Tanska, M. E. Mononen, R. K. Korhonen;
University of Eastern Finland, Kuopio, FINLAND.

MUSCLE & MOTION CONTROL

R263 Relationships between Achilles Moment Arm Length and Triceps Surae Muscle Size in Competitive Sprinters and Healthy Non-Athletes

G. G. Handsfield¹, K. Read¹, N. M. Fiorentino², S. S. Blemker¹;

¹University of Virginia, Charlottesville, VA, ²University of Utah, Salt Lake City, UT.

R264 Lumbar spine dynamic stability: a controlled kinematic outcome

S. M. Beaudette¹, R. B. Graham², S. H. M. Brown¹;
¹University of Guelph, ON, CANADA, ²Nipissing University, North Bay, ON, CANADA.

R265 Viscoelastic properties of Bovine Muscle Measured by MRE (Magnetic Resonance Elastography) Using Micro MRI

H. Suzuki, M. Goto, S. Tadano;
Hokkaido University, Sapporo, JAPAN.

R266 Which Motion Segments are Required to Adequately Quantify Thoracic Spine Motion?

A. Schinkel-Ivy, J. D. M. Drake;
York University, Toronto, ON, CANADA.

MUSCULOSKELETAL BIOMECHANICS

R267 Passive Forces in Single Myofibrils from Children with Cerebral Palsy

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R268 Measurement of ACL Strain During Landing: Comparison Between in-vitro and Modeling Approaches

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¹University Of Waterloo, ON, CANADA, ²University Of Toronto, ON, CANADA.

R269 Measuring large deformation properties of calf muscles using Magnetic Resonance Elastography

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R270 Pennation Angle Differences in Squat and Leg Press Exercises

H. Phillips, B. W. Infantolino;
Penn State - Berks, Reading, PA.

R271 Non-Optimal Muscle Contractions: Exemplification for the Lower-Limb Musculoskeletal System of a Novel Numerical Approach

S. Martelli, M. Taylor, K. Reynolds;
Medical Device Research Institute, School of Computer Science, Engineering and Mathematics, Flinders University, Adelaide, AUSTRALIA.

R272 Predicting Impingement in the Implanted Hip - The Effect of Uncertainty in the Center of Rotation

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R273 Patients with Leg length inequality following total hip arthroplasty have greater gait asymmetry

J. Li¹, A. Wahid¹, Z. Jin², J. Fisher¹, M. H. Stone³, A. Redmond¹, T. D. Stewart¹;
¹University of Leeds, UNITED KINGDOM, ²Xi'an Jiaotong University, CHINA, ³Leeds Teaching Hospitals Trust, UNITED KINGDOM.

R274 Lower Extremity Muscles Function After Tibialis Posterior Tendon Transposition

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Czech Technical University, Prague, CZECH REPUBLIC.

R275 Maximum Voluntary Contractions of Extrinsic Thumb Muscles: Methods

M. de Bruin, S. J. Wohlman, W. M. Murray;
Rehabilitation Institute of Chicago, IL.

R276 Quantitative Evaluation of Passive Biceps Brachii Stiffness throughout Adulthood

S. F. Eby, H. Giambini, B. A. Cloud, J. E. Brandenburg, P. Song, S. Chen, K. An;
Mayo Clinic, Rochester, MN.

R277 Model-based Recommendations for Reducing Back Loads during Squat Exercise on the International Space Station

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R278 Morphological Analysis of Changes in the Thoracic Skeleton with Sex and Age

A. A. Weaver, S. L. Schoell, C. M. Nguyen, J. D. Stitzel;
Wake Forest University School of Medicine, Winston-Salem, NC.

R279 Medial Gastrocnemius Muscle Growth During Adolescence is Mediated by an Increase of Fascicle Diameter Rather than by Longitudinal Fascicle Growth.

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MISCELLANEOUS BIOMECHANICS

R280 Mechano-Responsive Nano-therapeutics for Targeted Drug Delivery to Obstructed Blood Vessels

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R281 Reduced bone strength associated with elevated cortical porosity in osteogenesis imperfecta

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¹Marquette University, Milwaukee, WI, ²Shriners Hospitals for Children, Chicago, IL.

R282 Modifiable gait characteristics associated with a 2-year increase in peak external knee flexion moment following arthroscopic partial meniscectomy

M. Hall¹, T. V. Wrigley¹, B. R. Metcalf¹, R. S. Hinman¹, A. R. Dempsey², P. M. Mills³, F. M. Cicuttini⁴, D. G. Lloyd³, K. L. Bennell¹;
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R283 On Challenges of Validating a Human Head Model for High Rate Impacts

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R284 Method to bundle and scale-up fascicle-like muscle tissues improves contractility

V. Chan, D. M. Neal, H. H. Asada;
Massachusetts Institute of Technology, Cambridge, MA.

R285 Non-Invasive Estimation of the Stress Distribution within the Fibrous Cap

S. J. Huntzicker, M. M. Dooley;
University of Rochester, NY.

R286 Whole Body Posture Depends on Velocity for Running Change of Direction Tasks

K. L. Havens, R. O. Peterson, D. N. Roark, S. M. Sigward;
University of Southern California, Los Angeles, CA.

R287 Effect of Fitness and Fatigue on Gait Biomechanics in Obese Children?

B. Singh¹, A. Van Artsdalen¹, S. Francis², K. Janz², H. Yack²;
¹California State University, Fresno, CA, ²University of Iowa, Iowa City, IA.

R288 Neuromechanical function of the plantar intrinsic foot muscles during walking and running

L. A. Kelly, G. A. Lichtwark, A. G. Cresswell;
The University of Queensland, Brisbane, AUSTRALIA.

R289 Novel Method for the Robotic Simulation of Athletic Tasks Derived from In Vivo Kinematics on Cadaveric Knee Joints

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R290 Occupational and Recreational Exposures to Whole-Body Vibration

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Talas Engineering, Inc., Hayward, CA.

R291 Osseointegration of EBM Textured and Threaded Implants through Whole Body Vibration

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¹University of North Carolina at Chapel Hill, NC, ²North Carolina State University, Raleigh, NC.

R292 Realignment of the Cervical Vertebrae During Neck Muscle Contractions

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R293 Multi-Scale Analysis and Design of Laminated Fibre Reinforced PEEK Orthopaedic Implants

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National University of Ireland Galway, IRELAND.

R294 Oscillatory Flow Microstructural Modeling of Bone Marrow Stem Cells:

Implications for Heart Valve Tissue Engineering

K. Iyer¹, S. Rath¹, S. Bhattacharjee¹, V. Unnikrishnan², S. Ramaswamy¹;
¹Florida International University, Miami, FL, ²The University of Alabama, Tuscaloosa, AL.

R295 Lower-limb Amputee Kinetic Recovery Response to an Imposed Error in Mediolateral Foot Placement

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R296 Relationship Between COP and Kinematic Parameters During Unstable Sitting

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R297 Reducing Ground Reaction Forces by Means of Insole Intervention

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York University, Toronto, ON, CANADA.

OCULAR & EYE BIOMECHANICS

R298 Mechanical influences of spiral formation in the rat cornea

C. D. Foster¹, T. Mohammad Nejad¹, P. M. Iannaccone², S. Iannaccone²;
¹University of Illinois at Chicago, IL, ²Children's Memorial Hospital, Chicago, IL.

R299 Multimodal Imaging of the Lamina Cribrosa and Optic Nerve Head

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R300 Role of Pecten in Resisting Impact Injury in Woodpecker's Ocular

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R301 Microstructural Finite Element Modeling of Optic Nerve Head Biomechanics in Normal and Glaucoma Human Eyes

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ORTHOPAEDIC BIOMECHANICS

R302 Viscoelastic Modeling of In Vivo Cartilage Creep to Detect Softened Articular Cartilage

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University of Pittsburgh, PA.

R303 Quantitative Assessments of Rotator Cuff Muscle Morphology: Do Clinical Assessment Techniques Capture Whole Muscle Information?

M. E. Vidt¹, A. C. Santago, II¹, C. J. Tuohy², G. G. Poehling², M. T. Freehill², R. A. Kraft¹, A. P. Marsh³, E. J. Hegedus⁴, M. E. Miller⁵, K. R. Saul⁶;

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R304 Passive Knee Laxity, Varus-Valgus Excursion during Gait, and Perceived Instability are Uncorrelated in Subjects with Severe Osteoarthritis

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R305 Pathokinematics of Thumb Opposition and Circumduction Associated with Carpal Tunnel Syndrome

T. L. Marquardt, R. Nataraj, Z. Li;
Cleveland Clinic, OH.

R306 Quantification of Cruciate Ligament Length Changes Using a Parametric Representation of Insertion Site Geometry

R. Colbrunn¹, T. Bonner¹, R. Wozniak², R. Ramachandran³, J. Halloran¹;

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R307 Postural Control in Hip Osteoarthritis Patients Before and After Total Hip Arthroplasty

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R308 Lower extremity kinematics between unicompartmental knee arthroplasty and healthy individuals during stair descent

Y. Fu¹, K. J. Simpson², R. Kakar², T. L. Kinsey³, O. M. Mahoney³;

¹University of Mississippi, MS, ²University of Georgia, Athens, GA, ³Athens Orthopedic Clinic, GA.

R309 Narrowing of Carpal Arch Width by Transverse Compression of the Wrist

J. N. Gabra, T. L. Marquardt, A. Erdemir, Z. Li;
Cleveland Clinic, OH.

R310 MTP Fusion

B. C. Campbell¹, S. Conti², M. C. Miller¹, A. Mandel², S. Belagaje², P. Schimoler¹;

¹University of Pittsburgh, PA, ²Allegheny General Hospital, Pittsburgh, PA.

R311 Sagittal Plane Hindfoot Motion Using Fluoroscopic Imaging

B. D. McHenry¹, J. Long², G. Harris¹;

¹Marquette University, Milwaukee, WI, ²Cincinnati Children's Hospital Medical Center, OH.

R312 Quantifying Risk Levels for Fall Using Inertial Measurement Unit

N. Zheng¹, R. Peindl², C. Ertel¹, N. Habet², R. Seymour², J. Kellam²;

¹UNC Charlotte, NC, ²Carolina Healthcare System, Charlotte, NC.

R313 Mechanical characterization of rotator cuff repair using a bio-resorbable scaffold

C. Kolz, T. Suter, R. Tashjian, H. Henninger;
University of Utah, Salt Lake City, UT.

R314 Nucleotomy Shows Contrasting Effects on Spinal Flexibility In Vivo and In Vitro

S. Reitmaier, D. Volkheimer, N. Berger-Roscher, H. Wilke, A. Ignatius;
Institute of Orthopedic Research and Biomechanics, Ulm, GERMANY.

R315 Previous Achilles Tendon Rupture (ATR) Alters Both Ipsilateral and Contralateral Ankle Kinematics

A. N. Agres¹, S. Manegold², T. J. Gehlen², A. Arampatzis³, W. R. Taylor⁴, G. N. Duda¹;

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R316 Quantitative analysis of surface deterioration in retrieved flat male tapers.

D. Bünte, G. Huber, N. Bishop, M. Morlock;
Technical University of Hamburg, GERMANY.

R317 Locking Plate Osteosynthesis Fixation Configurations for Typical Problem Fractures of the Distal Femur: in silico Analysis of Different Simulated Screw Selection and Placement to Control Osteosynthesis Stiffness

M. Heyland¹, G. N. Duda¹, A. Trepczynski¹, D. Andermatt², A. Weber², K. Schaser³, S. Märdian³;

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R318 Patellofemoral Biomechanics of Anterior Knee Pain and Dysplastic Trochlear Patients: A Computational Study.

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R319 Quadriceps Force and Movement Strategies During High-Demand Activities after Unilateral Total Knee Arthroplasty

B. M. Gaffney¹, B. S. Davidson¹, M. D. Harris¹, J. E. Stevens-Lapsley², C. L. Christiansen², K. B. Shelburne¹;

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R320 One-Step Functional Registration for Knee Kinematic Assessment in Navigation Systems

N. Lopomo, C. Signorelli, F. Colle, S. Zaffagnini, A. Visani;
Istituto Ortopedico Rizzoli, Bologna, ITALY.

R321 PEEK Rods May Reduce Incidence of Spontaneous Fusion in Juvenile Scoliosis treated with Growth rods

A. Agarwal, V. Goel, A. Agarwal;
University of Toledo, OH.

R322 Passive Rotational Tibiofemoral Stability Can Be Completely Restored After ACL Reconstruction

P. Moewis¹, G. Duda¹, M. Heller², R. Doyscher³, H. Boeth¹, Y. Zhong¹, T. Jung³, W. Taylor⁴;

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R323 Measuring 3D Calcaneus Morphology with CT: Bilateral Symmetry as a Guide for Surgical Intervention

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R324 Novel Method To Estimate 3D Hip Morphology From 2D Radiographs: Potential For Clinical Diagnostics Of Hip Osteoarthritis?

H. Khayeri¹, S. Väänänen², L. E. Dahlberg³, J. Jurvelin², H. Isaksson¹;

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R325 Motion Characteristics of the Lumbar Spine during Dynamic Weight-bearing Activities

S. Driscoll, S. Wang, M. Wu, J. Sin, T. Cha, K. Wood, G. Li;
Massachusetts General Hospital, Boston, MA.

R326 Relationship between Knee Adduction Moment during Gait and Cartilage Mechanical Properties in Patients with Severe Knee Osteoarthritis

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R327 Measuring Glenohumeral Joint Motion Using Markerless Biplanar Fluoroscopic Radiostereometric Analysis in Forward Flexion and Abduction

A. Hannon, T. R. Jenkyn;

Western University, London, ON, CANADA.

SPECIAL TOPICS IN BIOMECHANICS – GAIT, MOTION, PROSTHETICS, & DISEASE

R328 What parameters are important when modelling lesion size during RFA treatment of liver cancer?

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R329 Muscle Activation of Trailing Leg During Slip

C. M. O'Connell, R. Cham, A. Mahboobin, A. Chambers;
University of Pittsburgh, PA.

R330 Walking & Talking: Understanding the Influences of Language on Motor Execution

J. M. Elrod, L. Altmann, C. Hass;

University of Florida, Gainesville, FL.

R331 Modulation of Variability Across Gait Initiation and Gait in Parkinson's Disease and Healthy Older Adults

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L. Altmann¹, C. J. Hass¹;

¹University of Florida, Gainesville, FL, ²John Hopkins University, Baltimore, MD, ³Ohio University, Athens, OH.

R332 Nanomechanical Design Principles of Biological Exoskeleton Interfaces

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R333 Mechanical design of a low cost transhumeral prosthesis

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R334 Required Coefficient of Friction Decreases with Increasing Gait Speed Among Older Obese Females

S. L. Arena¹, C. R. Garman², M. A. Nussbaum², C. T. Franck²,
M. L. Madigan²;

¹High Point University, High Point, NC, ²Virginia Polytechnic Institute and State University, Blacksburg, VA.

R335 Magnetic nanoparticle hyperthermia: Influence of in vivo model

A. Attaluri¹, S. Kandala², J. Wang², M. Wabler¹, M. Armour¹,
H. Zhou¹, C. Cornejo¹, Y. Zhang¹, M. Hedayati¹, T. DeWeese¹,
C. Herman², R. Ivkov¹;

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R336 Robustness of Bone Marrow Sparing in Intensity Modulated Proton Therapy of Cervical Cancer

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²The University of Iowa Hospitals and Clinics, Iowa City, IA.

R337 Running with a Load Increases Leg Stiffness

A. Silder, S. Delp;

Stanford University, Stanford, CA.

R338 Wear simulator study of titanium-nitride (TiN) coated femoral components of bicondylar total knee replacement under severe conditions

R. Schubert, C. Zietz, C. Fabry, R. Bader;

Department of Orthopaedics, Biomechanics and Implant Technology Research Laboratory, University Medicine, Rostock, GERMANY.

SPECIAL TOPICS – BIOFLUID MECHANICS

R339 Predicted Fluid Drag Forces at Cartilage Surfaces during Couette Flow: Influence of Synovial Fluid Properties

Y. Wu, S. Ferguson;

Biomechanics, ETHZ, Zürich, SWITZERLAND.

R340 Modeling Small Networks of Lymphatic Vessels Using Measured Parameter Values

S. Jamalian¹, C. D. Bertram², J. E. Moore, Jr.¹;

¹Imperial College, London, UNITED KINGDOM, ²University of Sydney, New South Wales, AUSTRALIA.

R341 Non-Invasive Velocity Measurements in Real Human Blood Vessels and Airways

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R342 Quantitative Comparison of 4D Phase-Contrast Magnetic Resonance Imaging and Subject-Specific Computational Fluid Dynamics Simulation of Cerebrospinal Fluid Velocities in Cervical Spine

S. Heidari Pahlavian¹, A. Bunck², R. Tubbs³, T. Yiallourou⁴, F. Loth¹, B. Martin¹;

¹University of Akron, OH, ²University Hospital of Cologne, GERMANY, ³Children's of Alabama, Birmingham, AL, ⁴EPFL, Lausanne, SWITZERLAND.

SPECIAL TOPICS– SOFT TISSUE BIOMECHANICS

R343 Medical Image Based Morphometry and Biomechanical Assessment on Late Radiation Injury of the Rectum

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R344 Painful Nerve Root Compression Alters the Compressive Properties of the Spinal Cord

J. Smith, P. Janmey, B. Winkelstein;

University of Pennsylvania, Philadelphia, PA.

R345 Quantification of Anisotropic Surface Deformation during Controlled Ex-vivo Filling of the Porcine Urinary Bladder

S. Wognum¹, A. Bel¹, R. Amini²;

¹Academic Medical Center, Amsterdam, NETHERLANDS,

²University of Akron, OH.

R346 Mechanical Properties of Fascia superficialis, Fascia brachii and Fascia antebrachii in the Horse

J. Andersen, C. Peham, P. Schramel, G. Forstenpointner, M. Egerbacher;

University of Veterinary Medicine Vienna, AUSTRIA.

R347 Material properties of the human heel fat pad under high strain rates

G. Grigoriadis, N. Newell, S. D. Masouros, A. M. J. Bull;

Imperial College, London, UNITED KINGDOM.

R348 Mechanical Properties of Tissues and Bending Properties of Tail Flukes of Dolphin

H. Morikawa;

Shinshu University, Ueda, JAPAN.

R349 Modeling the Vocal Folds: A Hyper Elasticity Approach

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REHABILITATION

R350 Rehabilitation improves generalization of muscle synergies across balance and walking in individuals with Parkinson's disease

J. L. Allen, J. L. McKay, L. H. Ting;

Emory University, Atlanta, GA.

R351 Walking Surface for Treatment in Children with Idiopathic Toe Walking

H. D. Fanchiang, M. D. Geil;

Center for Pediatric Locomotion Sciences, Atlanta, GA.

R352 Reliability and Validity of Inertial Sensors for Movement Analysis during Single Limb Loading Task

K. A. Pratt, S. M. Sigward;

University of Southern California, Los Angeles, CA.

R353 Older Adult Hill Transition Strategies Are Determined By Task Demands and Cautious Gait Patterns

R. C. Sheehan, J. S. Gottschall;

The Pennsylvania State University, University Park, PA.

R354 Relative Effects of Visual Flow Perturbation, Cognitive Challenge, and Restricted Foot Placement on Step Variability during Walking in Old and Young Adults

C. A. Francis¹, J. R. Franz¹, S. O'Connor², D. G. Thelen¹;

¹University of Wisconsin-Madison, WI, ²University of California-San Diego, La Jolla, CA.

R355 Remote Vibrotactile Noise Improves Phalanx Force Deviation during Power Grip in Stroke Survivors

L. R. Enders, N. Seo;

University of Milwaukee-Milwaukee, WI.

R356 Prosthetic Feet with Greater Forefoot Compliance are Preferred by Prosthetic Users Following Randomized Double Blind Laboratory and Community Testing

M. S. Orendurff¹, S. Raschke², J. Mattie², D. Kenyon², D. Moe³, L. Winder³, A. Wong², Y. Jones², A. M. Hernandez², D. Sanderson⁴, J. Highsmith⁵;

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R357 Quantitative Assessment of Functional Performance of Patients for Evidence Based Therapies

M. F. Bergamo, C. Disselhorst-Klug;

RWTH Aachen University, Institute of Applied Medical Engineering, Department of Rehabilitation and Prevention Engineering, GERMANY.

R358 New Method for Rehabilitation of Tongue Strength and Mobility

R. M. M. M. Furlan¹, G. A. Santana¹, C. N. Silva¹, A. R.

Motta¹, W. F. Bischof², E. B. Las Casas¹;

¹Universidade Federal de Minas Gerais, Belo Horizonte, BRAZIL, ²University of Alberta, Edmonton, AB, CANADA.

R359 Quantifying Gait and Balance Pathologies of Lumbar Spinal Stenosis Patients using the Gait Deviation Index and Limits of Stability Test

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¹Grand Valley State University, Grand Rapids, MI, ²Stanley Healthcare, Grand Rapids, MI, ³Spectrum Health Medical Group, Grand Rapids, MI.

R360 Musculoskeletal Adaption after Hemiparetic Stroke: Preliminary Evidence for Shortened Biceps Brachii Fascicle Lengths and Increased Passive Elbow Stiffness

C. M. Nelson, J. P. A. Dewald, W. M. Murray;
Northwestern University, Chicago, IL.

R361 Optimizing Cable Support Design for a Cable-Driven Assistive Glove to Help Open Post-Stroke Paretic Hands

P. Hur¹, D. G. Kamper², N. Seo¹;
¹University of Wisconsin-Milwaukee, WI, ²Illinois Institute of Technology, Chicago, IL.

R362 Quadriceps Function Remains Asymmetrical 3-months after Total Knee Arthroplasty

J. D. Winters, J. E. Stevens-Lapsley, K. Rainville, C. Christiansen;
University of Colorado Anschutz Medical Campus, Denver, CO.

R363 Mechanical Simulation of Hemiplegic Gait and Dynamic Electrical Stimulation for Rehabilitation

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¹Nanjing Sport Institute, Nanjing, CHINA, ²Northeastern University, Boston, MA.

R364 Positive Ankle Work is Decreased in Peripheral Arterial Disease Before the Onset of Claudication Pain

A. Z. Diffendaffer¹, J. M. Yentes¹, S. R. Wurdeman¹, I. I. Pipinos², J. M. Johanning², S. A. Myers¹;
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R365 Medial Knee Joint Moment Arm Characteristics of Walking Compared to Tai Chi Walking

A. Jagodinsky, J. Fox, W. Weimar, W. Liu;
Auburn University, Rehabilitation Biomechanics Lab, Auburn, AL.

R366 Optimal Regression Models for the Quantification of Bradykinesia

J. Kim, Y. Kwon, H. Jeon, G. Eom;
Konkuk University, Chungju, REPUBLIC OF KOREA.

R367 Possible Solution To Control Exercise Intensity During Treadmill Walk In Individuals With Spastic Cerebral Palsy Using A Treadmill

Y. Terada¹, A. Satonaka², K. Terada³, N. Suzuki⁴;
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R368 Responses of Balance and Relative Muscle Activation corresponding to Dynamic Motions in Anterior-Posterior and Medial-Lateral Directions

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R369 Remote rehabilitation, coaching and biofeedback using low cost gaming technology

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R370 Low-Intensity Vibration is Tolerated in Animals with Percutaneously Attached Prosthetics

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R371 Movement Strategies During Stand To Sit And Sit To Stand Tasks In Transtibial Amputees

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R372 Muscle co-activation during arm cycling against altering crank resistances

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R373 Sagittal Plane Biomechanics and Interlimb Asymmetries after Total Knee Arthroplasty: A Cross-Sectional Study

P. Flowers, J. Zeni, Jr, L. Snyder-Mackler;
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R374 Playskin: Developing an Exoskeletal Garment to Assist Upper Limb Mobility in Infants

J. Koshy, M. Olaya, K. Chang, R. Oblender, J. M. Buckley, M. A. Lobo;
University of Delaware, Newark, DE.

R375 Pilot Study: Improvements in Biomechanical Symmetry Following An Intensive Exercise Intervention in Females with Hypermobility Syndrome

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Cincinnati Children's Hospital Medical Center, OH.

R376 Yoga Based Self-care Rehabilitation for Better Quality of Life

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R377 Relationship between walking speed and ground reaction forces under conditions of body weight support by individuals post-stroke.

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¹University of Alabama at Birmingham, AL, ²Texas Scottish Rite Hospital for Children, Dallas, TX.

R378 Neuromuscular Differences Between Young and Older Women With and Without History of Falls

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R379 Poor Association between Postural Sway and Clinical Outcomes in Patients with Non-Specific Low Back Pain

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RESPIRATORY & LUNG BIOMECHANICS

R380 Pilot study into the causes of airway drying during continuous positive airway pressure breathing.

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R381 Lung shape changes and mechanics from supine to upright in adults and children

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R382 Mechanics of Airway Obstruction in Chronic Lung Disease

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R383 Visualization of Transitional Flow in Nasal Cavities

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R384 Modeling sound transmission through the porcine chest

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R385 Voxel-Based Modeling of Air-Conditioning in Nasal Cavities

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R386 Modeling the Effect on Forced Expiration of the Interaction Between Loss of Terminal Bronchioles and Decline in Tissue Elastic Recoil with Age and/or COPD

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¹Auckland Bioengineering Institute, NEW ZEALAND, ²James Hogg Research Centre, Vancouver, BC, CANADA.

R387 Modeling the interaction between contractile elements in an airway smooth muscle and the extracellular matrix.

H. Parameswaran, B. C. Harvey, B. Suki, K. R. Lutchen;
Boston University, MA.

RHEOLOGY & ELASTICITY

R388 Measurement of erythrocyte deformability as a visco-elastic properties by micro-channel technique (Influence of MCV, MCHC and glycation on relaxation time)

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¹Kansai University, Osaka, JAPAN, ²Osaka Medical College Hospital, JAPAN, ³Osaka Medical College, JAPAN.

R389 Relationship between rheological and electrical properties of RBC (red blood cells) suspensions in polymeric nanoparticle solutions

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SMART BIOSYSTEMS & MICROMECHANICS

R390 Neural Stem Cells Homing to Glioma Vasculature

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SPINE

R391 Monitoring Scoliosis Progression using Non-invasive 3D Markerless Symmetry Analysis of Surface Topography Data

A. Komeili, E. Parent, M. El-Rich, S. Adeb; University of Alberta, Edmonton, AB, CANADA.

R392 Lower Limb Position Influence on the Lumbar Spine: Implications for Pain Development During Prolonged Standing

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¹University of Waterloo, ON, CANADA, ²AIM Health Group, Waterloo, ON, CANADA.

R393 Polarization-Sensitive Optical Coherence Tomography Measurement of Fiber Realignment in the Facet Capsular Ligament during Flexion of Isolated L4-L5 Motion Segments

A. Claeson¹, Y. J. Yeh¹, T. Akkin¹, B. Winkelstein², V. Barocas¹;
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R394 Nonlinear Dynamic Response of the Intervertebral Disc

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¹ETH Zurich, SWITZERLAND, ²TUHH Hamburg University of Technology, GERMANY, ³University Medical Center Hamburg-Eppendorf, Hamburg, GERMANY.

R395 Parametric finite element modeling of the thoracic spine. Geometry and mesh evaluations.

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R396 Quantifying Finite Helical Axes during Simulated Spine Movements via the Alpha Shape

S. McLachlin, C. Dunning; Western University, London, ON, CANADA.

R397 Patient-Specific Finite Element Model of Adolescent Idiopathic Scoliosis

P. Büchler¹, B. Sigurdardottir¹, C. Reutlinger¹, S. Berger¹, C. Hasler²;
¹University of Bern, SWITZERLAND, ²University Children's Hospital Basel, SWITZERLAND.

R398 Measurement of Cervical Endplate Subchondral Bone Density Distribution Using 3D CT Model

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R399 Pelvis and Lower Extremity Kinematics during Treadmill Running Exhibited by Individuals with Spinal Fusion for Adolescent Idiopathic Scoliosis

Y. Li¹, R. Singh Kakar¹, Y. Fu², T. Oswald³, K. Simpson¹;
¹University of Georgia, Athens, GA, ²University of Mississippi, Oxford, MS, ³Pediatric Orthopedic Associates, Atlanta, GA.

R400 Population Average T2 MRI Maps for Quantifying Anatomical Features of Intervertebral Disc Degeneration in a Rabbit Model

J. T. Martin¹, R. L. Mauck¹, D. M. Elliott², Y. Zhang¹, H. E. Smith¹;
¹University of Pennsylvania, Philadelphia, PA, ²University of Delaware, Newark, DE.

SPORTS BIOMECHANICS & HUMAN PERFORMANCE

R401 Methods of Calculating Loading Rate during Running in the Absence of an Impact Peak

C. M. Wille, B. C. Heiderscheit; University of Wisconsin-Madison, WI.

R402 Objective Measurements during the Seated Bicep Curl Resistance Training Exercise

C. Kat, K. Nolte; University of Pretoria, SOUTH AFRICA.

R403 Role of Each Leg during Angular and Linear Impulse Generation in Turn Tasks with Modified Rotational Demands

A. Zaferiou, J. McNitt-Gray; University of Southern California, Los Angeles, CA.

R404 Walking Pelvic Kinematics in Runners Pre and Post Maximal Effort Treadmill Test

D. Bhaskaran, M. Watkins, G. Rhodes, P. Ludewig; University of Minnesota, Minneapolis, MN.

R405 Lumbar Spine Postures in Marines During Simulated Operational Conditions

D. B. Berry¹, A. E. Rodriguez-Soto¹, S. P. Gombatto², R. Jaworski³, K. R. Kelly³, S. R. Ward¹;
¹UCSD, La Jolla, CA, ²SDSU, San Diego, CA, ³NHRC, San Diego, CA.

R406 Mediolateral Angular Momentum Changes in Persons With Amputation During Perturbed Walking

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¹The University of Texas at Austin, TX, ²The Center for the Intrepid, San Antonio, TX.

R407 Muscle Activity with an Unstable Load while Squatting

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¹University of New England, Portland, ME, ²University of New England, Biddeford, ME.

R408 Outsole material and architecture optimization to reduce lower limbs exposure during typical soccer movements

M. Llari¹, Y. Godio-Rabouet¹, J. GUER², S. Blanchard², J. Palestri², L. Thollon¹, M. Behr¹;
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R409 Muscle Activity and Plantar Pressure in Different Running Shoe Configurations

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University of Stuttgart, GERMANY.

R410 Lower Limb Joint Moments in Novice and Trained Runners: Using Statistical Parametric Mapping to Compare Waveforms

N. S. Frank, J. P. Callaghan, S. D. Prentice;
University of Waterloo, ON, CANADA.

R411 Regaining Balance During Rotations in Dance

M. B. Lott;
Denison University, Granville, OH.

R412 Relationship Between Isokinetic Knee Extension Strength and Functional Extensor Power Production In ACL-Reconstructed Subjects

S. C. Wordeman^{1,2}, B. Roewer¹, S. Di Stasi^{1,3}, C. Nagelli¹, T. Hewett^{1,2,3,4};
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R413 Pelvis and Trunk Differentiation in Softball Pitchers

H. A. Plummer, G. D. Oliver, L. E. Henning, T. E. Holt;
Auburn University, Auburn, AL.

R414 Network Analysis of USA Olympics Men's Basketball Team Game Strategy

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¹National Cheng Kung University, Tainan City, TAIWAN, ²National Taichung University of Education, Taichung City, TAIWAN.

R415 Metabolic and Mechanical Properties of the Skate Skiing Techniques

A. D. Killick, W. Herzog;
University of Calgary, AB, CANADA.

R416 Reliability of Golf Club Kinematics during Putting - An Exploratory Study on Expert Golfers

Y. WU¹, C. Huang¹, Y. Liu², B. Chen¹;
¹National Taiwan Normal University, Taipei, TAIWAN, ²Chang Jung Christian University, Tai-Nang, TAIWAN.

R417 Associations of the Psoas Major Muscle Size, Running Mechanics, and Sprint Running Performance

M. Sakaguchi¹, R. Ema², S. Hanawa², D. J. Stefanyshyn¹, Y. Kawakami³;
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R418 Lower Extremity Joint Stiffness in Athletes after Anterior Cruciate Ligament Reconstruction during Jump Landing Task

J. Lin, Y. Lee, H. Lee;
National Taiwan Normal University, Taipei, TAIWAN.

R419 Quantification of Coordination Pattern Comparisons Using a Vector Coding Technique

J. Freedman Silvernail, K. A. Boyer, R. E. A. van Emmerik, J. Hamill;
University of Massachusetts, Amherst, MA.

R420 Muscle Hypertrophy Patterns in Collegiate Athletes Relate to Performance: A High Dimensional Clustering Analysis of 35 Lower Limb Muscles

K. E. Read, G. G. Handsfield, N. M. Fiorentino, J. Hart, C. H. Meyer, S. S. Blemker;
University of Virginia, Charlottesville, VA.

R421 Low Load, High Repetition Resistance Training Program Increases Bone Mineral Density in Untrained Adults.

B. Petersen, J. Gottschall;
Pennsylvania State University, State College, PA.

R422 Mechanics and Energetics of Human Walking as a Function of Speed and Backpack Load

T. P. Huang, A. D. Kuo;
University of Michigan, Ann Arbor, MI.

R423 Quantifying Rifle Aiming Dynamics with an Inertial Measurement Unit

R. V. Vitali, R. S. McGinnis, S. M. Cain, S. P. Davidson, S. G. McLean, N. C. Perkins;
University of Michigan, Ann Arbor, Ann Arbor, MI.

R424 Modulation of the Static Strength Capacity of the Neck by Direction of Force Application and Head Posture

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R425 Muscle synergy is robust across physiological demands and expertise level during ergometer rowing

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R426 Principal components analysis of rowing stroke kinematics during performance of a step-test on a row-perfect sliding ergometer

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R427 Risk factor assessment for ACL injury using clinical-based measurement and on-field video analysis

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R428 Lower Extremity Kinematics After 10-week Transition to Minimalist Running Shoes

S. Ridge¹, J. Nelson¹, L. Dahle¹, U. Mitchell¹, A. Johnson¹, I. Hunter¹, T. Standifird², D. Bruening³;
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R429 Numerical Optimization of Kinematic Scoring Parameters for Functional Movement Screen Deep Squat

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R430 Pelvis-Trunk Separation in Youth Baseball Pitchers

T. E. Holt, G. D. Oliver, C. A. Smith, T. L. Buchanan;
Auburn University, Auburn, AL.

R431 Rowing Phase Transitions Determined from Hull Mounted Accelerometer Signal Using Wavelet Transform

M. Klimstra, R. Brodie, S. Blades, S. Hundza, D. Commandeur, M. Jensen;
University of Victoria, BC, CANADA.

STEM CELLS

R432 MicroRNA-34a targets Forkhead Box J2 to modulate differentiation of endothelial progenitor cells in response to shear stress

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TISSUE ENGINEERING

R433 Viscoelastic Models of Collagen Hydrogels Scaffolds used in Vascular Tissue Engineering

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R434 Modeling the Role of Dynamic Mechanical Conditioning on Dense Connective Tissue Formation in Heart Valve Tissue Engineering

J. S. Soares, M. S. Sacks;
University of Texas at Austin, TX.

R435 Microstructural Design Optimization of Tissue Scaffolds: The Role of Controlled Degradation

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¹Heriot-Watt University, Edinburgh, UNITED KINGDOM, ²Univ Lille Nord de France, Lille, FRANCE, ³University of Sydney, AUSTRALIA.

R436 Necking and failure of constrained 3D microtissues induced by cellular tension

V. B. Shenoy¹, H. Wang¹, A. A. Svoronos², T. Boudou¹, M. Sakard³, J. Schellb², J. R. Morgan², C. S. Chen¹;
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R437 Nanomechanical Evaluation Of Repair Bone Regenerated By Magnetic Scaffolds

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R438 Macromer Concentration Influences Human Mesenchymal Stem Cell Differentiation and Associated Nucleus Pulposus-like Matrix Assembly in Carboxymethylcellulose Hydrogels

H. Lin, M. S. Gupta, D. M. Varma, S. B. Nicoll;
The City College of New York, New York City, NY.

R440 Construction and characterization of tissue-engineered blood vessels using smooth muscle cell-seeded electrospun PGS membranes

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¹Department of Biomedical Engineering, National Cheng Kung University, Tainan, TAIWAN, ²Orthopedic Department, Showchwan Memorial Hospital, Changhua, TAIWAN.

R441 Mechanobiology of cell-seeded collagen gels subjected to cyclic biaxial mechanical stretching

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National Cheng Kung University, Tainan, TAIWAN.

VASCULATURE

R442 Mathematical model of the build-up of lymphatic fluid in ascites

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¹Imperial College London, UNITED KINGDOM, ²University of Genoa, ITALY.

R443 Reciprocating and Multidirectional Disturbed Flow In Patient-Specific Arteriovenous Fistulae For Hemodialysis

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R444 Patient-specific Multi-scale Simulation to Plan Vascular Access Surgery in Hemodialysis Patients

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¹Orobix Srl, BG, ITALY, ²Industrial Engineering Department, University of Bergamo, ITALY.

R445 Modeling Of Patient-Specific Atherosclerosis Formation: A Multiscale Framework

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R446 Mitochondria DNA Mutations Associated with Advanced Musculoskeletal Aging do not cause Significant Cardiovascular Aging

M. Golob, L. Tian, Z. Wang, T. Zimmerman, N. Chesler;
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R447 Manufacture-oriented Struts Structure Optimization of Flow Diverter for Intracranial Aneurysm

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R448 Pressure-dependent Permeability of Aortic Elastic Lamellae to Albumin

K. Y. Chooi, A. Comerford, S. J. Sherwin, P. D. Weinberg;
Imperial College London, UNITED KINGDOM.

R449 Non-invasive local evaluation of aortic stiffness and its dependence with blood pressure in rats using ultrasound shear wave elastography

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R450 Parameter Identification in Patient-Specific Models of Blood Flow in the Central Arteries

N. Xiao, C. Figueroa;
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R451 Patient-Specific Finite Element Modeling and Rupture Risk Assessment of Ascending Aortic Aneurysm

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¹Georgia Institute of Technology, Atlanta, GA, ²Aortic Institute at Yale-New Haven, New Haven, CT.

R452 Wall Remodeling Drives Reductions in Mechanical Strain in a Murine Model of Intimal Hyperplasia

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R453 Non-invasive assessment of the main pulmonary artery stiffness during exercise stress using MRI in healthy subjects

O. Forouzan, J. Warczytowa, C. François, O. Wieben, N. Chesler;
University of Wisconsin-Madison, WI.

**R454 Retinal Pulse Wave Velocity Assessment
for In-vivo Estimation of the Arterial Stiffness in
Microcirculation**

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Riemer⁴, W. Vilser⁴;

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Universität München, Munich, GERMANY, ³University of
Basel, SWITZERLAND, ⁴IMEDOS Systems UG, Jena,
GERMANY.

ARTIFICIAL ORGANS

F1 The Impact of Implantation Configuration of Ventricular Assist Device on System Thrombogenicity

W. Chiu, Y. Alemu, A. J. McLarty, M. J. Slepian, D. Bluestein; Stony Brook University, Stony Brook, NY.

F2 Self-folding of 3D cell-laden microstructures using origami folding techniques and cell traction forces

K. Kuribayashi-Shigetomi;
Hokkaido University, Sapporo, JAPAN.

BASIS OF DISEASE

F3 Simvastatin Alters Substrate Stiffness Dependent Endothelial Cell Dysfunction.

M. C. Lampi, C. J. Faber, J. Huynh, C. A. Reinhart-King; Cornell University, Ithaca, NY.

BIOIMAGING/BIO-OPTICS

F4 The intrarater reliability of a new software for recording the muscle strength and size in a synchronized way

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F5 Simultaneous Analysis System for Blood Pressure and Flow Using Ultrasonic-Measurement-Integrated Simulation

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F6 Shear wave elastography as a functional biomarker in human tendon

D. H. Cortes¹, S. Suydam¹, K. G. Silbernagel², D. M. Elliott¹, T. S. Buchanan¹;
¹University of Delaware, Newark, DE, ²University of the Sciences, Philadelphia, PA.

F7 The Use of Bone Densitometry as a Clinical Tool to Evaluate Healing of a Percutaneous Prosthetic Attachment Implant:

K. A. Bodnyk¹, G. J. Noble¹, M. Matusicky⁴, J. Bertran¹, G. M. Pagnotti¹, N. Fitzpatrick², C. T. Rubin³, M. J. Allen¹, R. T. Hart¹;
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F10 The Potential of Peptide/Glycosaminoglycan Hydrogels to Satisfy the Basic Mechanical and Leakage-Resistant Requirements for a Nucleus Replacement Material

D. E. Miles, E. Mitchell, S. Tarsuslugil, N. Kapur, R. K. Wilcox, A. Aggeli;
University of Leeds, Leeds, UNITED KINGDOM.

F11 Tissue Interface Indentation

O. Armitage, M. Oyen;
University of Cambridge, Cambridge, UNITED KINGDOM.

BIOMATERIALS

F8 The Next Generation of Aortic Tissue Analogues for In-vitro Studies

B. Lynch, J. Nelson, T. M. McGloughlin;
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F9 Should Insects Work Out? - Effects of Mechanical Stress on the Biomechanics of Exoskeletons

J. Dirks, J. P. Spatz;
Max Planck Institute for Intelligent Systems, Stuttgart, GERMANY.

BIOMECHANICAL INSTRUMENTATION

F12 Torsion as a Prognostic Mechanical Biomarker when Measured by Echocardiography

A. Kwaczala, D. Savic, J. Schwan, J. Ferruzzi, S. G. Campbell;
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F13 System for Measuring Figure Skating Forces on Ice

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F14 The impact of non-circular TAVI deployment on valve performance

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BIOMECHANICS OF FLIGHT

F15 Thermalling Strategies in a Soaring Bird

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BONE

F16 Trabecular bone architecture in mammals scales to body mass with negative allometry

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F17 To What Extent Can CT-based Linear Finite Element Models Predict Experimental Failure Load and Fracture Patterns at the Proximal Femur in Stance and Fall Conditions?

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F18 The Biomechanics Evaluation of different type Micro-plates in Treating the Sagittal fracture of Mandibular Condyle

A. Qu, J. Leizhou, Y. Jiang, X. Xu, D. Wang;
 Shanghai Jiaotong University, Shanghai, CHINA.

F19 The application of digital volume correlation (DVC) to study the microstructural behaviour of trabecular bone during compression.

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F20 Time-lapse Microtomography for Vertebral Stiffness Assessment - Digital Volume Correlation Compared to FE Simulation

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F21 Significant Differences in Contralateral Proximal Femur Strength: a FE-based in-vivo Study on Post-menopausal Women.

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F22 Synchrotron X-Ray CT of Trabecular Bone's Nanostructure: Technique and Results

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F23 Torsional Resistance of Fractured Femurs as a Function of Axial Compression Loading

F. Y. Zapata Cornelio, A. C. Jones, Z. Jin, D. C. Barton, R. K. Wilcox; University of Leeds, Leeds, UNITED KINGDOM.

F24 Three dimensional kinematic analysis of human cadaver foot using a biplane X-ray fluoroscopy system

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F25 Trabecular Microarchitecture Predicts Fabric Tensor and Anisotropic Mechanical Behavior of Trabecular Bone

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F26 The Interaction of Fixed Compressive Deformation and Translational Shear Deformation in Rat Brain Tissue

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CARDIOVASCULAR FLUIDS

F27 The intracranial tissue dynamic response based on pedestrian-vehicle accidents

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F28 The role of intraventricular vortices in cardiac function.

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F29 The Effect of Arterial Curvature on Blood Flow and Oxygen Transport in Arterio-Venous Fistulae

L. Grechy, F. Iori, R. Corbett, J. Crane, W. Gedroyc, N. Duncan, C. G. Caro, P. E. Vincent;
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F30 Thrombogenesis and Thrombotic Occlusion in Eccentric, Elastic Arterial Stenosis Models

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F31 Simulation-based Prediction of Occlusion inside Cerebral Aneurysm at Bifurcation of Anterior Communicating Artery

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F32 The Role of Vibration and Local Hemodynamics in the Development of Cerebral Aneurysms

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F33 Spatial Correlation between Atherosclerotic Lesion Frequency, Arterial Wall Permeability and three Wall Shear Stress Metrics in the Rabbit Aorta

Y. Mohamied, E. L. Bailey, E. Bazigou, P. Sowinski, S. J. Sherwin, P. D. Weinberg;
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F34 The Development of a Methodology for Characterising the Calcific Content in Diseased Vascular Tissue

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F35 The Influence of Arterial Calcification on the Mechanical Behaviour, Rupture Stability and Failure Mode of Femoral Plaques

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CARTILAGE

F36 Subregional Knee Cartilage Thickness is Age-Dependent and is Associated with Serum Biomarkers in Adolescent and Mature Volleyball Athletes

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F37 Stribeck Analysis of Synovial Lubricants - Mechanisms and Synergy of Hyaluronic Acid and Lubricin

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F38 Synergistic Boundary Lubricating Ability of Proteoglycan 4 (Lubricin) and Hyaluronan at an Articular Cartilage - Meniscus Biointerface

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F39 The effect of IGF-I gene therapy on the mechanical properties of repaired equine cartilage

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F40 Structural inhomogeneity optimizes fluid load support and lubrication in TMJ condylar cartilage

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F41 The Relationship Between the Load-bearing Surface Area of the Medial Tibial Plateau and Measures of Body Size in Women with Knee Osteoarthritis

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CELL MEMBRANE

F42 Stability of quantum dots encapsulated in biological membrane.

M. Daniel, J. Reznickova;
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F43 Single Cell Membrane Damage and Repair Dynamics by Femtosecond Laser Photoporation

X. Duan, A. F. T. Mak;
The Chinese University of Hong Kong, Hong Kong, HONG KONG.

CELL MOTILITY

F44 Synchronizing Eukaryotic Flagellum with an External Oscillator.

G. Quaranta, M. Aubin-Tam, D. TAM;
Delft University of Technology, Delft, NETHERLANDS.

CELL NUCLEUS

F45 Spatiotemporal Changes in Nuclear Strain Measured by Deformable Image Registration

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¹Purdue University, West Lafayette, IN, ²University of Washington, Seattle, WA.

COLLAGEN STRUCTURE & MECHANICS

F46 The very stiff collagen fibril of the *oim* mouse model of osteogenesis imperfecta

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COMPUTATIONAL BIOMECHANICS

F47 Shape Optimization of Cementless Hip Prosthesis.

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F48 Towards an Optimal Design of Uncemented Acetabular Component Using Genetic Algorithms.

R. Ghosh, D. K. Pratihari, S. Gupta;
Indian Institute of Technology Kharagpur, Kharagpur, INDIA.

F49 Soleus Increases Its Relative Contribution to Vertical Squat Jump Velocity as Barbell Mass Increases

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F50 Sensitivity of Model Predictions of Muscle Forces to Subject-Specific Quadriceps Muscle Parameters: Pilot Study in Osteoarthritic Gait

J. Thompson, A. Chaudhari, L. Schmitt, W. Wei, M. Gurcan, T. Best, R. Siston;
The Ohio State University, Columbus, OH.

F5 Tibiofemoral contact mechanics in the finite element models with different gait cycle inputs - Importance of patient-specificity

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F52 Simulated Anterior Capsular Plications in Patient-Specific Computer Models Reduce External Rotation and Increase Stability of the Glenohumeral Joint

C. Yongpravat, C. A. Popkin, C. M. Jobin, W. N. Levine, T. R. Gardner, C. S. Ahmad;
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F53 Slow Limb Movements Require Precise Muscle Control

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F54 Simulation of Hip Strategy during Diabetic Neuropathic Gait using Planar Musculoskeletal Model

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F55 The Influence of Altered Muscle Recruitment Related to Knee Injury on Tibio-femoral Contact Forces on the Medial and Lateral Condyles

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F56 The Effect of the Anterior Rocker Sole Shoe Designs on the Loading of the Plantar Aponeurosis - a dynamic finite element analysis

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F57 Simulating Vibrations Experienced by Wheelchair Users using Experimental-Based Modeling

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F58 The Effects of Hip Rotation and Knee Valgus on Patellofemoral Joint Stress: A Finite Element Analysis

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F59 Study on aerosol transport phenomena at inhalation and exhalation periods

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F60 The Effects of Partial Lateral Meniscectomies on the Knee Joint Contact Stress during the Weight Acceptance Phase of the Running Gait Cycle: A Finite Element Study

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F61 Simulation of Atherosclerotic Plaque Delamination Using the Cohesive Zone Model

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F62 The Role of Cardiac Trabeculae on Ventricular Mechanics

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COMPUTATIONAL METHODS

F63 Simulation of a complete stent-graft deployment in a patient-specific abdominal aortic aneurysm

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F64 TOWARDS AN ACCURATE COMPUTATIONAL DESCRIPTION OF THE BONE-IMPLANT INTERFACE

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F65 The Effect of Marker Occlusion on the Accuracy of Kinematic Data Reconstruction: Influence of Duration, Timing, & Marker Location

S. Chisholm, S. D. Prentice;

University of Waterloo, Waterloo, ON, CANADA.

F66 Study of Paravalvular Leakage through Patient-Specific Computational Models of Transcatheter Aortic Valve Implantation (TAVI)

G. M. Bosi¹, C. Capelli¹, R. Chung², M. Hong Cheang², N. Delahunty², A. Pantazis², M. Mullen², A. M. Taylor¹, S. Schievano¹;

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F67 The Effect of Different Hallux Valgus Angles upon First Metatarsophalangeal Joint Stress: A Finite Element Study

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F68 Scalable parallel methods for the simulation of cardiovascular tissues

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F69 Simultaneous Parameterization of the Hip and Knee using only Pelvis and Shank Markers

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DENTAL

F70 The Effect of Orthodontic Mini-Screws Dimension on Mandible Stress Distribution

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F71 The Influence of Tooth Height to Diameter Ratio on the Fracture Resistance of Canine Teeth in Dogs

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F72 Sarcomere Length and Excursion are Significantly Affected by Surgical Muscle Overlap in Cleft Palate Repair

J. M. Inouye, C. M. Pelland, K. Y. Lin, K. Borowitz, S. S.

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F73 Stress configuration in isotropic and orthotropic cortical bone under molar occlusal load by finite element analysis

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ERGONOMICS & HUMAN FACTORS

F74 The Sagittal Profile of the Trunk in Different Sitting Positions and in the Standing Posture - an In Vivo Investigation under Ergonomic Aspects

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F75 Toe clearance and tripping potential during walking: Effects of Diabetic Peripheral Neuropathy

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F76 Sit/Stand Workstation Setup affects Upper Extremity Posture/ Muscle load and Their Variability

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F77 The Effect of Flooring on Muscle Oxygenation During Long-Term Walking Using Near Infrared Spectroscopy

J. Haney, M. S. Redfern, T. Huppert, A. J. Chambers; University of Pittsburgh, Pittsburgh, PA.

F78 The Effect of Work Boots on Center of Pressure Location at the Knee in Static Kneeling

L. M. Tennant, H. C. Chong, D. C. Kingston, S. M. Acker; University of Waterloo, Waterloo, ON, CANADA.

F79 The Effects of Speed, Direction and Load on Local Dynamic and Orbital Spine Stability in Healthy and Low Back Pain Patients During Repetitive Trunk Flexion and Extension

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F80 Toward the development of thumb model that replicates measured muscle endpoint forces

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F81 Study on Upper Body Muscle Activities of Caregivers Using Lift with Driving Assisting System

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F82 Spinal Loads in Daycare Workers When Lifting Children: A Pilot Study

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F83 The Effects of Sitting or Standing Posture and Material Handling Task Type on Trunk Muscle Activity

C. D. McKinnon, A. C. Cudlip, C. R. Dickerson, J. P. Callaghan;

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F84 The Neuromuscular Demands of Police Officers using the Mobile Data Terminal during a Night Shift: An Onset/Offset EMG Analysis

M. Rae¹, M. Girouard¹, J. Callaghan², W. Albert¹;

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F85 Towards Understanding the Role of Comfort in Movement Selection for Virtual Ergonomics Applications

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F86 The Influence of Fatigue, Arm Position, and the Limb Used on Perceived Exertion During Submaximal Shoulder Loading

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EXPERIMENTAL METHODS

F87 Study of Specific Absorption Rate of Radiofrequency in Frozen Tissue

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FLUID-SOLID INTERACTIONS

F88 The Frequency of Compressive Loading is Significant when Evaluating Poroelastic Bone Pore Pressure

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GENERAL ANIMAL LOCOMOTION

F89 Speeds, Gaits and Forces of Grizzly Bears.

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F90 The Functional Preference among the Joints in the Lower Extremities during Walking Maneuvers

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GROWTH & REMODELING

F91 Strain Levels Initiating the Targeted Adaptive Response of Bone to Load are Similar Between Ages

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F92 Self-Healing Properties of Insect Cuticle

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HEART & HEART VALVES

F93 Structural and Functional Relationships of Cardiac Remodeling in the Spontaneously Hypertensive Rat

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F94 Stability of Anterior Mitral Leaflet Shape and Position Throughout Ejection in the Beating Ovine Heart

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F95 Silicone Graphene Composite Material for the Heart Valve Prosthesis Application

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IMPLANTS

F96 Skin and bone integrated pylon (SBIP) seeded with autologous fibroblasts or mesenchymal stem cells (MSCs) for direct skeletal attachment of limb prostheses

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F97 The Effect of Humeral Head Positioning on Glenohumeral Range of Motion

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F98 The effect of DES drug release on the follow up BMS

A. Sun, Z. Wang, Z. Fan, X. Deng;
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F99 The Influence of Striker Mass and Struck Player Torso Mass on Head Collision Reconstructions

E. S. Walsh, M. Kendall, T. B. Hoshizaki;
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INJURY BIOMECHANICS

F100 The influence of impact angle on the dynamic response of a high velocity impact of an alpine helmeted head form on a snow covered surface

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F101 The Association between Peak Resultant Linear Acceleration and Brain Tissue Deformation in American Football Helmeted Head Impacts

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F102 The Effect of Posterior Cruciate Ligament Deficiency on Knee Adduction Moment During Gait

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F103 The Interaction of Ketorolac (Toradol) and Concussion in a Rat Model

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F104 Subfailure Overstretch Leads to Alteration of Passive Mechanical Response in Ewe Middle Cerebral Arteries

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University of Utah, Salt Lake City, UT.

F105 Tensile Force of Knee Ligaments Occurred from Roundhouse Kick Execution

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F106 The Development and Validation of Specimen-Specific Finite Element Models of the Spine to Investigate Sporting Injury Mechanisms

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F107 The effects of daily physical exercise on the load sharing mechanism between active and passive lumbar tissues

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F108 The Protective Effect of Bicycle Helmets - A Finite Element Study

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F109 The effect of ankle taping on dominant and non-dominant legs' lower limb muscle activation patterns during unanticipated cutting maneuvers on artificial field-turf

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F110 The Effect of Physiological Changes Due to Crying on Repeated Pediatric Head Trauma.

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F111 Skull Cortical Thickness Changes in the Adult Skull Measured from Clinical Computed Tomography Scans

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F112 The Effect of Age on Bicycle Helmet Impact Attenuation

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F113 The Verification of the Case that DAI was Suspected by Simulation of the Actual Traffic Accident

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F114 Stabilisation Strategies for Injury Inducing Moments.

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F115 Temporary Visual Dysfunction following Low Level Blast Exposure

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F116 The Application of a Radial Basis Function Interpolation Method to Create a Human Body Finite Element Model

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INTL SOCIETY OF BIOMECHANICS

F117 The Impact of Angular Velocities on Muscular Coordination of Biceps Brachii and Brachioradialis during Elbow Flexion and Extension.

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JOINTS

F118 Sagittal Plane Hip and Knee Biomechanics During Stair Climbing at Different Speeds

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F119 Steeper Posterior Tibial Slope Markedly Increases Forces in Anterior Cruciate Ligament

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F120 Stiffness of the Intact and ACL Deficient Knee during the Lachman Test: Implications for Clinical Assessments

A. A. Rahnama Azar, K. M. Bell, F. V. Arilla, F. H. Fu, V. Musahl, R. E. Debski;
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F121 Simultaneous estimation of the path, magnitude and orientation of femorotibial contact forces during gait through optimisation using geometric constraints

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F122 The gender differences in the lower extremity kinematics and kinetics during stair descent

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F123 The Effect of Joint Clearance on Hip Hemiarthroplasty Contact Mechanics

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F124 Support Moments During Stair Navigation

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LIGAMENT & TENDON

F125 Structure-function relationship of ligaments is strain rate dependent: Evidence from mechanical testing combined with X-ray diffraction

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F126 The Macroscale and Microscale Response of Tendon to Shear

F. Fang, A. Sawhney, S. Lake;
Washington University in St. Louis, St. Louis, MO.

F127 The Effect of Location and Size of Tears in the Supraspinatus Tendon on Potential Tear Propagation

J. Thunes, A. Slavinsky, S. Pal, R. M. Miller, R. Debski, S. Maiti;
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F128 THE INFLUENCE OF FIBRE TWIST ON THE ACHILLES TENDON RUPTURE - SUBJECT-SPECIFIC FINITE ELEMENT ANALYSIS

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MECHANICS OF CELL-BIOMATERIAL INTERFACE

F129 Size Effects of Nanopillar Arrays on Adhesion and Detachment of Circulating Tumor Cells

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MECHANOBIOLOGY/RESPONSES TO STRESS

F130 The effect of impact load on chondrocytes' mechanical properties studied by micropipette aspiration

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the University of Melbourne, Melbourne, AUSTRALIA.

F131 Substrate Stiffness and Fluid Flow act Synergistically to Direct Osteogenic Differentiation: an In Vitro Study

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F132 Simultaneous pressure measurements in articulated and stationary joints suggesting subperiosteal hydraulic connectivity of synovial capsules

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F133 Spontaneous Calcium Signaling of *in situ* Chondrocytes

Y. Zhou, J. Ma, L. Wang, X. Lu;
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F134 Study of the human saphenous vein arterialization in a compact and automated *ex vivo* vessel culture system

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F135 Endothelial monolayer permeability is modulated by matrix stiffness, matrix composition, and external chemical cues

D. LaValley, B. Mason, J. Huynh, C. Reinhart-King;
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MECHANOTRANSDUCTION IN MUSCLE

F136 Structural Features of the Actin-Myosin Complexes during Work Production and Forced Lengthening of Contracting Mammalian Muscle Fibers

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MEDICAL DEVICES

F137 The posterior subthalamic area influences pathological but not normal gait in Parkinson's disease

S. W. L. Foo, J. A. Alderson, C. R. P. Lind;
The University of Western Australia, Crawley, AUSTRALIA.

F138 Stent placement in the femoropopliteal artery: the effect of stent length and stent location on vessel deformation.

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F139 Soft Material Adhesion Characterization for *In vivo* Locomotion: Experimental and Modeling Results

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F140 Simulating TAVI Deployment in to a Native Geometry Featuring TAVI Leaflets, Native Valve Leaflets and Plaques.

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F141 The Influence of Ankle-Foot Orthosis Stiffness on Gait Performance in Patients with Lower Limb Neuromuscular and Musculoskeletal Impairments

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F142 Towards optimizing mechanical stimuli around stents to reduce restenosis for challenging coronary artery lesions

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F143 The Effects of Different Revision TKA Stem Design on Bone Stress Distribution: FEA Comparative Study

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F144 Towards the Development of A Novel Carotid Covered Stent

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F145 The Effect of Material Selection and Position of Partial Joint Replacement Prostheses on the Contact Mechanics of the Opposing Native Cartilage: A Finite Element Study

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F146 The Influence of a Novel Pelvis Support Garment on Frontal-Plane Hip Biomechanics during Gait

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MICRO/NANODEVICES

F147 Testing Myelotoxic effect of drugs and chemicals through a Lab-on-Chip device

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MOLECULAR BIOMECHANICS

F148 Musculoskeletal Adaptation to In Vivo Loading

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MOLECULAR MECHANICS OF MATERIALS

F149 Study of mechanical properties of chitosan/carbon nanostructures composites: MD simulation on a novel coarse-grained model

L. Y. Kossovich, I. V. Kirillova, E. L. Kossovich, A. A. Golyadkina, A. V. Polienko;
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MOTOR CONTROL

F150 Sex-related Differences in the Rate of Torque Development in the Human Tibialis Anterior

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F151 The Beneficial Effects of Serial Contractions on Muscle Performance after a Brief Period of Rest.

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F152 The Relationships Between Core Stability and Lower Extremity Loading While Running: A Simulation Study

M. E. Raabe, A. M. W. Chaudhari;
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F153 Sensorimotor delays are related to gait kinetics in persons with multiple sclerosis

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F154 Simulation of walking motion with altering speed by human neuro-musculo-skeletal model

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F155 Three-dimensional Kinematic Analysis of Upper Limbs during Increasing Sound Pressure Level in Professional Drummers

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F156 The influence of age on manual asymmetries in a drinking task

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F157 Task Anticipation and Complexity Contribute to Altered Regulation of Body Mechanics of Locomotor Transitions during Overground Walking

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F158 Testing the role of blood gases in the real-time optimization of metabolic cost in human gait

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F159 Spatial Variability of Human Gastrocnemius Muscle Activity During Human Walking

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F160 Shoe Conditions Alter Heel Strike and Angle and Muscle Activity in Outdoor Running

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MULTISCALE MODELING

F161 The effects of changes in voxel size on transit time distributions

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F162 Subject-specific Multiscale Modeling of Muscle Force and Knee Contact in Total Knee Arthroplasty

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F163 The Time Course of Ischemia and Cell Death Following Myocardial Infarction

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F164 The Absorption of Living Cells on Hydroxyapatite: a Multiscale Study

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MUSCLE & MOTOR CONTROL

F165 The Role of Dystrophins on Lateral Transmission of Force in Skeletal Muscle

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F166 Shear Forces on the Feet of Diabetes Patients during Stair Negotiation

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F167 Simulation of Stiffness Changes in Human Triceps Surae using a Systematic Muscle Model.

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F168 Spine and Muscle Responses to Sudden Loading of the Hands with and without Fatigued Elbow Flexors

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F169 The Effect of Walking Speed and Dopaminergic Medication on Knee Muscle Performance in People with Parkinson's Disease-Related Fatigue

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F170 The Effect of Passive Properties on Skeletal Muscle Failure

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MUSCULOSKELETAL

F171 The Influence of Vertebral Body Geometry on Lumbar Spine Loading.

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F172 Tension effects of the Achilles tendon and plantar aponeurosis on heel pad deformation

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F173 Shoulder muscle atrophy and its relation to strength in children with brachial plexus birth palsy

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F174 The Effect of Muscle Weakness on the Capability Gap during Gross Motor Function: a Simulation Study

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F175 The effect of energy return and damping within prosthetic feet on knee loading in the sound limb.

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F176 Sensitivity of Knee Contact Forces to Changes in Kinematic and Anatomic Parameters

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F177 The Effects of Filter Cutoff Frequency on Musculoskeletal Simulations of High Impact Movements

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F178 TLEM2.0: A New Complete and Consistent Musculoskeletal Geometry Dataset for Subject-Specific Modelling of the Lower Extremity

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F179 The Architecture of the Muscles Controlling the Ankle Joint

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F180 The effect of backpack load on the pelvic kinematics of adolescents

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F181 Tornado-like blood flow concept - New quantitative dependences in the heart reflect the intracardiac hydrodynamics and the heart remodeling

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F182 Sample Entropy Outperforms Approximate Entropy for Large Gait Data Sets

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F183 Towards a Large-Scale Subject-Specific Finite Element Model of Human Foot Musculoskeletal Complex

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F184 The Influence of Maximal and Submaximal Cyclic Concentric and Eccentric Exercise on Chondrocyte Death and Synovial Fluid Proteins in the Rabbit Knee

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F185 Tibia strains during high impact activities

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F186 Spatial and Temporal Contributions to Step Length Asymmetry: Applications to Split-Belt Adaptation and Hemiparetic Gait

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F187 Temporal distribution of unconfined compression stimuli and mechanical properties' remodeling on tissue engineered cartilage

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F188 Time Dependent Force/Deflection Behavior of the Periodontal Ligament in a Pig Model

C. Dirk, T. Knaup, L. Keilig, S. Reimann, C. Bourauel;
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F189 Step and Stride Time Variability in Older Adults with Knee Osteoarthritis

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F190 The Effect of Whole-Body Vibration on Postural Stability in Healthy Subjects

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F191 Simulation of Lesion Formation During Phase Shifted Droplets Enhanced HIFU Treatment

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F192 Time Lag of the Onset of Muscle Vibration and Force Development After Fatigue Electrically Evoked in Spinal Cord Injured Person

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OCULAR / EYE

F193 The Mechanics of Constrained Growth During Optic Cup Development in the Chick

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ORTHOPEDIC BIOMECHANICS

F194 The Kinetic Implications of Excess Mass on Children's Gait

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F195 The Effect of Implanting a Revision Tibial Knee Component on the Surface Strain of the Tibia: An In Vitro Analysis using Digital Image Correlation.

S. J. Wright, J. Forder, A. W. Miles;
University of Bath, Bath, UNITED KINGDOM.

F196 Sagittal plane pelvis motion influences transverse plane motion of the femur: Interplanar coupling at the hip joint

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F197 The Influence of Third Body Damage with Bone Void Fillers on the Wear of UHMWPE

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F198 The Different Response of Cortical and Trabecular Bone to Implant Insertion Quantified by Time-Lapsed In Vivo Micro-Computed Tomography

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F199 The role of the peroneal tendons in passive stabilisation of the ankle joint: an in vitro study

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F200 The effect of scoliosis implant design parameters on whole spine mechanical behavior

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F201 The Effect of Biceps Tension on the Propagation of Superior Labral Lesions

E. Hwang, J. Carpenter, R. Hughes, M. Palmer;
University of Michigan, Ann Arbor, MI.

F202 Stair Ascent and Descent Biomechanical Adaptations while using a Custom Ankle-Foot Orthosis

J. M. Whitehead, E. Russell Esposito, J. M. Wilken;
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F203 Testing the Accuracy of Patient-Specific Instrumentation for Total Knee Arthroplasty

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F204 The Relationship between Alignment, Function and Loading in Total Knee Replacement: In-Vivo Analysis of a Unique Patient Population

D. Williams¹, A. Metcalfe², J. Madete¹, G. Whatling¹, A. Roux¹, P. Kempshall², K. Lyons², M. Forster², C. Holt¹;
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F205 The influence of femoral mechanical properties on the primary stability of a cementless total hip arthroplasty: a finite element analysis

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F206 TLEMSafe: Helping Surgeons to Predict the Functional Recovery of Patients Requiring Severe Musculoskeletal Surgery.

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F207 The simplest passive walking model for simulating falls related to friction force

Y. Chang, H. Lin, Z. Lin, J. Qiu, W. Hsu, W. Shih;
National Taiwan University, Taipei, TAIWAN.

F208 The Effect of Hand Dominance on the Quantification of Wrist Motion

A. E. Kedgley, T. Eftaxiopolou, K. C. Shih, A. M. J. Bull;
Imperial College London, London, UNITED KINGDOM.

F209 The Effect of a Prefabricated Foot Orthotic on Frontal Plane Joint Mechanics During Running

T. G. Almonroeder, L. Benson, K. O'Connor;
University of Wisconsin-Milwaukee, Milwaukee, WI.

F210 Three Variations of the Single Leg Squat: A Comparison of Hip Kinematics

A. Khuu, E. Foch, C. L. Lewis;
Boston University, Boston, MA.

F211 The Effect of Shoulder Humeral Component Length on Bone Stresses: A Finite Element (FE) Analysis

N. Razfar¹, J. M. Reeves¹, D. Langohr¹, R. Willing², G. S. Athwal³, J. A. Johnson¹;
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F212 The Effect of Fixation Plate Length on Spinal Instability Following Anterior Cervical Plate Fixation for the Repair of in Vitro Flexion-Distractor Injuries

A. Alkuwari, S. D. McLachlin, T. A. Burkhart, C. E. Dunning, C. S. Bailey;
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GENERAL BIOMECHANICS

F213 Three-Dimensional Biomechanical Differences Between Those With Moderate Knee Osteoarthritis Who Progress Radiographically Versus Those Who Do Not

K. E. Costello, D. Ikeda, G. Hatfield, J. Astephen Wilson, W. D. Stanish, C. Hubley-Kozey;
Dalhousie University, Halifax, NS, CANADA.

F214 Stress-strain analysis of contractility in the ileum in response to flow and ramp distension in streptozotocin-induced diabetic rats

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F215 Tendon Shear is Only Partially Represented by Ultrasound Shear

J. Tat, A. M. Kocielek, P. J. Keir;
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F216 Simulating Live-Fire Primary Blast Loading Conditions in Laboratory Shock Tubes

A. Sundaramurthy¹, N. Chandra²;
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F217 The Effects of Upper Limb Posture and a Submaximal Gripping Task on Excitability of the Forearm Muscles

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F218 The possibilities of recording the iliopsoas muscle activity by surface EMG

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F219 Soft Tissue Artifact Compensation Using Triangular Cosserat Point Elements (TCPEs)

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F220 Sex Distribution of Study Populations Reported in American Society of Biomechanics Annual Meeting Abstracts

S. M. Bach¹, M. Morrow², K. Zhao², R. Hughes¹;
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F221 The Effect of Ankle-Foot Prosthesis Push-Off Work on Walking Kinetics and Overall Effort

J. M. Caputo, S. H. Collins;
Carnegie Mellon University, Pittsburgh, PA.

F222 The Importance of Retrievals in Implant Design: Case Study of a Broken Intramedullary Nail

R. Usoff;
University of California at Berkeley, Berkeley, CA.

F223 The Effect of Micro-Electric Current Load on the Change of Cytosolic pH of Plant Cell with the Progress of Cooling

T. NINAGAWA¹, A. EGUCHI², A. NARUMI¹, T. KONISHI³, Y. KAWAMURA⁴;
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F224 Should we normalize biomechanical data by subject-specific mass?

B. S. Davidson¹, C. A. Myers¹, K. B. Shelburne¹, K. G. Van Lieshout¹, D. Curran-Everett²;
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F225 The Swapper: Prosthetic Quick-Change Mechanism

A. Krasts;
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F226 Spatiotemporal Differences in Gait in Parkinson's Disease vs. Progressive Supranuclear Palsy: A Potential Aid in Diagnosis

K. L. Covino, J. W. Skinner, N. McFarland, C. J. Hass;
University of Florida, Gainesville, FL.

F227 The Effect of Emotion on the Center of Mass Movement during Walking

G. Kang, M. Gross;
University of Michigan, Ann Arbor, MI.

F228 Sonographic Assessment of Flexor Digitorum Profundus (FDP) and Subsynovial Connective Tissue (SSCT) Displacement during Active Long Finger Movements

A. M. Kociolek, M. Rizzuto, C. Tse, P. J. Keir;
McMaster University, Hamilton, ON, CANADA.

F229 Starvation and ATP induced motility and morphological variations in Amoeba proteus

S. N Sunitha;
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F230 The Impact of Blocked Sinus Valsalva on Aortic Valve Closing Velocity and Orifice Area

K. Krishna;
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F231 Towards Computational Modelling of Lymphatic Valve Mechanics

J. T. Wilson¹, R. van Loon², J. E. Moore, Jr¹;
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GENERAL SOFT TISSUE MECHANICS

F232 Superficial Facial Deformations During Nasal Continuous Positive Airway Pressure Therapy

A. Sims¹, K. Schindhelm¹, A. Simmons², M. Hoffman²;
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F233 Site-specific Characterization of Mechanical Properties of Human Knee Meniscus by Indentation Testing

E. K. Danso, J. T. J. Honkanen, J. S. Jurvelin, J. Töyräs, R. K. Korhonen;
University of Eastern Finland, Kuopio, FINLAND.

F234 The mechanical behavior of corneal stroma in shear deformation; influence of loading rate and amplitude

H. Hatami-Marbini;
Oklahoma State University, Stillwater, OK.

F235 Tensile Properties of Spinal Nerve Roots at Low to High Strain Rates: An In Vivo Study

J. Yaldo, C. Chen, G. Virk, S. Kallakuri, J. M. Cavanaugh;
Wayne State University, Detroit, MI.

PROTEIN MECHANICS

F236 Titin visco-elastic properties differ between isolated protein and in situ sarcomere preparations

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REHABILITATION

F237 The Effects of Exercise Type and Elbow Angle on Vertical Ground Reaction Force and Muscle Activity during a Push-Up Plus Exercise.

J. G. San Juan¹, D. N. Suprak¹, S. M. Roach², M. Lyda²;
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F238 Strength Enhancement Paradigm for Prescription of Passive-Dynamic Ankle-Foot Orthoses for Individuals Post-Stroke

E. S. Arch, D. S. Reisman, Z. B. Sniffen, S. J. Stanhope;
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F239 The relationship between trunk power, rotation and muscle endurance

G. Boggess, A. Schmitz, B. Noehren;
University of Kentucky, Lexington, KY.

F240 Strength Profiles Following Supervised Treadmill Exercise Treatment in Peripheral Arterial Disease

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F241 The efficacy of removable offloading devices to heal plantar foot ulcers in diabetes: a multicenter randomized controlled trial

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F242 Single-leg Balance Control Strategies of Prosthetic Users: Development of a Perturbed Balance Protocol and Preliminary Data

J. S. Akins, A. W. Ashoff, D. C. Kamaraj, D. M. Brienza, R. A. Cooper;
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F243 The Influence of Transfemoral Amputation Techniques on Muscle Capacity

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F244 Step Down Movement Kinematics of Persons with Multiple Sclerosis Who Display Leg Weakness

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F245 The Effects of Dual Task and Adding Weight on the Stepping Ability for Fallers and Non-Fallers

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F246 Tactile Ground Surface Indicators at the bottom of staircase influence the landing behaviors of elderly with Normal Vision.

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F247 The Kinematics of Tans-Radial Prosthesis Users During a Simple Lifting Task.

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F248 The Relationship Between Transfer Skills and Upper Limb Joint Loading In Wheelchair Users

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F249 The Effects of Wheelchair Setting on Shoulder Tendon Characteristics after Intense Wheelchair Propulsion

Y. Lin, S. R. Donahoe, N. S. Hogaboom, M. L. Boninger, A. M. Koontz;
University of Pittsburgh, Pittsburgh, PA.

F250 The Impact of Cognition Level and Task Difficult on Spatiotemporal Gait Measures During Dual-Tasking in Older Adults

T. Goetsch, D. M. Venema, K. Siu;
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F251 The Effects of Tetraplegia on Wheelchair Transfer Joint Kinetics

A. Koontz, P. Kankipati, C. Tsai, M. Boninger;
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F252 STRENGTH OF THE PELVIC FLOOR MUSCLES IN ASSOCIATION WITH HIP ADDUCTION AND ABDUCTION IN HEALTHY WOMEN

L. P. Cacciari, A. C. Pássaro, A. C. Amorim, I. C. N. Sacco;
Universidade de São Paulo, São Paulo, BRAZIL.

F253 The reliability and sensitivity of mediolateral balance assessment using a centre of mass tracking task (MELBA).

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F254 Subject-specific model adjustments for simulations of different spinal stabilization outcomes

H. Stark¹, N. Schilling², M. S. Fischer¹, A. Gussew³, P. Hiepe³, R. Rzanny³, J. R. Reichenbach³, B. Ullrich⁴, G. Hofmann⁴, J. Wollmann⁵, K. Wohlfahrt⁵, P. Schenk⁶, C. Anders⁶, H. Scholle⁶;
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F255 The effect of computerized balance training on balance control and confidence in persons with Parkinson's disease

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F256 Side differences in the knee angles and extensor joint moments at seat-off during sit-to-stand tasks in individuals at four months post knee arthroplasty

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F257 The Use of Inertial Measurement Units for the Assessment of Gait Kinematics in Stroke Patients

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F258 Sitting vs standing Isokinetic Trunk Flexion, Extension, Rotation and Lateral Flexion Performance Differences in Healthy and CLBP Patients

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F259 Center of Pressure Patterns During 180° Turns in Young Adults

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F260 Spatio-Temporal Characteristics During 180° Turns in Young Adults

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¹California State University, Northridge, Northridge, CA, ²Veterans Administration Greater Los Angeles Healthcare System, Los Angeles, CA.

F261 The Effect of Motor Imagery Use during Simple Knee Flexion-extension Exercises on Vastus Lateralis/Vastus Medialis Obliquus Muscle Co-contraction and Recruitment Timing.

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F262 Simulation of Muscle Work During Hip/Knee Exoskeleton-Assisted Gait

P. J. Barrance, A. Ramanujam, E. Johnsen, G. Forrest;
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F263 The influence of the knee hydrarthrosis on the muscle recovery after ACL reconstruction

T. Sakurai¹, S. Sasaki¹, T. Fukubayashi²;
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F264 The efficacy of a novel electromyography normalization technique using load-scaled values to compare disparate populations

D. T. Commandeur, M. D. Klimstra, R. Brodie, A. Guar, S. Hundza;
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F265 The Effects of Early Rehabilitation x Traditional Immobilization on the Gastrocnemius Medialis Architecture in Achilles Tendon Rupture Patients

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F266 Do Asymmetric Gait Kinematics Result From An Inter-limb Temporal Differences?

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F267 The Effects of Damping in Artificial Feet

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REPRODUCTION/WOMEN'S HEALTH

F268 Surface Curvature and Mesh Burden Measurements of Prolapse Mesh Utilizing Magnetic Resonance Imaging (MRI)

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RESPIRATORY/LUNG

F269 Studying flow patterns and particle deposition in the pulmonary acinus using microfluidics

R. Fishler, M. K. Mulligan, Y. Dubowski, J. Sznitman;
Technion, Haifa, ISRAEL.

F270 Temporal Changes in Pulmonary Function and Computed Tomography Scans in Patients with Idiopathic Pulmonary Fibrosis

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SPINE

F271 Statistical Shape and Alignment Modeling to Characterize Disc Degeneration in the Lumbar Spine

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F272 The effect of local hydration environment on annular thickness and mass temporal changes

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F273 Shear modulus of the human nucleus pulposus measured using MR Elastography correlates with directly measured mechanical properties

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F274 The Prediction of Axial and Shear Fatigue Strength of the Lumbar Spine from Radiological Metrics

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SPORTS BIOMECHANICS/HUMAN PERFORMANCE

F275 Shorter Heels Are Accompanied by Higher Achilles Tendon Forces, But Not Better Running Economy

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The Pennsylvania State University, University Park, PA.

F276 Test Protocol for the Evaluation of Hit Count Sensor Technologies for Helmeted and Unhelmeted Sports

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F277 The effect of side step on volleyball block landing

Y. Y. Hsieh, C. F. Huang, T. H. Yang;

National Taiwan Normal University, Taipei, TAIWAN.

F278 The Hamstrings:Quadriceps strength ratio as a function of angular velocity and angle

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