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AMERICAN SOCIETY OF BIOMECHANICS

ANNUAL MEETING OF THE AMERICAN SOCIETY OF BIOMECHANICS

PENN STATE UNIVERSITY, AUGUST 26-29, 2009

PROGRAM

WELCOME

Message from Conference Chairs

It is our great pleasure to welcome you all to The Pennsylvania State University for the Annual Meeting of the American Society of Biomechanics. It has been 30 years since this conference was last at Penn State, in that time the size of the conference has grown but we hope we can still offer all of you a warm and friendly welcome.

John Challis
Meeting Chair

Jinger Gottschall
Meeting Chair

Steve McCaw
Program Chair

Message from the President

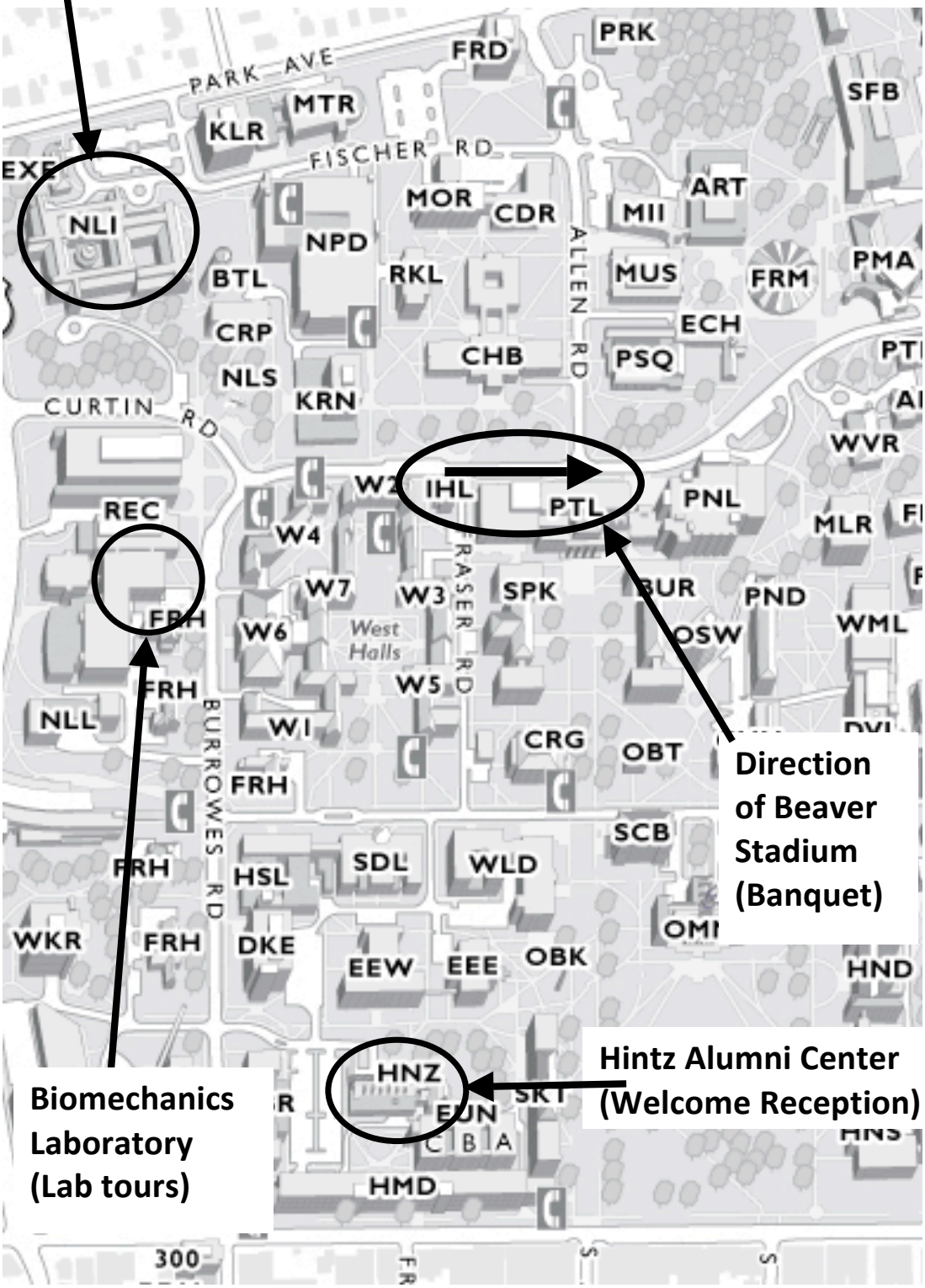
Welcome to the 32nd Annual Meeting of the American Society of Biomechanics. It is especially meaningful to preside over this meeting at Penn State, my own alma mater and the birthplace of graduate education in biomechanics. The Program and Meeting Chairs have been working incredibly hard over the past year in planning a meeting that is scientifically diverse and stimulating, with plenty of opportunity to reconnect with friends and colleagues.

The rest is up to you - Enjoy!

Irene Davis
ASB President

Map

Nittany Lion Inn
(conference venue)



Direction of Beaver Stadium (Banquet)

Hintz Alumni Center (Welcome Reception)

Biomechanics Laboratory (Lab tours)

Presenter Instructions

Information for Poster Presentations

The poster boards will be 48" x 48". Posters printed on a single large sheet of paper are preferred. It is recommended that your poster be 36" (91 cm) wide x 46" (117 cm) high in portrait mode. Pins will not be permitted on the poster boards. Instead, Velcro will be used and this will be available in the exhibit rooms. Posters may be mounted at 7:45 AM and must be removed by 7:00 PM. It is recommended to hang your poster no later than 8:30 AM and remove no earlier than 6:15 PM. Presenters should stand by odd numbered posters only for the first 45 minutes (4:45 until 5:30 PM), and stand by the even number posters only for the second 45 minutes (5:30 until 6:15 PM).

Information for Podium Presentations

Each presentation podium will be equipped with a laptop computer that is connected to the projection and sound system. All presentations must be loaded onto and delivered using the provided computer. Because of time constraints, there will not be enough time for each presenter to connect their own computer.

Location: Our "Ready Room" will be the Mount Nittany Room. It is located on the ground floor next to Board Room 2 (see map on next page).

Times: Wednesday through Friday 12pm-2pm OR 4pm – 6pm
Please attend on the day before your presentation.

What to Do: Please bring your presentation on a USB Drive to this location to load it and confirm that it will work on the presentation computers. Your files will be copied to our system at that time.

Assistance: Technical assistance will be available in the Ready Room. However, priority will be given to the loading of presentations. If your presentation file does not work properly on the provided computers, the computers will be available for troubleshooting at the end of the Ready Room session.

Presenter Frequently Asked Questions (FAQs)

Q: Where is the Ready Room located?
A: It is on the ground floor (downstairs), in the Mount Nittany Room near Board Room 2.

Q: What do I do if I cannot make the Ready Room hours on Wednesday for my Thursday presentation?
A: If your flight will not get you to State College until after 6pm on Wednesday, the day before your Thursday presentation, please contact Nick Giacobe (nxg13@psu.edu) to arrange an alternate time.

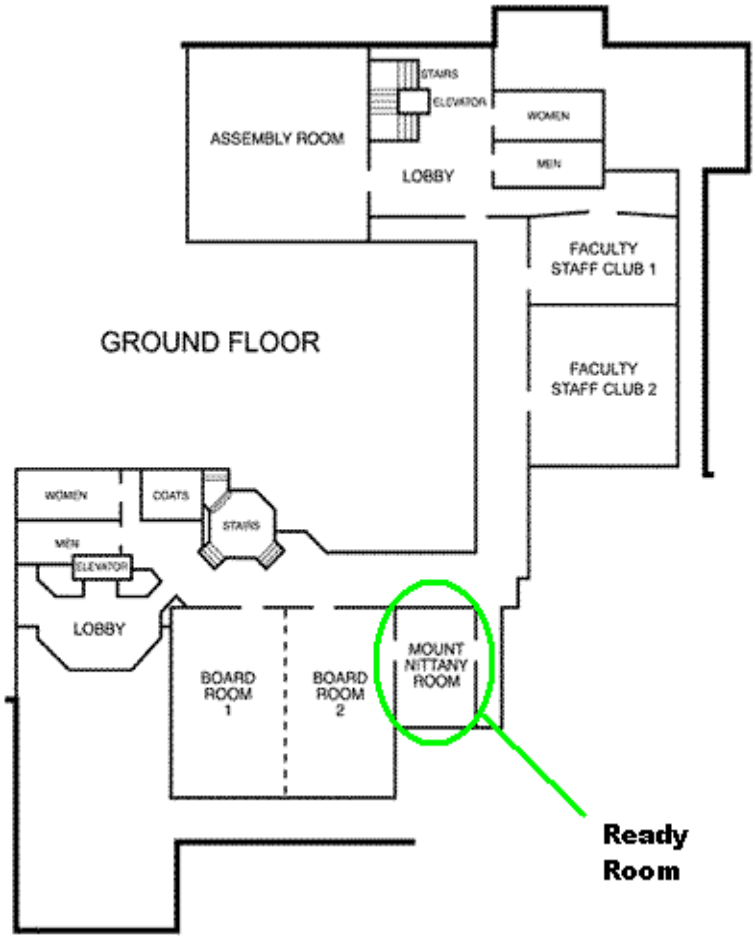
Presenter Instructions

Q: Can I use a Macintosh computer for my presentation?
A: We have selected a Windows environment for all computers in the ready room, and in the lecture rooms. Macintoshes will not be available.

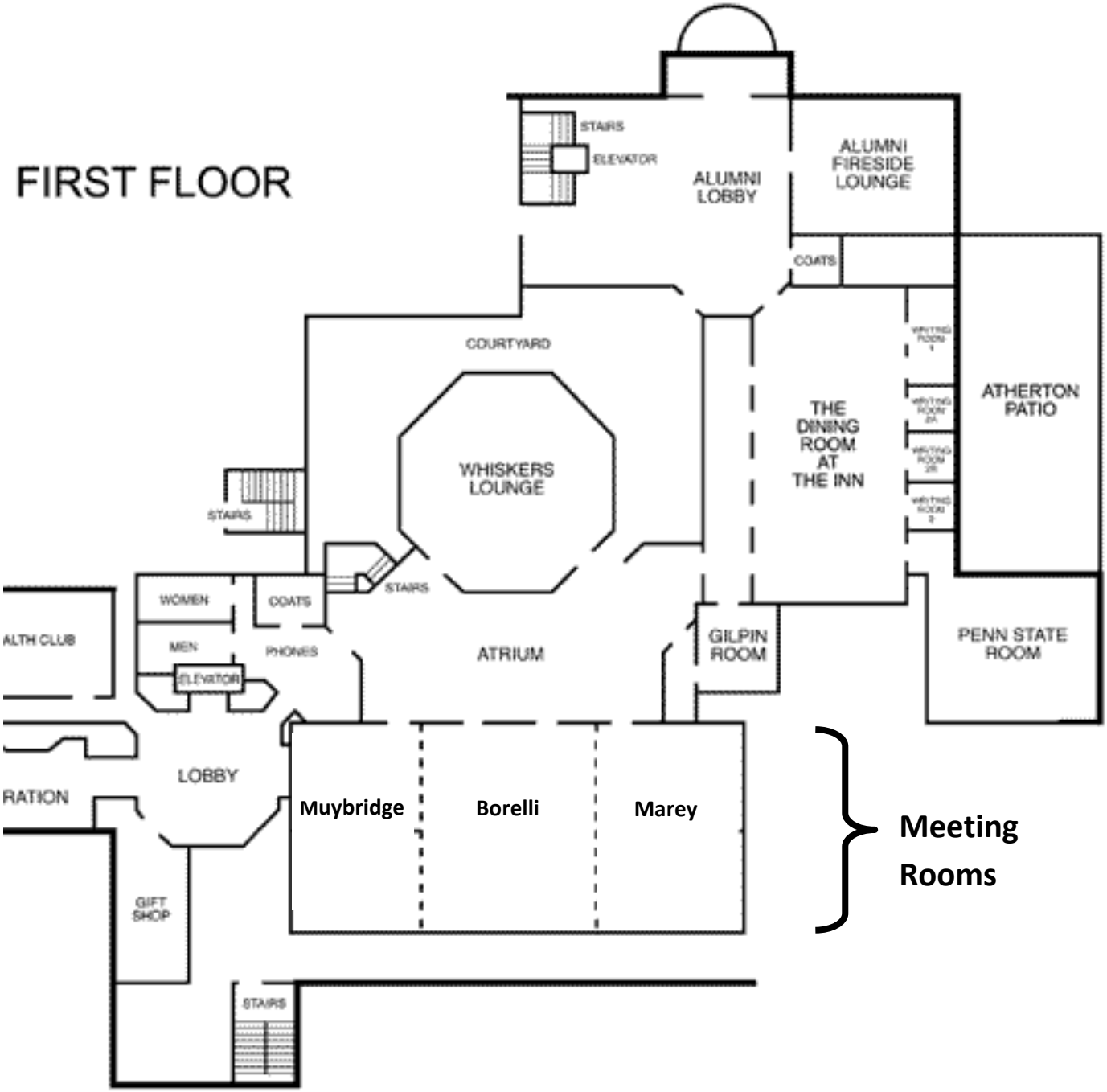
Q: Can I use my own computer (i.e. codecs, special software, etc) for my presentation?
A: No. Unfortunately, there is insufficient time between presenters to allow for computer swapping at the podium.

Q: Will I be able to use the computer's audio during my presentation?
A: Yes, it will be pre-connected. You will be able to control the volume from the computer.

Q: Can I use my own mouse/pointing device during the presentation?
A: Yes, but only if it does not require the installation of drivers (i.e. it must be a standard HID interface).



Meeting Floor Plan



ANNUAL MEETING OF THE AMERICAN SOCIETY OF BIOMECHANICS

PENN STATE UNIVERSITY

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Meetings Instructions

Poster Presentations

Presenters should stand by odd numbered posters only for the first 45 minutes (4:45 until 5:30 PM), and stand by the even number posters only for the second 45 minutes (5:30 until 6:15 PM). In the Alumni Lounge posters are numbered 1 to 66, in the Assembly Room 67 to 117, and in the Faculty Staff Club 118 to 192.

Podium Presentations

Each presenter is allotted 15 minutes; 10 minutes for the presentation, three minutes for questions, and two minutes for the transition between speakers. Please approach a microphone to ask a question.

Coffee Breaks

During the coffee breaks, beverages and snacks will be provided in the Assembly Room and the Faculty Staff Club.

Lunch

There are multiple sites where lunch will be served. If one spot is busy please move to another site, there will be people available to offer you direction.

Banquet

The banquet will be Friday evening. It will be held in the club area of Beaver Stadium. Buses will leave for the stadium from 6:15 PM onwards, and will be available for return from 9:30 until 10 PM. The stadium is just over a mile to walk, you simply need to follow Curtin Road east. From 7 PM until 9 PM the All-Sport Museum within the stadium will be available for a self-guided tour.

Internet Access

There is a public access wireless network in the Nittany Lion Inn. No user id or password is required.

ACKNOWLEDGEMENTS

The organizers would like to thank the following for their generous support,

Department of Kinesiology, Penn State University
Department of Industrial Engineering, Penn State University
Department of Mechanical and Nuclear Engineering, Penn State University
Department of Orthopaedics & Rehabilitation, Penn State University
The College of Health and Human Development, Penn State University
The College of Engineering, Penn State University
National Institutes of Health
Nike Corporation.

The American Society of Biomechanics would like to acknowledge their two corporate sponsors,

TekScan (http://www.tekscan.com/)
Phoenix Technologies, Inc. (http://www.phoenix.com/)

The following kindly reviewed abstracts for this meeting,

Nadya Amor
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Shirley Rietdyk
Stacie Ringleb
Brandi Row
Jason Scibek
Robert Siston
Cecile Smeesters
Jeremy Smith
Darryl Thelen
Brian Umberger
K. Vrongistinos
Henry Wang
Samuel Ward
John Williams
Vanessa Yingling
Bing Yu
Joseph Zeni Jr
Ronald Zernicke

Wednesday, August 26th, 2009

11:00-6:00	**Registration and Poster Placement**
12:00–4:00	**Laboratory Tours** Biomechanics Laboratory (see map for location)
12:00-2:00	**Topic: Tutorial I** **Sam Slobounov (Penn State University)** Incorporating Virtual Reality and Brain Imaging Technologies: Implications for Rehabilitation **Marey Room**
2:00-4:00	**Topic: Tutorial II** **Dan Ferris (University of Michigan)** Building a Robotic Lower Limb Exoskeleton **Borelli Room**
4:00-6:00	**ASB Executive Meeting** **Marey Room**
6:00-7:30	**Welcome Reception** Hintz Alumni Center (see map for location)

Thursday, August 27th, 2009
8:00-9:15 AM

	Topic: Methods & Imaging ***Chair***: Robert Siston ***Student Co-chair*** **Marey Room**	Topic: Aging ***Chair***: Michael Madigan **Borelli Room**	Topic: Upper Extremity ***Chair***: Karen Troy ***Student Co-chair*** **Muybridge Room**
8:00	Validation of a single camera 3D motion tracking system *O'Connor, Armstrong, Weinhandl, Kusik & Barrows* University of Wisconsin-Milwaukee	Effect of tactile paving on gait parameters in older adults *Thies, Kenney & Howard* University of Salford	Associations between force steadiness & tests of hand function across the adult life span *Marmon, Pascoe & Enoka* University of Colorado
8:15	Load dependent variations in knee kinematics measured by dynamic MR *Westphal & Thelen* University of Wisconsin-Madison	Plantarflexor moment arm correlates with preferred gait velocity in healthy elderly subjects *Lee & Piazza* Pennsylvania State University	The effects of single- vs. double-row supraspinatus surgical repair on cyclic and failure loading *Pincivero, Marbaugh, Levine, Iagulli, Rabenold, Frangiamore & Goel* University of Toledo
8:30	Semi-automated tendon identity tracking in MR images *Jensen, Goetz, Thedens, Baer, Lawler & Brown* University of Iowa	The relationship between balance and cognition in parkinson's disease *Nocera, Vallabhajosula, Amano & Hass* University of Florida	The influence of fifteen muscles on distal radioulnar joint loading: a biomechanical model *Bader, Boland, Uhl & Pienkowski* University of Kentucky
8:45	Expanding the potential of cine pc MRI in tracking musculoskeletal motion *Behnam, Wilson & Sheehan* National Institutes of Health	Invariant density analysis of postural sway and prospective fall risk in community-dwellering elderly *Hur, Kang, Lipsitz & Hsiao-Wecksler* University of Illinois at Urbana-Champaign	Etensor strength, surgical tensioning and pinch force following brachioradialis to fpl tendon transfer: a simulation study *Mogk, Johanson, Hentz, Holzbaur & Murray* Rehabilitation Institute of Chicago
9:00	Aplication of musculoskeletal models to aging: obtaining subject-specific measures of muscle volume using MRI *Hasson, Miller, Foulis, Kent-Braun & Caldwell* University of Massachusetts Amherst	The effects of Morton's extension inserts on plantar loading patterns, pain and function in individuals with hallux rigidus *Morris, Tome, Patel, Baumhauer, & Nawoczenski* Ithaca College	Modeling muscle contributions to multijoint mechanics *Hu, Murray & Perreault* Northwestern University
	COFFEE AND EXHIBITS **Assembly Room and Faculty Staff Club**		

Thursday, August 27th, 2009
9:45-11:00 AM

	Topic: Motor Control ***Chair***: Alaa Ahmed ***Student Co-chair*** **Marey Room**	Topic: Gait ***Chair***: Jinger Gottschall **Borelli Room**	Topic: Orthopaedics ***Chair***: Neil Sharkey ***Student Co-chair*** **Muybridge Room**
9:45	Modulation of force structure via visual scaling of fast time scale processes *Hu & Newell* The Pennsylvania State University	The effects of sprint speed on apparent stiffness in uni-lateral trans-tibial amputee sprint runners *McGowan, Grabowski, McDermott, Kram & Herr* University of Texas	Meniscal modeling in a discrete element analysis of the knee *Anderson, Iyer, Segal & Brown* University of Iowa
10:00	Effects of head position and impact direction on neck muscle response to perturbations *Vasavada, Trask, Knottnerus & Lin* Washington State University	The relationship between muscle strength and gait asymmetry in unilateral, trans-tibial amputees *Lloyd & Royer* University of Calgary	Altered 3-d quadriceps moment arms in patellofemoral pain *Wilson, Behnam & Sheehan* National Institutes of Health
10:15	High actuator gains are necessary to control a fast fingertapping motion optimally *Theodorou & Valero-Cuevas* University of Southern California	A computer simulation model for predicting optimal prosthesis inertial parameters *Theroux-Jones, Royer & Umberger* University of Delaware	Performance of a hip protector depends on its position during a fall *Choi, Hoffer & Robinovitch* Simon Fraser University
10:30	Gravity dominates unconstrained, three-dimensional reaching in rhesus monkeys *Jindrich, Courtine, Liu, McKay, Moseanko, Bernot, Roy, Zhong, Tuszynski & Edgerton* Arizona State University	Contributions of leg muscles to the axial knee joint contact force during normal walking *Sasaki & Neptune* Boise State University	Evaluation of synthetic composite tibias for fracture testing *Quenneville, Fraser & Dunning* The University of Western Ontario
10:45	Afferent regulation of locomotor cpg contributes to movement stabilization: a simulation study *Klishko, Markin, Shevtsova, Lemay, Rybak & Prilutsky* Georgia Institute of Technology	Re-interpreting detrended fluctuation analyses of stride-to-stride variability in human walking *Dingwell & Cusumano* University of Texas	Greater trochanter reattachement: experimental evaluation of cable tension & displacement during walking *Duke, Laflamme, Brailovski, Bourgeois, Toueg, Levasseur & Petit* Sacre Coeur Hospital
	COFFEE AND EXHIBITS **Assembly Room and Faculty Staff Club**		

Thursday, August 27th, 2009
11:30-12:45 AM

	Topic: Sport ***Chair:*** Rick Hinricks ***Student Co-chair*** **Marey Room**	Topic: Muscle ***Chair:*** Sylvia Blemker **Borelli Room**	Topic: Hand ***Chair:*** Joe Sommer ***Student Co-chair*** **Muybridge Room**
11:30	Effect of Loading Condition on Traction Coefficient between Shoes and Artificial Turf Surfaces *Kuhlman, Sabick, Pfeiffer, Cooper & Forhan* Boise State University	Effects of tendon morphology on muscular work and efficiency *Gidley & Umberger* University of Massachusetts	MRI-compatibile loading devices for measurement of tendon and median nerve motion within the carpal tunnel *Goetz, Baer, Jensen, Thedens, Lawler & Brown* University of Iowa
11:45	Peak traction coefficients of cleated athletic shoes at various angles of internal rotation on artificial turf *Cooper, Pfeiffer, Sabick, Kuhlman, Simonson & Shea* Boise State University	Thigh-calf and heel-gluteus contact forces in high flexion (experimental results) *Pollard* National Institute for Occupational Safety & Health	A probabilistc biodynamic model for finger tendon force estimation clarifies the roles of the flexors *Li & Zhang* University of Pittsburgh
12:00	Barrier clearance in the 3000m steeplechase *Ingebretsen, Hunter, Cunningham & Willis* Brigham Young University	Reductions in stretch shorten cycle force enhancement with increased coupling time during maximal knee extensions *Pain, Begon & Forrester* Loughborough University	Biomechanical evaluation of the change in thumb extension following relocation of the extensor pollicis longus tendon *Nicewonder, Chloros, Wiesler & Tanaka* Virginia Tech – Wake Forest University
12:15	Foot strike contact location and foot loading during the development of running in children age 3 to 11 years *Mientjes, Pisciotta & Lafortune* Nike Sport Research Lab	Gait retraining to reduce the knee adduction moment through real-time feedback of dynamic knee alignment *Barrios & Davis* University of Delaware	A new device for measuring flexor tendon forces and grip force: a cadaver model *Park, Freivalds, Sharkey & Lowe* Pennsylvania State University
12:30	The effect of gender & perceived threat on the reaction & movement times of young adults performing a simulated sport-protective response *Lipps, Eckner, Richardson & Ashton-Miller* University of Michigan	Effects of novel physiological-based functional electrical stimulation patterns on post-stroke gait *Kesar, Perumal, Reisman, Rudolph, Higginson & Binder-Macleod* University of Delaware	Grip force fluctuations are more than just noise *Rácz & Valero-Cuevas* University of Southern California
	LUNCH		

Thursday, August 27th, 2009
Afternoon

	Topic: Awards ***Chair:*** Rodger Kram **Borelli Room**	
2:00	The influence of prior hamstring injury on musculotendon morphology & muscle contraction mechanics *Silder & Thelen* University of Wisconsin-Madison	Young Scientist Pre-Doctoral Award
2:15	3D synergies in handwriting *Shim, Hooke, Karol & Park* University of Maryland	Young Scientist Post-Doctoral Award
2:30	Orderly recruitment of motor units by optical stimulation in transgenic mice *Llewellyn, Thompson, Deisseroth & Delp* Stanford University	Finalist *Journal of Biomechanics* Award
2:45	Loss of isometric tension in myofibrils undergoing activated stretches *Panchangam & Herzog* University of Calgary	Finalist *Journal of Biomechanics* Award
3:00	Mechanical loading of in situ chondrocytes in a lapine retropatellar cartilage after anterior cruciate ligament transection *Han, Seerattan & Herzog* University of Calgary	Finalist *Clinical Biomechanics* Award
3:15	Patellofemoral kinematic differences exist between high-load and low-load conditions in patients with patellofemoral pain *Draper, Besier, Santos, Fredericson, Beaupre, Delp & Gold* Stanford University	Finalist *Clinical Biomechanics* Award
3:30	**COFFEE AND EXHIBITS** **Assembly Room and Faculty Staff Club**	
3:45	**Topic: Keynote** ***Chair:*** Neil Sharkey **Borelli Room**	
	"The Neuromechanical Foundations of Handedness"	

Thursday, August 27th, 2009
4:45-6:15 PM

POSTERS

Presenters should stand by odd numbered posters only for the first 45 minutes (4:45 until 5:30 PM), and stand by the even number posters only for the second 45 minutes (5:30 until 6:15 PM).

Topic	Poster Numbers	Location
Sports	1 - 25	Alumni Lounge
Running	26-32	Alumni Lounge
Landing	33-47	Alumni Lounge
Skeletal Tissue	48-62	Alumni Lounge
Aging	67-82	Assembly Rooms
Mechanics	83-108	Assembly Rooms
Animal	109-113	Assembly Rooms
Muscle	118-140	Faculty Staff Club
Upper Extremity	141-179	Faculty Staff Club

Topic: Sports
Location: Alumni Lounge

1	The effect of hip strengthening on running and squatting mechanics in female runners *Willy & Davis* - University of Delaware
2	The effect of squat load and depth on patellofemoral joint kinetics *Cotter, Devor, Jamison & Chaudhari* - The Ohio State University
3	On gender differences in the reaction times of sprinters at the 2008 Beijing Olympics *Lipps, Eckner, Richardson, Galecki & Ashton-Miller* - University of Michigan
4	Effects of a simulated soccer match on cutting knee dynamics and reaction time *Collins, Smith, Ebersole & O'Connor* – University of Wisconsin-Milwaukee
5	Frequency analysis of ski chatter in slalom skiing: comparison of inside and outside ski responses *Smith, Lappi & Reid* - Norwegian School of Sport Sciences
6	Force measurement during ice hockey forward skating Stidwill, Pearsall, Dixon & Turcotte - McGill University
7	The effects of testing technique on the performance of chest protectors in Tae Kwon Do *Tsui & Pain* - Loughborough University
8	Assessment of a potential ACL injury risk protocol *Weinhandl, Armstrong, Earl, Kusik, Barrows & O'Connor* - University of Wisconsin-Milwaukee
9	Joint-specific power absorption during eccentric cycling *Elmer, Madigan & Martin* - University of Utah

Thursday, August 27th, 2009
4:45-6:15 PM

	continued Topic: Sports ***Location***: Alumni Lounge
10	Ground contact time in steeplechase hurdling *Willis & Hunter* - Brigham Young University
11	The effect of approach in volleyball spike jump for female athletes Hsieh - California State University, Chico
12	Specificity in the strength and power profiles of elite athletes Forrester & Pain - Loughborough University
13	A comparison of base running techniques in baseball Ficklin, Dapena & Brunfeldt - Indiana University
14	The influence of cricket leg guards on running times and stride parameters Webster & Roberts - Loughborough University
15	Partial external soft tissue vibration damping decreases local oxygen consumption Coza, Nigg, Dunn & Anderson - University of Calgary
16	Maximizing velocity in the hammer throw Hunter, Robinson & Clyde - Brigham Young University
17	Biomechanical parameters and mile performance Tukuafu, Hunter, Cunningham & Willis - Brigham Young University
18	Kinematics estimation sing a global optimization with closed loop constraints Begon, Fohanno & Colloud - Université de Montréal
19	3-D inverse dynamics analysis of martial arts circular kick Saxby & Robertson - University of Ottawa
20	Kinematic description of three types of softball pitches using a unique glenohumeral model Miller, Richards, Kaminski & Royer - University of Delaware
21	Movement classification for studies on player-surface interaction El Kati, Forrester & Fleming - Loughborough University
22	Shoulder rotational properties of throwing atheletes Zheng & Eaton - UNC Charlotte
23	An analysis of characteristics of ground reaction forces according to circle motion in gymnastics the pommel horse Kim, Park & Jean - Dankook University
24	Kinematic analysis on the motion of jump lotus kick 540^{o} in Wushu Kang, Park & Jeon - Dankook University
25	Influence of inertial estimates on elbow joint moments during pitching Wicke, Keeley & Alford - Texas A&M-Commerce

Thursday, August 27th, 2009
4:45-6:15 PM

	Topic: Running ***Location***: Alumni Lounge
26	The influence of force loading patterns on heel pad properties *Gales & Challis* - The Pennsylvania State University
27	Segment coordination response to alterations in foot strike pattern *Gruber, Russell, Miller, Chang & Hamill* - University of Massachusetts
28	Is midfoot striking during running advantageous over rearfoot or forefoot striking? *Altman & Davis* - University of Delaware
29	Influence of thong flip-flops on running kinematics in preschoolers *Shroyer, Robinson & Weimar* - Auburn University
30	Joint contributions to support moment during running and hopping in a runner with achilles tendinopathy: an interlimb comparison *Chang, Popovich, Jr. & Kulig* - University of Southern California
31	Changes in joint kinematics and asymmetry throughout a run to fatigue in healthy female runners *Brown, Zifchock, Miana & Hillstrom* - Hospital for Special Surgery, New York
32	The influence of pelvic control on running mechanics *Jamison & Chaudhari* - The Ohio State University

	Topic: Landing ***Location***: Alumni Lounge
33	Prophylactic ankle stabilizers affect ankle but not knee or hip joint energetics during drop landings *Gardner, Barlow & McCaw* - llinois State University
34	The relation between knee separation distance and lower extremity kinematics during a drop land: implications for clinical screening *Havens, Sigward, Cheng, Pollard & Powers* - University of Southern California
35	The influence of relative hip and knee extensor strength on lower extremity biomechanics during a drop land task *Stearns & Powers* - University of Southern California
36	Differences of tibiofemoral kinematics between ACL-intact and ACL-deficient knees in an in vitro simulated pivot landing - *Oh, Kreinbrink, Antle, Wojtys & Ashton-Miller* University of Michigan
37	Impact forces during ballet: implications for injury *Boros & Skelton* - Texas Tech University
38	Optimising ballet floor design to assist in injury prevention *Fleming* - Loughborough University
39	Using ankle, knee & hip peak angular velocities to predict lower extremity work during drop landings *Barlow, Gardner & McCaw* - Illinois State University
40	Can risk factors for knee injury during landing be reduced by simple verbal instruction? *Milner, Srivatsan, Zhang & Fairbrother* - University of Tennessee, Knoxville
41	The effects of different fatiguing protocols on landing mechanics and knee kinesthetic sense *Afifi & Hinrichs* - Arizona State University

Thursday, August 27th, 2009
4:45-6:15 PM

continued Topic: Landing
Location: Alumni Lounge

42	Asymmetry in joint work of healthy participants during landing *Wortley, Zhang & Carson* - The University of Tennessee, Knoxville
43	The influence of gender & maturation on landing strategies: implications for ACL injury *Sigward, Pollard, Cheng, Lee & Powers* - University of Southern California
44	The effects of strength training on knee biomechanics during a drop jump in males *Sorensen, Dai, McIntyre & Gillette* - Iowa State University
45	Comparison of testing protocols of ankle sprain mechanism: inversion drop test & landing on an inverted surface *Chen, Zhang , Wortley, Milner & Bhaskaran* - The University of Tennessee, Knoxville
46	Biomechanical characteristics of drop landing on an inverted surface with ankle brace *Zhang, Chen & Wortley* - The University of Tennessee, Knoxville
47	The influence of jump landings on dynamic stability *Liu & Heise* - University of Delaware

Topic: Skeletal Tissue
Location: Alumni Lounge

48	Treadmill running and tower climbing exercise produce genotype dependent responses in the femurs of C57BL/6J (B6) and DBA/2J (D2) aged inbred mice *Gdovin, Sharkey & Lang* - The Pennsylvania State University
49	The effect of atorvastatin calcium on the cortical bone strength of corticosteroid treated rabbits *Handal, John, Booker, Khurana, Saing & Samuel* - Albert Einstein Medical Center
50	Geomata: a robust and intuitive software application for extracting anatomical boundaries from medical images *Bennetts & Erdemir* - Cleveland Clinic
51	Semi-automatic 3D virtual reconstruction of simulated comminuted articular fractures *Thomas, Anderson, Willis, Marsh & Brown* - The University of Iowa
52	Tension pattern of the cruciate ligament fibers during rolling and sliding *Wang, Li, O'Farrell, Harner & Zhang* - University of Pittsburgh
53	A comparison of prodisc and charite TDR designs under alternative wear testing standards *Goreham-Voss & Brown* - University of Iowa
54	The need for a bail-out plan: screw options for osteoporotic bone *Hartsell & Cooper* - Smith & Nephew, Inc
55	Use of design of experiment approach to predict force - displacement relationship for the subject-specific model of lateral meniscus *Kia, Guess, Mishra & Thiagarajan* - University of Missouri – Kansas City
56	Orientation-dependent impingement contact mechanics for hard-on-hard total hip bearings *Elkins, Pedersen,Callaghan & Brown* - University of Iowa
57	Structural properties of diabetic and normal plantar soft tissue *Pai & Ledoux* - VA RR&D Center of Excellence for Limb Loss Prevention & Prosthetic Engineering, Seattle

Thursday, August 27th, 2009
4:45-6:15 PM

	continued Topic: Skeletal Tissue ***Location***: Alumni Lounge
58	The effects of lateral ligament sectioning on the stability of the ankle and subtalar joint *Ringleb, Dhakal, Anderson, Bawab, Paranjape & DeMaio* - Old Dominion University
59	Correlation between bone mineral density and fixation strength of orthopedic bone plates *Cartner, Zheng, Ricci & Tornetta* - Smith & Nephew, Inc.
60	Achieving greater bone-plate compressive forces in fracture fixation *Cartner, Ricci & Tornetta* - Smith & Nephew, Inc.
61	In vivo tracking of tendon elongation using ultrasound *Karimpoor, Screen & Morrissey* - Queen Mary University of London
62	An investigation of pubovisceral muscle enthesial loading at the end of the second stage of labor *Kim, Ashton-Miller & DeLancey* - University of Michigan

	Topic: Aging ***Location***: Assembly Room
67	Age-related differences in balance after task-specific training *Bieryla & Madigan* - Virginia Tech
68	Effects of aging-related losses in muscle strength on the feasible region for balance recovery *Kadono & Pavol* - Oregon State University
69	Effect of visual perturbations and dual task on treadmill walking of older and younger adults *Beschorner, McGowan, Redfern, Sparto & Cham* - University of Pittsburgh
70	A three-dimensional kinematic and kinetic comparison of overground and treadmill walking in healthy elderly subjects *Watt, Franz, Jackson, Dicharry, Riley & Kerrigan* - University of Virginia
71	Center of mass position during repeated exposure to forward and backward slipping *Coley & Cham* - University of Pittsburgh
72	Effect of vibrotactile trunk tilt feedback on postural stability in older adults *Ursu, Jiang, & Sienko* - University of Michigan
73	Center of pressure sway parameters considered jointly better differentiate older adult fallers from non-fallers *Bigelow & Berme* - University of Dayton
74	Control of submaximal center of pressure movements in healthy women: effects of age and movement type *Hernandez, Ashton-Miller & Alexander* - University of Michigan
75	Preliminary investigation of balance recovery from a trip in overweight and normal weight older adults *Matrangola, Bieryla & Madigan* - Virginia Polytechnic Institute & State University
76	Effects of age & walking speed on metabolic cost & lower extremity joint kinematics during gait in healthy adults *Peterson & Martin* - Pennsylvania State University
77	The effects of gender & obesity on trunk inertial parameters in old & elderly adults *Chambers, Sukits, McCrory & Cham* - University of Pittsburgh
78	Effects of a single step requirement on balance recovery maneuvers in young & older adults *Dinn & King* - University of Missouri – Kansas City

Thursday, August 27th, 2009
4:45-6:15 PM

continued Topic: Aging

Location: Assembly Room

79	Temporal changes in gait in healthy older individuals during prolonged treadmill walking *Bechard, Birmingham, Jones, Giffin, Zecevic & Jenkyn* - The University of Western Ontario
80	Response of the knee adduction moment to changes in gait speed: peak versus impulse *Maly & Robbins* - McMaster University
81	Age-related changes in dynamic stability & avoidance strategies when stepping over an obstacle in a dual task paradigm *Paquette & Vallis* - University of Guelph
82	Effects of backward walking on balance and lower extremity walking kinematics in healthy young and older adults *Dufek, Mercer, Aldridge, Melcher & Gouws* - University of Nevada, Las Vegas

Topic: Mechanics

Location: Assembly Room

83	Electromyographic responses to aging in children with cerebral palsy *Laurer, Pierce, Tucker, Barbs & Prosser* - Temple University
84	PCL treatment influences sensitivity to joint line changes in total knee arthroplasty *Hast, Walker & Piazza* - The Pennsylvania State University
85	Effect of force redirection on upper limb net joint moments during wheelchair propulsion *Munaretto, McNitt-Gray, Flashner & Requejo* - University of Southern California
86	The use of an accelerometer to determine vestibulospinal function: the NIH toolbox project *Lin, Steed, Marchetti, Musolino, Redfern & Whitney* - University of Pittsburgh
87	Changes in wrist moment arms of the first dorsal extensor compartment following simple distal radius malunions *Scallon, Bednar, Ladd & Murray* - Northwestern University
88	Biomechanics of the sit to stand in people with multiple sclerosis *Bowser, Rourke, White & Simpson* - University of Georgia
89	Assessment of the pressore steptm system as an extended wear weightbearing activity monitor for use with orthopaedic patients *Williams, Allen, Wu, Rudert & Pedersen* - University of Iowa
90	Cumulative knee loading relates to pain intensity & knee extensor torque in people with knee osteoarthritis *Maly & Robbins* - McMaster University
91	Influence of asymmetry of lower extremity force on center of mass velocity during a sit to stand task among subjects with hip fracture *Kneiss, Yelle & Houck* - Ithaca College-Rochester
92	Sensory feedback from ankle extensor afferents improves locomotor output in human SCI *Wu, Gordon, Kahn & Schmit* - Rehabilitation Institute of Chicago
93	Effect of foot and ankle muscle strength in participants with PTTD compared to healthy controls *Fetzer, Hilton & Houck* - Ithaca College-Rochester
94	Gait training and knee hyperextension *Teran-Yengle, Segal, Johnston, Singh, Torner, Walace & Yack* - The University of Iowa

Thursday, August 27th, 2009
4:45-6:15 PM

continued Topic: Mechanics
Location: Assembly Room

95	Pilot study of gait symmetry effects following hip fracture rehabilitation *Rodgers, Geigle & Miller* - University of Maryland
96	Balance adjustment during obstacle crossing in patients with total hip arthroplasty *Chiu & Chou* - University of Oregon
97	Passive resistance to knee motion following total knee arthroplasty *Byrne & Prentice* - Memorial University of Newfoundland
98	Mechanical properties of an elastomer insert ankle foot orthosis *Talaty, Seale, & Siegler* - Drexel University
99	Load transfer and symmetry in gait during double support in acquired brain injury and healthy controls *Yarossi, Nolan, Savalia, Forrest & Elovic* - Kessler Foundation Research Center
100	Robotic outcomes in persons with rotator cuff tears *Finley, Conroy, Jones-Lush & Bever* - University of Indianapolis
101	Improving dynamic stability during the compensatory stepping response of a transfemoral amputee *Crenshaw, Kaufman & Grabiner* - University of Illinois at Chicago
102	Locomotor training: the effects of treadmill speed and body weight support on lower extremity joint kinematics *Lathrop, Morin, Worthen-Chaudhari, Chaudhari, Basso, Schmiedeler & Siston* - The Ohio State University
103	Does acute whole body vibration training improve physical performance for people with knee osteoarthritis? *Salmon & Tillman* - University of Florida
104	Surgical recession of the gastrocnemius does not influence plantar pressure *Chimera, Castro & Manal* - University of Delaware
105	Stand-to-sit movement after bi-compartmental knee replacement *Wang, Dugan, Frame & Rolston* - Ball State University
106	Joint moment contributions to swing knee extension acceleration during gait in subjects with spastic hemiplegic cerebral palsy *Goldberg, Requejo & Fowler* - University of California, Los Angeles
107	Reliability and repeatability of self-selected wheelchair transfer techniques *Lin, Koontz & Kankipati* - Department of Veterans Affairs, Pittsburgh, PA
108	Scapular-humeral kinematics during wheelchair propulsion *Raina, McNitt-Gray & Requejo* – University of Southern California

Topic: Animal
Location: Assembly Room

109	Effects of multiple-group muscle weakness on the retro-patellar cartilage in rabbits *Youssef, Seerattan, Leonard & Herzog* - The University of Calgary
110	Validation of an experimental device simulating the stance phase of a canine hindlimb at trot: an in vitro kinematics study *Lussier, Clément, Jaafar, van Petit & Hagemeister* - University of Montreal

Thursday, August 27th, 2009
4:45-6:15 PM

	continued Topic: Animal ***Location***: Assembly Room
111	Exercise effects via treadmill running and tower climbing on femoral bones of C57BL/6J and DBA/2J adult female mice *Preston, Sharkey & Lang* - The Pennsylvania State University
112	Effects of exercise in trabecular and cortical bone of osteopenic rats: a biomechanical study *Zamarioli, Simões, Chagas, Volpon & Shimano* - Laboratory of Biomechanics – Faculty of Medicine of Ribeirão Preto
113	Changes in muscle-skeletal system after spinal cord injury: a biomechanical study in paraplegic rats *Zamarioli, Maranho, Okubo, Falcai, Volpon & Shimano* - Faculty of Medicine of Ribeirão Preto

	Topic: Muscle ***Location***: Faculty Staff Club
118	Conservation of limb function after peripheral nerve injury in rat locomotion *Bauman & Chang* - Georgia Tech
119	Lower extremity muscle volumes can be accurately obtained from high resolution MRI *Sepulveda, Kingsbury, Eng, Lieber & Ward* - University of California, San Diego
120	Isometric force production requires asymmetric muscle-tendon length trajectory *Sawicki & Roberts* - Brown University
121	Muscle forces in the lower limb predicted by static and dynamic optimization *Miller, Umberger & Caldwell* - University of Massachusetts
122	Power augmentation in a compliant muscle-tendon system *Sheppard, Sawicki & Roberts* - Brown University
123	Isokinetic plantar flexion torque increases after open gastrocnemius recession *Chimera, Castro & Manal* - University of Delaware
124	Architectural parameters of the tricep brachii during isometric contractions *Kutz, Fiolo, Infantolino & Challis* - The Pennsylvania State University
125	Comparison of rotator cuff muscle architecture between humans and selected vertebrate species *Kwan, Eng, Ward* - University of California San Diego
126	Are ultrasound measures of muscle thickness representative of muscle activation in the abdominal wall? *Brown & McGill* - University of Waterloo
127	Seat tube angle affects rectus femoris activation when riding in an aerodynamic position *Silder, Gleason & Thelen* - University of Wisconsin-Madison
128	Quadriceps activation at different hip and knee joint angles *Winter & Burnley* - Aberystwyth University
129	Knee extensor torque reduction during constant perceived exertion isometric contractions *Mukherjee & Pincivero* - The University of Toledo
130	Muscle forces during mastication *Vilimek & Goldmann* - Czech Technical University in Prague
131	A novel approach for experimental derived muscle parameters of the soleus muscle *Binder-Macleod, Manal & Buchanan* - University of Delaware

Thursday, August 27th, 2009
4:45-6:15 PM

	continued Topic: Muscle ***Location***: Faculty Staff Club
132	Estimating dynamic muscle forces of torso during flexion movement *Gottipati & Plaut* - Virginia Polytechnic Institute & State University
133	Fascicle lengths in the first dorsal interosseous muscle *Ellis, Casey, Infantolino & Challis* - The Pennsylvania State University
134	The influence of running speed on the extensor paradox observed in adult runners *Lambert, Kwon & Kwon* - Texas Woman's University
135	Maximal knee extension stretch shorten cycles on an isovelocity dynamometer to examine active force ehancement *Pain, Begon & Forrester* - Loughborough University
136	Deep hip muscle activation during a squat exercise *Decker, Krong, Peterson, Anstett, Torry, Giphart, Shelburne & Philippon* - Steadman-Hawkins Research Foundation
137	Force-length profiles for the triceps brachii *Fiolo, Kutz, Infantolino & Challis* - The Pennsylvania State University
138	Motor asymmetry reduction in older adults revealed by interlimb transfer *Wuebbenhorst & Sainburg*- The Pennsylvania State University
139	Can an external muscle stimulus help the learning of complex gross coordinate motion? *Shin, Park & O'Sullivan* - Seoul National University
140	Upper limb muscle volume characterization in older adult subjects *Vidt, Daly, Marsh & Holzbaur* - Wake Forest University

	Topic: Upper Extremity ***Location***: Faculty Staff Club
141	Interlimb coordination differences in left- and right-handers. *Przybyla & Sainburg* - The Pennsylvania State University
142	A method to quantify the influence of radial head fracture location on elbow kinematics *Kuxhaus, Brogdon, Druschel, Schimoler, Marchessault, Baratz & Miller* - Allegheny General Hospital
143	A method for alignment of the glenoid implant based on sphere fitting *Lewis & Armstrong* - Penn State Hershey
144	Development of an analytical model for rotator cuff repairs *Aurora, van den Bogert & Derwin* – Lerner Research Institute
145	Theoretical analysis of the muscle loading in a thumb in response to increased joint stiffness *Wu, Li, Cutlip & An* - National Institute for Occupational Safety & Health, Morgantown, WV
146	The effect of TFCC injury on ECU function and friction *Domire, Karabekmez, Duymaz, Rutar, Amadio & Moran* - Mayo Clinic
147	Inverse optimization of digit forces in multi-finger prehension based on analytical determination of the objective function *Niu, Tereknov, Pesin, Latash & Zatsiorsky* - The Pennsylvania State University
148	A quantitative analysis of the relationship between scapular orientation & shoulder strength *Picco, Fischer & Dickerson* - University of Waterloo

Thursday, August 27th, 2009
4:45-6:15 PM

continued Topic: Upper Extremity
Location: Faculty Staff Club

149	The effects of noise on the control of a planar model of reaching *Nguyen & Dingwell* - University of Texas at Austin
150	A method for quantifying active thumb circumduction motion in children *Bruening, Cooney & Lubahn* - Shriners Hospitals for Children, Erie PA
151	Revisiting finger flexor excursions with current modeling techniques *Kociolek & Keir* - McMaster University
152	The relationship between hand dexterity and hand muscle structure *Hsu, Halayko, Kim & Shim* - University of Maryland
153	Muscle fatigue affects task performance during repetitive upper extremity movements *Gates, Smallwood & Dingwell* - University of Texas
154	EMG analysis of abductor policis longus, extensor carpi ulnaris & flexor carpi ulnaris during forearm prono-supination *Bader, Boland, Stone, Uhl & Pienkowski* - University of Kentucky
155	A strain-energy approach to simulating slow finger movements and changes due to loss of musculature *Kurse & Valero-Cuevas* - University of Southern California
156	Hand force estimation strategies for field application *Stevenson, Reid, Godwin & Sadler* - Queen's University
157	Effect of modulation of the internal forces on digit coordination during multi-finger object prehension *Martin, Latash & Zatsiorsky* - The Pennsylvania State University
158	Catch like property in human adductor pollicis muscle *Fortuna, Vaz & Herzog* - Federal University of Rio Grande do Sul
159	Frictional properties of the hand skin *Uygur, de Freitas & Jaric* - University of Delaware
160	Finger enslaving in a three-dimensional pressing task *Kapur, Friedman, Zatsiorsky & Latash* - Pennsylvania State University
161	Activation of the shoulder musculature during a sustained submaximal abduction isometric contraction. *Timmons, Adler & Boguszewski* - The University of Toledo
162	In-vitro estimation of finger joint reaction forces during isometric force generation *Lee & Kamper* - Rehabilitation Institute of Chicago
163	Clavicle kinematics following change in length of the sternoclavicular ligaments *Szucs & Borstad* - The Ohio State University
164	Relationship between clinical & biomechanical measures of hand function *Amano, Alberts, Richardson, Doidge, Joyner & Hass* - University of Florida
165	Characterization of the flexor digitorum superficialis as a predictor of grasping strength *Shain, Kim ,& Craelius* - Rutgers University
166	The effects of suprascapular nerve block on humeral head translation *San Juan, Kosek & Karduna* - University of Oregon
167	Effect of the t-poles & conventional hiking poles on the foot VGRF and the joint moment of the upper extremity joints *Singhal, Yoon, Casebolt & Kwon* - Texas Woman's University

Thursday, August 27th, 2009
4:45-6:15 PM

continued Topic: Upper Extremity
Location: Faculty Staff Club

168	An analysis of the finger joint moments in a hand at the maximal isometric grip: effects of friction & cylinder diameter *Wu, Dong, McDowell & Welcome* - National Institute for Occupational Safety & Health
169	Influence of glenoid inclination on rotator cuff moment arms: a computational study *Langenderfer, Baldwin & Rullkoetter* - Central Michigan University
170	Prehension synergy: the changes in synergistic digit actions under systematcially manipulated conditions of task constraints *Park, Kim & Shim* - University of Maryland
171	Shoulder rotator muscle fatigue and EMG during repeated maximal effort exercise *Hess, Calhoun & Pincivero* - The University of Toledo
172	Scapulothoracic motion & muscle activity during the raising & lowering phase of an overhead reaching task *Ebaugh & Spinelli* - Drexel University
173	Variance in upper extremity muscle activity during cyclic pushing tasks *Hodder, Gruevski & Keir* - McMaster University
174	Evaluation of glenohumeral muscles during provocative tests designed to diagnose slap lesions *Wood, Sabick, Pfeiffer, Kuhlman, Christensen, Curtin, Nilsson & Shea* - Boise State University
175	Humeral retroversion in biomedical perspective: ranges of variation in human populations and the role of activity patterns in their developmental determinants *Eckhardt & Kuperavage* - The Pennsylvania State University
176	Modifications in joint kinetics during manual wheelchair propulsion over time *Coghlan, McNitt-Gray, Requejo, Mulroy & Ruparel* - University of Southern California
177	The associations between biomechanical impairments and hand function in people with rheumatoid arthritis *Baker & Rogers* - University of Pittsburgh
178	An anatomic coordinate system of the trapezium using curvature *Rainbow & Crisco* - Brown University
179	Power grip force is modulated in dynamic arm movement *Gao, Lin & Marzilli* - University of Texas Southwestern Medical Center

Friday, August 28th, 2009
8:00-9:15 AM

	Topic: Tendon & Ligament ***Chair***: Tom Brown ***Student Co-chair*** **Marey Room**	Topic: Locomotion Energetics ***Chair***: Brian Umberger **Borelli Room**	Topic: Spine ***Chair***: Paul Ivanic ***Student Co-chair*** **Muybridge Room**
8:00	The effect of cyclic loading on the coefficient of friction differs by gender in the articular cartilage of murine knee joints *Drewniak, Jay, Fleming & Crisco* Brown University	Metabolic response in functional electrically stimulated pedaling with the lower leg muscles *Hakansson & Hull* University of Delaware	Comparing load and posture on industrial based lifting tasks: effects of gender, spinal load magnitude & postural asymmetry *Nairn, Parkinson, Callaghan & Drake* University of Windsor
8:15	Individuals with patellofemoral pain demonstrate higher patellofemoral joint stresses compared to those who are pain-free: evaluation using finite element analysis *Farrokhi & Powers* University of Southern California	Foot-strike pattern selection to minimize muscle energy expenditure during running: a computer simulation study *Miller, Russell, Gruber & Hamill* University of Massachusetts, Amherst	Development and validation of a non-invasive spinal motion measurement system *Stinton, Shapiro, Mullineaux, Shaffer, Cassidy & Pienkowski* University of Kentucky
8:30	Mechanical properties of the anterior cruciate ligament after corticosteroid administration *Okubo, Zamarioli, Falcai, Volpon & Shimano* University of São Paulo	Elastic leg exoskeleton reduces the metabolic cost of hopping *Grabowski & Herr* Massachusetts Institute of Technology	Is muscle co-activation a predisposing factor for low back pain development during standing? *Nelson-Wong & Callaghan* University of Waterloo
8:45	The depth of the medial tibial plateau is an important anterior cruciate ligament injury risk factor *Hashemi, Chandrashekar, Gill, Slauterbeck, Schutt, Dabezies, Mansouri & Beynnon* Texas Tech University	Changes in kinematics, metabolic cost & external work done during walking with a propulsive force *Zirker, Bennett, Friedman, Mehdi & Abel* University of Virginia	An in-vitro biomechanical evaluation of posterior lumbar dynamic stabilization systems: universal clamp and wallis *Shaw, Ilharreborde, Berglund, Zhao, Gay & An* Mayo Clinic
9:00	Low stress tendon fatigue: mechanical and structural findings *Parent & Langelier* Université de Sherbrooke	Effects of age and walking speed on coactivation during gait *Peterson & Martin* Pennsylvania State University	Is there a low back cost to hip-centric exercise? examining the l4/l5 joint compression during movements prescribed to overload the hips *Frost, Beach, Fenwick, Callaghan & McGill* University of Waterloo
	COFFEE AND EXHIBITS **Assembly Room and Faculty Staff Club**		

ANNUAL MEETING OF THE AMERICAN SOCIETY OF BIOMECHANICS
PENN STATE UNIVERSITY

PENNSTATE

Friday, August 28th, 2009
9:45-11:00 AM

	Topic: Knee ***Chair***: Irene Davis ***Student Co-chair*** **Marey Room**	Topic: Muscle and Tendon ***Chair***: Huub Maas **Borelli Room**	Topic: Upper Extremity ***Chair***: Andy Karduna ***Student Co-chair*** **Muybridge Room**
9:45	Injury prevention training results in biomechanical changes consistent with decreased knee loading in female athletes during landing *Pollard, Sigward & Powers* University of Southern California	Non-uniform distribution of sarcomere lengths along a muscle fiber *Infantolino & Challis* The Pennsylvania State University	Forward dynamic simulation of an upper extremity movement using computed muscle control *Daly, Vidt & Holzbaur* Wake Forest University
10:00	Effect of off-loader braces and degree of valgus correction on clinical outcome for persons with medial knee OA *Russell & Ramsey* University at Buffalo	A phenomenological model of shortening induced force depression during muscle contractions *McGowan, Neptune & Herzog* University of Texas at Austin	Glenohumeral joint contact forces during wheelchair activities *Morrow, An & Kaufman* Mayo Clinic
10:15	Longitudinal Sex Differences In Knee Abduction In Young Athletes *Ford, Shapiro, Myer, van den Bogert & Hewett* Cincinnati Children's Hospital	Postactivation potentiation and decreased motor unit firing rate during submaximal contractions of the tibialis anterior *Inglis, Howard, MacIntosh, Gabriel & Vandenboom* Brock University	Influence of indenter size and wrist posture on transverse carpal ligament stiffness *Holmes, Howarth, Callaghan & Keir* McMaster University
10:30	Articular loading during walking in subjects with ACL deficiency *Manal, Snyder-Mackler & Buchanan* University of Delaware	The magnitude & the time dependent structure of force fluctuations are muscle-length dependent *Winter & Challis* Aberystwyth University	Recovery of scapula kinematics & shoulder muscle activation following an isometric fatigue task *Borstad, Kynyk, Lower, Sellers, Szucs & Navalgund* The Ohio State University
10:45	Comparison of tibial translations during soft and stiff landings in healthy adults: a biplane fluoroscopy study *Peterson, Krong,Giphart, Shelburne, Steadman & Torry* Steadman Hawkins Research Foundation	A biomechanical comparison of the side-to-side and pulvertaft tendon transfer repair techniques *Brown, Hentzen, Kwan, Ward, Friden & Lieber* University of California San Diego	Cycle to cycle variability in a repetitive upper extremity task *Keir, Brown & Holmes* McMaster University
	COFFEE AND EXHIBITS **Assembly Room and Faculty Staff Club**		

ANNUAL MEETING OF THE AMERICAN SOCIETY OF BIOMECHANICS
PENN STATE UNIVERSITY

PENNSTATE

Friday, August 28th, 2009
11:30-12:45 PM

	Topic: Computational Biomechanics ***Chair***: Martin Tanaka ***Student Co-chair*** **Marey Room**	Topic: Running ***Chair***: Ewald Hennig **Borelli Room**	Topic: Aging ***Chair***: Monica Maly ***Student Co-chair*** **Muybridge Room**
11.30	Adaptive surrogate modeling for cost-effective determination of nonlinear tissue properties *Halloran, Frampton & Erdemir* The Cleveland Clinic	Dynamic arch development: midfoot contact area and loading during running in children age 3 to 11 years *Mientjes, Pisciotta & Lafortune* Nike Sport Research Lab	Influence of age & gait speed on required coefficient of friction independent of step length *Anderson & Madigan* Virginia Polytechnic Institute & State University
11.45	Pelvic motion during seated pedaling facilitates intersegmental energy transfer *Gleason, Silder & Thelen* University of Wisconsin - Madison	In vivo knee cartilage contact during downhill running *Anderst, Thorhauer & Tashman* University of Pittsburgh	Modulating step length during walking by young and old adults *DeVita, Copple, Patterson, Rider, Long, Steinweg & Hortobagyi* East Carolina University
12.00	The use of subject-specific anatomic parameters in an EMG-driven musculoskeletal model results in improved knee joint moment predictions when compared to generic & scaled models *Tsai & Powers* University of Southern California	Using forward dynamic simulations of high speed running to assess hamstring strain injury potential *Chumanov, Heiderscheit & Thelen* University of Wisconsin-Madison	A shoe-based method for randomly perturbing the stance phase of gait and its effect on step width *Kim, Richardson, Nnodim, Takemura & Ashton-Miller* University of Michigan
12.15	Computational simulation of ankle contact mechanics following focal defect resurfacing with a metallic implant *Anderson, Tochigi, Rudert, Vaseenon, Amendola & Brown* University of Iowa	The probability for tibial stress fracture increases with running speed despite a reduction in the number of loading cycles *Edwards, Taylor, Rudolphi, Gillette & Derrick* Iowa State University	Are feedback related adjustments to step width affected by performance of the Stroop Test? *Hurt, Rosenblatt & Grabiner* University of Illinois at Chicago
12.30	A large scale optimization approach to generate subject-specific knee joint models *Borotikar & van den Bogert* Cleveland Clinic	Mechanics of unilateral trans-tibial amputee sprint runners *Grabowski, McGowan, Herr, McDermott & Kram* Massachusetts Institute of Technology	Lower extermity muscle strength and gait variability in older adults *Shin, Valentine, Evans & Sosnoff* University of Illinois at Urbana-Champaign
	LUNCH		

Friday, August 27th, 2009
Afternoon

2.00	**Topic: Hay Lecture** ***Chair:*** Vladimir Zatsiorsky ***Introduction***: Jill McNitt-Gray ***Presentation***: Tom Buchanan **Borelli Room**
	Doris Miller (University of Western Ontario) "Ups and downs of the competitive diving"
3:15	**COFFEE AND EXHIBITS** **Assembly Room and Faculty Staff Club**
3:45	**Topic: Keynote Lecture** ***Chair:*** Irene Davis **Borelli Room**
	Kiisa Nishikawa (Northern Arizona University) **"**How do they do it? Specializations of toads for extremely rapid prey capture"

Friday, August 28th, 2009
4:45-6:15 PM

POSTERS

Presenters should stand by odd numbered posters only for the first 45 minutes (4:45 until 5:30 PM), and stand by the even number posters only for the second 45 minutes (5:30 until 6:15 PM).

Topic	Poster Numbers	Location
Balance	1 – 30	Alumni Lounge
Walking	31-65	Alumni Lounge
Methods	67-104	Assembly Room
Motor Control	105-115	Assembly Rooms
Computational Biomechanics	118-132	Faculty Staff Club
Injury	133-144	Faculty Staff Club
Ergonomics	145-158	Faculty Staff Club
Spine	159-186	Faculty Staff Club
Cardiovascular	187-188	Faculty Staff Club

	Topic: Balance ***Location***: Alumni Lounge
1	Dynamic postural stability in pregnant fallers, non-fallers and nonpregnant controls *McCrory, Chambers, Daftary & Redfern* - West Virginia University
2	Kinematic responses to galvanic stimulation of the human vestibular system during locomotion *Steed, Roche & Redfern* - University of Pittsburgh
3	Recovery gait following an unexpected slip *Timcho, Chambers & Cham* - University of Pittsburgh
4	Are restricted, repetitive behaviors and postural control linked in autism spectrum disorders? *Hass, Fournier, Selbst, Benefield, Lewis & Radonovich* - The University of Florida
5	Quiet standing and quiet sitting in young children with autism spectrum disorders *Fournier, Radonovich, Selbst, Benefield & Hass* - The University of Florida
6	Emotional influences on the center of pressure trajectory during gait initiation *Joyner, Gamble, Fournier, Hass & Janelle* - University of Florida
7	Preliminary investigation of slip and trip propensity in overweight and normal weight adults *Matrangola, Anderson & Madigan* - Virginia Polytechnic Institute & State University
8	The influence of turning strategy on dynamic postural stability in person with early stage parkinson's Disease *Song, Ferris, Sigward, Fisher, Petzinger, Parent & Salem* - University of Southern California
9	Five-toed socks decrease static postural control among health individuals as measured with time-to-boundary analysis *Shinohara & Gribble* - University of Toledo
10	Modeling and simulation of balance recovery responses to tripping *Shiratori, Coley, Cham & Hodgins* - Carnegie Mellon University

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: Balance ***Location***: Alumni Lounge
11	Effect of balance recovery task difficulty on stepping velocities for forward, sideways and backward loss of balance directions *Telonio & Smeesters* - Université de Sherbrooke
12	Effects of age and instructions limiting the number of steps on the threshold of balance recovery *Cyr & Smeesters* - Université de Sherbrooke
13	Recovery from postural perturbations without stepping following localized muscle fatigue *Davidson, Madigan, Nussbaum & Wojcik* - University of Colorado Denver
14	The effect of lumbopelvic posture on pelvic floor muscle activation and intravaginal pressure generation in continent women *Capson, Nashed & McLean* - Queen's University
15	The interaction between posture and cognition during a manual fitting task *Seaman, Ponto, Keough, Ryu & Haddad* - Purdue University
16	Predicting an imminent fall using 3D trunk acceleration *Cain, Crenshaw, Kaufman & Grabiner* - University of Illinois at Chicago
17	Comparison of an automatic and voluntary task in early Parkinson's disease *McVey, Stylianou, Lyons, Pahwa, Luchies & Cheney* - The University of Kansas
18	Postural sway changes in mild to moderate Parkinson's disease *Stylianou, Luchies, McVey, Lyons & Pahwa* - The University of Kansas
19	The effect of boundary shape and minimal selection on single limb stance postural stability *Joshi, Bazett-Jones, Earl & Cob* - University of Wisconsin-Milwaukee
20	Recovery limb positioning and trip recovery success *Roos, McGuigan & Trewartha* - The University of Texas at Austin
21	Trip recovery strategy selection in younger and older adults and the associated physical demands *Roos, McGuigan & Trewartha* - The University of Texas at Austin
22	Magnitude of potential vulnerability to balance control after a transition to standing *DiDomenico & McGorry* - Liberty Mutual Research Institute for Safety
23	Dynamic stability assessed with frequency analysis compared to spatiotemporal analysis *Heise, Liu, Smith, Allen & Hoke* - University of Northern Colorado
24	Body center of pressure control during gait initiation in transtibial amputees *Fink, Yen, Auyang & Chang* - Georgia Tech
25	Effects of increased task difficulty on performance variable stabilization during human locomotion *Auyang & Chang* - Georgia Tech
26	Automatic detection of slip-induced backward falls *Liu & Lockhart* - University of Houston
27	Proactive balance control: kinematic analysis of a reach task *Mukherjee & Armstrong* - The University of Toledo
28	Comparison of total hip arthroplasty and a hip resurfacing during quiet standing *Bouffard, Therrien, Nantel, Lavigne, Venditolli & Prince* - Marie Enfant Rehabilitation Center
29	Differences in upper body posture and postural muscle activation in females with larger breast sizes *Bennett, Kuhlman, Sabick, Pfeiffer & Laverson* - Boise State University
30	Postural control response to stance on a compliant surface *Haworth, Strang, Hieronymus & Walsh* - Miami University

Friday, August 28th, 2009
4:45-6:15 PM

	Topic: Walking ***Location***: Alumni Lounge
31	An evaluation of functional asymmetry at non-preferred walking speeds *Smith, Rice & Seeley* - Brigham Young University
32	Vertical displacement of the center of mass during spring-loaded crutch ambulation *Dunn & Seeley* - Brigham Young University
33	Time-normalization techniques for gait data *Helwig, Hong & Hsiao-Wecksler* - University of Illinois at Urbana-Champaign
34	Interaction between mass and alignment on knee adduction movement in patients with knee osteoarthritis *Moyer, Birmingham, Kean, Jones, Jenkyn, Chesworth & Giffin* - University of Western Ontario
35	Changes in ankle kinematics to preserve an invariant roll-over shape *Wang & Hansen* - Northwestern University
36	Electrical stimulation of the semitendinosus during terminal swing increases knee flexion excursion during early stance *Hernandez, Lenz & Thelen* - University of Wisconsin-Madison
37	Lower extremity coordination in obese women *Russell, Gruber, van Emmerik & Hamill* - University of Massachusetts Amherst
38	KInematic adaptations of the forefoot and hindfoot during cross-slope walking *Damavandi, Dixon & Pearsall* - McGill University
39	Kinectics of a weighted challenge in individuals with knee osteoarthritis *Kubinski & Higginson* - University of Delaware
40	Varus knee torques in high-heeled stair descent *Stevermer, Nelsen & Gillette* - Iowa State University
41	Lower extremity joint moment during carrying tasks in children *Gillette, Stevermer, Miller, Edwards & Schwab* - Iowa State University
42	The robotic gain simulator: the effect of EMG to force *Aubin & Ledoux* - VA RR&D Center of Excellence for Limb Loss Prevention & Prosthetic Engineering, Seattle
43	Midtarsal kinematics defined using finite helical axes analysis *Okita, Meyers, Challis & Sharkey* - The Pennsylvania State University
44	Plantar flexor reflex response to a perturbation during human walking maintains ankle joint torque pattern *Kao, Lewis & Ferris* - University of Michigan
45	Gait strategy changes with walking speed to accommodate biomechanical constraints *Kang, Yeom & Park* - KAIST, Korea
46	The role of tibialis posterior on foot kinematics during walking *Pohl, Rabbito & Ferber* - University of Calgary
47	Children with cerebral palsy require more strides to dissipate disturbances present in their walking pattern Kurz, Corr & Stuberg - University of Nebraska Medical Center
48	Individual limb work is influenced by ankle-foot-orthotics worn by children with cerebral palsy *Kurz, Stuberg & Ginsburg* - University of Nebraska Medical Center

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: **Walking** ***Location***: Alumni Lounge
49	Differences in frontal plane stability during treadmill and overground walking *Rosenblatt & Grabiner* - University of Illinois at Chicago
50	Compensatory changes in the uninvolved knee after gait training with real-time feedback in adults with knee osteo-arthritis *Singh, Segal, Johnston, Teran-Yengle, Torner, Walace & Yack* - The University of Iowa
51	Effective rocker shapes for walking, swaying and standing *Wang & Hansen* - Northwestern University
52	Sensitivity analysis of loading conditions on mechanical stiffness measurements of a passive dynamic ankle foot orthoses *Takahashi & Stanhope* - University of Delaware
53	Biplane fluoroscopy analysis of knee kinematics during gait *Krong, Peterson, Giphart, Shelburne & Torry* - Steadman-Hawkins Research Foundation
54	Effect of total hip arthroplasty on contribution of individual joints to dynamic effect of total hip arthroplasty on contribution of individual joints to dynamic support during walking *Chou, Amali & Lugade* - University of Oregon
55	The immediate bilateral effects of unilateral knee bracing for the treatment of knee osteoarthritis: preliminary results *Zifchock, Backus, Bogner, Pavlov, Mandl, Chen, Garrison, Brown, Cordasco, Williams, Hunter, Bedi & Hillstrom* - Hospital for Special Surgery, New York
56	Effect of walking speed on plantar loading and foot kinematics in subjects with stage II posterior tibial tendon dysfunction *Neville, Flemister & Houck* - SUNY Upstate Medical Center
57	Kinematic and EMG comparison of gait in normal gravity and microgravity *De Witt, Edwards, Perusek, Lewandowski & Samorezov* - Wyle Integrated Science & Engineering Group
58	The origins of bipedal locomotions inferred from geometric cross sectional properties of ancient african femora *Kuperavage & Eckhard* - Pennsylvania State University
59	Distinguishing between mechanical pathology and compensation using gait analysis in people with knee osteoarthritis *Maly & Costigan* - McMaster University
60	Temporal and frequency characteristics of trunk and hip muscle activity patterns in early walkers with and without cerebral palsy. *Prosser, Lee, Barbe, VanSant & Lauer* - Temple University
61	Evaluation of asymmetry in ground reaction forces and muscle activity during the stance phase of gait in asymptomatic subjects *Burnett, Campbell-Kyureghyan, Kar & Quesada* - University of Louisville
62	Comparison of ankle and foot joint kinetics after heel-off between individuals with posterior tibial tendon dysfunction and controls *Van Vlack, Tome, Neville, Flemister & Houck* - Ithaca College-Rochester
63	Footwear is an Important determinant for medial-lateral stability during hill transitions in walking humans *Stern & Gottschall* - The Pennsylvania State University
64	At similar slopes, stair walking is a safer alternative to ramp walking *Sheehan & Gottschall* - The Pennsylvania State University
65	Transitioning to the next level: foot position and hip muscle activity during stair walking *Gascon & Gottschall* - The Pennsylvania State University
65	The effect of body weight support on the ankle-foot roll over shape *Morin, Lathrop, Worthen-Chaudhari, Basso, Schmiedeler & Siston* - The Ohio State University

Friday, August 28th, 2009
4:45-6:15 PM

Topic: Methods

Location: Assembly Room

67	Ground reaction force measurements for multi-segment foot models *Bruening, Cooney & Buczek* - Shriners Hospitals for Children, Erie PA
68	Ground reaction force is a temporal predictor of anterior tibial translation during drop landing in healthy adults *Peterson, Krong, Giphart, Steadman, Torry & Shelburne* - Steadman Hawkins Research Foundation
69	Modeling of custom foot orthotics *Trinidad, Krishnamurty & Hamill* - University of Massachusetts Amherst
70	Comparing Cardan rotation angle and finite helical axis representations of talocrural and subtalar in vivo kinematics *Sheehan* - National Institutes of Health
71	The relationship between intravaginal and urethral pressure during voluntary contraction and during coughing in continent women *McLean & Madill* - Queen's University
72	Influence of microstructure on the mechanical properties of vertabral bone assessed by quantitative computed tomography – study on synthetic – model *Levasseur, Ploeg & Petit* - Hôpital du Sacré de Montréal
73	On the appropriateness of estimating intramuscular myoelectric signals from surface electrodes for the rotator cuff *Brookham, Waite & Dickerson* - University of Waterloo
74	Design and development of a dynamic knee simulator for in-vitro knee biomechanics research *Cassidy, Ens & Chandrasheka* - University of Waterloo
75	The effect of lower limb instrumentation on kinetics and kinematics during stair climbing *Beath & Durkin* - University of Waterloo
76	Rethinking maximum voluntary exertion techniques to avoid muscle fatigue while reducing experimental setup time: a shoulder example *Chopp, Fischer & Dickerson* - University of Waterloo
77	Intersegmental dynamics of swing are refined over time to accommodate changes in leg inertia *Smith, Villa, Orpet & Heise* - University of Northern Colorado
78	Vibration platform oscillation characteristics using high speed 3-D motion capture *Branscomb, Smith & Bressel* - Utah State University
79	Characterization of head motion in the MR environment *Andrews-Shigaki, Robinson, Zaitsev, Chang & Ernst* - University of Hawaii at Manoa
80	Partitioning gait data into temporal and intensity differences *Helwig, Hong & Hsiao-Wecksler* - University of Illinois at Urbana-Champaign
81	The validity of different occlusal indicators *Forrester, Pain, Toy & Presswood* - Loughborough University
82	Measuring the propagation of a mechanical wave through soft tissue with a 3D motion capture system *Pérez-Jiménez & Pain* - Loughborough University
83	Piecewise linear approximation to filter force plate signals *Cannella, Mehta & Silfies* - Drexel University
84	Accuracy of optical and electromagnetic tracking systems during dynamic motion *Lugade, Erickson, Fujimoto, Chen, San Juan, Karduna & Chou* - University of Oregon
85	Repeatability of In-vivo motion analysis: optical vs. electromagnetic tracking systems *Chen, Fujimoto, Ewers, Amasay, San Juan, Lugade, Erickson, Chou & Karduna* - University of Oregon

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: Methods ***Location***: Assembly Room
86	Influence of pelvis cluster configurations on estimating joint parameters in gait analysis: a pilot Study *Ramanujam, Terry & Forres* - Kessler Foundation Research Center
87	Reliable knee positioning for weight-bearing MRI *Dubowsky, Gade, Allen & Barrance* - Kessler Foundation Research Center
88	Test-retest reliability of in-shoe lateral heel pressure measurements during gait *Leitch, Birmingham, Giffin, Jones & Jenkyn* - University of Western Ontario
89	A device to quantify cyclic compressive loads applied to soft tissue for in-vivo animal models *Cunningham & Butterfield* - University of Kentucky
90	Ankle shock while running on a treadmill: a requisite stride number *Waddell, Brewer & Cappaert* - University of Mississippi
91	Capturing wheelchair propulsion kinematics using inertial sensors *Hooke, Morrow, An & Kaufman* - Mayo Clinic
92	Assessing the fit of constitutive models to experimental stress-strain data *Morrow, Donahue, Odegard & Kaufman* - Mayo Clinic
93	The effects of model degrees of freedom and marker weight on resultant hip kinematics in OpenSim *Thompson, Chaudhari & Siston* - The Ohio State University
94	A combinatorial approach to automated patient-specific finite element meshing *Ramme, Magnotta & Grosland* - The University of Iowa
95	Feature based all hexahedral mesh generation in orthopaedic biomechanics *Shivanna, Tadepalli, Magnotta & Grosland* - The University of Iowa
96	Method for verifying mechanical properties of proximal tibia trabecular bone derived from CT data *Alipit & Racanelli* - Stryker Orthopaedics
97	Repeatability of ankle joint kinematic data at heel strike using the Vicon plug-in gait model *Wright, Seitz, Arnold & Michener* - Virginia Commonwealth University
98	Finite element analysis based design optimization for prosthetic socket *Gao, Wang & Le* - University of Texas Southwestern Medical Center
99	A comparison of shoulder joint angle reduction methods *Oyama, Leigh & Yu* - The University of North Carolina at Chapel Hill
100	A novel portable visuomotor manual reaction time test *Kim, Eckner, Richardson & Ashton-Miller* - University of Michigan
101	Time-lapse microtomography of trabecular bone deformation using flat panel X-Ray sensor *Jirousek* - Academy of Sciences of the Czech Republic
102	Two methods to determine muscle forces and joint contact force: comparison to experimental muscle activity *Richards, Zeni, Jr. & Higginson* - University of Delaware
103	Volitional MVC EMG normalization tasks between days *MacLeod, Chimera, Manal & Buchanan* - University of Delaware
104	Comparison of warm-up periods for treadmill running *Fellin & Davis* - University of Delaware

Friday, August 28th, 2009
4:45-6:15 PM

	Topic: Motor Control ***Location***: Assembly Room
105	Comparison of gleno-humeral kinematics obtained using bone pins and skin mounted markers – a preliminary validation study *Rao, Miana, Lenhoff, Backus, Vanadurongwan, Chen, Brown, Coleman, Cordasco, Altchek, Fealy, Imhauser, Karduna, Warren, Wright, Zifchock & Hillstrom* - New York University
106	Passive sensitivity determines goal-level variability in a shuffleboard task *John, Dingwell & Cusumano* - Pennsylvania State University
107	Stochastic control models explain how humans exploit redundancy to control stepping variability during walking *Dingwell, John & Cusumano* - University of Texas
108	Biomechanics of transport of a fragile object *Gorniak, Zatsiorsky & Latash* - Pennsylvania State University
109	Multi-muscle synergies in a dual task *Klous, dos Santos & Latash* - Pennsylvania State University
110	Temporal effects of galvanic vestibular stimulation on gait as measured by accelerometers *Roche, Steed & Redfern* - University of Pittsburgh
111	Relationships between spastcity of the knee extensors and muscle mass in children with cerebral palsy *Pierce, Prosser, Lee & Lauer* - Widener University
112	Consistent hopping performance through different joint-level strategies *Yen & Chang* - Georgia Tech
113	A theoretical study of the effect of elbow muscle co-contraction level on forearm steadiness *Gordon & Ashton-Miller* - University of Michigan
114	Effect of target size on whole body inter joint synergies: an uncontrolled manifold analysis *Karol & Shim* - University of Maryland
115	Muscle recruitment order in various reaction time tests *Pain, Gu & Hiley* - Loughborough University

	Topic: Computational Biomechanics ***Location***: Faculty Staff Club
118	Mechanical properties of orbital fat and its encapsulating connective tissue *Chen & Wei* - University of Southern California
119	Single level fusion in a C2 cervical spine finite element model *Kallemeyn, Smucker, Fredericks, Shivanna & Grosland* - The University of Iowa
120	An EMG assisted biomechanical model of lumbar spine with passive components *Shu, Burnfield & Mirka* - Madonna Rehabilitation Hospital, Lincoln, NE
121	Arm motion coupling during locomotion-like actions: an experimental study and a dynamic model *Shapkova, Terekhov & Latash* - The Pennsylvania State University
122	Validation of an experimental device simulating the stance phase of a canine hindlimb at trot in the cranial cruciate deficient stifle: an in vitro kinematics study *Lussier, Clément, Jaafar, Petit & Hagemeister* University of Montreal

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: Computational Biomechanics ***Location***: Faculty Staff Club
123	Telescoping action improves the fidelity of an inverted pendulum model in diplegic cerebral palsy gait *Buczek, Cooney, Walker, Rainbow & Sanders* - National Institute for Occupational Safety & Health, Morgantown WV
124	An EMG driven model to estimate ACL forces during normal walking *Shao, Manal & Buchanan* - University of Delaware
125	The study of menisci effect on tibio-femoral kinematics in a computational knee joint *Kia, Guess & Paiva* - University of Missouri – Kansas City
126	Integration of vibrotactile feedback in a 3D model of human balance *Ersal, Vichare & Sienko* - University of Michigan
127	Biomechanical animations communicate emotion during walking *Wei, Keen, Herzog, Crane & Gross* - University of Michigan
128	An analytical approach to evaluating uncemented total hip replacement intraoperative proximal femur fracture risk *Schmidt, Shields, Fuchs, Racanelli & Wang* - Stryker Orthopaedics
129	Study of muscle torque sharing patterns in isometric plantar flexion by an EMG-driven biomechanical model *Oliveira & Menegaldo* - Federal University of Rio de Janeiro
130	A method to determine whether a musculoskeletal model can resist arbitrary external loadings within a prescribed range *Chu & Hughes* - University of Michigan
131	Uncertainties in tissue mechanical response with increased cell density: microstructural and homogeneous models revisited *Bennetts, Chokhandre & Erdemir* – The Cleveland Clinic
132	Identification of footwear insole material response for optimal reduction of plantar heel pressure *Chokhandre, Erdemir & Cavanagh* - The Cleveland Clinic

	Topic: Injury ***Location***: Faculty Staff Club
133	Comparing knee kinematics during gait using biplane fluoroscopy and optical marker-based methods *Krong, Peterson, Giphart, Shelburne & Torry* - Steadman-Hawkins Research Foundation
134	Linear head accelerations resulting from short falls onto the occiput in children *Heller, George, Yamaguchi, McGowan & Prange* - Exponent Failure Analysis Associates
135	Correlating femoral shape with patellar kinematics to uncover the mechanisms of maltracking in patellofemoral pain *Sheehan, Wilson, Harbaugh & Alter* - National Institutes of Health
136	Severity of head impacts resulting in mild traumatic brain injury *Beckwith, Chu, Crisco, McAllister, Duma, Brolinson & Greenwald* - Simbex
137	The relationship between MB loading asymmetry and knee function prior to total knee arhroplasty *Christiansen & Stevens-Lapsley* - University of Colorado Denver
138	Injury tolerance criteria for short duration axial loading of the tibia *Quenneville, McLachlin, Fraser & Dunning* - The University of Western Ontario

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: Injury ***Location***: Faculty Staff Club
139	Anticipatory effects on frontial plane hip kinematics during cutting movements *Mizell, Hass, Siders & Tillman* - University of Florida
140	Theoretical predictions of human upper extremity buckling behavior under impulsive end-loading: effects of gender and extensor muscle stretch behavior *Lee & Ashton-Miller* - University of Michigan
141	Misstepping and hip fractures in the osteoporotic elderly *Uygur, Richards, Jaric, de Freitas & Barlow* - University of Delaware
142	Comparison of functional and isokinetic fatigue protocols: injury research implications *Douex & Kaminsk* - Univeristy of Deleware
143	Patellofemoral joint kinetics during forward step-up, lateral step-up and forward stepdown exercises *Chinkulprasert, Vachalathiti & Powers* - Mahidol University
144	Occupant kinematics in locomotive low-speed impacts *Serina, Peterson, White & Desautels* - Talas Engineering, Inc.

	Topic: Ergonomics ***Location***: Faculty Staff Club
145	Balance control during material handling over a slippery surface *Catena, DiDomenico & Dennerlein* - Harvard School of Public Health
146	Lower body kinematics while walking across a sloped surface *Breloff, Wade & Waddell* - Univerisity of Oregon
147	Endurance time is joint-specific: a modeling and meta-analysis investigation *Avin & Law* – The University of Iowa
148	Safe patient handling: a kinematic analysis of device-assisted versus no versus sit-to-stand motion *McBride, Hueftle, Krause, Buster, Burnfield, Bashford & Taylor* – Madonna Rehabiliation Hospital
149	Fatigue effects on slip risk while wearing fire-protective equipment *Sukits, Montgomery, Kong, Hostler, Suyama, Cham & Chambers* – University of Pittsburgh
150	Upper extremity muscle fatigue that induces muscle imbalances does not increase movement instability *Gates & Dingwell* – University of Texas, Austin
151	Safety margin in ramp torque production task with a circular object *Huang & Shim* – University of Maryland
152	An ergonomic investigation of speed fastening work rates *Gooyers & Stevenson* - Queen's University
153	Comparison of use of backrest and forearm support with a standard workstation and a workstation with a board attachment *El Sagheir & Dumas* - Queen's University
154	Biomechanical evaluation of supported standing with diagonal *Abdoli-Eramaki, Damecour, Ghasempoor & Bouchard* - Ryerson University

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: Ergonomics ***Location***: Faculty Staff Club
155	Predicted acceptable load transfer through the ribcage while leaning on the dynamic trunk support *Abdoli-Eramaki, Damecour, Ghasempoor & Bouchard* - Ryerson University
156	The effect of prolonged vibration exposure on the tensile mechanical properties of single layers of the annulus fibrosus *Gregory & Callaghan* - University of Waterloo
157	A comparison of lower extremity fatigue between leather and rubber boots in professional firefighters *Wade, Garten, Breloff & Acevedo* - Auburn University
158	Pressures applied to anatomical landmarks of the knee while kneeling postures *Moore, Porter & Mayton* - National Institute for Occupational Safety & Health, Pittsburgh

	Topic: Spine ***Location***: Faculty Staff Club
159	Using a robotic treadmill trainer to measure changes in rat locomotion following spinal cord injury *Neckel, Dai, Laracy & Bregman* - Georgetown University
160	Sex differences in posture and kinematics of the human head and neck *Zheng, Jahn & Vasavada* - Washington State University
161	An heirarchical viscoelastic ligament failure model *Lucas, Salzar & Bass* - Exponent, Inc.
162	The efficacy of stability ball accommodation training on trunk posture, muscle activation levels and discomfort ratings during seated office *Jackson, Gregory, Banerjee, & Callaghan* - University of Waterloo
163	Use of a geared wheelchair wheel for facilitating manual ramp ascent: effects on trunk muscular demand *Howarth, Polgar, Dickerson & Callaghan* - University of Waterloo
164	Changes in posture do not affect the functional range of motion for the porcine cervical spine under shear loading *Howarth, Gallagher & Callaghan* - University of Waterloo
165	The effects of anterior shear displacement rate on the viscoelastic properties of the porcine cervical spine *Gallagher, Howarth, Callaghan* - University of Waterloo
166	Influence of automobile seat lumbar support prominence on spine and pelvis postures: a radiological investigation *De Carvalho & Callaghan* - University of Waterloo
167	Intervertebral disc biomechanics adjacent to fusion *Ellingson, Mehta, Huelman & Nuckley* - University of Minnesota
168	Effect of technique on knee, hip and L/S net moments in the parallel back squat *King, Hannon & Shoup* - Ithaca College
169	Validity of surface EMG electrode placement for trunk musculature *Mehta, Cannella, Ebaugh & Silfies* - Drexel University
170	Whiplash injury prevention with active head restraint *Ivancic, Sha & Panjab* - Yale University

Friday, August 28th, 2009
4:45-6:15 PM

	continued Topic: Spine ***Location***: Faculty Staff Club
171	Strain in thoracolumbar spine during cyclic loading at two frequencies *Yalla, Campbell-Kyureghyan, Cerrito & Voor* – University of Louisville
172	Females exhibit shorter paraspinal reflex latencies than males *Miller, Slota & Madigan* - Virginia Tech-Wake Forest SBES
173	Evaluation of lumbar lordosis with and without high-heeled shoes *Russell, Muhlenkamp & Hoiriis* - Life University
174	Trunk and leg muscle EMG and perceived exertion during resisted trunk rotation exercise *Marbaugh, Goel, Dick, & Pincivero* - The University of Toledo
175	The effect of follower load on lumbar spine facet joint forces and intervertebral disc pressures *Popovich Jr., Welcher, Cholewicki, Tawackoli & Kulig* - University of Southern California
176	Differences in wear resulting from perturbations of the ISO standard for total disco replacement *Goreham-Voss & Brown* - University of Iowa
177	Cervical laminoplasty construct stability: experimental and finite element investigation *Tadepalli, Gandhi, Fredericks, Smucker, & Grosland* - University of Iowa
178	Effect of initial methotrexate concentration on the elution and mechanical properties of vertebroplastic bone cement *Handal, Schulz, Pahys, Williams, Kwok & Samuel* - Albert Einstein Medical Center
179	Fatigability of trunk muscles when simulating pushing movement during treadmill walking *Peng, Lin, Lien & Chiou* - Graduate Institute of Rehabilitation Science, Chang Gung University
180	Pelvic and shoulder rotations of idiopathic scoliotic adolescents during walking *Briand, Charbonneau, Labelle & Prince* - University of Montreal
181	Relative contributions to disc degeneration progression is higher by degenerative tissue matrix than annular fibers laxity: a finite element analysis in pure compression *Hussain, Gay, An, Triano & Tepe* - Logan University
182	Effect of golf swing styles on resultant joint movements of low body joints and L4/L5 *Shin & Hur* - University of Illinois at Urbana-Champaign
183	Effect of active head restraint on residual neck instability due to rear impact *Ivancic, Sha, Lawrence & Mo* - Yale University
184	Effects of seated whole-body vibration on spinal stability control: stiffness and reflex *Slota & Madigan* - Virginia Tech
185	Motion effects of manual manipulations on cervical lateral flexion *Rutledge, Vorro, Gorbis & Bush* - Michigan State University
186	Intradiscal pressure changes with posterior lumbar dynamic stabilization systems: universal clamp and walls *Shaw, Ilharreborde, Berglund, Zhao, Gay & An* - Mayo Clinic

Friday, August 28th, 2009
4:45-6:15 PM

Topic: Cardiovascular

Location: Faculty Staff Club

187	Biomechanical analysis of dynamic respiratory deficits in axial dystonia *Razzook, Stanley, Drinkard, Alter, Woolstenhulme, Lebiedowska & Damiano* - National Institutes of Health, Bethesda
188	The role of calcium interaction with titin immunoglobulin domain in cardiac muscle *DuVal & Herzog* - University of Calgary

Saturday, August 29th, 2009
8:30-9:45 AM

	Topic: Comparative Evolution ***Chair***: Kiisa Nishikawa ***Student Co-chair*** **Marey Room**	Topic: Muscle ***Chair***: Darryl Thelen **Borelli Room**	Topic: Methods ***Chair***: Kurt Manal ***Student Co-chair*** **Muybridge Room**
8:30	Do humans stabilize running like robots? *Qiao & Jindrich* Arizona State University	Does aponeurosis morphology affect injury susceptibility in skeletal muscle? *Rehorn & Blemker* University of Virginia	A method for quantifying pipette ergonomics *Zhao, Berglund, Blazeski, Tung & An* Mayo Clinic
8:45	Evidence for passive stabilization during single-limb stance in flamingos *Ting & Chang* Emory University & Georgia Institute of Technolog	Series elastic elements limit muscle lengthening rates in eccentric contractions *Roberts & Azizi* Brown University	A method for prediction of seated spinal curvature *Leitkam & Bush* Michigan State University
9.00	Sequential disruption of the crural fascia results in loss of stability during locomotion *Stahl & Nichols* Georgia Institute of Technology & Emory University	Optimization of muscle wrapping objects using simulated annealing *Gatti & Hughes* University of Michigan	A new method designed to quantify sensorimotor integration in the lower extremity *Lyle, Valero-Cuevas & Powers* University of Southern California
9.15	Quantifying human knee anthropometric differences between ethnic groups & gender using shape analysis techniques *Schmidt, Reyes, Fischer, Geesink, Nolte, Racanelli & Reimers* Stryker Orthopaedics	History effects of antagonist coactivation at constant muscle length *Maas & Huijing* Faculteit Bewegingswetenschappen	Dimensional accuracy of an automated ankle foot orthosis fit and manufacturing process *Schrank & Stanhope* University of Delaware
9:30	Hypothesis test and rejection in evolutionary biomechanics: reconstruction of body size (stature and mass) in LB1 from flores Indonesia *Weller, Kuperavage & Eckhardt* The Pennsylvania State University	In-vivo tomographic elastography using skeletal muscle noise *Sabra & Archer* Georgia Institute of Technology	Simulation of gait using a 3d musculoskeletal model *Ackermann & van den Bogert* Cleveland Clinic
	COFFEE AND EXHIBITS **Assembly Room and Faculty Staff Club**		

Saturday, August 29th, 2009
10:00-11:15 AM

	Topic: Sport ***Chair***: Michelle Sabick ***Student Co-chair*** **Marey Room**	Topic: Gait and Posture ***Chair***: Kevin Ford **Borelli Room**	Topic: Bone ***Chair***: Don Anderson ***Student Co-chair*** **Muybridge Room**
10:00	Upper extremity motion sequence in javelin throwing *Liu, Leigh & Yu* Beijing Sport University	Transfer of dynamic learning across postures *Ahmed & Wolpert* University of Colorado at Boulder	Reduced impact loading following gait retraining over a 6 month period *Davis, Crowell,Fellin & Altman* University of Delaware
10:15	Relationships between selected javelin technique variables & throwing performance *Leigh, Liu & Yu* The University of North Carolina at Chapel Hill	Postural feedback scaling describes the postural abnormality of Parkinsonian patients *Kim, Horak, Carlson-Kuhta & Park* KAIST	Validating the enhanced daily load stimulus model using the bedrest analog of spaceflight *Genc, Humphrey, Rice, Englehaupt, Novotny, Gopalakrishnan, Ilaslan, Licata & Cavanagh* Case Western Reserve University
10:30	The effects of detraining on stabilometric performance in volleyball players *Dai, Sorensen & Gillette* Iowa State University	Postural sway dynamics and falls risk in type 2 diabetes *Morrison, Colberg, Parson & Vinik* Old Dominion University	Mechanical loading causes an acute and temporary decrease in the stiffness of mouse tibiae *Bhatia & Troy* University of Illinois at Chicago
10:45	Gender differences in head impact acceleration in collegiate ice hockey *Brainard, Beckwith, Chu, Crisco, McAllister, Duhaime, Maerlender, Duma, Brolinson & Greenwald* Simbex	Influence of foot-floor friction coefficient on the passive response to slip during walking *Mahboobin, Cham & Piazza* University of Pittsburgh	The role of juxta-articular bony compliance on intra-articular impact stresses *Goreham-Voss, Tochigi, Rudert & Brown* University of Iowa
11:00	Inside/outside force ratio and ski chatter in slalom skiing *Lappi, Reid, Haugen & Smith* Norwegian School of Sport Sciences	Quantifying coordination during recovery from a tripping task *Rosenblatt, Hurt & Grabiner* University of Illinois at Chicago	The geometry of the tibial plateau and tibiofemoral kinematics: a biomechanical analysis *Hashemi, Chandrashekar, Gill, Slauterbeck, Schutt, Dabezies, Mansouri & Beynnon* Texas Tech University
	COFFEE AND EXHIBITS **Assembly Room and Faculty Staff Club**		

Saturday, August 29th, 2009
11:30-12:45 AM

	Topic: Ergonomics ***Chair***: Peter Keir ***Student Co-chair*** **Marey Room**	Topic: Rehabilitation ***Chair***: Margaret Finley **Borelli Room**	Topic: Motor Control ***Chair***: Jae Kun Shim ***Student Co-chair*** **Muybridge Room**
11:30	Transmission of whole body vibration in children while standing *Bressel, Smith & Branscomb* Utah State University	Development of a low cost robotic gait trainer *Bradford & Pidcoe* Virginia Commonwealth University	Sense of effort during single- and multi-finger force production *Gregory* U.S. Military Academy
11:45	Knee positioning influences whole body 3-D vibration transmission *Smith, Bressel, Branscomb & Snyder* Utah State University	Biomechanical asymmetry before and after total knee arthroplasty in subjects with and without back pain *Campbell-Kyureghyan, Burnett, Topp & Quesada* University of Louisville	Sources of two components of variance in multifinger cyclic force production tasks Kariyamaanikam, *Friedman, Zatsiorsky & Latash* Penn State University
12:00	Changes in scapular kinematics pre and post workday *Ettinger, Kincl & Karduna* University of Oregon	Effect of selective muscle weakness on range of motion of glenohumeral joint *Shah, Novotny & Higginson* University of Delaware	Prehension stratigies for grasping objects with complex geometry *Slota, Latash & Zatsiorsky* Pennsylvania State University
12:15	Developing an empirical spatial shoulder muscle activity map *Belbeck, Chow & Dickerson* University of Waterloo	Upper extremity kinetic model of functional arm reaching in stroke *Liu, Rodgers, Waller, Kepple & Whitall* University of Maryland	Simple finger movements require complex coordination of excursions and forces across all muscles *Kutch, Kurse, Hoffmann, Theodorou, Hentz, Leclercq, Fassola & Valero-Cuevas* Southern California
12:30	Biomechanical evaluation & redesign of an accessory unit for exercise in manual wheelchair users *Hofmann & Troy* University of Illinois at Chicago	Reliability of muscle fibre conduction velocity in the tibialis anterior *McIntosh & Gabriel* Brock University	Flexion-withdrawal reflexes in the upper-limb adapt to the position of the limb *Riley, Krepkovich, Mayland, Murray & Perreault* Rehabilitation Institute of Chicago
	LUNCH		

Saturday, August 29th, 2009
Afternoon

2:00	**Topic: Borelli Award** ***Chair:*** John Challis ***Introduction***: Richard Hughes ***Presentation***: Rodger Kram **Borelli Room**
	James Ashton-Miller (University of Michigan) "The Borelli Lecture"
3:15	**COFFEE BREAK** **Assembly Room and Faculty Staff Club**
3:45	**Topic: ISB Sponsored Keynote** ***Chair:*** Walter Herzog **Borelli Room**
	Ewald Hennig (University Duisburg-Essen) "Athletic Footwear for Injury Prevention and Performance Enhancement"
4:45	**Topic: Awards and Closing Ceremony** ***Chair***: Irene Davis **Board Room**
5:30	**ASB Exectutive Meeting**

Keynote Biographies

Keynote - "The Neuromechanical Foundations of Handedness"

Robert Sainburg, is a faculty member at Penn State University with appointments in Kinesiology and Neurology. Bob has been involved in research in motor control for over 20 years, applying biomechanics and employing novel experimental techniques to the analysis of handedness. Bob was trained as an occupational therapist, before obtaining both a masters and doctoral degree from Rutgers University in neuroscience. His training was completed by a three post-doc in neurobiology at Columbia University. Bob held a faculty position at SUNY Buffalo in the Departments of Occupational Therapy, Physical Therapy, Exercise and Nutrition Sciences.

Bob's specific research interest is the neural mechanisms underlying control of multi-joint arm movements in humans. He combines both psychophysical experiments and biomechanical simulations to determine the neural processes responsible for coordinating the complex mechanics of the musculoskeletal system. Studies in patients with neurological lesions are conducted to determine the contributions of specific neural structures to control.

Bob recently gave the Pattishall Research Lecture, which is delivered each year by the most recent recipient of the Pattishall Outstanding Research Achievement Award. He is the Executive Editor of the Journal of Motor Behavior, and co-director of the Interdisciplinary Graduate Program in Neuroscience at Penn State.

James G. Hay Memorial Lecture - "Ups and downs of the competitive diving"

Doris I. Miller, Professor Emerita, University of Western Ontario, has been actively involved in sports biomechanics research throughout her career focusing upon computer simulation and modeling, lower extremity amputee running and competitive diving. Her assignment as diving coach at the University of Saskatchewan initially peaked her interest in biomechanics and led her to pursue a Ph.D. at Penn State in that specialty. Her doctoral dissertation (1970) involved a 3-D computer simulation and graphic display of dive flight. She has held faculty appointments at the universities of Toronto, Saskatchewan, Washington and Western Ontario. Dr. Miller was involved with USA Diving from 1983 to 2009, providing reports on competition performances, participating in coach education seminars and receiving the Paragon, United States Diving Service and Glenn McCormick Memorial awards. In addition to her publications in peer-reviewed journals, she has given invited presentations at national and international conferences. She has been editor of Exercise and Sport Sciences Reviews, editorial consultant for the Journal of Biomechanics, and on the editorial boards of the Journal of Applied Biomechanics and Sports Biomechanics. She is a Founding Member of ISB, ASB and CSB; a fellow of the American Academy of Kinesiology and Physical Education, ISBS (Dyson Lecturer), CSB (Career Award); Emeritus Member of ASB (6th president) and Honorary Member of ISB.

Keynote Biographies

Keynote – "How do they do it? Specializations of Toads for Extremely Rapid Prey Capture"

Dr. Kiisa Nishikawa is a Regents' Professor in the Department of Biological Sciences at Northern Arizona University. She received her Ph.D. in Zoology from the University of North Carolina. She was a postdoctoral fellow in the Department of Anatomy and Neurobiology at Dalhousie University and a Miller Postdoctoral Fellow in the Museum of Zoology at the University of California at Berkeley. Her research interests include evolution of brain and behavior, biomechanics, muscle contraction, and neuromuscular control of ballistic movements. Twenty years of research in her laboratory has demonstrated that, among vertebrates, toads are uniquely adapted for ballistic prey capture. They achieve movement velocities more than 100 times greater than those of other anurans. In her presentation, Dr. Nishikawa will discuss adaptations of toads that contribute to extreme movement velocities and muscle power output, including anatomical substrates for catch and trigger mechanisms, muscle activation patterns, and muscle physiology.

Borelli Award Winner

James A. Ashton-Miller, Ph.D., is The Albert B. Schultz Collegiate Research Professor and a Distinguished Research Scientist affiliated with the Departments of Mechanical Engineering, Biomedical Engineering, and Internal Medicine, and the Institute of Gerontology, at the University of Michigan, Ann Arbor.

Dr. Ashton-Miller received his BSME from the University of Newcastle-upon-Tyne in England, an MSME from MIT, and a PhD from the University of Oslo, Norway in 1982. After working at the University of Illinois at Chicago he was recruited to the University of Michigan in 1983.

His research has principally addressed the etiology of unintentional injuries in the population, partly because they cost the country billions of dollars in direct and indirect costs each year. This includes research on the etiology of back injuries; neuromuscular aging, balance and falls in the elderly; the pathomechanics of ACL injuries in athletes; and the etiology of birth-related injuries in women.

Professor Ashton-Miller directs the Biomechanics Research Laboratory and is Associate Director of the Bone and Joint Injury Prevention and Rehabilitation Center at the University of Michigan that was started with a $5m donation. He has authored over 170 peer-reviewed papers, 15 book chapters and mentored 23 doctoral theses. He and his students have received over a dozen national and international awards for their research. He has served as a member of several NIH study sections in the field of aging, was elected president of the American Society of Biomechanics in 2001, and in 2008 served as Meeting Chair for the North American Congress of Biomechanics. He consults to the NCAA and a number of Fortune 500 companies.

Keynote Biographies

ISB Sponsored Keynote – "Athletic Footwear for Injury Prevention and Performance Enhancement"

Dr. Ewald Hennig was born, raised, and educated in Germany, studying physics and completing his graduate studies in applied physics at the J. W. Goethe University in Frankfurt. From 1981 to 1984 he worked and studied at the biomechanics department of the Pennsylvania State University and was awarded a Ph.D. degree in 1984. After returning back to Germany he first was an assistant professor at the University of Konstanz and in 1987, he became full professor for biomechanics at the Department of Movement and Sport Sciences of the University Duisburg-Essen.

Dr. Hennig holds several patents for biomedical and biomechanical instrumentation, one of which is licensed to Novel Inc. (Germany) for the manufacturing of pressure distribution devices. His research interests include lower extremity biomechanics, casual and athletic footwear, the role of skin receptors for balance control, obesity problems in adults and children, and diabetic foot studies. He has published over 350 papers, abstracts, and chapters in books.

In his leisure time, Dr. Hennig enjoys reading, hiking, running, biking, and skiing. He also loves travelling and visiting friends in many parts of the world.

For more than 20 years his laboratory has been involved in the testing of running shoes for a government supported consumer agency. A description of the testing procedures, results and the changes in running shoe biomechanics during the last 20 years will be presented in the keynote lecture. Whereas the focus of running shoe research is mainly the reduction of overuse injuries, performance criteria are predominant in the design of soccer shoes. Soccer players prefer light weight but stable shoes, offering adequate traction for explosive movements on the field. His laboratory has been involved for more than ten years in analyzing the modern game of soccer and in the testing of performance aspects of soccer shoes. Results will be presented that soccer shoes designs can help to enhance performance of players by adequate traction and a reduction in shoe weight. Maximum kicking speed and - even more important - kicking accuracy can be influenced by soccer shoe design. The comparison of the prevention and performance perspective shall highlight the importance and value of biomechanical research for better athletic footwear.

PROGRAM OVERVIEW

Wednesday, August 26th 2009

11:00 - 06:00	Registration and Poster Placement		
12:00 – 04:00	Lab Tours		
12:00 - 02:00	Tutorial I		
02:00 – 04:00	Tutorial II		
04:00 – 06:00	ASB Executive Meeting		
06:00 – 07:00	Reception – Hintz Alumni Center		

Thursday, August 27th 2009

07:00-8:00	Registration and Poster Placement		
08:00-08:15	Methods Imaging	Aging	Upper Extremity
09:15-09:45	COFFEE AND EXHIBITS		
09:45-11:00	Motor Control	Gait	Orthopaedics
11:00-11:30	COFFEE AND EXHIBITS		
11:30-12:45	Sport	Muscle	Hand
12:45-02:00	LUNCH		
02:00-03:30	Awards Lectures		
03:30-03:45	COFFEE AND EXHIBITS		
03:45-04:45	Keynote Lecture by Bob Sainburg		
04:45-06:15	Posters and Exhibits		
06:15-07:15	Mentoring Roundtable		

Friday, August 28th 2009

07:00-08:00	Past Presidents Breakfast + Poster Placement		
08:00-09:15	Tendon/Ligament/Cartilage	Locomotion Energetics	Spine
09:15-09:45	COFFEE AND EXHIBITS		
09:45-11:00	Knee	Muscle	Upper Extremity
11:00-11:30	COFFEE AND EXHIBITS		
11:30-12:45	Computational Biomech.	Running	Aging
12:45-02:00	Lunch		
02:00-03:15	Hay Lecture – Doris Miller		
03:30-03:45	COFFEE AND EXHIBITS		
03:45-04:45	Keynote Lecture by Kiisa Nishikawa		
04:45-06:15	Posters and Exhibits		
06:30-09:00	Banquet – Beaver Stadium (walk-able, buses will also leave from Nittany Lion Inn)		

Saturday, August 29th 2009

07:00-08:00	5K Lab Challenge		
08:30 -09:45	Methods Imaging	Aging	Upper Extremity
09:45-10:00	COFFEE		
10:00-11:15	Motor Control	Gait	Orthopaedics
11:15-11:30	COFFEE		
11:30-12:45	Sport	Muscle	Hand
12:45-02:00	Lunch and ASB Business Meeting		
02:00-03:15	Borelli Lecture – James Ashton-Miller		
03:30-03:45	COFFEE		
03:45-04:45	ISB Sponsored Keynote Lecture by Ewald Hennig		
04:45-05:30	Closing Ceremony and Awards Ceremonies		
05:30-07:00	ASB Executive Board Meeting		