

The 5th Annual

OBC

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**Ontario Biomechanics
Conference**

Hosted by:

HUMAN HEALTH
and
Nutritional Sciences

with



**School of
Engineering**

UNIVERSITY
of
GUELPH

March 14th to 16th, 2008
Barrie, ON

Conference Organizing Committee

Faculty

Dr. Michele Oliver, Associate Professor, School of Engineering

Dr. Jim Dickey, Assistant Professor, Human Health & Nutritional Sciences

Students

Robert Joel Jack, Ph.D. candidate, Department of Biophysics

Brian Mangan, M.Sc. candidate, Human Health & Nutritional Sciences

Sarah Cation M.A.Sc, School of Engineering

Lauren Bailey, M.A.Sc. candidate, School of Engineering

Conference Concept

This is the 5th annual Ontario Biomechanics Conference which has been organized to provide an opportunity for biomechanics students in Ontario to network and present their work in a casual and nurturing environment.

Awards



The Canadian Society for Biomechanics (CSB) student award is designed to recognize excellent student research in biomechanics. Based on their abstracts and award applications 3 finalists were selected. One winner will be chosen by a committee based on the finalist's presentations. The winner will receive \$150.



The Global Source for Software & Instrumentation
for Ergonomics, Biomechanics & Medicine

The NexGen Ergonomics award is designed to recognize excellent student research in occupational biomechanics and ergonomics. Based on their abstracts and award applications 4 finalists were selected. One winner will be chosen by a committee based on the finalist's presentations. The winner will receive \$150.

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5th ANNUAL BIOMECHANICS CONFERENCE 2008

Conference Proceedings

FRIDAY MARCH 14TH, 2008

12:00-2:00	<i>Registration</i>	Lobby CTMC Building
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Session 1	Modelling Chair: Steve Brown	Centre Hall
	Proposals	7 min talk + 2 min Q&A
2:15-2:24	Development of a three-dimensional finite element model of the hand and wrist for virtual prototyping	Gong, Oliver, & Dony
2:25-2:34	Evaluation of the impact of the attenuation effects of the leg and foot using finite element analysis	Sankar & Andrews
2:35-2:44	Biomechanical analysis of meniscal injury and risk of osteoarthritis development	Tschirhart, Gordon, Hurtig, Dickey & Shirazi-Adl
	Abstracts	9 min talk + 3 min Q&A
2:45-2:57	Creation of the geometry for a finite element model of the wrist under loaded and unloaded conditions	Curtis, Dony, & Oliver
2:58-3:10	A neuro-musculoskeletal model for testing locomotor control hypothesis	Noble & Prentice
3:11-3:23	Virtual modeling of the lifting activities among the cylinder drivers and dock workers at Superior Propane	Nouraei, Abdoli-E, & Potvin

Session 2	Spine Chair: Steve Brown	Centre Hall
	Abstracts	9 min talk + 3 min Q&A
3:24-3:36	The effect of fatigue on trunk muscle activation and postures during firefighting tasks	Gregory, Howarth, Narula, & Callaghan
3:37-3:49	Linking tissue damage with the CT image; tracking progressive intervertebral disk herniations	Yates & McGill
3:50-4:02	Dynamic axial torque/twisting: an investigation on spine injury mechanisms	Marshall & McGill

4:05-4:15	BREAK	
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Session 3	Knee Chair: Tyson Beach	Centre Hall
	Proposals	7 min talk + 2 min Q&A
4:20-4:29	The effect of sustained static kneeling on functional knee joint stability	Kajaks & Costigan
	Abstracts	9 min talk + 3 min Q&A
4:30-4:42	Neuromuscular contribution to knee stability as measured through surface electromyography	Cort & Potvin
4:43-4:55	The effect of internal and external laxity on unconstrained multi-axial knee joint rotation in sheep during late swing phase of walking	Mangan, Dickey, & Hurtig

Session 4	Occupational Workplace I Chair: Tyson Beach	Centre Hall
	Proposals	7 min talk + 2 min Q&A
4:56-5:05	Canadian military soft armour testing	Gooyers, Selinger, Almosnino, Upjohn, Costigan, & Stevenson
5:06-5:15	Quantifying physical exposures in police cruiser operations	McKinnon, Dickerson, Callaghan, & Durkin
5:16-5:25	The influence of paint roller design and wall height on shoulder muscular activity, humeral posture and horizontal force applied during standard wall painting	Rosati, Dickerson, & Hall

5:25-5:35	BREAK	
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5:35-6:30	Keynote Speaker - Dr. Joan Stevenson <i>"Biomechanical dreams of yesterday's accomplishments, today's realities and tomorrow's imagination"</i>	Centre Hall
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6:30-7:30	DINNER	CTMC Dining Room
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8:00-10:00	Music and Games Night Refreshments and Snacks	Bayview Building
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SATURDAY MARCH 15TH, 2008

7:30-8:30	BREAKFAST	CTMC Dining Room
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Session 5	CSB Award Finalists Chair: Steve Fischer	Centre Hall
8:35-8:44	Steve Fischer - CSB Student Representative	
		12 min talk + 3 min Q&A
8:45-9:00	Gait characteristics of the centre of pressure in sub-acute stroke patients	Chisholm, Perry, & McIlroy
9:01-9:16	In-vitro investigation of meniscal movement using medical imaging	Innes, Hurtig, Holdsworth, & Gordon
9:17-9:32	The minimum number of padding points: effects of sampling and cutoff frequency when digitally filtering kinematic data	Howarth & Callaghan

Session 6	EMG & Neurology Chair: Mike Holmes	Centre Hall
	Proposals	7 min talk + 2 min Q&A
9:35-9:44	Vestibular and sensory cutaneous interaction at subthreshold simulation during stance	Woolnough & Bent
9:45-9:54	Determining the interaction of muscle and cutaneous sensory information during a proprioceptive task at the ankle	Lowrey & Bent
9:55-10:04	Estimating indwelling EMG from surface electrodes in the rotator cuff	Waite, Brookham, McLean, & Dickerson
	Abstracts	9 min talk + 3 min Q&A
10:05-10:17	Electromyography evaluation of manual muscle tests	Brookham, Dickerson, & McLean
10:17-10:29	Methodological variance associated with normalizations of erector spinae EMG using sub-maximal and maximal contractions	Jackson, O'Brien, Dempsey Callaghan

10:30-10:40	BREAK	
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Session 7	Applied Biomechanics Chair: Tegan Upjohn	Centre Hall
	Abstracts	9 min talk + 3 min Q&A
10:45-10:57	Gender responses to sitting in an automobile and office seats-influence of hip and hamstring flexibility on seated postures	Beach, McDonald, Coke, & Callaghan
10:58-11:10	The effectiveness of wrist guards for reducing wrist and elbow accelerations following simulated forward falls	Burkhart & Andrews
11:11-11:23	Head and neck kinematics during horizontal and combined vertical low velocity whiplash-like perturbations	Hynes & Dickey

11:24-11:36	The design and evaluation of a simple whole-body vibration simulator	Li, Abdoli-E, Russo, & Ghasempoor
11:37-11:49	Effects of geared wheels on shoulder muscle activity during wheelchair ramp ascent and descent	Pronovost, Howarth, Dickerson, Polgar, & Callaghan
11:50-12:02	Head accelerations and muscle activation during side, frontal and rear whiplash-like perturbations	Sacher & Dickey
12:03-12:15	Lower extremity kinematic effects of medial arch support among functionally flat footed individuals	Cunningham & Perry
12:16-12:28	Validation of an approach to map human body with an electromagnetic field tracer	Nouraei, H., Majid Hosseini, & Abdoli-E

12:30-1:25	LUNCH	CTMC Dining Room
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Session 8	Gait	
	Chair: Shawn Robbins	Centre Hall
	Proposals	7 min talk + 2 min Q&A
1:30-1:39	The effect of foot rotation on the free moment in walking	Almosnino, Kajaks, & Costigan
1:40-1:49	The effect of whole body and leg segment tissue composition on tibial response during impact	Schinkel, Burkhart, Okkema, & Andrews
	Abstracts	9 min talk + 3 min Q&A
1:50-2:02	Do clinical measures reflect gait biomechanics during recovery from anterior cruciate ligament rupture?	Clark, Robbins, & Maly
2:03-2:15	Age-related differences in locomotor strategies prior to obstacle circumvention during late-visual cueing	Paquette, Brunsting, & Vallis

Session 9	NexGen Ergonomics Award Finalists	
	Chair: Joel Jack	Centre Hall
		12 min talk + 3 min Q&A
2:18-2:30	Gender differences and passive tissue response to prolonged sitting in an automobile seat	De Carvalho & Callaghan
2:31-2:46	Lumbar spine movement during prolonged seated work	Dunk & Callaghan
2:47-3:02	Constrained handgripping reduces maximal arm strength	Smets, Potvin, & Keir
3:03-3:18	Musculoskeletal symptoms in northern Ontario tree planters	Upjohn, Keir, & Dumas

3:20-3:30	BREAK	
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Session 10	Methods I	
	Chair: Jennie Jackson	Centre Hall
	Proposals	7 min talk + 2 min Q&A
3:35-3:44	Improving EMG-based force estimates from fatigued muscles	Cashaback, Cort, Sutherland, & Potvin
3:45-3:54	Perception of shoulder moment load during load transfer tasks	Hall & Dickerson
3:55-4:04	Measuring the strength and coordination of neck muscles: design specifications	Nashed, Almosnino, Stevenson, & Pelland
4:05-4:14	Development of a measurement method for determining grasp capabilities using pressure mapping	Slater & Wells
4:15-6:00	FREE TIME	
4:25-5:40	Outdoor Games - Leader Joel Jack Annual OBC Hockey Tourney	Upper Parking Lot
6:00-7:00	Banquet & Buffet Dinner	CTMC Dining Hall
7:00-7:45	Awards and Dessert Buffet	Centre Hall
8:00-10:00	Social	Bayview Building

Sunday MARCH 16TH, 2008

7:30-8:30	BREAKFAST	CTMC Dining Room
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Session 11	Occupational Workplace II	
	Chair: Joel Cort	Centre Hall
	Abstracts	9 min talk + 3 min Q&A
8:40-8:52	Muscle activity patterns in varied overhead work	Chopp, Fischer, & Dickerson
8:53-9:05	An investigation of muscle activation requirements and maximal voluntary exertions during a one hour of signed language interpreting: a case study	Fischer & Wells
9:06-9:18	Tri-planar trunk motion in northern Ontario skidder operators	Jack, Oliver, Cation & Dony
9:19-9:31	A biomechanical assessment of an assistive load carriage device	Kudryk & Stevenson
9:32-9:44	A psychophysical investigation of grip types with specific application to job rotation	McFall & Wells
9:45-9:57	The effect of participatory office ergonomic training on the perceived working postures of VDT users	Okkema & Andrews
9:58-10:10	Student perceptions of their manual patient transfer training	van Wyk, Weir, & Andrews
10:11-10:23	Job Task Analysis for CSL silicones, Guelph, ON.	Wallace, Klarner, Woodrow Irwin, Black, Makit, & Oliver

Session 12	Prosthetics & Assistive Devices	
	Chair: Joel Cort	Centre Hall
	Proposals	7 min talk + 2 min Q&A
10:24-10:33	The effect of downstream changes to the prosthetic leg on the dynamics of transfemoral amputee gait	Jones, Deluzio, & Mechefske
10:34-10:43	Structural investigation of osseointegrated abutment (for transfemoral amputees) to evaluate its resistance to fracture	Thompson & Mechefske
10:44-10:53	Long range, rugged terrain mobility device for people with disabilities	Restorick & Wyss

10:55-11:15	BREAK (REMINDER: Checkout at 11am)	
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Session 13	<i>Tissue and Loading</i> <i>Chair: Craig Tschirhart</i>	Centre Hall
	Abstracts	9 min talk + 3 min Q&A
11:20-11:32	Force and stiffness transmission through layers of the rat abdominal wall	Brown, S. & McGill
12:33-12:45	Development of a laser reflectance system to measure the cross-sectional area of soft tissue	Pokhai, Gordon, & Oliver

Session 14	<i>Occupational Workplace III</i> <i>Chair: Craig Tschirhart</i>	Centre Hall
	Abstracts	9 min talk + 3 min Q&A
12:46-12:58	Comparing methods of quantifying tibial acceleration slope	Holmes & Andrews
12:59-1:11	Video evaluation of distal upper extremity posture	Kociolek & Keir
1:12-1:24	Developing a cumulative loading measure for the knee: examining test-retest reliability	Robbins, Jones, Birmingham Callaghan, & Maly
1:25-1:37	Muscular activity in bimanual upper extremity task	Brown, M., Holmes, & Keir
1:38-1:50	Biomechanical and physiological testing of the dynamic trunk support in progressive sagittal angles (0-40 degrees)	Damecour, Abdoli-E, Ghasemipoor, & Neumann

1:50-2:00	Closing Remarks	Centre Hall
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