

Detailed Program, Dynamic Walking 2009

Sunday, June 7

18:00 **Informal dinner and drinks** at the Highland Pub at SFU

Monday, June 8

8:30 **Coffee** and refreshments served in the atrium

9:00 **Welcome** from the organizers

9:30 Keynote: **Art Kuo** - *25 ways to reduce or eliminate the energetic cost of walking*

10:15 Presentation: **Peter Adamczyk** - *Center of mass mechanics in amputees - asymmetric gait for an asymmetric body*

10:30 **Coffee** and refreshments served in the atrium

11:00 Presentation: **Jesse Dean** - *Development of a passive exoskeleton for swing phase gait assistance*

11:15 Presentation: **Ernesto Martinez-Villalpando** - *Biomimetic active prosthetic knee with antagonistic actuation*

11:30 Presentation: **Bram Vanderborght** - *New adjustable compliant actuator MACCEPA 2.0 for energy efficient locomotion*

11:45 Keynote: **Hugh Herr** - *On the design of biomimetic leg prostheses and orthoses*

12:30 **Lunch**

14:00 Presentation: **Jim Usherwood** - *From ducks to undergraduates... how effective is the compass-gait in accounting for top walking speeds?*

14:30 Presentation: **Sukyung (Sue) Park** - *Gait strategy changes with walking speed to accommodate biomechanical constraints*

14:45 Presentation: **Alan Wilson** - *Muscle tendon unit dynamics during locomotion in humans and other animals*

15:15 Presentation: **Sam Walcott** - *Using biophysically-based models to determine muscle energy consumption*

15:45 Tutorial: **Build Your Own 'Bot** - Daniël Karssen

18:00 **Barbecue Dinner** at the Highland Pub at SFU

20:00 Informal drinks and snacks at the Highland Pub at SFU

Tuesday, June 9

- 8:30** Coffee and refreshments served in the atrium
- 9:00** Presentation: **Hartmut Geyer** - *Could muscle reflexes that encode principles of legged mechanics dominate human walking?*
- 9:30 Presentation: **Heather More** - *The scaling of sensorimotor control in terrestrial locomotion*
- 9:45 Tutorial: **Limit Cycle Analysis** - Peter Adamczyk and Shawn O'Connor
- 11:15** Presentation: **Lowie van Zijl** - *Dynamic One-Step Transitions*
- 11:30 Presentation: **Joseph Solomon** - *Braitenberg control of a seven-link walking model*
- 11:45 Keynote: **Russ Tedrake** - *Nonlinear control for the compass gait*
- 12:30 **Lunch**
- 14:00** Presentation: **David Lee** - *Determining minimum collisional loss in quadrupedal gait*
- 14:30 Presentation: **Martin Groß** - *How to achieve stable trotting?*
- 14:45 Presentation: **C. David Remy** - *Passive dynamic walking with quadrupeds - extensions towards 3D*
- 15:00 Keynote: **Chris Atkeson** - *Quadrupedal dynamic walking*
- 15:45 **Poster Session:**
- Christopher Assad - *Cerebellar balance for humanoids*
 - Yvonne Blum - *Can impacts be avoided in stable running?*
 - Houman Dallali - *Non-minimum phase problem of ZMP stabilization*
 - Tomas de Boer - *Stumble recovery of a simple walking model*
 - Reza Ghorbani - *Elastic collision in dynamic walking of biped locomotion*
 - Daniel Giesbrecht - *Dynamics of legged walking mechanism "Wind Beast"*
 - David Post - *An analytical measure of the control authority over the unactuated degree of freedom in underactuated bipeds*
 - Alena Grabowski - *The effects of velocity and weight support on metabolic power and ground reaction forces during walking*
 - Martin Grimmer - *Biarticular structures to strengthen the push-off in lower leg prosthesis*
 - Kathrin Hatz - *Contribution of proprioceptive feedback to ankle extensor activity in freely walking cats*
 - Devin Koepl - *Force controlled actuator*
 - Michael Levashov - *Feedback control of dynamic bounding gaits in LittleDog*
 - Qingguo Li - *Stride-by-stride walking speed estimation using inverted pendulum model*
 - Chenggang Liu - *Standing balance control using a trajectory library*

Hiroshi Kimura - *Stable quadrupedal dynamic walking using phase modulations based on leg unloading*

Moritz Maus - *Postural stability in human walking*

Matthew Millard - *Foot placement and balance in 3D*

Michael Mistry - *Compliant walking using floating base inverse dynamics*

18:30 Buses leave for downtown Vancouver

19:15 Informal dinners and exploration of downtown Vancouver

23:00 Buses return to SFU

Wednesday, June 10

- 8:30** **Coffee** and refreshments served in the atrium
- 9:00** Presentation: **Jonathan Hurst** - *Stiffness control for robot running*
- 9:15 Presentation: **Marco Hutter** - *Open-loop control strategies in passive dynamic hopping*
- 9:30 Keynote: **Martijn Wisse** - *Open-loop stable robot*
- 10:15 **Coffee** break in the atrium
- 10:45** Presentation: **Jonathan Dingwell** - *Sub-optimal stochastic control models explain how humans exploit redundancy to control step-to-step variability during treadmill walking*
- 11:15 Presentation: **Hiroshi Kimura** - *Gait Adaptation Model in Human Splitbelt Treadmill Walking*
- 11:30 Presentation: **Shawn O'Connor** - *Direction dependent weighting of walking and standing balance*
- 11:45 Keynote: **David Reinkensmeyer** - *Walking consistently by constantly adapting*
- 12:30 **Lunch**
- 14:00** Presentation: **Jerry Pratt** - *Applying capture points to the control of a dynamic walking bipedal robot*
- 14:30 Presentation: **Sjoerd Bruijn** - *The role of arm swinging in stabilizing human walking*
- 14:45 Presentation: **John Schmitt** - *Dynamics and stability of lateral plane locomotion on inclines*
- 15:00 Keynote: **Stephen Robinovitch** - *The mechanics of injury avoidance during falls: lessons for robots from the human experience*
- 15:45 **Poster Session:**
- John Rebula - *Human walking and running: it's all in the redirection*
- Thomas Robert - *Angular momentum synergies during walking*
- Koray Safak - *Energetics and stability of a planar biped robot: comparative results on passive, active and anthropomorphic gaits*
- Ryan Cawsey - *The effect of stride length changes on triceps surae excitation during walking*
- Cécile Smeesters - *Theoretically predicting the disturbance threshold line separating falls from recoveries*
- Mark Snaterse - *Real-time selection of preferred step frequency in human walking*
- Kristine Snyder - *A simple control systems approach to stability throughout the walking cycle*
- Benjamin Stephens - *Biped energy control for balance and walking*
- Thomas Sugar - *A control algorithm for a prosthetic ankle using phase plane invariants*

Laura Trutoiu - *Gait variability measures for younger and older adults under four walking conditions*

Gijs van Oort - *Control of walking robots using virtual springs*

Eric Whitman - *Optimization-based policy search for control of periodic systems*

Dengpeng Xing - *Feedback controller parameter optimization for standing balance*

Karl Zelik - *Passive dynamic simulation of ankle elasticity during walking: implications for foot prostheses*

18:00 **Dinner** at the Highland Pub at SFU

19:30 Informal drinks and snacks at the Highland Pub at SFU

Thursday, June 11

- 8:30** **Coffee** and refreshments served in the atrium
- 9:00** Presentation: **Michael Ernst** - *Spring-like legged locomotion with constant speed on uneven ground: a control approach*
- 9:15 Presentation: **Daniël Karssen** - *Non-linear leg spring increases the disturbance rejection during running*
- 9:30 Presentation: **Alexander Sproewitz** - *Compliant leg design for a quadruped robot*
- 9:45 Presentation: **Dai Owaki** - *A two-dimensional passive dynamic running biped with elastic elements*
- 10:00 Keynote: **Andy Ruina** - *The Steinkamp Hopper: It can't stand up, yet it hops 109 times in 5 meters without falling. Is it stable?*
- 10:45 **Coffee** and refreshments served in the atrium
- 11:15** Tutorial: **State Estimation** - Art Kuo
- 12:15** **Group Photo**
- 12:45 **Lunch**
- 14:00** Presentation: **Pranav Bhounsule** - *Cornell Ranger: energy-optimal control*
- 14:15 Presentation: **Louis Flynn** - *Optimization of a synthetic wheel prismatic joint biped with torso*
- 14:30 Keynote: **Tad McGeer** - *A pitch for the W-prize*
- 15:15 **Device Demonstrations:**
- Isaac Chang - *Cart for measurement of overground walking speed*
 - Stelian Coros - *Control a physics-based character in virtual environment*
 - Max Donelan - *Bionic Power energy-harvesting knee brace*
 - Louis Flynn - *MSU Biped, a synthetic wheel walking robot*
 - Martin Grimmer - *AKFP, a biarticular orthosis-prosthesis*
 - Ernesto Martinez-Villalpando - *Biomimetic active prosthetic knee*
 - Mark Senterse - *Servo treadmill*
 - Alan Wilson - *measuring locomotion using GPS and IMU*
 - Martijn Wisse - *Walking robot "Flame"*
 - Karl Zelik - *Energy-recycling bionic foot, rev. II and III*
- 16:45 **Farewell** from the organizers
- 18:00** **Busses** leave for Vancouver Science Center
- 19:00 Dynamic Walking Farewell Party at the Vancouver Science Center
- 23:00** **Busses** return to SFU

	Monday, June 8	Tuesday, June 9	Wednesday, June 10	Thursday, June 11
8:30	Coffee, snacks, & discussion	Coffee, snacks, & discussion	Coffee, snacks, & discussion	Coffee, snacks, & discussion
8:45	Welcome	Geyer	Hurst	Ernst
9:00			Hutter	Karssen
9:15		More		Sproewitz
9:30	Kuo	Limit Cycle Tutorial Adamczyk & O'Connor	Wisse	Owaki
9:45	Adamczyk		Coffee	Ruina
10:00	Coffee			
10:15		Coffee & group work	Dingwell	Coffee
10:30	Dean			
10:45	Martinez	Van Zijl	Kimura	State Estimation Tutorial Kuo
11:00	Vanderborght	Solomon	O'Connor	
11:15				
11:30	Herr	Tedrake	Reinkesmeyer	
11:45				Group photo
12:00				
12:15				
12:30	Lunch	Lunch	Lunch	Lunch
12:45				
13:00				
13:15				
13:30				
13:45	Usherwood	Lee	Pratt	Bhounsule
14:00				Flynn
14:15	Park	Groß	Bruijn	McGeer
14:30	Wilson	Remy	Schmitt	
14:45				
15:00	Walcott	Atkeson	Robinovitch	demo intro
15:15				
15:30	BYOB Intro	poster intros	poster intros	Demos
15:45				
16:00	Build Your Own Bot Karssen	Poster Session	Poster Session	
16:15				Farewell
16:30				
16:45				
17:00				
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17:30				
17:45				
18:00	BBQ @ SFU		Dinner @ SFU	Bus to Vancouver
18:15				
18:30		Bus to Vancouver		
18:45				
19:00				Dynamic Walking Farewell Party @ Vancouver Science Center
19:15		Informal Dinner @ various Vancouver restaurants	Informal Snacks & Drinks @ SFU	
19:30	Informal Snacks & Drinks @ SFU			
19:45				
20:00		Informal Exploring Downtown Vancouver		
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23:00		Bus to SFU		Bus to SFU
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