Banff International Research Station
for Mathematical Innovation and Discovery

Noise, Time Delay and Balance Control
November 8 – 13, 2009

MEALS

*Breakfast (Buffet): 7:00–9:30 am, Sally Borden Building, Monday–Friday
*Lunch (Buffet): 11:30 am–1:30 pm, Sally Borden Building, Monday–Friday
*Dinner (Buffet): 5:30–7:30 pm, Sally Borden Building, Sunday–Thursday
Coffee Breaks: As per daily schedule, 2nd floor lounge, Corbett Hall
***Please remember to scan your meal card at the host/hostess station in the dining room for each meal.**

MEETING ROOMS

All lectures will be held in Max Bell 159 (Max Bell Building accessible by walkway on 2nd floor of Corbett Hall). LCD projector, overhead projectors and blackboards are available for presentations. Please note that the meeting space designated for BIRS is the lower level of Max Bell, Rooms 155–159. Please respect that all other space has been contracted to other Banff Centre guests, including any Food and Beverage in those areas.

SCHEDULE

Sunday

16:00	Check-in begins (Front Desk - Professional Development Centre - open 24 hours)
17:30–19:30	Dinner, Sally Borden Building
20:00	Informal gathering in 2nd floor lounge, Corbett Hall (if desired)
	Beverages and small assortment of snacks available on a cash honour-system.

Monday

7:00–8:45	Breakfast
8:45–9:00	Introduction and Welcome to BIRS by BIRS Station Manager, Max Bell 159
9:00–10:00	John Milton (The Claremont Colleges, USA)
	Why this workshop: Discontinuous versus continuous control
10:00-10:30	Coffee Break, 2nd floor lounge, Corbett Hall
10:30–11:30	Robert Peterka (Oregon Health & Science University, USA)
	Experimental paradigms and models of postural control in humans
11:30–13:00	Lunch
13:00–14:00	Guided Tour of The Banff Centre; meet in the 2nd floor lounge, Corbett Hall
14:00–14:30	Francisco Valero-Cuevas (University of Southern California, USA)
	Demonstration - *Manipulating the edge of stability: the thumb-finger spring compression paradigm*
14:30-15:00	John Milton (The Claremont Colleges, USA)
	Demonstration - *Wobble boards and stick balancing*
15:00–15:30	Coffee Break, 2nd floor lounge, Corbett Hall
15:30–16:15	Ami Radunskaya (Pomona College, USA)
	Tutorial - *Delay Differential Equations*
16:15–17:00	Lena Ting (Georgia Institute of Technology, USA)
	Tutorial - *Physiology of balance control and adaptability in normal and clinical populations*
17:30–19:30	Dinner

Tuesday

7:00–9:00	Breakfast
	Mathematics for models of human balance control
9:00–10:00	Jan Sieber (University of Portsmouth, UK)
	Effects of delayed switching
10:00–10:30	Coffee Break, 2nd floor lounge, Corbett Hall
10:30–11:30	Rachel Kuske (University of British Columbia, Canada)
	Time delays and noise
11:30–13:30	Lunch
13:30–14:00	Andy Ruina (Cornell University, USA)
	Deadbeat linear control: some elementary things some people don't know
14:00–14:30	Lena Ting (Georgia Institute of Technology, USA)
	Demonstration - *Sensory perturbation*
14:30–15:00	Coffee Break, 2nd floor lounge, Corbett Hall
15:00–15:30	Jason Boulet (University of Ottawa, Canada)
	Stochastic two delay-differential model of delayed visual feedback effects on postural dynamics
15:30–16:00	Kei Masani, Albert H. Vette, Mark Robinson (University of Toronto, Canada)
	Demonstration - *Functional Electrical Stimulation for Standing*
16:00–16:30	Toru Ohira (Sony Computer Laboratory, Japan)
	Demonstration - *Mechanical stick balancing*
16:30–17:30	Free time/discussions
17:30–19:30	Dinner

Wednesday

7:00–9:00	Breakfast
9:00–10:00	**Debate: Passive versus active control of human balance**
	Ian Loram (Manchester Metropolitan University, UK)
	Ramesh Balasubramaniam (McMaster University, Canada)
10:00–10:30	Coffee Break, 2nd floor lounge, Corbett Hall
10:30–11:30	Rebuttals and Conclusions
11:30–13:30	Lunch
13:30–14:00	**Group Photo; meet on the front steps of Corbett Hall**
14:00–14:30	Manoj Srinivasan (Ohio State University, USA)
	Understanding noisy human running data
14:30–15:00	Jason Kutch (University of Southern California, USA)
	Tutorial - *Noise as a window to nervous system function*
15:00–15:30	Coffee Break, 2nd floor lounge, Corbett Hall
15:30–16:00	Minoru Shinohara (Georgia Institute of Technology, USA)
	Effects of subsensory noise on human postural control
16:00–16:30	Robert Peterka (Oregon Health & Science University, USA)
	Predicting how noise in sensory and/or motor systems influences the sensory-re-weighting phenomenon
16:30–17:30	Free time/discussions
17:30–19:30	Dinner

Thursday

7:00–9:00	Breakfast
9:00–10:00	**Debate: Predictive vs non-predictive control of human balance**
	Tamas Insperger (Budapest University of Technology and Economics, Hungary)
	Francisco Valero-Cuevas (University of Southern California, USA)
10:00–10:30	Coffee Break, 2nd floor lounge, Corbett Hall
10:30–11:30	Rebuttals and Conclusions
11:30–13:30	Lunch
13:30–14:00	James Finley and Eric Perreault (Northwestern University, USA)
	Feedforward vs feedback control
14:00–14:30	John Jeka and Tim Kiemel (University of Maryland, USA)
	Human postural control used closed loop system ID techniques
14:30–15:00	Coffee Break, 2nd floor lounge, Corbett Hall
15:00–15:30	Gabor Stépán (Budapest University of Technology and Economics, Hungary)
	Balancing and vision
15:30–17:30	Free time/discussions
17:30–19:30	Dinner

Friday

7:00–9:00	Breakfast
9:00–10:00	**Summary Discussions**
	Time-delayed feedback. Moderator: Sue Ann Campbell, Canada
	"Act and wait" control. Moderator: Gabor Stépán, Hungary
	Noise, delay and balance control. Moderator: Toru Ohira, Japan
10:00-10:30	Coffee Break, 2nd floor lounge, Corbett Hall
10:30-11:10	**Summary Discussions**
	Biological implications. Moderators: Lena Ting, USA & Minoru Shinohara, USA/Japan
	Future directions. Moderator: John Milton, USA
11:10-11:30	Farewell remarks
11:30–13:30	Lunch

Checkout by 12 noon.

** 5-day workshops are welcome to use the BIRS facilities (2nd Floor Lounge, Max Bell Meeting Rooms, Reading Room) until 3 pm on Friday, although participants are still required to checkout of the guest rooms by 12 noon. **