



The Third Computational Motor Control Workshop at Ben-Gurion University of the Negev

June 13-14, 2007, W. A. Minkoff Senate Hall, BGU Marcus Family Campus, Beer-Sheva, Israel

Website: <http://www.bgu.ac.il/cmfw>



Wednesday, June 13, 2007

8:20-8:50 Registration, coffee

8:50-9:00 Greetings – **Dr. Amir Karniel**, head of the organizing committee, BGU

9:00-9:10 Opening remarks – **Prof. Rivka Carmi**, BGU president

Computation and Psychophysics

Chairperson: Prof. Anatol Feldman, Montreal

9:10-9:40 **Prof. Daniel Wolpert, Cambridge, UK**
Uncertainty in sensorimotor control

9:40-10:10 **Dr. Opher Donchin, BGU**
Learning by observation

10:10-10:40 **Prof. Philip Sabes, UCSF**
The eyes don't have it (all): Bayesian integration of motor plans across multiple reference frames predicts eye-centered reach errors

10:40-10:55 Discussion

10:55-11:20 Coffee

Basal Ganglia and Reinforcement

Chairperson: Dr. Opher Donchin, BGU

11:20-11:50 **Prof. Jim Houk, Northwestern**
Agent-Based Models of the Motor System

11:50-12:20 **Prof. Hagai Bergman, Hebrew U.**
Motor repertoire is maintained by basal ganglia positive reinforcement learning

12:20-12:30 Discussion

12:40-20:00 Trip to the Negev and Dinner

Thursday, June 14, 2007

8:30-9:00 Registration, poster placement and coffee

Motor Cortex

Chairperson: Prof. Eilon Vaadia, Physiology, Hebrew U.

09:00-09:30 **Prof. Andy Schwartz, University of Pittsburgh**
Cortical Trajectory representation and Brain Machine Interfaces

09:30-10:00 **Prof. Ron Meir, Technion**
Control theory combined with a physiological plant model predict neural activity in motor cortex

10:00-10:30 **Dr. Nedialko Krouchev, CRNS, Montreal**
Neural computation for arm reaching: a realistic population model of interactions in the motor cortex with parallels to primate experiments

10:30-10:45 Discussion

10:45-11:40 Coffee and Posters

Spinal Cord

Chairperson: Prof. Gideon Inbar, Technion

11:40-12:10 **Prof. Uwe Windhorst, Goettingen, Germany**
Spinal recurrent inhibition: role in motor learning?

12:10-12:40 **Prof. Boris Prilutsky, GeorgiaTech, Atlanta**
Modeling the spinal CPG and neural control of locomotion

12:40-12:50 Discussion

12:50-13:20 Lunch

13:20-14:40 Posters

Neural basis of motor computations

Chairperson: Prof. Tamar Flash, Weizmann

14:40-15:10 **Prof. Pierre-Paul Vidal, LNRS, Paris**
Skeletal geometry and motor control

15:10-15:40 **Prof. Charles Capaday, CRULRG, Canada**
Linear summation of cat motor cortical outputs

15:40-16:10 **Prof. Natalia Dounskaia, Arizona State U.**
Optimization processes during arm movements revealed through directional biases

16:10-16:25 Discussion

16:25-16:30 **The ATI Industrial Automation, Alpha Omega and NanInstruments**
Best poster and Travel Awards

16:30-17:00 Coffee and Posters

Cognitive Control

Chairperson: Dr. Amir Karniel, BGU

17:00-17:30 **Prof. Emanuel Donchin, U. of South Florida**
The Brain as a Finger: The P300 Based Brain Computer Interface

17:30-18:00 **Prof. Joseph Tzelgov, BGU & AAC**
Emergence of primitives in sequence learning

18:00-18:10 Discussion

Invitation Letter and Call for Posters

Dear Colleagues,

We wish to invite you to participate in the third annual Ben-Gurion University workshop on computational motor control on June 13-14, 2007, in the W. A. Minkoff Senate Hall at Ben-Gurion University of the Negev, Beer-Sheva, Israel.

The following information is also available on our website:

<http://www.bgu.ac.il/cmchw>

Thank you for your attention,

Amir Karniel and Opher Donchin akarniel@bgu.ac.il; donchin@bgu.ac.il



Winter in the Negev

Overview: The nervous system analyses sensory information and orchestrates motor commands. In so doing, it faces challenges that it shares with many artificially engineered systems. In the spirit of the classic field of cybernetics, the field of computational motor control makes scientific and technological progress simultaneously by exploring the differences between artificial control theory and biological motor control. Computational motor control is a multidisciplinary research program in which mathematics, engineering, biology, medicine and the cognitive neurosciences all play important roles. This workshop will bring together world leaders in the field of computational motor control including Israeli researchers and distinguished guests. The goal will be to learn about the current state of the field and to identify the directions that will provide the medical and scientific breakthroughs of the next decades.

Call for Posters: The posters will be available throughout the second day near the lecture hall to facilitate fruitful discussions. Please submit a one-page abstract of up to 500 words by May 30 through the website or by email to cmchw@bgu.ac.il with the subject heading "CMCW registration form". An email should clearly contain your name and affiliation. All the accepted abstracts will appear on the website prior to the workshop. Poster's should have a maximum width of 90 cm and a maximum height of 120 cm

Best Poster Award: The award committee will choose the best poster(s) which will be announced at the end of the workshop. The Best Poster Award Committee:

- Opher Donchin, Ben-Gurion University.
- Dana Cohen, Bar-Ilan University
- Ronen Segev, Ben-Gurion University
- Gideon Inbar, Technion – Israel Institute of Technology

Travel Award: In special cases we will also consider a travel award to partially cover the expenses of international researchers/students who submit a request letter to cmchw@bgu.ac.il The criteria for the travel award are: (i) The scientific quality of the proposed poster and its relevance to the topic of the workshop (ii) An interest in pursuing a PhD, post doc or faculty position at Ben-Gurion University.

Tour to the Negev: We plan a half day hike to Makhtesh Ramon, cost per-person will be 150NIS (approx. \$40), registration should be done by email to cmchw@bgu.ac.il and payment (cash only) will be done during the morning of June 13 at the workshop registration desk.

Registration: Please register before May 30. Registration is mandatory but free. Space may be limited, so please register early. Please register on our website or by email to cmchw@bgu.ac.il with the subject heading "CMCW registration form".

Sponsors:

- The President, Ben-Gurion University
- The Rector, Ben-Gurion University
- The Dean of the Faculty of Health Sciences, BGU
- The Zlotowski Center for Neuroscience, BGU

Advisory committee (In alphabetical order):

- Emilio Bizzi, MIT
- Dana Cohen, Bar-Ilan University
- Opher Donchin, Ben-Gurion University
- Tamar Flash, Weizmann Institute
- Gideon Inbar, Technion
- Rich Ivry, Berkeley
- Amir Karniel, Ben-Gurion University
- Sandro Mussa-Ivaldi, Northwestern University
- Stefan Schaal, University of Southern California
- Eilon Vaadia, Hebrew University



The desert in motion