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Symposium on Grand Challenges in Neural Technology

National University of Singapore
December 4-5, 2013

Sponsored by: SINAPSE Singapore Institute for Neurotechnology; MST Micro Systems Technologies engineering for life

Locations

Day 1 (December 4):
CeLS Auditorium, Centre for Life Sciences (CeLS), Medical Drive 28

Day 2 (December 5):
Lecture Theatre LT22, Faculty of Science, Science Drive 2

Program

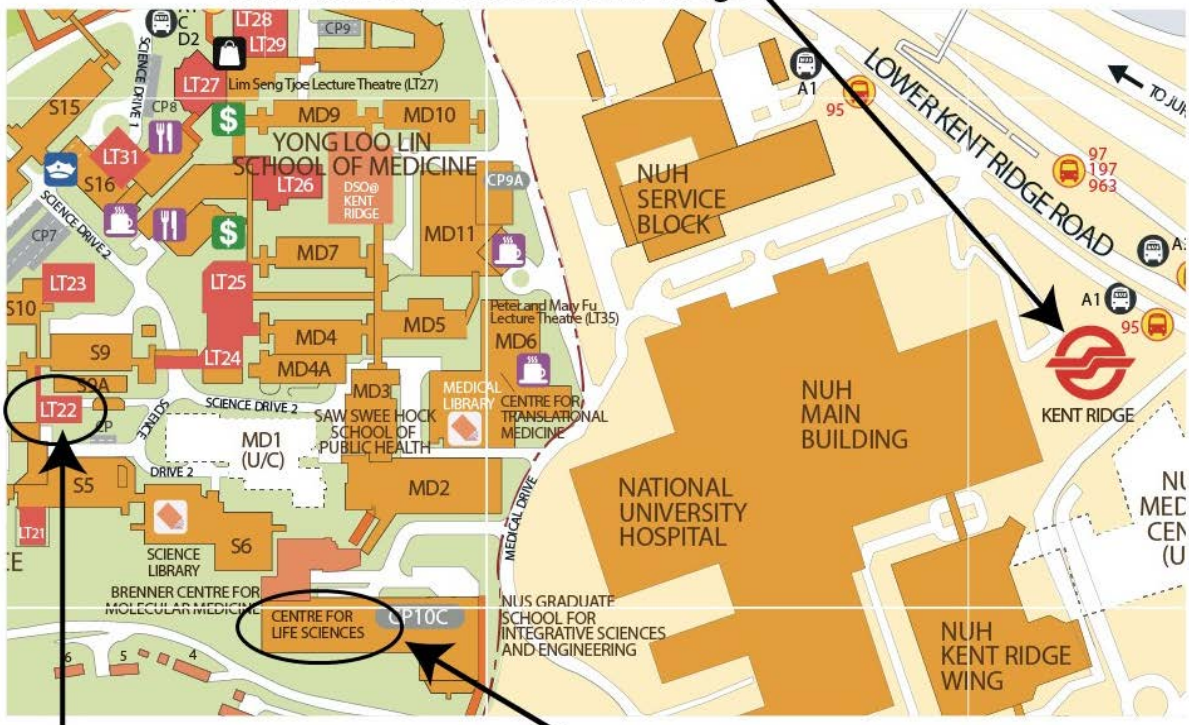
December 4, Wednesday, Morning, CeLS Auditorium	
08:15 – 08:30	**Welcome Remarks** Nitish Thakor, SINAPSE and National University of Singapore Bruce Wheeler, IEEE EMBS and University of Florida
Session 1: Peripheral Nerve Interfaces Chair: Bruce Wheeler, University of Florida, USA	
08:30 – 09:00	Silvestro Micera (Ecole Polytechnique Fédérale de Lausanne, Switzerland) *The quest for a bionic hand: recent achievements and future perspectives*
09:00 – 09:30	Thomas Stieglitz (IMTEK, University of Freiburg and CorTec) *Stability and Selectivity of PNS implants*
09:30 – 10:00	John Tsang (Institute for Microelectronics, A*STAR, Singapore) *Flexible Neural Interface for the Peripheral Nervous System*
10:00 – 10:30	Group Photo and Coffee Break
Session 2: Central Nervous System Interfaces Chair: Victor Pikov, Huntington Medical Research Institutes, USA	
10:45 – 11:15	Jit Muthuswamy (Arizona State University, USA) *Microscale robots for stable neural interfaces*
11:15 – 11:45	David Holder (University College London, UK) *Imaging of fast neural activity during evoked responses or seizures in rat cerebral cortex using Electrical Impedance Tomography*
11:45 – 13:00	Lunch (at CeLS Lobby)

December 4, Wednesday, Afternoon, CeLS Auditorium	
Session 3: Circuits for neural interfaces Chair: Kian Ann NG, SINAPSE, National University of Singapore	
13:00 – 13:15	Zhi Yang (National University of Singapore, Singapore) *On-chip neural signal processing*
13:15 – 13:30	Yong-Ping Xu (National University of Singapore, Singapore) *Peripheral Nerve Repair – A Bionic Approach*
13:30 – 13:45	Je Minkyu (Institute for Microelectronics and A*STAR, Singapore) *Neural Recording Front-End with Analog Buffer, Digital Delay, and Spike Detection*
13:45 – 14:00	Shih-Cheng Yen (National University of Singapore) *Peripheral Nerve Prostheses in the Non-Human Primate*
Session 4: Retinal implants Chair: Sudip Nag, SINAPSE, National University of Singapore	
14:00 – 14:25	Nigel Lovell (University of New South Wales, Australia) *Challenges in Improving the Performance of a Retinal Prosthesis: Neural Interfacing and Current Steering*
14:25 – 14:50	Jun Ohta (Nara Institute of Science and Technology, Japan) *Challenges for high performance stimulation in a retinal prosthesis*
14:50 – 15:15	Jong-Mo Seo (Seoul National University, Korea) *Challenges for Improving the Safety of a Retinal Implant*
15:15 - 15:35	Tea/Coffee Break
Session 5: Neuromodulation devices Chair: Gerald Loeb, University of Southern California, USA	
15:30 – 16:00	Herming Chiueh (National Chiao Tung University, Taiwan) *Closed-loop epileptic seizure detection in rats*
16:00 – 16:30	Luming Li (Tsinghua University, China) *Rechargeable DBS: from prototype to clinical use*
Session 6: Panel on Translation and Commercialization Chair: Percy Luu, National University of Singapore	
16:30 – 18:00	Florian Solzbacher (University of Utah, USA) *Building the R&D teams for commercialization of neural interfaces* Thomas Stieglitz (IMTEK, University of Freiburg and CorTec, Germany) *From prototypes to approved devices: challenges to setup a production* Gerald Loeb (University of Southern California, USA) *Regulation and Reimbursement Challenges for Novel Class III Devices*
18:00 – 19:00	**Tour of SINAPSE Institute and Poster Session** Location: 5th Floor @ CeLS
Social Program	
19:00 – 19:45	Bus from CeLS to the Gardens By the Bay
19:45 – 20:00	Illumination show at the OCBC Garden Rhapsody
20:00 –	Buy your own dinner at Majestic Bay or Satay by the Bay restaurants

December 5, Thursday, Morning, LT22	
Session 7: Neuromorphic Engineering Chair: Garrick Orchard, SINAPSE, National University of Singapore	
9:00 – 9:30	Arindam Basu (Nanyang Technological University, Singapore) *Neuromorphic Circuits for Scalable Neuroprosthetics*
9:30 – 10:00	Shoushun Chen (Nanyang Technological University, Singapore) *Temporal Feature Extraction in Spike-based Image Processing*
10:00 – 10:30	Tea/Coffee Break
10:30 – 11:00	Christoph Posch (Pierre-and-Marie-Curie University, France) *Neuromorphic vision - sensing and encoding for temporal resolution, dynamic range and power efficiency*
11:00 – 11:30	Ryad Benosman (Pierre-and-Marie-Curie University, France) *Bio-Inspired Event-based Computation*
11:30 – 12:00	Jack Gallant (University of California Berkeley, USA) *A Reverse-Engineering Approach for Understanding Computation in the Human Brain*
12:00 – 13:00	Lunch (at the LT22 Entrance)

December 5, Thursday, Afternoon, LT22	
Session 8: EEG-Based Brain-Machine Interfaces Chair: Kenneth Kwok, Temasek Labs/SINAPSE, National University of Singapore	
13:00 – 13:30	Cuntai Guan (A*STAR, Singapore) *Brain-Computer Interfaces for Medical Applications*
13:30 – 14:00	José del R. Millán (Ecole Polytechnique Fédérale de Lausanne, Switzerland) *Translating Brain-Machine Interfaces to End-Users: Lessons and Challenges*
14:00 – 14:30	Anastasios Bezerianos (SINAPSE, Singapore and University of Patras, Greece) *Investigation of brain function through connectivity mapping: A tool towards next generation Brain Computer Interface*
14:30 – 15:00	Tea/Coffee Break
Session 9: Short presentations Chair: Faith Bazley, SINAPSE, National University of Singapore	
15:00 – 15:20	Ivan Minev (Ecole Polytechnique Fédérale de Lausanne, Switzerland) *Stimulation of the spinal cord using mechanically soft materials*
15:20 – 15:40	Justin Dauwels (Nanyang Technological University) *Theoretical framework for controlling absence seizures*
15:40 – 16:00	Ignacio Delgado-Martínez (SINAPSE, National University of Singapore) *Decoding of motor information in non-human primates using a chronic implantable system*
16:00 – 16:30	Free time
Social Program	
16:30 – 17:15	Bus from LT22 Carpark to Clarke Quay
17:15 – 17:45	Thirty-minute walk from Clarke Quay to Chijmes Center (through City Hall)
17:45 –	Buy your own dinner at the restaurants inside Chijmes Center

MRT (metro) Station: Kent Ridge



Day 2 Venue: LT22

Day 1 Venue: Centre For Life Sciences