

INCF NEWSLETTER

Issue 3, 2009

INCF activities

INCF at SfN Neuroscience 2009

INCF will have an exhibit booth at the SfN Neuroscience 2009 meeting in Chicago, October 17-21, where a number of INCF- and Neuroinformatics-related projects will be demo-ed. Exhibits will be open 09.30 - 17.00 starting October 18. See the column to the right of this page for a condensed demo program; the full program can be found on the INCF web site.

INCF is also co-sponsoring a social event, held together with the Neuroscience Information Framework (NIF), on October 19th: "Neuroscience 2.0 - Networking data, tools and people" (Lake Erie Room, 6:30 - 9:00 pm).

www.incf.org

INCF National Nodes

EuroSPIN - European Study Programme in Neuroinformatics



Education and Culture DG

ERASMUS MUNDUS

The INCF Swedish National Node at KTH will together with the University of Edinburgh (UK), the National Centre for Biological Science (India) and the Albert-Ludwigs-Universität Freiburg (Germany) host a new Erasmus PhD programme in Neuroinformatics, called **EuroSPIN**. Each PhD candidate will pursue an interdisciplinary research project leading to a joint or double Ph.D. degree from two of the participating universities. The program was approved by the EU Commission in July 2009. It will start latest September 2010, and is soon open for applications.

www.kth.se/eurospin

Visit us at booth #2100!

Live demos at SfN 2009 in Chicago

Sunday, October 18

09:30 - 12:30: Reaching 500 models in **ModelDB**: implications for advances in neuronal integration

09:30 - 12:30: Modelling Large-Scale Neuronal Networks with the **NEST** Topology Module

13:30 - 16:30: Spectral Analysis of Neural Time Series Data: An introduction to **Chronux**

13:30 - 16:30: **BrainInfo** Online 3D Macaque Brain Atlas

Monday, October 19

09:30 - 12:30: INCF Japan Node (**J-Node**) and neuroinformatics platforms: Integrative Brain Research Platform, Cerebellar Development Transcriptome Database Platform

09:30 - 12:30: The **INCF Digital Brain Atlasing Program**: Community Built Infrastructure Spanning Multiple Atlas Spaces

13:30 - 16:30: INCF Japan Node (**J-Node**) and Neuroinformatics Platforms: Dynamic Brain Platform, Related Abstract Search Tool

13:30 - 16:30: The **CARMEN** Portal for Sharing and Analysis of Neurophysiological Data

Tuesday, October 20

09:30 - 12:30: Neuroinformatics Resources for Computational Neuroanatomy

09:30 - 12:30: The **Rodent Brain Workbench**: Web-enabled Brain Mapping at Microscopic Resolution

13:30 - 16:30: Modelling Network Diseases: From Retinal Dysfunction to Epilepsy

13:30 - 16:30: Scalable Brain Atlas Viewer: **NeuroLex** concepts in interactive 3D-context

Wednesday, October 21

09:30 - 12:30: **NeuroLex.org** - A semantic wiki for neuroinformatics based on the NIF Standard Ontology

09:30 - 12:30: Data Sharing Between **NITRC** and the **INCF Software Center**

13:30 - 16:30: Open forum discussion - *spontaneous demonstrations welcome!*

Single-Neuron Modeling Competition 2009: Winners Announced

How well are single-cell properties reproduced by present-day neuronal models? And how can we quantify “well reproduced”?

Recently, several labs have approached this question by assessing the quality of neuron models with respect to spike timing prediction or characteristic features of the voltage trace. So far, all modelers have used their own preferred performance measure on their data sets. The *Quantitative Single-Neuron Modeling Competition*, that recently completed its third round, offers a coherent framework to compare neuronal models and fitting methods. The aim is to bridge the gap between experimentalists and modelers, and to provide the opportunity for modelers to compare their methods and models to those of other people in the field.



Ryota Kobayashi was awarded the INCF Prize, which was handed out for the first time in the competition's history.

The four modeling competition challenges:

- A:** Spike timing of a regular spiking L5 pyramidal cell responding to in-vivo-like current injection
- B:** Spike timing of a L5 fast spiking cell responding to in-vivo-like current injection
- C:** Timing of somatic spikes of a tufted L5 pyramidal cell responding to in-vivo-like current injected in the apical dendrites and the soma simultaneously
- D:** Spike timing of a single post-synaptic neuron in the lateral geniculate nucleus knowing the spike train on the pre-synaptic side (i.e., in a retinal ganglion cell)



Karim El-Laithy and wife with the FACETS prize diploma.

The winners were announced on September 7th at the INCF Neuroinformatics Congress in Pilsen, and prizes were given for outstanding contributions.

The **INCF Prize** (10 000 CHF) to the participant(s) providing a significant win in at least two of the four challenges. This year the award was given to **Ryota Kobayashi** (Japan) for winning Challenges A and B, in collaboration with Shigeru Shinomoto.

The **FACETS Award** (500 CHF) to the participant providing a significant win in a single challenge, or shared between all participants providing a shared win in a single challenge. This year, the award was split between **Karim El-Laithy** (Germany) and **Ja-Lyoung Joe** (S. Korea) for best overall performance in Challenge D.

The competition was hosted by the INCF and organized by Richard Naud under the leadership of Wulfram Gerstner at the Brain Mind Institute of the Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, who also provide the prize money.

More details on the challenges, including training data, can be found on the INCF website. Past competitions will also be made available there, in order to serve as benchmarks for future models and methods.

www.incf.org/community/competitions/spike-time-prediction/2009



Neuro Informatics 2010

Kobe, August 30 - September 1



Find your next job on the INCF Portal

From October onwards, the INCF Portal will offer a curated selection of job openings in Neuroinformatics through the new Job Portal on the INCF web site. Users can view, print, forward and save job ads in a section connected to their user profile page. "This feature was among the top-ranked items on the wish list generated by our latest user survey", says INCF Usability and Requirements Analyst Ylva Lillberg.

www.incf.org/community/jobs

Large-Scale becomes Multi-Scale

Early this summer, the INCF Program on Large-Scale Modeling had its name changed, in order to better reflect the Program's scope and purpose. The program will hereafter be called the INCF program on Multi-Scale Modeling.

Work on MUSIC Continues

Mikael Djurfeldt, INCF's Expert in Data Handling and developer of the MUSIC library, is now working with Michael Hines, lead developer of the NEURON simulation environment, on a MUSIC interface for the NEURON simulator.

Neuroinformatics Profiles

A conversation with outgoing OCNS president, Ranu Jung

"Neuroinformatics is like a "Babel fish" [translator] for the different fields of science and engineering and even philosophy that are linked with neuroscience. The better designed and versatile the "Babel fish" the greater impact and value it will have", Ranu Jung explains.

Her own career integrates several such academic disciplines. Jung started her way towards computational neuroscience with an undergraduate degree in Electronics and Communication. Convinced that Biomedical engineering was the field that would allow her to bridge engineering and medicine, she decided to pursue a doctorate in it and moved from India to join Case Western Reserve University in the USA. She first encountered computational modeling as part of her doctoral work, and has since then veered closer to her initial fascination with medical devices. *"As an engineer who several years ago stepped into the company of mathematicians, physicists, and neuroscientists, I am convinced that neural engineers in particular should take advantage of computational tools to investigate the complexity and adaptability of the nervous system, and use this understanding in the design of our next generation of engineered systems",* Jung states.

Today, Jung's lab - part of the Center for Adaptive Neural Systems - is actively pursuing development of neurotechnology that is inspired by biology, is adaptive and could be used to promote adaption in the nervous system to overcome neurological disability or trauma. One of their projects is to develop neurotechnology to promote adaptation after incomplete spinal cord injury (iSCI), based on the notion that appropriately timed electrical activation of specific neural circuits can promote functional recovery after neurotrauma by promoting reorganization of the spared spinal neural circuits. Another project deals with the development of a new prosthetic system, which will utilize a direct peripheral nerve interface to provide amputees with sensory feedback from their artificial hand. *"I am very excited about this project because it promises to provide amputees artificial limbs that are more natural to use and more highly functional",* Jung says.

The Organization for Computational Neurosciences (OCNS), where Ranu Jung serves as president until the end of the year, was established to serve the needs of an international community of scientists actively engaged in using quantitative tools to address questions in neuroscience. As one of its main tasks, the OCNS has been supporting the organization of the international computational neuroscience (CNS) conferences since 2003 - a meeting with a clear tradition of support for younger

Affiliations:

Co-director of the Center for Adaptive Neural Systems; Associate Professor of Bioengineering, School of Biological and Health Systems Engineering. Affiliated faculty of Electrical Engineering, School of Electrical, Computer and Energy Engineering at the Ira A. Fulton Schools of Engineering, Arizona State University. President of the OCNS from 12/2006 to 12/2009.



Ranu Jung

scientists. *"We are strongly committed to offering the new generation of transdisciplinary computational neuroscientists - students, postdoctoral fellows and young scientists who are formally being educated in computational neuroscience - an international forum for knowledge exchange and shared communication",* Jung says. Towards this end, the OCNS provides travel awards and other support for these groups. The board of the organization also provides endorsement for some of the meeting workshops for book publication consideration.

"it is very clear that "computation" is now fully embedded within neurosciences and that it is an integral part of the study of the nervous system"

Asked about the future of the field of computational modeling, Jung replies: *"I think the major barrier is figuring out when, why and how to do the computational modeling. In some cases there is lack of data - for this we need improved methodology - neurotechnology to probe the nervous system, gather information from it, perturb it - find non-invasive tools, get data over very long and very short time spans as well as the spatial dimension".*

As part of the work required for crossing these barriers and for spreading the use of neuroinformatics tools, Jung explains, a higher level of standardization must be sought after: *"In computational neuroscience we have borrowed from the lexicon of many fields and now it is indeed time to introduce standardization, one of the goals that INCF is trying to achieve with its effort. The ability to share models, databases, cross-compatibility of simulation and analysis platforms will go a long way in making computational neuroscience accessible to researchers in other fields".*

And, she emphasizes, modelers and theoreticians have some internal marketing to perform: *"We need to continue educating the rest of the community of how "Computational Neuroscience" can be an added value to their research effort and in many cases, although not recognized as such, is an integral part of their effort".*