

INCF NEWSLETTER

Issue 2, 2009

INCF activities

incf Software Center

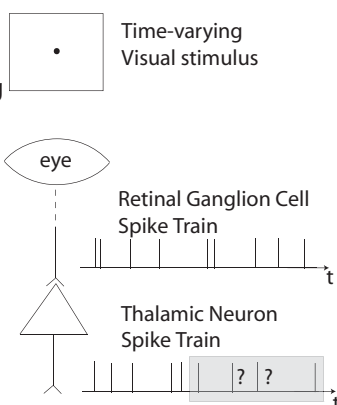
The **INCF Software Center** and the Neuroimaging Informatics Tools and Resources Clearinghouse (**NITRC**) are now sharing content. Software tools hosted by NITRC also appear at the INCF Software Center with a link pointing back to the original entry at NITRC. This will help developers wishing to promote their software tools, since entries registered once at NITRC will automatically be mirrored at the Software Center.

<http://software.incf.org/>

INCF Community

Single-Neuron Modeling Competition

For the third time running, the Quantitative Single Neuron Modeling



Competition organizers at the Brain Mind Institute of the Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland invite you to compare your methods and models to those of other people in the field. Anyone can participate and any type of model is accepted. Four challenges are given. To qualify for the FACETS Award (500 CHF), participants must achieve a shared win in a single challenge. The INCF Prize (10 000 CHF) is given to the participant(s) providing a significant win in at least two of the challenges. Submissions are open until **August 25**, on the INCF website. The winners will be announced at the INCF Neuroinformatics Congress in Pilsen, September 6-8, 2009.

<http://incf.org/community/competitions/>

INCF National Nodes

Neuroinformatics at CNS*2009 in Berlin

The INCF German National Node (G-node) is organizing a special symposium on Neuroinformatics on July 22, the day following the main CNS meeting, in the Einstein lecture hall in the Berlin-Brandenburg Academy of Sciences. Topics include open-source tools for data analysis and frameworks for the management and sharing of tools and data among neuroscientists. The speaker program (below) will be followed by discussions about the current scope and future development of tools for data sharing and data analysis in neurophysiology.

Participating speakers:

- **Ad Aertsen** (BCCN Freiburg) will talk about FIND, an integrated analysis toolbox for multiple-neuron recordings and network simulations.
- **Jan Benda** (BCCN Munich) will address the issues of automated data and metadata acquisition and on-line analysis, introducing the software relacs.
- **Hemant Bokil** (Cold Spring Harbor Laboratory) will present the Chronux software package for the analysis of neural data.
- **Eilif Muller** (EPFL) will talk about efforts to develop Python modules for neuroscience and neuroinformatics.
- **Colin Ingram** (University of Newcastle) will present the "Code Analysis, Repository and Modeling for e-Neuroscience" (CARMEN) project, a UK-wide initiative to develop a virtual laboratory for neurophysiology.
- **Fritz Sommer** (UC Berkeley) will present the data sharing efforts of the Collaborative Research in Computational Neuroscience (CRCNS) funding program in the US.
- **Shiro Usui** will introduce the Japan National Neuroinformatics Node, and in particular its digital archive for vision science, the Visiome Platform.

<http://www.cns.org/2009/informatics.shtml>

INCF Review

Understanding for the International Neuroinformatics Coordinating Facility, the official document governing the establishment and operations of INCF, specifies that the progress and operations of INCF should be reviewed by an independent site visit team three years following the establishment of the organization. The review is to be used to evaluate the effectiveness of the governance structure and to recommend any necessary changes or the continuation/cessation of INCF for next phase beyond the initial five years.

On May 7-8, 2009, a Review Panel composed of five eminent experts with complementary backgrounds (see box below) visited the INCF Secretariat. The organization's key achievements were presented to the Panel, covering the rationale and history of INCF, the organizational developments, scientific programs and technical projects, educational and outreach initiatives, national node structures and activities, and vision for the future. The Review Panel conducted interviews with the INCF leadership and spoke to staff at the Secretariat as well as scientific leaders of key INCF programs. The Panel assessed the strengths that INCF has demonstrated in its first three years of operation, and suggested future directions. The strong leadership and convincing strategic plan were applauded. In particular, the Panel noted that a clear understanding of INCF's role as coordinator, not competitor, has helped identify areas where INCF's can play a key role in facilitation rather than duplication of efforts.

INCF Review Panel

Dr Kathie Olsen (Chair), National Science Foundation (NSF), USA. A neuroscientist by training, Dr. Olsen has served in the NSF for many years, and as Deputy Director until 2009. She has also served in the Office of Science and Technology Policy for the White House, and is Head of the US delegation to the Global Science Forum of OECD.

Dr Richard Morris, The Wellcome Trust and University of Edinburgh, UK. Dr Morris is well known for his research on mechanisms of memory and learning. He is a member of the Royal Society, UK, and is currently Head of Neuroscience and Mental Health at the Wellcome Trust, UK. He has been an advisor to Lord Sainsbury,

Major strengths of INCF:

- INCF's vision is compelling and in its first three years, the organization has made a strong start in creating the infrastructure that will enable INCF to carry out its mission
- The workshops organized by INCF are an effective mechanism for establishing strategies and priorities in key areas, and for involving leaders in the field to help organize specific undertakings.
- INCF has outlined a strong scientific program and developed extensive work plans to identify deliverables and outcomes.
- The INCF Neuroinformatics Portal will serve as a premier channel for access to resources and to foster interactions among the scientific community.
- INCF has been very effective in outreach to the research community.
- INCF has been recognized for their work with major scientific journals and the Society of Neuroscience to develop new directions in the publication of research articles to reduce the burden of review and accelerate the time to publication.

In conclusion, the Review Panel felt that the INCF has made remarkable progress, exhibited an exciting vision, and recommends continued support of this enterprise for the next five years.

UK Science Minister 1998 - 2006 and founder of the Gatsby Foundation. He is a past president of the Federation of European Neuroscience Societies.

Dr Klaus-Peter Hoffmann, Ruhr-Universität Bochum, Germany. Dr. Hoffmann is a pioneer in studies of visuo-motor coordination in a broad range of experimental models from fish to primates, combined neuroinformatics techniques with analyses of basic neuronal networks. He has served in many different capacities including being the Dean of the Faculty of Biology, president of the German Neuroscience association, and in Human Frontier Science Program and the German Science Foundation (DFG).

Neuro 2009 Informatics

2nd INCF Congress of Neuroinformatics

Pilsen, Czech Republic - September 6 - 8, 2009

Workshop topics:

- **Advances in the automatic analysis of multi-dimensional data**

Chairs: Jaap Van Pelt, Ulla Ruotsalainen

Bart ter Haar Romeny, Uri Eden, Klaus Linkenkaer-Hansen

- **Ontologies for neuroscience: applications and advances**

Chair: Maryann Martone

Tim Clark, Alan Ruttenberg, Jeffrey Grethe

- **How should a neuron be modeled: biophysical detail vs. abstraction**

Chairs: Gaute Einevoll, Andreas Herz

Arnd Roth, Wulfram Gerstner, Peter Hunter

- **High performance computing and grid infrastructure for neuroinformatics applications**

Chairs: Luciano Milanese, Shiro Usui

Markus Diesmann, Andrey Semin, Pietro Liò

- **The neuroinformatics of neural connectivity**

Chairs: David Willshaw, Kevan Martin

Albert Cardona, Giorgio Ascoli, Rolf Kötter

Keynote speakers:

Kenji Doya

Alon Halevy

Astrid Prinz

Andrew Schwartz

Shankar Subramaniam

Arthur Toga

Dr Masao Ito, RIKEN Brain Science Institute, Japan. Dr Ito is an outstanding neuroscientist, member of the US National Academy, and receiver of the Japan Prize. He was a Dean at the University of Tokyo and subsequently the Founding Director of the Brain Science Institute at RIKEN. This new and well-funded institute has in a short time evolved to a leading position in neuroinformatics and in neuroscience. It is unique in that it from the start incorporates a major effort in neuroinformatics and brain inspired technologies. Dr Ito has been President of the International Brain Research Organization and played a prominent role in the multinational Human Frontier Science Program. He has been advisor for research to the Prime Minister of Japan.

Dr Paul Messina is a prominent computational scientist. He was Director of Center for Advanced Computing Research at California Institute of Technology, and Principle Investigator for the Teragrid and the National Virtual Observatory projects. He has been a member of the Board of Directors of the Global Grid Forum and served on the advisory panel for CyberInfrastructure at the US National Science Foundation. In addition, Dr. Messina has been Senior Advisor to the Director of the CERN (European Organization for Nuclear Research) and Director of Advanced Simulation and Computing for Defense Programs in the National Nuclear Security Administration, US Department of Energy.

Neuroinformatics Profiles

A conversation with the CARMEN project's Stuart Baker

"As an experimental neuroscientist interested in the control of movement, what does my work have to do with neuroinformatics?" Stuart Baker repeated the question. A Wellcome Trust Senior Fellow and Professor at Institute of Neuroscience, Newcastle University, UK, Baker carries out experiments in monkeys, recording multiple single unit activity. Most of this is in the awake state so that neural activity can be related to voluntary movements. With a special focus on sub-cortical brain centers, the group has made significant contribution to the increasing realization that brainstem centers such as the reticular formation, cuneate nucleus, and thalamus are playing a key role. Baker is also one of the few experts worldwide recording from the spinal cord in the awake state - again, a key center for motor control, but often assumed to be simply a passive way-station.

As an experimentalist, Baker is very aware of how much data costs. Experiments in monkeys are hugely time consuming, and have increasingly become very expensive. *"The stack of DVDs representing the data from a typical monkey experiment in my lab is worth £0.5M, and represents 3 years work from a PhD student or post-doc, not to mention a substantial contribution from the rest of the team,"* Baker gave his own example, *"once we publish our findings, the data sits on a shelf, and is rarely used again"*. Realizing that this is a real waste, Baker is very keen on datasharing and serves as a co-investigator for the CARMEN project (www.carmen.org.uk). This initiative seeks to produce a database for archiving and sharing neuroscience data. The idea is that once a lab has finished publishing from a particular dataset, they will make it available via CARMEN to others who might be interested in doing further analysis. Within the UK climate, this is very timely - funders are increasingly concerned that data gathered using public funds should not be lost. *"I can see that in the next 2-5 years, depositing data onto CARMEN at the end of a project will be a grant requirement - just as we are now required to deposit all of our publications on PubMed,"* Baker predicted. *"This will be an enormous advantage to the community and neuroinformatics is the key."*

"I'm never really sure what 'neuroinformatics' is, precisely defined," Baker smiled, *"but I think applying information technology to neuroscience research brings a lot of advantages. Three aspects of my work can testify!"*

Another aspect of neuroinformatics is computational modeling. 'Analysis' in the standard sense can only get us so far with our data. Because so many interacting brain areas are involved in neural functions, computational models may help



Stuart Baker

to understand the system fully. As a key tool in current neuroscience research, models are used to formulate hypotheses regarding the function of the nervous system, validate self-consistency of the description of a phenomenon or function, and serve as a platform for integrating knowledge. Modeling can also be used to falsify hypotheses and then suggest new experiments. *"I think many people misunderstand the role of modeling,"* Baker commented. *"The aim is NOT to replicate the data - that just tells you that your model could be correct; but it could also be wrong. Much more interesting is when the model doesn't replicate the data - then you can really identify where the preconceptions used to form the model are in error. We try to use this approach, that is, a model could be considered a tool to identify what we don't know."*

"I'm never really sure what 'neuroinformatics' is, precisely defined, but I think applying information technology to neuroscience research brings a lot of advantages"

"Our data are also complex and standard analyses often don't answer the questions that we want to ask," Baker continues. *"So, we need to develop novel ways of analysing data - with all of the associated statistical issues"*. Many of the group's experimental papers introduce new analysis methods; *"I see this as key if we are to make real advances."* As part of this effort, Baker coordinates the UK Spike Train Analysis Network (www.spiketrain.org), which seeks to bring people together (and not just from the UK!) to collaborate on analysis development. *"We run focussed workshops for the theoretically minded, as well as dissemination workshops to help experimentalists get started with complex analysis of spike trains."* The network also runs a seminar series, which is broadcast over the internet live as well as archived, and a real community of people interested in the field starts to form and is able to interact in a 'virtual department', spanning geographical and institutional boundaries. *"You can look at the seminar archive (also recordings of dissemination workshop talks) on the website, and sign up for notification of the live broadcasts,"* Finally, Baker extended an invitation to the INCF network. *"We are always looking for volunteer speakers - you'll be presenting your work to a much larger audience than a usual departmental seminar, and most of the audience are 'expert', so it's very worthwhile."*