INCF NEWSLETTER
**Issue 4, 2010**

## INCF activities

### INCF on YouTube

INCF now has its own YouTube channel, featuring full-length videos from the INCF Congresses of 2008 and 2010, as well as a number of short videos from our booth at the most recent SfN conference in San Diego. Stay tuned for more updates and additions!

**www.youtube.com/user/INCForg**

### INCF coorganizes CNS*2011


The computational neuroscience conference CNS will run for the 20th time this summer, July 23-28 in Stockholm. INCF is involved as one of several local organizers.

The conference will be located at KTH. The program starts with one day of tutorials followed by three days of main meeting and two days of workshops. Social activities include a reception in the City Hall - the venue of the Nobel Prize festivities.

The **abstract submission closes February 14**, and May 15 is the deadline for early registration. Hope to see you in Stockholm!

**www.cnsorg.org/2011**

### INCF releases second Training Report

The findings and recommendations from the 2nd and 3rd workshops on Training in Neuroinformatics, organized by David Willshaw at University of Edinburgh, are now published as a report in the INCF report series. The workshops focused on needs and recommendations for extended and short course provision.

**incf.org/core/training-committee**

## INCF Node activities

### APNNA Award to Prof. Shiro Usui

The APNNA (The Asia Pacific Neural Network Assembly) has awarded Professor Shiro Usui, RIKEN Brain Science Institute, the 2010 APNNA Outstanding Achievement Award for "his pioneering and fundamental contributions to Neuroinformatics". Professor Usui is the Director of the INCF National Node of Japan.

**wiki.cse.cuhk.edu.hk/APNNANEW/awards**

### 3rd G-Node Winter Course in Neural Data Analysis

**Munich, March 7 - 11, 2011**

The German Neuroinformatics Node (G-Node) organizes a practical data analysis course on a yearly basis to promote state-of-the-art methods of neural data analysis. It specifically addresses PhD students (2 ECTS) and young postdocs with either experimental or theoretical background.

The 2011 course will focus on electrophysiological data. The students will analyze synaptic transmission and reliability in intracellular recordings, spike train variability, transfer functions, and the timeresolved directional tuning of extracellular single unit recordings.

**Faculty**
Clemens Boucsein, ALU and BC Freiburg
Susanne Ditlevsen, Univ Copenhagen
Jan Grewe, LMU Munich
Martin Nawrot, FU and BCCN Berlin

**portal.g-node.org/dataanalysis-course-2011**

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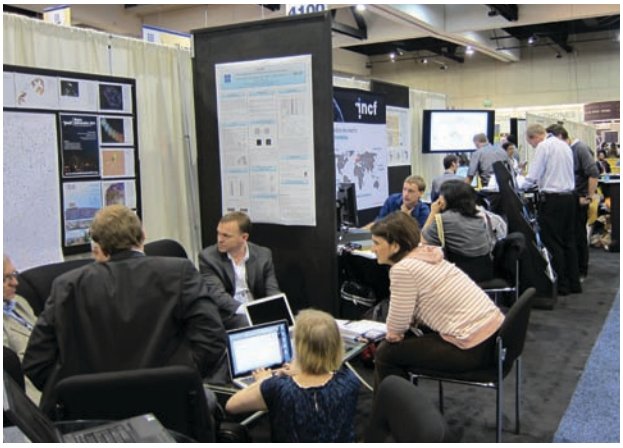
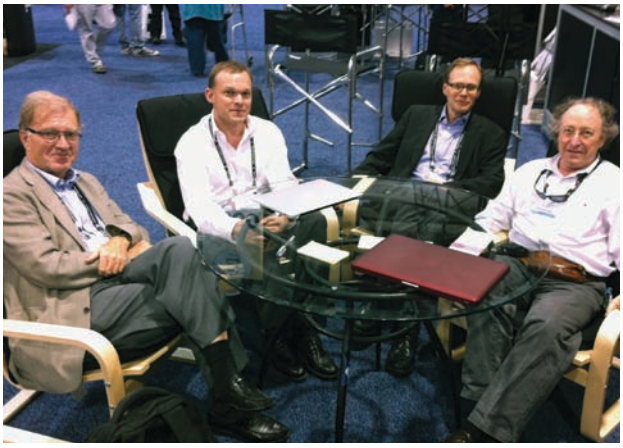
## INCF at SfN 2010 in San Diego

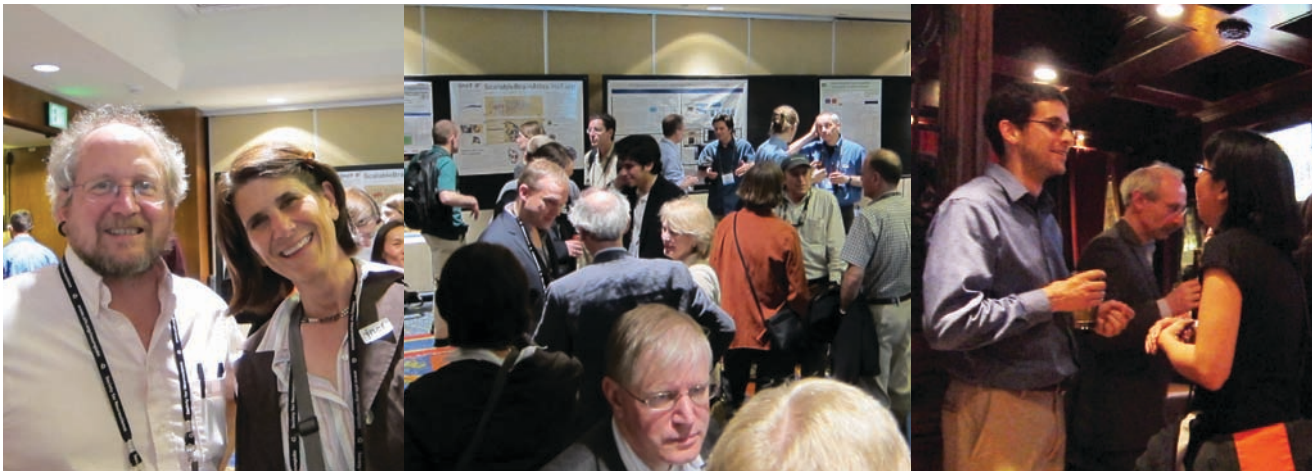

Part of the 'neuroinformatics aisle' at SfN: Whole Brain Catalog, CARMEN and INCF. Located on the opposite side of the aisle, not visible in this picture, were the booths of NIF and LAMHDI.



The INCF booth was almost constantly full of visitors, due to our dual-track program of hosted demos and our meeting-friendly mingling area.



The current, future and past Executive Directors of the INCF: Sten Grillner, Sean Hill, Jan Bjaalie and Mark Ellisman.



David Kennedy and Maryann Martone (left), from the INCF National Node of USA, organizers of the official SfN-sponsored Neuroinformatics & Genomics Social (middle), as well as the more informal Neuroscience 2.0 social (right), which was held at the Tipsy Crow bar in downtown San Diego, and co-sponsored by several neuroinformatics projects and initiatives.

# incf | Neuro Informatics 2011

Boston, USA, September 4-6

## Keynote speakers

**Kim "Avrama" Blackwell** (George Mason University)
**Ed Callaway** (Salk Institute)
**Shin Ishii** (Kyoto University)
**Allan Jones** (Allen Institute for Brain Science)
**Terry Sejnowski** (Salk Institute & UCSD)

## Workshops

**1: Network principles derived from analysis and databasing of cortical connectivity**
(Chair: Jan Bjaalie, University of Oslo)

**2: Connectome integration across modalities**
(Chair: David Van Essen, Washington University)

**3: Advances in Computational Psychiatry**
(Chair: David Kennedy, U. of Massachusetts Medical Center)

**4: Functional reconstruction of neural networks**
(Chair: Upinder Bhalla, NCBS)

**www.neuroinformatics2011.org**

*Photo: David Kennedy & Blaise Frederick*

## A conversation with Lydia Ng, Director of Atlas Developent at the Allen Institute for Brain Science.

*We took the opportunity to talk to Allen Institute's Lydia Ng, Director of Atlas Development, about brain atlases.*

**What is your background, and how did you end up in your current position at the Allen Institute for Brain Science?**

As an undergraduate I studied electrical engineering and computer science. My interest in programming, algorithms and applied mathematics led me to a PhD in image processing with a focus on the estimation of optical flow (the motion of objects in video).

In 2000, I joined Insightful Corporation as a research scientist in their Medical Imaging Research group. During that time I worked on algorithm development for several grants with the aim of building a commercial medical imaging platform to support clinical workflows.

The Allen Institute for Brain Science had just started when I joined in 2004 as an analyst in the Informatics team. The challenge was to create a genome-wide, cellular resolution gene expression dataset of the adult mouse brain within three years - Dr. David Haynor, a colleague and consultant to the project called it an opportunity to "register more brains than anyone else…"

**What were the most important problems to solve in creating this gene expression atlas?**

Manually annotating over half a million images was out of the question so we had to create an atlas based solution that utilized unsupervised registration methods. Not only did the solution have to be of sufficient accuracy, it also had to be robust – with this many images it would be impossible to verify the results by hand. First step is to create a 3D atlas space based on the Allen Reference Atlas delineations. Registering the genome-wide expression dataset to the 3D atlas space allowed us to interpret the results in context of anatomical structures. For each gene, we generated a 3D expression grid consisting of 200 µm voxels in reference atlas space.

**What can one do with the expression grid data?**

Using the gridded data, searches for genes with enrichment in a particular structure can be performed by comparing voxels within the structure against neighboring structures or the rest of the brain. The spatial profile of one gene can also be used to seed a search to find other genes with a similar expression profiles. Moreover, one can use the whole dataset in unison and use gene expression to discover spatial relationship within the brain – this is the basis of the Anatomic Gene Expression Atlas (AGEA).

**What did you do since then?**

Since the completion of the Allen Mouse Brain Atlas I have been involved in several other large scale projects including: the Allen Developing Mouse Brain Atlas, the Allen Human Brain Atlas and a multi-institute grant on the NIMH Transcriptional Atlas of Human Brain Development. We have also started on a four year project on creating the Allen Mouse Brain Connectivity Atlas.

*Dr. Lydia Ng*
*Director of Atlas Development*
*Allen Instituite for Brain Science*

Today, as the Director of Atlas Development, I oversee the teams responsible for design and implementation of the Institute's web application as well as visualization and data mining tools.

***"Making data accessible to the scientific community is a central tenet of the Institute's mission"***

**What have you learned, and how will it be used for future developments?**

Working on the Allen Mouse Brain Atlas has taught me the power of combining datasets to mine for information and to discover new relationships. Linking and layering other data sources in addition to the existing expression data is the logical next step. Doing so requires the construction of spatial and/or ontological relationship between data from disparate sources but creating these links is very difficult to do without commonly agreed models.

An atlas-based data sharing hub has the potential of streamlining this process: instead of having to determine a multitude of source-to-source relationships, each source need to only do a one-time connection to a standard canonical space. The challenge here is in identifying a widely applicable reference space.

**How does your work and that of the Allen Institute fit together with INCF?**

Making data accessible to the scientific community is a central tenet of the Institute's mission. This ties in well with the goals of the Digital Atlasing Program and the creation of Waxholm space, a canonical coordinate system for sharing data. Our participation in this early phase includes registering our 3D atlas to the canonical space and help with developing web services to allow links from external data to our anatomical and gene expression data.

The next challenge is to move from prototype phase to community adoption. A significant barrier to widespread adoption is the availability of simple tools to achieve spatial registration of user data to the standard space. This is especially pronounced within labs that do not have staff programmers with registration experience. INCF is well positioned to foster the development and maturation of these tools through the engaging of algorithms/tool building community.

**www.alleninstitute.org**
**www.brain-map.org**