

FROM SINGLE CELL TO WHOLE ANIMAL: NEW IMAGING TECHNOLOGIES IN NEUROSCIENCE

Society for Neuroscience Satellite Symposium
3.30–7.00 p.m., Saturday, November 2, 2002,
Peabody Orlando Hotel, Ballroom G & H,
Plaza International, Orlando, FL

Many exciting developments in imaging are emerging from the interfaces of physics, biology, mathematics and computer science. The Promega Neuroscience Satellite Symposium *From Single Cell to Whole Animal: New Imaging Technologies in Neuroscience* focuses on these developments, which range from the imaging of single molecules within cells to in vivo imaging of gene expression in animals.

Ronald Kalil from the University of Wisconsin-Madison will moderate the symposium. Kalil is a Professor of Ophthalmology and Visual Sciences in the UW-Madison Medical School and directs the W.M. Keck Laboratory for Biological Imaging. His research interests include the mechanisms of neural cell death, and tissue and cellular reorganization after brain damage.

Mark H. Ellisman, Director of the National Center for Microscopy and Imaging Research at San Diego, will provide the keynote address, “[Multi-Scale Structure and Function in the Nervous System.](#)” Ellisman’s research interests center on structure-function relationships within the nervous system—in particular the relationship between structural changes in axons and synapses and changes in neuronal function. His laboratory investigates questions about cellular interactions during nervous system regeneration, aging in the central nervous system, transport of molecules within neurons, and the molecular differentiation of excitable membranes.

Dr. Ellisman is a Senior Fellow at the San Diego Supercomputer Center and Director of the Center for Research in Biological Structure at UCSD. He serves as a Professor in both the Department of Neuroscience and the Department of Bioengineering at UCSD. Ellisman’s awards include Faculty Distinguished Lecturer (UCSD School of Medicine), the Jacob Javits Neuroscience Investigator Award, and the UCSD Department of Neurosciences Award for Outstanding Teaching.

Nancy Kanwisher and members of her laboratory in the Department of Brain and Cognitive Sciences at the Massachusetts Institute of Technology use functional magnetic resonance imaging (fMRI) to observe how the brain recognizes images and other visual stimuli. Work in her laboratory has helped to identify distinct areas of the visual cortex that are responsible for specific visual tasks.

SYMPOSIUM SPEAKERS

Ronald Kalil (Moderator)

University of Wisconsin-Madison

Mark H. Ellisman, Ph.D. (Keynote Speaker)

University of California, San Diego

Nancy Kanwisher, Ph.D.

Massachusetts Institute of Technology

Paul Forscher, Ph.D.

Yale University

Karel Svoboda, Ph.D.

Cold Spring Harbor Laboratory

Kanwisher and colleagues identified the “fusiform face area,” which is a cortical region that responds strongly when a person views a face but responds only weakly to other visual stimuli. Her laboratory has also identified the “parahippocampal place area,” which responds when a person views images of places, and a third specialized region that responds when a person views non-facial body parts. Her symposium presentation, “[fMRI Investigations of Human Extrastriate Cortex: People, Places and Things,](#)” will highlight some of this research.

Dr. Kanwisher is a Professor in the Department of Brain and Cognitive Sciences at MIT. In addition, she serves on the editorial board or is an associate editor for several peer-reviewed neuroscience journals, including *Cognition* and the *Journal of Neuroscience*. Dr. Kanwisher was named a MacVicar Faculty Fellow for her contributions to teaching and undergraduate education in 2002, and she received a National Academy of Sciences Troland Research Award in 1999.

Paul Forscher is interested in the mechanism through which the complex and specific network of neurons and targets is created in the brain. How does a single neuron find a specific signaling partner among the billions of potential “partners” in the brain? Forscher’s laboratory studies growth cones—specialized structures that guide axons to their targets. The growth cone provides the machinery for motility and the receptors for signals that direct the growth or migration of a cell to its target. The molecular motors and cytoskeletal protein dynamics that underlie growth cone motility are a current focus of work in the Forscher laboratory. His talk, “[Actin and Microtubules in Growth Cones: It Takes Two to Tango,](#)” will address the latest work of his laboratory in this area. Dr. Forscher is an Associate Professor in the Department of Biology at Yale University.

Karel Svoboda, Associate Professor at Cold Spring Harbor Laboratory, studies how synapses function within intact neural networks and how they change (i.e., neural plasticity) in response to sensory experience. His laboratory addresses this question, in part, by measuring neuronal function in intact tissue using two-photon laser scanning microscopy (2PLSM). Using 2PLSM, his laboratory can measure intracellular calcium stores that accumulate with activation of synaptic receptors. This calcium imaging is capable of detecting the excitation of single synapses within highly complex cortical tissue that can contain nearly one million neurons within a cubic millimeter. Dr. Svoboda's talk, "Imaging Experience-Dependent Synaptic Plasticity in vivo," will highlight his work with 2PLSM and in vivo neural imaging.

Symposium Registration

A casual reception will be held prior to the keynote address. Admission is free, but advance registration is requested. For online registration and the latest updates, please go to: www.promega.com/neuro2002

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for the

Second Annual International Bioethics Forum

WHO DECIDES?

Madison, WI

April 25–26, 2003

more information: www.btc.org

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