

## **McGovern Institute for Brain Research**

The McGovern Institute for Brain Research at MIT is led by a team of world-renowned neuroscientists committed to meeting two great challenges of modern science: understanding how the brain works and discovering new ways to prevent or treat brain disorders. The McGovern Institute was established in 2000 by Patrick J. McGovern and Lore Harp McGovern, who are committed to improving human welfare, communication, and understanding through their support for neuroscience research.

### **New Faculty Appointments**

In June 2010, Guoping Feng joined the McGovern Institute and Department of Brain and Cognitive Sciences, where he now holds the Poitras professorship of neuroscience. This appointment brings the total number of McGovern faculty members to 16, including 13 full investigators and three associate members (as of June 2010). Professor Feng, who was previously an associate professor at Duke University, studies the formation and function of synaptic connections and their disruption in mouse models of human brain disorders. He has developed a variety of genetic technologies to study the mechanisms underlying psychiatric diseases, including obsessive-compulsive disorder and bipolar disorder.

We also conducted a new faculty search during spring 2010, culminating in the successful recruitment of Feng Zhang, who will join the McGovern Institute in 2011, with a joint appointment at the Broad Institute. As a student at Stanford University, Dr. Zhang has done pioneering work on the development of optogenetic methods for manipulating brain function. Dr. Zhang is currently a junior fellow at Harvard University's Society of Fellows.

### **Annual Symposium**

The McGovern Institute held its annual symposium on May 7, 2010. The theme this year was "Cells, Circuits and Behavior." The symposium featured eight speakers from the United States and abroad who discussed topics ranging from the computational power of single neurons and the complexity of gene regulation in the brain to the development of neural prosthetic devices. The keynote talk was from Steven Paul, former vice president for research at Eli Lilly, who discussed recent advances in Alzheimer's disease and the implications for new treatment.

### **Scolnick Prize**

The 2010 Scolnick Prize was awarded jointly to Lily and Yuh-Nung Jan of the University of California, San Francisco, for their work on neurogenetics, which has been central to our understanding of potassium channels and of early neural development. The Jans gave a joint award lecture on May 28, 2010, followed by a reception and dinner at the institute.

## **Annual Retreat**

The McGovern Institute's annual retreat was held for a second year at the American Academy of Arts and Sciences in Cambridge, MA. The event featured 13 talks from McGovern labs and 26 poster presentations, followed by dinner at the academy. In addition to over 100 members of the institute, the audience included founding donors Pat and Lore McGovern and the chair emeritus of our leadership board, Robert Metcalfe.

## **Board of Directors**

The McGovern board of directors meets quarterly, in July, October, January, and April. Current board members are Patrick McGovern; Lore McGovern; Elizabeth McGovern; Marc Kastner, MIT; Robert Langer, MIT; Edward Scolnick, Broad Institute; Sheila Widnall, MIT; and James Poitras, Avalon Mining, Inc.

## **The McGovern Leadership Board**

The McGovern Leadership Board meets twice per year, on the third Thursday of April and October. The Leadership Board participates in programming at the McGovern Institute and interacts with the director and faculty members throughout the year, providing critical funding and layperson advice to the Institute.

## **Scientific Advisory Board**

The Scientific Advisory Board met on November 10, 2009. This board, which meets every two years to provide guidance on the institute's research programs, is composed of some of the world's most prominent neurobiologists. Current members are John Duncan of the Medical Research Council in Cambridge, England; Nikos Logothetis from the Max-Planck Institute for Biological Cybernetics in Tübingen, Germany; Carla Shatz of Stanford University; Charles Stevens of the Salk Institute; Robert Wurtz from the National Eye Institute; Gerald Fischbach of the Simons Foundation; and Eve Marder of Brandeis University. In its report, which was delivered to Dean Kastner, the board endorsed the strategic direction of the institute and concluded that progress was excellent and that the institute was thriving.

## **Magnetoencephalography Laboratory**

Following a successful \$4 million fundraising campaign, the institute is establishing a magnetoencephalography facility within the Martinos Imaging Center. The equipment was ordered in fall 2009, construction began in early 2010, and the new lab is expected to be operational in early 2011. The lab will serve as a core facility for the local neuroscience research community and will support a wide range of studies on human brain function in health and disease.

## **Viral Vector Core Facility**

This core facility was established jointly by the Picower Institute for Learning and Memory and the McGovern Institute for Brain Research in 2008 as a shared resource for the local neuroscience community. The McGovern Institute has taken over the administrative responsibility for operating this core as of October 2009.

## McGovern Institute Neurotechnology Program

The McGovern Institute Neurotechnology Program (MINT) provides seed funding for collaborations between McGovern labs and researchers from other disciplines, with a focus on developing new technologies for brain research. MINT-funded collaborations have led to several publications within the reporting period and have also led to several larger funding awards that were enabled by pilot data obtained through MINT funding.

## Communications

The McGovern Institute produced a video about the institute made by John Rubin Productions. The video has been widely viewed and won two industry awards, a Telly Award and a CINE award. We also redesigned the institute's website and created a new communications database.

## Awards and Honors

Yingxi Lin was named a John Merck scholar in June 2010. Tomaso Poggio was awarded the Okawa prize in October 2009 for his work on computational neuroscience. In December 2009 Professor Poggio was also named a fellow of the American Association for the Advancement of Science. Aaron Andalman, a student in Michale Fee's lab, was awarded the 2009 Capranica Foundation Neuroethology Prize for his research on the neural control of birdsong. Robert Desimone won the 2010 Helmholtz Award from the International Neural Network Society for his contributions to the understanding the neural basis of perception.

## Major Research Publications During the Reporting Period

H. Robert Horvitz's lab identified a new class of receptors for monoamine neurotransmitters. *Science*, July 2009.

Michale Fee and colleagues identified two distinct circuits that contribute to trial and error learning in songbirds. *Proceedings of the National Academy of Sciences (PNAS)*, July 2009.

Nancy Kanwisher and colleagues demonstrated plasticity in the human visual cortex within a few seconds following temporary occlusion of a patch of visual field. *The Journal of Neuroscience*, July 2009.

Emilio Bizzi and colleagues showed that motor impairments in stroke patients can be understood as impairments in specific combinations of muscle activity, known as synergies. *PNAS*, October 2009.

Ann Graybiel's lab identified a population of neurons in primate cortex that represent elapsed time with millisecond-level precision. *PNAS*, October 2009.

Edward Boyden's lab demonstrated a new optogenetic tool: a light-activated ion pump that can be used to silence neurons with light. *Nature*, January 2010.

Nancy Kanwisher and colleagues demonstrated that face recognition ability is inherited separately from IQ. *Current Biology*, January 2010.

Ann Graybiel and colleagues found that morphology of human basal ganglia can predict ability to learn video games. *Cerebral Cortex*, January 2010.

Alan Jasanoff and colleagues described a new class of MRI sensor for the neurotransmitter dopamine. *Nature Biotechnology*, February 2010.

Nancy Kanwisher's lab described a new fMRI-based method for localizing language function in the human brain. *Journal of Neurophysiology*, April 2010.

Michale Fee and colleagues demonstrated a high degree of parallelism between song learning structures in birds and mammalian basal ganglia. *Journal of Neurophysiology*, June 2010.

Tomaso Poggio and colleagues presented a new computational model to describe how visual attention contributes to object recognition. *Vision Research*, June 2010.

Ann Graybiel's lab identified two distinct basal ganglia circuits that contribute differently to habit learning. *Neuron*, June 2010.

**Robert Desimone**

**Director**

**Doris and Don Berkey Professor of Brain and Cognitive Sciences**

More information about the McGovern Institute for Brain Research can be found at <http://mcgovern.mit.edu/>.