McGovern Institute Neurotechnology (MINT) program funds three new projects

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Julie Pryor
McGovern Institute for Brain Research

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The McGovern Institute for Brain Research at MIT today announced three new collaborative funding awards as part of the McGovern Institute Neurotechnology (MINT) program. The goal of this program is to promote the development of innovative new technologies for neuroscience research and therapeutic applications. MINT awards are typically up to $100,000 for one year.

One MINT award will support a collaboration between Ed Boyden in the MIT Media Lab and Clif Fonstad in the Department of Electrical Engineering and Computer Science to develop new devices for optical control of neural activity. Boyden, an associate member of the McGovern Institute, has been a pioneer in the development of optogenetics, a technology in which light-sensitive ion channels are expressed in target neurons, allowing their activity to be controlled by light. The approach has great promise for research and clinical applications, but to take full advantage of this potential, better methods are needed for delivering bright light to target neurons within the brain. Fonstad, an expert on optoelectronics, plans to work with Boyden to build miniature implantable devices that can deliver light to precise locations deep within the brain and record electrical activity at the same target locations. If successful, this approach could open the door to a new generation of therapies based on light activation of specific brain circuits.

The second project is a collaboration between Ann Graybiel at the McGovern Institute and Michael Cima in the MIT Department of Materials Science and Engineering. Their goal is to make a device that combines a recording electrode with a precise drug-infusion system, allowing researchers to record electrical responses to pulses of drugs within the brain. Cima, an expert on the design of medical devices, will work with Graybiel to develop a fluid-handling system that will allow rapid and precise control of drug release from different reservoirs, and that can be implanted chronically into the brain. Graybiel hopes to use the resulting system to characterize different compartments within the striatum, a brain structure that is implicated in reward, motivation and substance abuse. In the longer term, the method should also be applicable to clinical drug delivery, by allowing rapid monitoring of a drug's effect on the brain.

The third project aims to develop a system for the automatic classification of animal behaviors. Tomaso Poggio of the McGovern Institute and his postdoc Thomas Serre have recently developed a computer system that can learn to recognize different actions, using strategies similar to those used by the brain. Their system has many potential applications, but the possibility of recognizing animal behaviors is especially important for neuroscience, for instance as a way to evaluate mouse behavioral mutants or to test the effects of drugs. The new MINT award will support scaling up of the initial prototype to create a working system that will be tested in four different labs at the McGovern Institute and the Broad Institute. The ability to recognize and quantify behaviors automatically would greatly accelerate many aspects of behavioral research and drug discovery for behavioral disorders. (A demonstration can be viewed on TechTV here)

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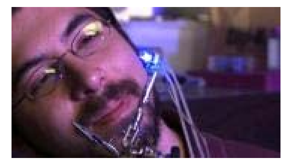

Ed Boyden holding his most recent optogenetic device; an array of optical elements that can turn on and off individual neurons in sixteen different points with the brain.
Credits - Courtesy of the McGovern Institute

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