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White House Event to Feature Neurotechnology Architecting Network Leaders from MIT

Self-organizing network of innovators commits to developing a dozen new neurotechnologies

On September 30, 2014, the White House is hosting a BRAIN Initiative Conference to highlight commitments, investments, and progress by the Federal government, private sector companies, universities, and non-profit organizations to develop technologies to radically accelerate our understanding of the brain. In 2013, four MIT researchers were invited to the White House BRAIN Initiative launch, whose goal is to "accelerate the development and application of new technologies that will enable researchers to produce dynamic pictures of the brain that show how individual brain cells and complex neural circuits interact at the speed of thought."

One such organization highlighted in this year's BRAIN Conference is the Neurotechnology Architecting Network, a self-organizing and rapidly growing network of scientists and engineers coming together to develop tools for understanding how the brain works. To date, members of the network have generated new robots, molecules, microscopes and methods for analyzing the brain, as well as new startup companies. This distributed network transcends traditional institutional boundaries to systematically roadmap and rapidly design, prototype, assess, and distribute core technologies for mapping, recording, and safely repairing neural circuitry.

Many of the collaborations were initiated through seed funding from the McGovern Institute Neurotechnology (MINT) program, created in 2006 to support collaborations between neuroscientists and researchers from other disciplines within and beyond MIT for the purpose of developing new tools and platform technologies for brain research. Directed by Charles Jennings, the MINT program is built on the shared goal of technical innovations that will help to transform the future of neuroscience and medicine. With support from the Institute's founding donors Patrick and Lore Harp McGovern, the MINT program provides seed funding for over thirty collaborative projects in diverse fields including genetic methods for optical recording of neural activity and new electrodes and electronic systems for neural prosthetic devices. MINT awards are typically made for a one-year period, and can provide up to $100,000 in direct costs. To be eligible for consideration, projects must involve collaboration between a McGovern faculty member and researchers from outside the McGovern Institute.

The network also seeks to engage and stimulate neurotechnology development in the for-profit sector. Since 2007, MIT Instructor Joost Bonsen and MIT Professor Ed Boyden have co-taught a course called Neurotechnology Ventures with the MIT Media Lab and Sloan School of Management. This seminar focuses on envisioning, launching, and maturing start-ups that are commercializing innovations from neuroscience and neuroengineering. Topics include neuroimaging, diagnostics, motor rehabilitation, novel scientific tools, and novel therapeutics including neuropharmaceuticals, neuromodulation, neuroprosthetics, regenerative medicine, and more. Each class is devoted to a specific topic area, exploring issues from deeply technical breakthroughs through development of transformative market opportunities. Working in small groups, graduate students prepare an executive business plan summary for a new neurotechnology start-up. Startups who have participated or are participating in the Ventures course and Neurotechnology Architecting Network include Kendall Research Systems, LeafLabs, Neuromatic Devices, and 3Scan.

The network already extends far beyond MIT. "Key to the success of these collaborations is 'architecting,' our strategy for working backwards from a major scientific goal, and surveying all the possible engineering solutions. We then rapidly prototype new tools that aim to reveal the fundamental underpinnings of brain operation at a ground-truth level," says Ed Boyden.

"Our ambitious, omnidisciplinary technical goals require strategic collaborations with innovators that transcend discrete, physical institutions," says Desiree Dudley, Director of Neurotechnology Partnerships. "We discover, create, and disseminate new tools and technologies through non-profits and companies in a 'neurotech valley' that is transformatively distributed."

MIT research scientist Adam Marblestone, who led the collaborative creation of one of our technology's roadmaps, states, "We are all unified in our shared goals - to revolutionize our fundamental understanding of the brain, and deeply improve human health."

More information about the Neurotechnology Architecting Network can be found at http://neuroarchitecting.org.

Person/Organization: Edward Boyden
Research Group/Program: Synthetic Neurobiology
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