

**Brain Research through Advancing Innovative Neurotechnologies® (BRAIN)  
Multi-Council Working Group (MCWG) Meeting  
August 20, 2019**

The NIH BRAIN Initiative [Multi-Council Working Group \(MCWG\)](#), which works to ensure a coordinated and focused effort on BRAIN across NIH and provides ongoing oversight of the long-term scientific vision of the BRAIN Initiative, met on August 20<sup>th</sup> and was presented with a series of updates from the NIH, the [Neuroethics Working Group \(NEWG\)](#), the Defense Advanced Research Projects Agency (DARPA), and the National Science Foundation (NSF).

In opening remarks, Walter Koroshetz, M.D., NINDS Director, welcomed the following new MCWG members: **Hollis Cline, Ph.D.**, Chair and Hahn Professor of Neuroscience at The Scripps Research Institute, La Jolla, CA; **Alfred Emond, Ph.D.**, Program Manager at DARPA, Arlington, VA; **David Holtzman, M.D.**, Professor and Chair of Neurology at Washington University School of Medicine, St. Louis, MO; and **Yael Niv, Ph.D.**, Professor at Princeton University, Princeton, New Jersey.

Dr. Koroshetz gave an update on the Advisory Committee to the Director (ACD) BRAIN Initiative Working Group 2.0 (BRAIN WG 2.0) and BRAIN Neuroethics Subgroup (BNS). Each working group presented their reports to the NIH Director, Dr. Francis Collins, and the ACD in June 2019. The reports are being finalized with NIH staff, based on ACD feedback. The draft reports and video of the presentations are available on the NIH ACD website: <https://acd.od.nih.gov/meetings.html>. The BRAIN WG 2.0 and BNS are separate from the MCWG and NEWG and their ongoing meetings and input.

Dr. Koroshetz mentioned how the NIH BRAIN Initiative is continuously trying to improve diversity. For instance, using [data from the NSF National Center for Science and Engineering Statistics](#), NIH has been able to include women as an underrepresented category in its BRAIN Initiative Advanced Postdoctoral Career Transition Award to Promote Diversity (K99/R00; [PAR-18-813](#) and [PAR-18-814](#)). Further, NIH held a BRAIN scientific session at the 2018 Annual Biomedical Research Conference for Minority Students ([ABRCMS](#)) and will hold scientific panel sessions at the upcoming Society for Advancement of Chicanos/Hispanics and Native Americans in Science ([SACNAS](#)) and Society of Women Engineers ([SWE](#)) meetings. Dr. Koroshetz also announced BRAIN Initiative related events that are planned for the upcoming annual Society for Neuroscience meeting in October 2019, including the [BRAIN Initiative Alliance social](#). He highlighted this year's [Presidential Early Career Awards for Scientists and Engineers \(PECASE\) recipients](#) who are researchers and scientific administrators contributing to BRAIN. Finally, he described several BRAIN-funded research articles including one, [published in Nature](#) from [Edward F. Chang, M.D.](#), University of California, San Francisco, which showed that it was possible to synthesize speech from brain signals. The technology may one day be used to help paralyzed patients speak again.

Henry T. (Hank) Greely, J.D., Director for Law and Biosciences, Stanford University, CA, gave an update on the NEWG, who are a group of experts in neuroethics and neuroscience that serves to provide the NIH BRAIN Initiative with input relating to neuroethics. Greely highlighted an article published in *Neuron* by the NEWG earlier in the year describing how neuroethics is integrated into the NIH BRAIN Initiative ([Ramos et al., 2019](#)). He described the consultation the NEWG provided to Nenad Sestan, M.D., Ph.D., Yale School of Medicine, who recently published a [BRAIN-funded article in Nature describing BrainEx](#), a system for preserving post-mortem brain tissue. Greely described research being conducted by [NIH BRAIN neuroethics grantees](#) and reminded the group that the NEWG is available to field neuroethics questions from MCWG members and BRAIN grantees.

Dr. Emondi gave an update on DARPA's contribution to the BRAIN Initiative by highlighting the following programs:

- Hand Proprioception and Touch Interfaces ([HAPTIX](#)), which is "pursuing key technologies to enable precision control of and sensory feedback from sensor-equipped upper-limb prosthetic devices."
- Next-Generation Nonsurgical Neurotechnology ([N<sup>3</sup>](#)), which "aims to develop high-performance, bi-directional brain-machine interfaces for able-bodied service members."
- Neural Engineering System Design ([NESD](#)), which "seeks to develop high-resolution neurotechnology capable of mitigating the effects of injury and disease on the visual and auditory systems of military personnel."
- Intelligent Neural Interfaces ([INI](#)), which "is soliciting proposals to establish the proof of concept prototype for third-wave artificial intelligence methods that could improve and expand the application space of next-generation neurotechnology."

Sri Raghavachari, Ph.D., Program Director, NSF, presented an update on NSF's activities. He highlighted NSF's emphasis on infrastructure and international, cross-disciplinary collaborations and gave a short summary of the following programs: Next Generation Networks for Neuroscience ([NeuroNex](#)); Collaborative Research in Computational Neuroscience ([CRCNS](#)); Integrative Strategies for Understanding Neural and Cognitive Systems ([NCS](#)); and Cyberinfrastructure for Biological Research ([CIBR](#)).

Bruce J. Tromberg, Ph.D., Director of the NIH's National Institute of Biomedical Imaging and Bioengineering ([NIBIB](#)) gave a presentation on the growing importance of bioengineering in medicine and summarized NIBIB's role in the NIH BRAIN Initiative. He emphasized that NIBIB is helping researchers develop better computational models for optimizing both current and future technologies.

[Dr. Yael Niv](#) presented a summary of her latest research exploring the role of orbitofrontal-hippocampal neural activity patterns in human decision-making. This work is also described in her [recent article in Science](#).

Olivier Berton, Ph.D., Health Scientist Administrator at the National Institute on Drug Abuse and NIH BRAIN Team A Co-Lead, gave an overview of the team's portfolio. Team A oversees two [NIH BRAIN priority areas](#) (outlined in the [BRAIN 2025 report](#)): 1. *Cell Type/Discovering Diversity*: Identify and provide experimental access to the different brain cell types to determine their roles in health and disease; and 2. *Circuit Diagrams/Maps at Multiple Scales*: Generate circuit diagrams that vary in resolution from synapses to the whole brain. Douglas Kim, Ph.D., Health Scientist Administrator at the National Institute of Mental Health (NIMH) highlighted advances such as Designer Receptors Exclusively Activated by Designer Drugs (DREADDs) and multiplexed error-robust fluorescence in situ hybridization (MERFISH) as examples of the cutting-edge tools being developed, enhanced, and shared amongst researchers as part of the Team A portfolio. Yong Yao, Ph.D., Program Director, NIMH, gave an update on the large-scale coordinated projects, collectively known as the BRAIN Initiative Cell Census Network ([BICCN](#)), which aims to generate comprehensive 3D common reference brain cell atlases that will integrate molecular, anatomical, and functional data for describing cell types in mouse, human, and non-human primate brains.

The meeting proceeded with a closed session of the MCWG members and federal staff to discuss funding plans for FY19 awards. The next meeting will be held on January 31, 2020.