

**Brain Research through Advancing Innovative Neurotechnologies® (BRAIN)  
Multi-Council Working Group (MCWG) Meeting  
January 31<sup>st</sup>, 2020**

On January 31<sup>st</sup>, 2020, National Institutes of Health (NIH) Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative [Multi-Council Working Group \(MCWG\)](#) – which ensures coordinated and focused efforts across NIH and provides continuous oversight of the long-term scientific vision of the BRAIN Initiative – met to discuss goals for BRAIN 2.0 (*i.e.*, the second half of the initiative). NIH BRAIN Initiative leaders, the BRAIN Initiative [Neuroethics Working Group \(NEWG\)](#), [Intelligence Advanced Research Projects Activity \(IARPA\)](#), and the Department of Energy (DOE) provided updates and led discussions on current and potential future BRAIN activities.

[In opening remarks](#), Walter Koroshetz, MD, Director of the National Institute of Neurological Disorders and Stroke (NINDS) and co-chair of the MCWG, [welcomed John Ngai, PhD as the incoming director of the NIH BRAIN Initiative](#), who is expected to join NIH in March. Dr. Koroshetz then highlighted the success of the initiative, which has been enthusiastically supported by Congress and the NIH. He pointed out that the BRAIN Initiative is now faced with the challenge of ensuring continued productivity.

Dr. Ngai introduced himself as the new director of the NIH BRAIN Initiative. He summarized former leadership roles at the University of California, Berkeley, and involvement in the [BRAIN Initiative Cell Census Network \(BICCN\)](#). Dr. Ngai then provided an update on [BRAIN 2.0](#) and discussed his shared vision for the future of the NIH BRAIN Initiative. He outlined strategic goals, such as leveraging advances from BRAIN to enable neuroscience discovery, promoting disease-focused projects, democratizing technologies for scientific and clinical use, and enhancing diversity. Dr. Ngai also touched on more immediate goals, including reviewing the [BRAIN 2.0 Neuroscience](#) and [Neuroethics](#) reports with various stakeholders to identify and implement ‘big idea’ projects. As one of these stakeholders, Dr. Ngai then led the MCWG in a discussion on BRAIN 2.0 goals and challenges. The MCWG identified democratizing technologies and associated costs as major hurdles. They deliberated ways in which the BRAIN Initiative could disseminate tools in a cost-effective manner, including by promoting partnerships with industry and encouraging the use of open-source tools and technologies. Dr. Ngai proposed that workshops may be an avenue for the neuroscience community to provide input into tool dissemination.

David Markowitz, PhD, program manager at IARPA, gave an update on IARPA’s contributions to the BRAIN Initiative on neural circuit mapping. Dr. Markowitz highlighted the Machine Intelligence from Cortical Networks ([MICrONS](#)) project, which “seeks to revolutionize machine learning by reverse engineering the algorithms of the brain.” He summarized the scientific discoveries enabled by MICrONS, including advancements in large-scale functional connectomics, automated circuit reconstruction from structural imaging data, and several others. Looking ahead, Dr. Markowitz concluded by emphasizing the need for data sharing and storage, tool development, and infrastructure development to maximize the value of the expansive datasets created by MICrONS and similar computational neuroscience projects.

Chris Fall, PhD, Director of the DOE’s Office of Science, presented DOE activities related to the BRAIN Initiative. He gave an overview of ongoing NIH collaborations with the DOE and proposed ways in which DOE could work with the BRAIN Initiative in the future. Dr. Fall and meeting participants suggested that the DOE could facilitate ongoing and future BRAIN efforts in data integration and sharing, infrastructure development, and large-scale human brain mapping.

Henry T. (Hank) Greely, JD, Director for Law and Biosciences at Stanford University and NEWG co-chair, gave an update on the BRAIN Initiative NEWG, a group of experts in neuroethics and neuroscience that

provides the NIH BRAIN Initiative with input regarding neuroethics research and considerations. Dr. Greely highlighted a review article by the NEWG published in [JAMA Neurology](#) describing key ethical challenges surrounding human research with neural devices. He then summarized the [NEWG meeting the day prior](#), where members considered priorities to take on from the BRAIN 2.0 Neuroethics report. He noted that data privacy and non-human primate research were big topics. Further, he mentioned that the NEWG consulted about a grant application involving invasive neural devices in humans. He also summarized talks on first-in-human trials, including one on findings from a [BRAIN Initiative project using brain-computer interfaces](#) and another about FDA neural device regulations. Lastly, Dr. Greely reminded the group that the NEWG is available for consult on neuroethics questions from the MCWG and BRAIN grantees.

Susan Weiss, PhD, Director of the Division of Extramural Research at the National Institute of Drug Abuse (NIDA) and the MCWG Designated Federal Official, introduced [David Holtzman](#), MD, from the Washington University School of Medicine in St. Louis, as a new MCWG member. He presented findings from his recent translational work on sleep and Alzheimer's disease. In summary, Dr. Holtzman and his research team discovered a relationship between altered sleep patterns and Alzheimer's disease pathology. These findings were recently published in [Science](#) and [Science Translational Medicine](#).

Theresa Cruz, PhD, Acting Director of the National Center for Medical Rehabilitation Research (NCMRR) at the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) and BRAIN Team B co-lead, gave an overview of the team's portfolio. Team B helps to oversee primarily two of the [BRAIN Initiative priority areas](#): 1. *Monitor Neural Activity/The Brain in Action*: Produce a dynamic picture of the functioning brain by developing and applying improved methods for large scale monitoring of neural activity., and 2. *Interventional Tools/Demonstrating Causality*: Link brain activity to behavior by developing and applying precise interventional tools that change neural circuit dynamics. Dr. Cruz summarized the team's vision for tool development, optimization, and dissemination, and highlighted new tools developed/optimized by BRAIN-funded scientists, including fully 3D printed multi-electrode arrays, implantable micro-coils for magnetic stimulation, GPCR-based neurotransmitter sensors, and others. She also touched on the BRAIN priority area, *Human Neuroscience/Advancing Human Neuroscience*, which strives to develop innovative technologies to understand the human brain and treat its disorders. Dr. Cruz discussed neuroethics collaborations and scientific advancements, such as [a neural implant used to restore vision to blind people](#). She also discussed strategies to promote BRAIN Initiative [public-private partnerships](#).

Greg Farber, PhD, Director of the Office of Technology Development and Coordination at the National Institute of Mental Health (NIMH) and BRAIN Coordinating Team co-lead, provided a synopsis of FY19 BRAIN Initiative applications and awards. Dr. Farber discussed the BRAIN Initiative's efforts to fund new and early stage investigators and summarized the characteristics of awardees. He noted that 75% of BRAIN performance sites come from 11 states (CA, MA, NY, PA, TX, MD, NC, IL, WA, MI, and MN), with the highest numbers in California, New York, and Massachusetts. MCWG members suggested targeted outreach to academic departments and research institutions in states that have active neuroscience funding from NIH but are not as involved in the BRAIN Initiative (e.g., FL and OH).

Next, Devon Crawford, PhD, Health Scientist Administrator at NINDS, presented an overview of FY14-19 BRAIN Initiative demographics. Dr. Crawford discussed several recent BRAIN Initiative diversity efforts, such as outreach at conferences hosted by organizations that promote diversity in STEM (e.g., the Annual Biomedical Research Conference for Minority Students (ABRCMS), the Society for Advancing Chicanos/Hispanics and Native Americans in Science (SACNAS), and the Society for Women Engineers (SWE)). She also mentioned diversity efforts at the level of BRAIN funding. For instance, the [BRAIN Initiative Advanced Postdoctoral Career Transition Award to Promote Diversity K99/R00](#) promotes

retention and advancement of women, underrepresented racial and ethnic groups, and individuals with disabilities. Further, Dr. Crawford highlighted goals of the new NIH BRAIN Initiative Diversity Working Groups and mentioned potential plans to promote diversity and outreach efforts. Meeting participants discussed ways to encourage women to collaborate, attract more diverse award applicants, and make current funding mechanisms well-known for underrepresented minorities, women, and individuals with disabilities, particularly at the postdoctoral and junior faculty level.

The meeting proceeded with a closed session of the MCWG members and federal staff to discuss funding plans for FY20 awards. The next MCWG meeting will be held on May 22, 2020.