

**Brain Research Through Advancing Innovative Neurotechnologies® (BRAIN)
Multi-Council Working Group (MCWG) Meeting
January 25th, 2022**

On January 25, 2022, the National Institutes of Health (NIH) *Brain Research Through Advancing Innovative Neurotechnologies®* (BRAIN) Initiative [Multi-Council Working Group \(MCWG\)](#) met virtually to discuss the current state of the BRAIN Initiative and a new concept for funding.

In [opening remarks](#), John Ngai, PhD, Director of the NIH BRAIN Initiative and chair of the MCWG, welcomed the new working group members, Ted Abel, PhD, at the University of Iowa, John Maunsell, PhD, at the University of Chicago, and Tirin Moore, PhD, at Stanford University. Dr. Ngai also introduced two new *ex officio* MCWG members, Michelle Elekonich, PhD, at the National Science Foundation, and Katrina Gwinn, MD, FAAN, at the United States Food and Drug Administration. Next, he discussed the BRAIN budget through fiscal year 2026, noting the \$100 million increase in Congressionally appropriated funds for fiscal year 2021. Dr. Ngai emphasized that this funding increase helped launch three transformative projects outlined in the [BRAIN 2.0](#) report: 1) Organizing Resources for Brain Cell Type Access and Manipulation Across Species (cell type-specific armamentarium); 2) Phase III Brain Cell Census (parts list); and 3) Next-Generation Technologies for Brain Microconnectivity Analysis (wiring diagrams). Next, he updated the group on current efforts to advance scientific excellence through inclusivity by highlighting a [recent publication](#) on this topic¹, new funding opportunities, the Plan for Enhancing Diverse Perspectives ([PEDP](#)), and other activities. He also highlighted the BRAIN Initiative Alliance [Toolmakers' Resources page](#) and BRAIN Initiative Workspace to Organize the Knowledge Space (BRAINWORKS), a project aimed to develop a web application that uses artificial intelligence to organize emerging neuroscience literature. Lastly, Dr. Ngai summarized a [recent commentary](#) in *Cell* on the three BRAIN 2.0 transformative projects² and updated the group on progress made so far, including [creating a comprehensive brain cell atlas](#) of the mammalian cortex, the first major BRAIN Initiative Cell Census Network ([BICCN](#)) milestone. He also mentioned a recent scientific advancement in engineering new reagents to systemically deliver genes to the brains of rodents and non-human primates. Dr. Ngai detailed the 10-year strategy for mapping brain connectivity across scales, including goals and anticipated funding opportunities for establishing comprehensive centers, smaller tool development projects, and data coordination efforts.

The meeting continued with an update on the NIH BRAIN Neuroethics Working Group (NEWG) activities by Henry (Hank) T. Greely, JD, Director of Law and Biosciences at Stanford University and co-chair of the NEWG. Dr. Greely started off by thanking Khara Ramos, PhD, for her service as Director of the NIH Neuroethics Program. Next, he summarized NEWG presentations and discussions from the day prior, which focused primarily on ethical challenges in neural device implantation in human research participants through a panel discussion. Dr. Greely highlighted a recent [viewpoint article](#) in *Neuron* on this topic³. As for next steps, he mentioned that the NEWG plans to continue discussions on ethical issues in neural implant research in humans, especially in the context of long-term, invasive studies. Lastly, Dr. Greely reminded the group about two upcoming NEWG workshops; one focused on post-trial responsibilities and another on data sharing. Dr. John Ngai pointed out that bringing together MCWG and NEWG members is incredibly valuable in identifying key issues and future directions in the field of neuroscience and its workforce.

¹ Richardson, R. R., Crawford, D. C., Ngai, J., & Beckel-Mitchener, A. C. (2021). Advancing scientific excellence through inclusivity in the NIH BRAIN Initiative. *Neuron*, 109(21), 3361-3364.

² Ngai, J. (2022). BRAIN 2.0: Transforming neuroscience. *Cell*, 185(1), 4-8.

³ Feinsinger, Ashley et al. "Ethical commitments, principles, and practices guiding intracranial neuroscientific research in humans." *Neuron* vol. 110,2 (2022): 188-194.

Following the NEWG update, the group discussed a concept for future funding. Shumin Wang, PhD, Program Director at the National Institute of Biomedical Imaging and Bioengineering (NIBIB) and Director of the NIBIB program in Magnetic Resonance Imaging and in Magnetic, Biomagnetic and Bioelectric Devices in the Division of Applied Science and Technology, introduced a concept on an initiative to support multi-disciplinary, synergistic approaches to develop non-invasive brain functional imaging technologies. Dr. Wang summarized main findings from two recent workshops and a request for information on non-invasive imaging, including developing completely new modalities for brain functional imaging and improving the resolution of current technologies (i.e., MEG, PET, fMRI). For example, he noted potential opportunities in funding machine learning and model-based techniques, building new integrative systems capable of collecting brain data across scales, and several others. Based on these findings, the goal of this concept is to support multi-disciplinary approaches that bridge the gap between scales by taking research community recommendations into consideration and encouraging out-of-the-box thinking to fuel development. Dr. Wang also proposed building a consortium composed of non-invasive imaging investigators from across fields of study and organizing annual meetings and working groups to ensure cross-pollination of research ideas.

In response to Dr. Wang's proposal, MCWG and NEWG members emphasized the importance of improving whole-brain imaging and moving emerging integrative technologies, such as optics and acoustics, from animal models into humans. They also noted anticipated challenges in reviewing or evaluating innovative, out-of-the box proposals and possible difficulties in advancing projects from proof-of-concept to first-in-human, especially within five years. Given these challenges, the group emphasized the importance of the review criteria for proof-of-concept phases of proposals. They also recommended funding the development of technologies capable of imaging beyond the central nervous system. Finally, they recommended including ways to engage non-neuroscientists, such as engineers and computer scientists, and to integrate neuroethics into the concept.

The meeting proceeded with a closed session of the MCWG members and federal staff to discuss funding plans for several fiscal year 2022 awards. The next MCWG meeting will be held on Monday, May 16, 2022, and a [videocast](#) will be available for live viewing and archived.