***Brain Research Through Advancing Innovative Neurotechnologies*® (BRAIN)**
Multi-Council Working Group (MCWG) Meeting
February 13, 2024

On February 13, 2024, 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 updates from the BRAIN Neuroethics Working Group (NEWG) and other BRAIN Initiative partners.

In opening remarks, Susan Weiss, PhD, Designated Federal Official of the MCWG, welcomed meeting participants and introduced new MCWG members, Dan Merfeld, PhD, Ohio State University, who will serve as the National Institute on Deafness and Other Communication Disorders (NIDCD) representative; Alyssa Picchini Schaffer, PhD, Simons Foundation, who will serve as the BRAIN Initiative Alliance representative; and Lt. Col. Adam Willis, MD, PhD, Defense Advanced Research Projects Agency (DARPA), who will serve as the DARPA federal *ex officio* member. She thanked Dan Sanes, PhD, New York University; Amy Bernard, PhD, The Kavli Foundation; and Gopal Sarma, MD, PhD, DARPA, for their service to the MCWG.

Next, Nita Farahany, PhD, JD, Director of the Duke Initiative for Science and Society and NEWG Co-Chair summarized the February 12, 2024, NEWG meeting. The first session of the NEWG meeting focused on the potentially unique ethical considerations of pediatric neurostimulation; clinicians and ethicists discussed protecting children *through* research rather than *from* research by designing clinical trials that are more inclusive of and of benefit to children. Many of the issues explored during the session may not be unique to pediatric neurostimulation research, but the discussion raised unresolved issues that may warrant further exploration. During the second session of the meeting, researchers presented emerging neuroethics research opportunities. These opportunities may include how clinical interventions can shift or restore a patient's sense of personal identity, how generative AI has advanced to catalyze re-visiting the limitations and safeguards of functional magnetic resonance imaging (fMRI) decoding technology, and the factors that shape decisions and priorities in neurotechnology research and commercialization.

John Ngai, PhD, Director of the NIH BRAIN Initiative and Chair of the MCWG, then summarized the BRAIN project team structure and budget. Since 2014, the BRAIN Initiative has invested more than $3 billion to fund more than 1,300 projects. Dr. Ngai acknowledged researchers affiliated with the BRAIN Initiative who had been elected to the National Academy of Medicine, elected to the National Academy of Engineering, and received the National Medal of Science. He highlighted the recent National Eye Institute (NEI) Visual NeuroPlasticity Workshop, as well as the upcoming 10th Annual BRAIN Initiative Conference and Allen Institute Modeling Software Workshop. Dr. Ngai also presented an update on the BRAIN Initiative Cell Atlas Network and shared current funding opportunities and notices. Finally, he highlighted new scientific findings and developments from the BRAIN Initiative: (1) a series of articles outlining a complete cell atlas of the mouse brain;[1] (2) a series of articles characterizing cell types and their functions in human and nonhuman primate brains;[2] (3) use of an objective biomarker in management of personalized deep brain stimulation;[3] (4) development of next-generation red and

[1] Yao, Z., van Velthoven, C.T.J., Kunst, M. et al. (2023). A high-resolution transcriptomic and spatial atlas of cell types in the whole mouse brain. *Nature 624*, 317-332. https://doi.org/10.1038/s41586-023-06812-z
[2] Maroso, M. (2023). A quest into the human brain. *Science 382*, 166-167. https://doi.org/10.1126/science.adl0913
[3] Alagapan, S., Choi, K.S., Heisig, S. et al. (2023). Cingulate dynamics track depression recovery with deep brain stimulation. *Nature 622*, 130–138. https://doi.org/10.1038/s41586-023-06541-3

green dopamine sensors with increased sensitivity, selectivity, and signal to noise;[4] and (5) identification of the projections between the thalamus and paraventricular nucleus that underlie maternal oxytocin release in response to infant cries.[5]

Dr. Picchini Schafer updated the group on the Simons Foundation's neuroscience programs and initiatives. The Simons Neuroscience Collaborations on the Global Brain and Plasticity and the Aging Brain support and convene scientists to answer fundamental questions about brain function through collaborative research. Each Simons Collaboration is limited to 10 years; the Simons Foundation is reviewing 20 proposals for a new Collaboration to replace the Global Brain in July 2024. The Simons Foundation Autism Research Initiative (SFARI) aims to improve the understanding, diagnosis, and treatment of autism spectrum disorders (ASD) by funding innovative research, convening workshops and meetings, and developing high-quality resources for research and clinical use; SFARI also supports several early career grants focused on supporting trainees from historically underrepresented backgrounds. The four faculty at the Simon Foundation's Flatiron Institute Center for Computational Neuroscience are developing models, principles, and conceptual frameworks to deepen our knowledge of brain function in health and disease. Finally, The Transmitter is a publication focused on informing neuroscientists about developments across the field and forging connections within the neuroscience field; it includes scientist-written essays, columns, and op-eds about neuroscience research and culture, and the Synaptic podcast. There was robust discussion of the complementary missions of the Simons Foundation and BRAIN Initiative across the research ecosystem, as well as opportunities to learn from the Simons Foundation's leadership on platforms for data sharing, curation, and storage.

The next MCWG meeting will be held on May 14, 2024, and a video recording will be available for live viewing and archived.

[4] Zhuo, Y., Luo, B., Yi, X. et al. (2023). Improved green and red GRAB sensors for monitoring dopaminergic activity in vivo. *Nature Methods*. https://doi.org/10.1038/s41592-023-02100-w

[5] Valtcheva, S., Issa, H.A., Bair-Marshall, C.J. et al. (2023). Neural circuitry for maternal oxytocin release induced by infant cries. *Nature 621*, 788–795. https://doi.org/10.1038/s41586-023-06540-4