

EXECUTIVE OFFICE OF THE PRESIDENT  
**OFFICE OF SCIENCE AND TECHNOLOGY POLICY**  
WASHINGTON, D.C. 20502

May 2, 2016

Dear House and Senate Appropriations Committees:

This letter is submitted to report to the Committees on the activities of the Interagency Working Group on Neuroscience (IWGN) that was chartered under the National Science and Technology Council's (NSTC) Committee on Science. The charge of the IWGN is to "coordinate activities in neuroscience research across the Federal government, with a focus on the fundamental understanding of learning, brain development and plasticity, and brain health and recovery."

The IWGN is co-chaired by the Office of Science and Technology Policy (OSTP), the National Science Foundation (NSF), and the National Institutes of Health (NIH). It comprises more than 20 Federal departments and agencies with expertise in neuroscience research and with diverse missions that include funding, conducting, and utilizing research related to health, education, public safety, security, intelligence, defense, and more. Knowledge gained from the research supported by these Federal agencies can transform learning practices and help lead to new methods for prevention and treatment of dementia, Parkinson's disease, and mental illness, as well as recovery from traumatic brain injury and substance-abuse disorders.

In February 2014, the IWGN released a report entitled "Priorities for Accelerating Neuroscience Research Through Enhanced Communication, Coordination, and Collaboration," which identifies five priority areas for research, policy, and communication in the domain of neuroscience: (1) understanding and applying the brain's information-processing capabilities; (2) understanding and treating brain diseases, disorders, and trauma; (3) understanding and optimizing interactions between the environment and the brain across the lifespan; (4) translating research to practice; and (5) improving communication and engaging the public.

The following is a summary of recent activities supported by IWGN member agencies to address these goals.

Understanding Cognition

Consistent with the goals of understanding the brain's information-processing capabilities and understanding and treating brain diseases, disorders, and trauma, the IWGN and its member agencies have planned or initiated several activities and programs focused on understanding cognition and identifying ways to better assess cognitive function to support the development of treatments for disorders involving cognitive deficits.

In support of this goal, the Food and Drug Administration (FDA) held a public workshop, "Neurodiagnostics and Non-Invasive Brain Stimulation Medical Devices", on November 19-20, 2015. The focuses of the workshop were on cognitive-assessment medical devices to provide evaluation of cognitive function through non-invasive measurements and on non-invasive brain stimulation devices to improve or modify cognitive function. Through this workshop, the FDA obtained public input and feedback on scientific, clinical, and regulatory considerations associated with medical devices for assessing and influencing cognitive function.

A number of funding opportunities have also been developed by IWGN agencies with a focus on cognition. The “Machine Intelligence from Cortical Networks” (MICrONS) program, a new addition to the suite of neuroscience programs at the Intelligence Advanced Research Projects Activity (IARPA), seeks to reverse-engineer the algorithms of the brain to revolutionize machine learning. NSF has implemented the “Integrative Strategies for Understanding Neural and Cognitive Systems” (NSF-NCS) grant program to support transformative and integrative research that aims to accelerate understanding of neural and cognitive systems. NIH has released a funding announcement, “Temporal Dynamics of Neurophysiological Patterns as Potential Targets for Treating Cognitive Deficits in Brain Disorders,” to foster research on the rhythmic patterns of brain activity underlying cognition, and to promote using this knowledge to determine how new treatments could be developed for patients with nervous-system disorders by correcting aberrant brain activity—a novel approach to treatments for cognitive deficits.

### Promoting Data Sharing

A confluence of powerful new experimental methods and approaches has led to a rapid increase in the scale of neuroscience data collection, a larger diversity of systems and phenomena that can be studied, and the development of resources for analysis, modeling, experimentation, simulation, and integration across multiple studies and systems. How best to share, manage, and develop data and other resources for neuroscience remains unresolved, and as such, this has been a key topic of focus and discussion for the IWGN and its member agencies. IWGN member agencies have been active in this area and have initiated a number of programs to support the development of key data resources, including the development of the National Brain Observatory, led by NSF, and the NIH Big Data to Knowledge (BD2K) program.

In coordination with the IWGN agencies, NSF is planning a workshop, “Toward a Data and Resource Ecosystem for Neuroscience Discovery”, to be held in July 2016. The goal of the workshop is to develop a shared understanding of key challenges and opportunities in this rapidly developing landscape, and to develop coordinated strategies and priorities to best enable and capitalize on data and other resources. Participants will include government funders, members of the research community, and other enabling organizations. The workshop will focus on grants and other incentives to engage and promote neuroscience data sharing across the research community, strategies to increase the ease with which neuroscience data may be accessed and utilized, and ways to foster sustainability of shared data resources.

### Participating in the BRAIN Initiative

The IWGN has continued to support the coordination of activities and efforts to increase the ability of scientists to observe and understand brain function through the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. The 2015 re-charter of the IWGN included a new goal of facilitating interagency communications about ongoing efforts of the BRAIN Initiative. The five Federal agencies engaged in the BRAIN Initiative—the Defense Advanced Research Projects Agency (DARPA), FDA, IARPA, NIH, and NSF—have coordinated their efforts on the BRAIN Initiative to maximize Federal government investments through convening multiple meetings of investigators and program stakeholders in 2015.

**Federal Agency Efforts.** NIH continues to support a diverse set of BRAIN Initiative projects, including developing new devices to record and modulate activity in the human nervous system and revolutionizing human neuroimaging technologies to understand how individual cells and complex neural circuits interact in time and space. DARPA is focusing on leveraging brain-function research to alleviate the burden of illness and injury and provide novel, neurotechnology-based capabilities for military personnel and civilians alike. In addition, DARPA is working to improve researchers' abilities to understand the brain by fostering advancements in data handling, imaging, and advanced analytics. NSF aims to generate an array of physical and conceptual tools needed to determine how healthy brains function over the lifespan of an organism (including the human organism). NSF will also focus on the development and use of these tools to produce a comprehensive understanding of how thoughts, memories, and actions emerge from the dynamic actions of the brain. IARPA will focus on applying breakthroughs in neuroscience to advance understanding of cognition and computation in the brain. IARPA is also investing in efforts to test and validate non-invasive neural interventions that have the potential to significantly improve adaptive reasoning and problem solving. FDA will focus on enhancing the transparency and predictability of the regulatory landscape for neurological devices. FDA also plans to implement a new program that would speed the availability of certain medical devices that address unmet public-health needs while ensuring that patients receive high-quality, safe, and effective medical devices, including those that treat brain disorders.

**Stakeholder Engagement and Private-Sector Commitments.** Major foundations and private research institutions, including the Howard Hughes Medical Institute, Allen Institute for Brain Science, and the Kavli Foundation, as well as patient-advocacy organizations and universities, have committed over \$240 million to The BRAIN Initiative. In addition, members of the National Photonics Initiative Photonics Industry Neuroscience Group and other companies including GE, GlaxoSmithKline, and Inscopix have joined this effort through commitments of more than \$30 million for research and development.

**Meeting of Investigators and Stakeholders.** On March 27, 2015, OSTP and the IWGN coordinated a meeting of Program Officers and Program Managers from the five Federal agencies involved in the BRAIN Initiative. The convening also included representatives from private foundations and research institutes including: the stakeholders above; members of the National Photonics Initiative; and private companies including Google, GlaxoSmithKline, and Inscopix. In addition, representatives from the Department of Energy and the National Institute of Standards and Technology, two Federal agencies interested in the BRAIN Initiative, also participated in the event. Group discussions covered a broad array of topics, including data sharing, communications with all stakeholders, and cross-disciplinary collaborations.

In addition, IWGN member agencies participated in other BRAIN Initiative communication and outreach efforts, including the “BRAIN Initiative in 2015: Update and Outreach Town Hall” held on October 20, 2015 at the 2015 Society for Neuroscience Meeting, where they participated in an interactive discussion to update the neuroscience research community on BRAIN Initiative activities and opportunities. Additionally, the 2<sup>nd</sup> Annual BRAIN Initiative Investigators Meeting, which was held on December 10-11, 2015, featured NIH, NSF, DARPA, and IARPA

BRAIN Initiative awardees presenting the latest findings from Initiative-supported projects. The meeting included research highlights, as well as extended discussions of key areas such as data infrastructure and technology innovation.

Additional information on BRAIN Initiative activities can be found in the February 2016 fact sheet available at:

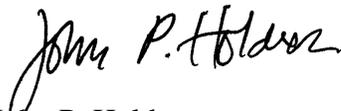
[https://www.whitehouse.gov/sites/default/files/microsites/ostp/brain\\_initiative\\_fy16\\_fact\\_sheet\\_ostp.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/brain_initiative_fy16_fact_sheet_ostp.pdf).

Additional information on the National Photonics Initiative BRAIN Initiative activities can be found in the fact sheet available at:

<https://spie.org/Documents/AboutSPIE/PDF/NPI%20BRAIN%20Fact%20Sheet%20final%20101614.pdf>

Thank you for the opportunity to share this update on the progress of IWGN activities. OSTP is pleased with the progress being made across the Federal Government on neuroscience research and looks forward to continued collaboration with stakeholders and the Congress in this important domain.

Sincerely,

A handwritten signature in black ink that reads "John P. Holdren". The signature is written in a cursive style with a large initial "J".

John P. Holdren  
Assistant to the President for Science and Technology  
Director, Office of Science and Technology Policy