White House Hosts Conference on BRAIN Initiative

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On September 30, the White House hosted a conference on President Obama's BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative. The Initiative is a large-scale effort to provide researchers with important insights to treat a variety of disorders, including Alzheimer's disease, schizophrenia, and traumatic brain injury, among others. Four agencies, the National Institutes of Health (NIH), the National Science Foundation (NSF), the Food and Drug Administration (FDA), and the Defense Advanced Research Projects Agency (DARPA), have together committed more than $110 million to the Initiative in FY 2014 (see Update, April 7, 2014, pg. 26).

The White House conference served as an opportunity for the Administration to highlight new federal and private sector commitments to the effort, including the FDA and the Intelligence Advanced Research Projects Activity (IARPA). The FDA's goal for the BRAIN Initiative is to enhance the transparency of the regulatory landscape for neurological medical devices. IARPA, which is located within the Office of the Director of National Intelligence and invests in high risk, high-payoff research surrounding the difficult challenges faced by the intelligence community, intends to use multidisciplinary approaches to advance understanding of cognition and computation in the brain. IARPA intends to support several applied research programs in this area. The conference also highlighted the participation of the Presidential Commission for the Study of Bioethical Issues in the Initiative.

National Institutes of Health

National Institute of Mental Health (NIMH) director Tom Insel noted that earlier in the day, the NIH announced the agency's first wave of investment, $46 million in FY 2014, in support of the Brain Initiative. The FY 2014 funding will allow more than 100 investigators (58 awards) in 15 states and several countries to work "to develop new tools and technologies to understand the neural circuit function and capture a dynamic view of the brain in action," according to the NIH. The NIH component of the BRAIN initiative is guided by its long-term scientific plan, *BRAIN 2025: A Scientific Vision*, which includes seven high-priority research areas and responds to the President's call to action:

1. Discovering diversity: Identify and provide experimental access to the different brain cell types to determine their roles in health and disease.
2. Maps at multiple scales: Generate circuit diagrams that vary in resolution from synapses to the whole brain.
3. 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.
4. Demonstrating causality: Link brain activity to behavior with precise interventional tools that change neural circuit dynamics.

5. Identifying fundamental principles: Produce conceptual foundations for understanding the biological basis of mental processes through development of new theoretical and data analysis tools.
6. Advancing human neuroscience: Develop innovative technologies to understand the human brain and treat its disorders; create and support integrated human brain research networks.
7. From BRAIN Initiative to the brain: Integrate new technological and conceptual approaches produced in Goals 1-6 to discover how dynamic patterns of neural activity are transformed into cognition, emotion, perception, and action in health and disease.

National Science Foundation

Joanne Tornow, deputy assistant director for NSF's Directorate for Social, Behavioral, and Economic Sciences (SBE), highlighted the agency's support of approximately $20 million in BRAIN-related projects. The projects include the recently awarded 36 Early Concept Grants for Exploratory Research (EAGER) to enable new technologies designed to better understand how complex behaviors emerge from the activity of brain circuits. "NSF has proposed to significantly increase our investments in new interdisciplinary and transdisciplinary research and workforce development, as well as exploration of brain-inspired technologies, novel materials and components, and advanced manufacturing techniques," said Tornow. The NSF also announced a new funding opportunity designed to support "transformative and integrative research to accelerate [the] understanding of neural and cognitive systems." NSF also declared its intention to expand its Industry/University Cooperative Research Centers (I/UCRC) program. The program is aimed at encouraging new industry-university partnerships as part of the BRAIN Initiative.

Presidential Commission for the Study of Bioethical Issues

Lisa Lee, executive director of the Presidential Commission for the Study of Bioethical Issues, an independent advisory panel, updated participants on its contributions to the Initiative. Specifically, Lee publicized the Bioethics Commission's progress and goals related to the President's request to review the ethical issues associated with the conduct and implications of neuroscience research. Part one of the Commission's two-part response, *Gray Matters: Integrative Approaches for Neuroscience, Ethics, and Society*, includes four recommendations for institutions and individuals engaged in neuroscience research:

1. Integrate ethics early and explicitly throughout research.
2. Evaluate existing and innovative approaches to ethics integration.
3. Integrate ethics and science through education at all levels.
4. Explicitly include ethical perspective on advisory and review bodies.

According to Lee, the next step for the Commission is consideration of the implications of neuroscience research and its applications more broadly, including the ethical issues raised across stages of life—from infancy through old age, and what neuroscience research might mean for the various affected communities. The Commission expects to hold at least one additional public meeting in November before concluding its deliberations and making a final set of recommendations.

Additional Support

The White House conference also highlighted major foundations and universities, including COSSA members, that are aligning more than $240 million of their research efforts, including:

- Carnegie Mellon University (CMU), which will spend $40 million over five years to increase collaboration among faculty from disciplines such as computer science and engineering with those taking biological and behavioral approaches to neuroscience. Linking brain science to behavior via the application of machine learning, statistics, and computational modeling will be a hallmark of CMU's efforts.
- The University of Texas System, which pledges $20 million over two years for equipment, faculty recruitment, and seed money in the form of peer-review grants for multi-institutional, collaborative, and research projects.
- The University of California, Berkley and Carl Zeiss Microscopy, which will spend $12 million to create infrastructure for neurotechnology development.
- Boston University, which pledged $4 million over five years to launch three neuroscience research centers focused on addressing the goals of the BRAIN Initiative.

More information regarding the conference is available here.