



## Obama Administration Proposes Doubling Support for The BRAIN Initiative

“So there is this enormous mystery waiting to be unlocked, and the BRAIN Initiative will change that by giving scientists the tools they need to get a dynamic picture of the brain in action and better understand how we think and how we learn and how we remember. And that knowledge could be -- will be -- transformative.”

- President Barack Obama  
April 2013

On April 2, 2013, President Obama launched the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, a Grand Challenge designed to revolutionize our understanding of the human brain. Under this initiative, Federal agencies such as the Defense Advanced Research Projects Agency (DARPA), the National Institutes of Health (NIH), the National Science Foundation (NSF), and the Food and Drug Administration (FDA) are supporting the development and application of innovative, new technologies that can create a dynamic understanding of brain function and its relationship to behavior. These scientific and technological advances could also lead to improvements in our ability to diagnose, treat, and even prevent diseases of the brain.

The President’s 2015 Budget proposes to double the Federal investment in The BRAIN Initiative from about \$100 million in FY 2014 to approximately \$200 million in FY 2015. Proposed investments by the NIH, DARPA, and NSF are described below.

Given the audacious goals of the initiative, the President has called for this to be an “all hands on deck” effort involving not only the Federal Government but also companies, health systems, patient advocacy organizations, philanthropists, state governments, research universities, private research institutes, and scientific societies. Later this year, the White House will hold an event to feature the role of these organizations in achieving the President’s bold vision.

**National Institutes of Health:** In FY 2015, NIH plans to expand its commitment to the success of The BRAIN Initiative, with an estimated \$100 million in funding from the agency. NIH will develop and apply new tools to map the circuits of the brain, measure the dynamic patterns of activity within those circuits, and understand how they create unique cognitive and behavioral capabilities. Ultimately, this fundamental knowledge is expected to revolutionize our understanding of complex brain functions and their links to behavior and disease.

A working group comprising top neuroscience experts will continue to inform the development of NIH’s multi-year, trans-NIH scientific plan for The BRAIN initiative. This plan will outline the ultimate vision for NIH’s role in The BRAIN Initiative, including specific measurable goals and timetables. Based on this group’s preliminary recommendations, NIH initial efforts are focusing on building a new arsenal of tools and technologies for studying the brain. This state-of-the-art “toolbox” will include a systematic inventory of all the different types of cells in the brain, targeted genetic and non-genetic approaches for accessing specific cells and circuits, new and better capabilities for recording from rapidly firing collections of neurons, and interdisciplinary approaches to understanding how brain circuits produce unique human functions. NIH is also charting the course for the next generation of non-invasive imaging techniques that can be used to explore human brain functions and behaviors in real time.

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The Opportunity, Growth, and Security Initiative proposed in the 2015 Budget would provide additional NIH funds for The BRAIN Initiative.

**Defense Advanced Research Projects Agency:** In FY 2015, DARPA plans to invest an estimated \$80 million to support The BRAIN Initiative. DARPA's investments aim to leverage 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' ability to understand the brain by fostering advancements in data handling, imaging, and advanced analytics.

In FY 2015, the Restoring Active Memory (RAM) effort will further develop memory prostheses as part of its larger effort to identify how memories are encoded in the brain during learning and skill acquisition, with the ultimate goal of accelerating warfighter recovery after traumatic brain injury. DARPA's neuro-adaptive technology efforts, like Systems-Based Neurotechnology for Emerging Therapies (SUBNETS), aim to create closed-loop medical devices able to measure and modulate networks of neurons in research participants with intractable psychiatric illness and alleviate severe symptoms of diseases like post-traumatic stress disorder and major depression. DARPA's neuroscience technologies program will create interfaces for handling and analyzing large datasets of neural data, allowing investigators to rapidly and transparently solve complex problems of computation, generate new models, and model the brain in multiple dimensions and spatiotemporal scales. New military medical imaging efforts will provide new discovery tools capable of understanding structures of the behaving brain at high resolution in a stable manner over multiple experiments and generate tremendous amounts of data regarding the functional and structural connections between regions of the brain. Finally, the Prosthetic Hand Proprioception and Touch Interfaces (HAPTIX) effort will develop human-ready implantable electronic microsystems that monitor and modulate information in motor and sensory fibers of peripheral nerves, enabling amputees to achieve advanced and intuitive control and sensory functions with prosthetic limbs.

**National Science Foundation:** In FY 2015, NSF plans to invest \$20 million to support The BRAIN initiative. To attain a fundamental scientific understanding of the complexity of the brain, in context and in action, NSF investments in The BRAIN Initiative are focused on generating an array of physical and conceptual tools needed to determine how healthy brains function over the lifespan of an organism, including humans. 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. NSF is prioritizing research in three areas where the agency's capacities are uniquely strong: integrative and interdisciplinary research; new theories, computational models, and analytical tools that will guide research questions and synthesize experimental data; and the development of innovative technologies and data infrastructure required to handle the large-scale datasets resulting from this research. Examples of investments that NSF has already made to support The BRAIN Initiative include a new \$25 million Science and Technology Center on "Brains, Minds and Machines" at the Massachusetts Institute of Technology and new Research Coordination Networks (RCNs) to organize the scientific community and increase collaboration.