

NIH Blueprint for Neuroscience Research

The NIH Office of the Director and these NIH Institutes and Centers participate in the NIH Blueprint for Neuroscience Research:

- NCATS
- NCCIH
- NEI
- NIA
- NIAAA
- NIBIB
- NICHD
- NIDA
- NIDCR
- NIEHS
- NIMH
- NINDS
- NINR
- OBSSR



U.S. Department of Health
and Human Services
National Institutes of Health

The Blueprint Mission

Over the past century, researchers have made breathtaking progress in understanding the anatomy, cell biology, physiology and chemistry of the brain. Yet many fundamental mysteries remain, including how brain function translates into mental function and why brain function declines with age. Recent advances in neuroimaging, genomics, computational neuroscience, engineering and other disciplines have put us on the brink of another great era in neuroscience, when we can expect to make transformative discoveries regarding brain function in health, aging and disease.

The NIH Blueprint for Neuroscience Research aims to accelerate these discoveries. The Blueprint is a collaborative framework that includes the NIH Office of the Director and the NIH Institutes and Centers that support research on the nervous system. By pooling resources and expertise, the Blueprint identifies cross-cutting areas of research and confronts challenges too large for any single Institute or Center. Since its inception in 2004, Blueprint has supported the development of new tools, training opportunities and other resources to assist neuroscientists. In 2009, the Blueprint Grand Challenges were launched to catalyze research with the potential to transform our basic understanding of the brain and our approaches to treating brain disorders.

Blueprint Grand Challenges

- The [Human Connectome Project](#) is an effort to map the connections of the healthy brain. It is expected to help answer questions about how genes influence brain connectivity, and how this in turn relates to mood, personality and behavior. The investigators will collect brain imaging data plus genetic and behavioral data from 1,200 adults. They are working to optimize brain imaging techniques to see the brain's wiring in unprecedented detail. Building on the success of the Connectome Project, in 2014 the Blueprint authorized funds to expand the age range of normal subjects to include both young people and older adults.
- The [Grand Challenge on Chronic Neuropathic Pain](#) supports research to understand the changes in the nervous system that cause acute, temporary pain to become chronic. The initiative has supported multi-investigator projects to partner researchers in the pain field with researchers in the neuroplasticity field.
- The [Blueprint Neurotherapeutics Network](#) is helping small labs develop new drugs for nervous system disorders. The Network provides research funding, plus access to millions of dollars worth of services and expertise to assist in every step of the drug development process, from laboratory studies to preparation for clinical trials. Project teams across the U.S. have received funding to pursue drugs for conditions from vision loss to neurodegenerative disease to depression.

The BRAIN Initiative®

During 2012 and 2013, the Blueprint Directors considered additional projects, including suggestions from both internal and external sources. Within the wider community beyond NIH there had also been recognition that recent technical advances have brought neuroscience research to a watershed moment. In 2013, attention turned to the newly launched [Brain Research through Advancing Innovative Neurotechnologies® \(BRAIN\) Initiative](#), a coordinated effort among public and private institutions and agencies aimed at revolutionizing our understanding of the human brain. NIH has a large role in this effort, and Blueprint was one of the inaugural sponsors for the initiation of the BRAIN Initiative by focusing a large portion of its funding in 2014 on the initial high priority research areas established by the NIH Advisory Committee to the Director BRAIN Working Group.

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Blueprint Resources

Since its inception in 2004, Blueprint has supported the development of new resources, tools and opportunities for neuroscientists. From fiscal years 2007 to 2009, Blueprint focused on three major themes of neuroscience - neurodegeneration, neurodevelopment, and neuroplasticity. These efforts enabled unique funding opportunities and training programs, and helped establish new resources that continue to be available to researchers and the general public today. These resources include the following:

- The **Blueprint Non-Human Primate Atlas** is an online database of gene expression in the rhesus macaque brain from birth to four years old. The atlas is publicly accessible and allows users to search for gene expression data by gene, brain region, and age. It is expected to aid research on human brain development and developmental disorders.
- The **Blueprint Resources Antibodies Initiative for Neurodevelopment (BRAINdev)** is funding the targeted manufacture and distribution of high quality monoclonal antibodies for neurodevelopment research, which are available from <http://neuromab.ucdavis.edu/>. A list of antibody targets in progress can be found under Current projects.
- The **Gene Expression Nervous System Atlas (GENSAT)** and the **Cre Driver Network** are projects that have developed, characterized and continue to distribute transgenic mouse lines (GFP reporters and Cre drivers) to serve as tools for research on the central nervous system. As of December 2014, over 100 lines are available from the Cre driver network and over 1400 (GFP and Cre) lines are available from GENSAT.
- The **Neuroimaging Informatics Tools and Resources Clearinghouse (NITRC)** triad of services include a resources registry, data commons, and cloud-based virtual machine with popular neuroimaging software pre-installed. These services help researchers save time, meet data sharing requirements, and leverage cloud-based computing on increasingly larger data sets.
- The **Neuroscience Information Framework (NIF)** is an online portal to neuroscience information that includes a customized search engine, a curated registry of resources and direct access to more than 100 databases.
- The **NIH Toolbox for Assessment of Neurological and Behavioral Function** is a set of integrated tools for measuring neurologic and behavioral function, and for generating data that can be used and compared across diverse clinical studies.
- Blueprint Training Programs help undergraduate and graduate students pursue interdisciplinary careers in neuroscience. Current programs focus on computational neuroscience and brain imaging.
- The **NIH Blueprint Enhancing Neuroscience Diversity through Undergraduate Research Experiences (ENDURE)** supports undergraduates from underrepresented groups in a two-year neuroscience research program and encourages matriculation into PhD programs.
- Blueprint Science Education Awards have supported the development of new approaches to teaching neuroscience – including K-12 instruction, museum exhibits, and web-based platforms.

The Future of the Blueprint

The Blueprint welcomes suggestions from the scientific, clinical and patient communities regarding initiatives that will advance the progress of neuroscience research. Workshop summaries, requests for information, new developments and specific initiatives are posted at www.neuroscienceblueprint.nih.gov.

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