NSF Neuroscience Opportunities
Support for brain-related research and education

U.S. National Science Foundation

The U.S. National Science Foundation (NSF) invests in research to understand the complex inner workings of the brain and to use this knowledge to develop technologies that improve people's lives and further the advancement of science. To yield these insights, NSF supports creative and integrative research across diverse areas of science and engineering.

Below is a non-exhaustive list of NSF funding opportunities that support areas of neuroscience and brain-related research. Opportunities with a specific focus on neuroscience and brain-related research include a short summary thereof. Other categories simply list relevant programs and have links to www.nsf.gov. Prospective investigators are encouraged to reach out to NSF program officers to discuss the program(s) that best fit their proposed work.

Opportunities with Specific Neuroscience/Brain-related Research Focus

These opportunities cover a wide range of neuroscience and brain-related topics, including Neural Mechanisms and Processes; Understanding Intelligence; Brain-Inspired Concepts and Design; Theory, Computation, Analysis, and Modeling of Brain Function; and Human Cognition and Behavior.

Algorithmic Foundations (AF)
Supports research on the theory of algorithms focused on problems that are central to computer science and engineering, and the development of new algorithms and techniques for analyzing algorithms and computational complexity.

Behavioral Systems
Supports integrative research on the behavior of individuals and groups of animals. Supports species-specific and comparative studies, as well as modeling and theoretical approaches.

Biomaterials
Supports research and education on biological, biomimetic, bioinspired and bioenabled materials, and on synthetic materials intended for applications where they will be in contact with biological systems.

Biomechanics and Mechanobiology (BMMB)
Supports fundamental research on biological mechanics across multiple scales, from subcellular to whole organism.

Biophotonics
Supports fundamental engineering research in areas of photonics relevant to solving critical problems in the fields of medicine, biology and biotechnology.

Biosensing
Supports fundamental research on the monitoring, identification and quantification of biological phenomena, with the potential to advance both engineering and the life sciences.

Cellular Dynamics and Function
Supports interdisciplinary research aimed at mechanistic understanding of the structure, function and evolution of cellular and subcellular systems across the tree of life.

Chemistry of Life Processes (CLP)

Supports experimental and computational research that uses innovations in chemistry to study the molecular underpinnings of biological processes.

Civil Infrastructure Systems (CIS)

Supports fundamental research focused on the design and management of infrastructure, such as transportation, power, water and pipelines. Projects will support the creation of smart, sustainable national and international communities.

Cognitive Neuroscience (CogNeuro)

Supports research aimed at increasing understanding of the neural mechanisms of human cognition, including attention, learning, memory, decision making, language, social cognition and emotions.

Collaborative Research in Computational Neuroscience (CRCNS)

Supports collaborative research projects and the sharing of data and other resources for the study of computational neuroscience.

Communications and Information Foundations (CIF)

Supports research on the theoretical underpinnings of information acquisition, transmission and processing in communications and information processing systems.

Communications, Circuits, and Sensing-Systems (CCSS)

Supports research on circuit and system hardware and signal processing techniques in the following areas: radio-frequency circuits and antennas for communications and sensing; communication systems and signal processing; and dynamic bio-sensing systems.

Computational and Data-Enabled Science and Engineering (CDS&E)

CDS&E is a "meta-program" that includes participation from all Divisions within the Directorate for Mathematical and Physical Sciences and the Division of Chemical, Bioengineering, Environmental and Transport Systems and the Division of Civil, Mechanical and Manufacturing Innovation within the Directorate for Engineering. It supports projects that harness computation and data to advance knowledge and accelerate discovery above and beyond the goals of the participating individual programs.

Dear Colleague Letter: Neurobiology in Changing Ecosystems (NiCE)

In collaboration with the Kavli Foundation, invites proposals that apply new, integrative approaches to understand molecular, biophysical, cellular, and circuit-level neural processes underlying adaptation and resilience in response to changing environments organisms face due to anthropogenic activity.

Decision, Risk and Management Sciences (DRMS)

Supports research that increases understanding of how individuals, organizations and societies make decisions. Areas include judgment, decision analysis and aids, risk analysis and communication, public policy decision making and management science.

Developmental Sciences (DS)

Supports research on the cognitive, linguistic, social, cultural and biological processes involved in human development across the life span — illuminating the developmental processes that support individuals in living productive lives as members of society.

Disability and Rehabilitation Engineering (DARE)

Supports fundamental engineering research that improves the quality of life of persons with disabilities. Projects advance knowledge regarding a specific disability, pathological motion, or injury mechanism.

Dynamics, Control and Systems Diagnostics (DCSD)

Supports fundamental research on the analysis, measurement, monitoring and control of dynamic systems.

Emerging Frontiers in Research and Innovation (EFRI): Biocomputing through EnGINeering Organoid Intelligence (BEGIN OI)

Supports foundational and transformative research to advance the design, engineering and fabrication of organoid systems that are capable of processing information dynamically while interfacing with non-living systems.

Enabling Discovery through GEnomics (EDGE)

Supports the development of genomic tools and research to uncover the relationships between genes and phenotypes across environmental, developmental, social and genomic contexts.

Emerging Mathematics in Biology (eMB) Program

Supports research in mathematical biology that addresses significant biological questions by applying nontrivial mathematics or developing new theories — particularly from foundational mathematics, including artificial intelligence or machine learning.

Energy, Power, Control, and Networks (EPCN)

Supports research in modeling, optimization, learning, adaptation and control of networked multi-agent systems; higher-level decision making; and dynamic resource allocation and risk management.

Engineering of Biomedical Systems

Supports fundamental and transformative research that integrates engineering and life sciences to solve biomedical problems.

Ethical and Responsible Research (ER2)

Supports research on what constitutes and promotes responsible research conduct and how to instill that knowledge in researchers, practitioners and educators across all career stages.

Expeditions in Computing (Expeditions)

Supports long-term, multi-institutional research with the potential to transform computer and information science and engineering.

Foundational Research in Robotics (FRR)

Supports research on robotic systems that exhibit significant levels of both computational capability and physical complexity.

Foundations of Emerging Technologies (FET)

Supports research at the intersection of computing and biological systems; nanoscale science and engineering; and quantum information science and other technologies supporting novel computing and communication models.

Human-Centered Computing (HCC)
Supports interdisciplinary research in human-computer interaction to design technologies that amplify human capabilities and to study how human, technical and contextual aspects of computing and communication systems shape their benefits, effects and risks.

Human Networks and Data Science (HNDS)
Supports research that studies the behavior of individuals and groups by leveraging data and network science and the development of data infrastructure that makes such work possible.

Information Integration and Informatics (III)
Supports computational research on the full data life cycle, from collection through archiving, analysis and discovery, to maximize the utility of information resources for science and engineering.

Integrative Research in Biology (IntBIO) Track in the Directorate for Biological Sciences Core Programs
Invites submission of collaborative proposals to tackle bold questions in biology that require an integrated approach to make substantive progress. Submissions can be made to core programs across the Directorate for Biological Sciences.

Linguistics
Supports research on human language — encompassing investigations of the properties of individual human languages and natural language in general — and the intersections of linguistics with cognition, society and other areas of science.

Mathematical Biology
Supports research in areas of applied and computational mathematics relevant to the biological and life sciences.

Molecular Foundations for Biotechnology (MFB)
Supports fundamentally new approaches in molecular sciences to drive new directions in biotechnology, a critical and emerging technology of the 21st century.

Mind, Machine and Motor Nexus (M3X)
Supports fundamental research that explores embodied reasoning as mediated by bidirectional sensorimotor interaction between human and synthetic actors.

Molecular Biophysics
Supports computational and experimental research on the structure, dynamics and function of biomolecules, supermolecular assemblies and their interactions.

National Artificial Intelligence Research Institutes
Supports the development of new AI Institutes that focus on one of the following themes: astronomical sciences, materials research and new methods for strengthening AI.

Neural Systems Cluster

Supports mechanistic studies in neuroscience, from structure to function in natural context, that span multiple levels of analysis, from molecular and cellular to complex behavioral aspects of organisms.

- **Organization Program:** Supports research on how the nervous system is organized along developmental, genetic, molecular, and cellular lines; explorations of developmental mechanisms; and how experiential/environmental interactions affect basic structural and functional characteristics of the nervous system.
- **Activation Program:** Supports research focused on how signals from the external environment activate the nervous system, and how the nervous system integrates sensorimotor responses to trigger an action.
- **Modulation Program:** Supports research focused on mechanisms mediating organism-environment interactions, including, but not limited to, synaptic, circuit, and behavioral plasticity; social and emotional regulation of behaviors; neuroendocrine and neuroimmune function; biological rhythms and other complex functions.

Operations Engineering (OE)

Supports research on advanced analytical methods that improve operations in complex, decision-driven environments.

Organismal Responses to Climate Change (ORCC)

Supports research, research coordination networks and conferences that integrate ecological and evolutionary approaches with genomic, physiological, structural, developmental, neural or behavioral

Perception, Action and Cognition (PAC)

Supports theoretically motivated research aimed at increasing understanding of human perception, action and cognition and their interactions.

Physics of Living Systems (PoLS)

Supports theoretical and experimental research that explores the fundamental physical processes used by living systems, with a focus on basic physical principles that underlie biological function.

Physiological Mechanisms and Biomechanics Program (PMB)

Supports fundamental research that addresses mechanisms of physiological processes and biomechanics in the context of the whole organism, as well as studies of physiological plasticity and adaptation.

Robust Intelligence (RI)

Supports computational research in artificial intelligence, machine learning, computer vision, human language technologies and computational neuroscience.

Science of Learning and Augmented Intelligence (SL)

Supports research to develop fundamental knowledge about principles, processes and mechanisms of learning and about augmented intelligence — how human cognitive function can be augmented through interactions with others and technology.

[Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH)](#)
Supports the development of transformative advances in computer and information science, engineering, mathematics, statistics, behavioral and cognitive research to address pressing questions in the biomedical and public health communities.

[Social Psychology](#)
Supports research and infrastructure to advance knowledge of human social behavior, including neural and physiological patterns; thought and emotion processes; and intentions, actions and habits that explain ways of thinking about and relating to others.

[Statistics](#)
Supports research in statistical theory and methods, including research in statistical methods with applications in any domain of science and engineering.
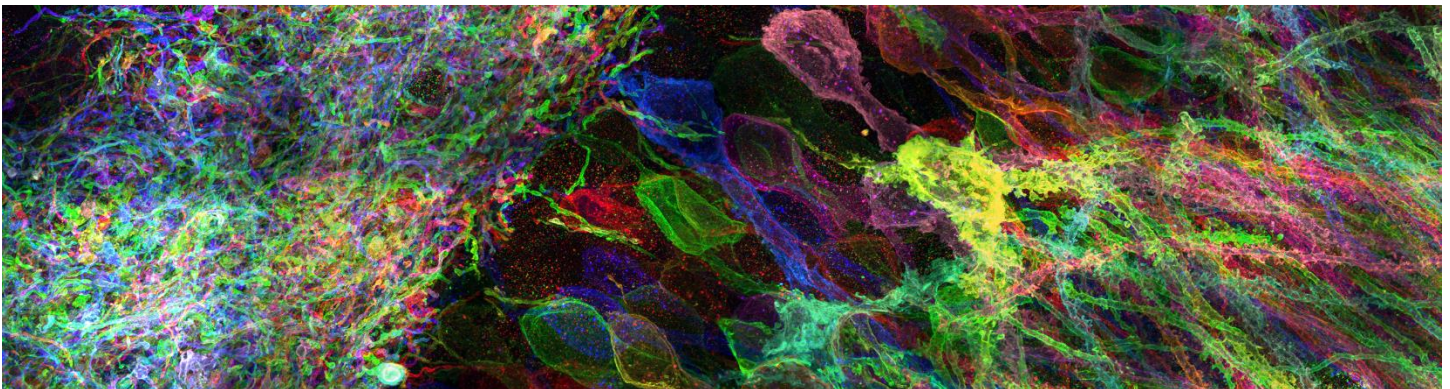
Mouse brain cells labeled with Brainbow and visualized with expansion microscopy. (Ed Boyden, MIT)

Infrastructure, Tools and Technology

At NSF, a range of programs exist to support technological advancements, new tools to meet societal needs, cyber and physical infrastructure, and capacity building.

- [Advanced Computing Systems & Services: Adapting to the Rapid Evolution of Science and Engineering Research](#)
- [Campus Cyberinfrastructure (CC*)](#)
- [Chemical Measurement and Imaging (CMI)](#)
- [Community Infrastructure for Research in Computer and Information Science and Engineering (CIRC)](#)
- [Cyberinfrastructure for Sustained Scientific Innovation (CSSI)](#)
- Division of Biological Infrastructure Research Resources Cluster
  - [Infrastructure Innovation for Biological Research (Innovation)](#)
  - [Infrastructure Capacity for Biological Research (Capacity)](#)
  - [Sustaining Infrastructure for Biological Research (Sustaining)](#)
- [Engineering for Civil Infrastructure (ECI)](#)
- [Major Research Instrumentation Program (MRI)](#)
- [Mid-scale Research Infrastructure-1 (Mid-scale RI-1)](#)
- [Mid-scale Research Infrastructure-2 (Mid-scale RI-2)](#)

Translational Avenues

NSF offers several opportunities to move ideas from the laboratory to the market and society. These include support for academic institutions and small businesses, interdisciplinary efforts, and regional economic development programs.

- Accelerating Research Translation (ART)
- America's Seed Fund (SBIR/STTR)
- Convergence Accelerator
- Experiential Learning for Emerging and Novel Technologies (ExLENT)
- NSF Innovation Corps Hubs Program (I-Corps™ Hubs)
- Partnerships for Innovation (PFI)
- Pathways to Enable Open-Source Ecosystems (POSE)
- Regional Innovation Engines
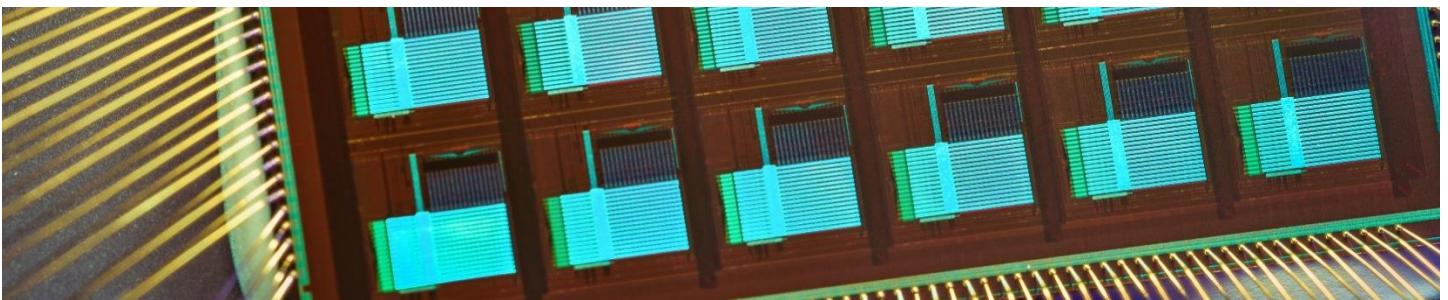
The NeuRRAM chip is the first compute-in-memory chip to demonstrate a wide range of AI applications at a fraction of the energy consumed by other platforms while maintaining equivalent accuracy. (David Baillot/UC San Diego Jacobs School of Engineering)

Collaboration and Center-scale Investments

NSF supports a variety of centers programs that contribute to the Foundation's mission and vision. Centers exploit opportunities in science, engineering, and technology in which the complexity of the research program or the resources needed to solve the problem require the advantages of scope, scale, duration, equipment, facilities, and students.

- Accelerating Research through International Network-to-Network Collaborations (AccelNet)
- Biology Integration Institutes (BII)
- Centers of Research Excellence in Science and Technology (CREST Centers)
- Centers of Research Excellence in Science and Technology - Research Infrastructure for Science and Engineering (CREST-RISE)
- Centers of Research Excellence in Science and Technology (CREST) Postdoctoral Research Program (PRP) (CREST-PRP)
- Global Centers (GC)
- Partnerships for International Research and Education (PIRE)
- Science and Technology Centers (STC): Integrative Partnerships

Education, Training and Broadening Participation

Convergent, interdisciplinary, and multi-disciplinary approaches towards training, education and workforce development are supported at NSF. Opportunities span a range of educational levels and a variety of institutional environments to help broaden the pool of STEM students and professionals ready to engage in this work.

Specific Career Stages (in career progression order)

- Advanced Technological Education (ATE)
- Research Experiences for Undergraduates (REU)
- Graduate Research Fellowship Program (GRFP)
- NSF Research Traineeship Program (NRT)
- Science, Technology, Engineering and Mathematics (STEM) Education Individual Postdoctoral Research Fellowships (STEMEdIPRF)
- Faculty Early Career Development Program (CAREER)
- Mid-Career Advancement (MCA)

Specific Institution Types or Locations

- EPSCoR Research Incubators for STEM Excellence Research Infrastructure Improvement (E-RISE RII)
- EPSCoR Research Infrastructure Improvement: EPSCoR Research Fellows
- Facilitating Research at Primarily Undergraduate Institutions (RUI/ROA)
- Hispanic-Serving Institutions: Enriching Learning, Programs, and Student Experiences (HSI: ELPSE)
- Hispanic-Serving Institutions: Equitable Transformation in STEM Education (HSI:ETSE)
- Historically Black Colleges and Universities - Excellence in Research (HBCU - EiR)
- Historically Black Colleges and Universities - Undergraduate Program (HBCU-UP)
- Launching Early-Career Academic Pathways in the Mathematical and Physical Sciences (LEAPS-MPS)
- Research Coordination Networks (RCN)
- International Research Experiences for Students (IRES)

Specific Disciplines

- Research Experiences for Teachers Sites in Biological Sciences (BIORETS)
- BIO Research Experience for Undergraduates Sites (BIO REU Sites)
- Research and Mentoring for Postbaccalaureates in Biological Sciences (RaMP)
- Postdoctoral Research Fellowships in Biology (PRFB)
- Building Research Capacity of New Faculty in Biology (BRC-BIO)
- Research Coordination Networks in Undergraduate Biology Education (RCN-UBE)
- Mathematical and Physical Sciences Ascending Postdoctoral Research Fellowships (MPS-Ascend)
- SBE Postdoctoral Research Fellowships (SPRF)
- Research Experiences for Teachers in Engineering and Computer Science
- Science, Technology, Engineering and Mathematics Education Organizational Postdoctoral Research Fellowships (STEM Ed OPRF)
- Strengthening the Cyberinfrastructure Professionals Ecosystem
- Training-based Workforce Development for Advanced Cyberinfrastructure

Broadening Participation

- Dear Colleague Letter: STEM Access for Persons with Disabilities (STEM-APWD)
- Dear Colleague Letter: Planning Grants to Broaden Participation in the Emerging Frontiers in Research and Innovation Program
- Dear Colleague Letter: Veterans Research Supplement (VRS) Program
- Growing Research Access for Nationally Transformative Equity and Diversity (GRANTED)
- Leading Culture Change Through Professional Societies of Biology (BIO-LEAPS)
- Louis Stokes Alliances for Minority Participation (LSAMP)
- NSF Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM)
- Organizational Change for Gender Equity in STEM Academic Professions (ADVANCE)

Research on STEM Education

- EDU Core Research (ECR:Core) Program
- Improving Undergraduate STEM Education (IUSE: EDU)
- Innovations in Graduate Education (IGE)

A group of attendees at the Jemez-Zia Pueblo Youth Festival learn about neuroscience as part of an outreach effort from the Syed Lab at the University of New Mexico (Neural Diversity Lab, University of New Mexico)