U.S. Federal Government Department and Agency Research Support

By far, the single largest supporter of research and sponsored projects in the United States is the U.S. Federal Government. This includes research conducted in support of:

- agency intramural laboratories—research labs within the National Cancer Institute;
- facilities and federally funded research and development centers (FFRDCs)—Ames Laboratory, Jet Propulsion Laboratory; and
- sponsored programs at nonfederal organizations—academic institutions, hospitals, nonprofit research institutions, and small businesses.

Fifteen federal departments and twelve other federal agencies engage in and/or provide funding for sponsored programs, primarily in the U.S. The majority of the annual funding total for science and engineering is accounted for by the R&D activities of the following seven departments and agencies.

DEPARTMENT OF AGRICULTURE (USDA)

The ***National Institute of Food and Agriculture (NIFA)*** is the USDA's principal extramural research agency, funding individuals; institutions; and public, private, and non-profit organizations in support of research, education, and extension, with the majority of awards being funded through the Agriculture and Food Research Initiative (AFRI). The five NIFA units—Institute of Food Production and Sustainability; the Institute of Bioenergy, Climate, and Environment; the Institute of Food Safety and Nutrition; the Institute of Youth, Family, and Community; and the Center for International Programs—fund a breadth of programs with a with $1.6 billion identified for discretionary funding (FY2021). In FY 2021, priority science areas included food security, water, climate variability and change, sustainable bioenergy, childhood obesity prevention, and food safety. NIFA's Federal Assistance Policy Guide describes agency policies and procedures. Key partners are more than 100 institutions of higher education making up the land grant university system.

More directed funding for sponsored programs activities announced in Grants.gov are also supported by the Department's ***Agriculture Research Service***, ***Forest Service*** and ***Natural Resource Conservation Service***

DEPARTMENT OF COMMERCE (DOC)

The ***National Institute of Standards and Technology (NIST)***, has program announcements and other special programs in mission-relevant areas. Examples of funding areas include research

aimed at advancing the principles of resilience in building design and building codes and standards; centers to add capabilities to the Manufacturing Extension Partnership (MEP) Program, including the development of projects to solve new or emerging manufacturing problems; and research that complements the Material Measurement Laboratory (MML) Grant Program at NIST.

The ***National Oceanic and Atmospheric Administration (NOAA)*** funds mission-relevant programs in such diverse areas as fisheries, coastal management, ocean exploration, and climate. NOAA's research capacity is enhanced in its support of 20 Cooperative Institutes consisting of 69 universities and research institutions across 27 states and the District of Columbia. In addition, for over 50 years, the National Sea Grant Program has supported coastal and Great Lakes communities through research, extension, and education. As a number of NOAA programs provide direct funding to states, researchers at universities and other research organizations may partner with state agencies to conduct sponsored projects.

DEPARTMENT OF DEFENSE (DOD)

While the share of federally-funded R&D expenditures to institutions of higher education from the DOD is only slightly more than that of the NSF (15% compared to 12% in 2019) understanding the DOD's programs in support of research and training is much less straightforward than the NSF or other U.S. federal agencies.

The ***Air Force Office of Scientific Research (AFOSR)***, part of the Air Force Research Lab (AFRL), funds research and educational programs at universities and industry laboratories. Proposals for research are solicited through annual and special Broad Agency Announcements (BAA) and special programs in mission relevant areas of materials science, physics, chemistry, mechanics, mathematics, computational science and human performance and biosystems.

Army Medical Research and Materiel Command (MRMC) oversees the *Congressionally Directed Medical Research Programs (CDMRP)***.** The mission of CDMRP is to manage collaborative research that discovers, develops and delivers heath care solutions for service members, veterans and the American public. The program differs from many U.S. federal funding programs in that a pre-application submission is required prior to any formal submission to Grants.gov.

The ***Army Research Office (ARO)***, part of the Army Research Laboratory (ARL), funds basic and applied fundamental research in engineering and in the physical, information and life sciences. Basic research proposals from educational institutions, nonprofit organizations and private industry are typically solicited through Broad Agency Announcements.

To pursue transformative—rather than incremental—advances, the ***Defense Advanced Research Projects Agency (DARPA)*** uses academic, corporate and governmental partners to apply multi-disciplinary approaches both to advance knowledge through basic research and to create innovative technological that address practical problems. In addition to program-specific contract opportunities, each technical office maintains a Broad Agency Announcement, refreshed annually, in diverse areas including biological technologies, defense sciences, information innovation, microsystems technology, strategic technology, and tactical technology.

The ***National Security Agency (NSA)*** supports workshops, conferences and research experiences for undergraduates in the mathematical sciences and additionally funds project-specific contracts that support the agency's research mission particularly in the areas of signals intelligence and cybersecurity.

The ***Office of Naval Research (ONR)*** coordinates the science and technology programs of the U.S. Navy and Marine Corps, funding mission-relevant basic and applied research in math, computer science and electronics; ocean and atmospheric sciences; engineering, physical & materials sciences; cognitive and medical human systems. ONR solicits applications through annual and special Broad Agency Announcements (BAA) and special Funding Opportunity Announcements.

DEPARTMENT OF EDUCATION (ED)

The mission of the Department of Education's **Institute of Education Sciences (IES)** is to provide rigorous and relevant evidence on which to ground education practice and policy and share this information broadly. By identifying what works, what doesn't, and why, IES strives to improve educational outcomes for all students, particularly those at risk of failure. IES research and training programs are announced in the *Federal Register*.

At various times, other individual units within the Department have needs for demonstration and interpretive projects: these opportunities are also published in the *Federal Register*.

DEPARTMENT OF ENERGY (DOE)

The **Office of Science** is the basic scientific research arm of the Department of Energy, managing a research portfolio through six core program offices: advanced scientific computing research, basic energy sciences, biological and environmental research, fusion energy Sciences, high energy physics; and nuclear physics. FOAs are published in the areas of

- Energy efficiency and renewable energy

- Fossil energy
- Nuclear energy, and
- Power grid, electricity delivery and energy reliability.

In addition, the Office of Science manages and supports additional programs and activities, including the Workforce Development for Teachers and Scientists Program and the DOE Small Business Programs. Department of Energy Laboratories (e.g., Argonne National Laboratory, Lawrence Berkeley National Laboratory) provide unique opportunities for collaboration and may provide opportunities for limited research support. The Office of Science also supports national user facilities that provide researchers with access to unique resources to conduct their research, including accelerators, colliders, supercomputers, light and neutron sources, as well as facilities for studying the nanoworld and the atmosphere.

DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS OR HHS)

The Department of Health and Human Service is the largest grantmaking agency in the U.S. federal government and includes the **Agency for Healthcare Quality and Research** (AHRQ), the **Centers for Disease Control and Prevention** (CDC), and the **Food and Drug Administration** (FDA), in addition to the **National Institutes of Health** (NIH)**.**

The **Agency for Healthcare Quality and Research (AHRQ)** supports research and training to improve the quality, effectiveness, accessibility, and cost effectiveness of health care. Policies and procedures, agency requests, and notices are published in the *Federal Register* and the *NIH Guide for Grants and Contracts*.

The **Centers for Disease and Control and Prevention (CDC)** funds research and non-research public health programs that advance the Agency's public health mission domestically and abroad. In fiscal year 2019, the Office of Grants Services (OGS) supported 5,010 grant awards to 1,289 recipients.

The **Food and Drug Administration** (FDA) supports grants, cooperative agreements and contracts to support mission-specific issues on food and drug safety, including medical devices, radiation-emitting products, vaccines, blood and biologics, animal and veterinary medicines, cosmetics, and tobacco products.

The **National Institutes of Health** is the world's largest funder of biomedical research, awarding nearly $32.6 billion in extramural grants, contracts, cooperative agreements, fellowships, loan repayments and other transaction agreements in FY2019. Of that amount, over 9.6% ($3.133

billion) was awarded as R&D contracts. The NIH is composed of 27 separate institutes and centers (ICs), including 24 that award extramural grants and contracts:

- **Fogarty International Center (FIC)** supports and facilitates global health research conducted by U.S. and international investigators, builds partnerships between health research institutions in the U.S. and abroad, and trains scientists to address global health needs.
- **National Cancer Institute (NCI)** supports research and training to develop the knowledge base that will lessen the burden of cancer in the U.S. and around the world.
- **National Center for Advancing Translational Sciences (NCATS)** offers an array of funding programs designed to help researchers translate basic scientific knowledge into interventions that improve human health.
- **National Center for Complementary and Integrative Health (NCCIH)** supports research and training in complementary and integrative health involving both natural products and mind and body practices.
- **National Eye Institute (NEI)** funds research and training with respect to blinding eye diseases, visual disorders, mechanisms of visual function, preservation of sight and the special health problems and requirements of the blind.
- **National Heart, Lung, and Blood Institute (NHLBI)** supports research and training to prevent and treat heart, lung, blood and sleep disorders.
- **National Human Genome Research Institute (NHGRI)** funds genomic research and training organized around five areas: structure of genomes, biology of genomes, biology of disease, science of medicine and effectiveness of healthcare.
- **National Institute on Aging (NIA)** supports research and training leading to understand the nature of aging and the aging process, and diseases and conditions associated with growing older.
- **National Institute on Alcohol Abuse and Alcoholism (NIAAA)** funds basic and clinical research and training to address alcohol-related issues across the lifespan.
- **National Institute of Allergy and Infectious Disease (NIAID)** supports research and training to understand, treat, and prevent infectious, immunologic, and allergic diseases.
- **National Institute of Arthritis and Musculoskeletal Diseases (NIAMS)** funds research and training into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases.

- **National Institute of Biomedical Imaging and Bioengineering (NIBIB)** funds research and training that integrates the physical and engineering sciences with the life sciences to advance basic research and medical care.
- **National Institute of Child Health and Human Development (NICHD)** supports research and training in areas relevant to normal and abnormal human development, from fertilization through adolescence, including intellectual and developmental disabilities.
- **National Institute on Deafness and Other Communication Disorders (NIDCD)** funds research and training on hearing, balance, taste and smell, and voice, speech, and language.
- **National Institute of Dental and Craniofacial Research (NIDCR)** funds basic, translational, and clinical research and training to improve dental, oral, and craniofacial health.
- **National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)** supports research and training on diabetes and other endocrine and metabolic diseases; digestive diseases, nutritional disorders and obesity; and kidney, urologic and hematologic diseases.
- **National Institute on Drug Abuse (NIDA)** funds basic and clinical research on drug use, its consequences, and the underlying neurobiological, behavioral, and social mechanisms involved.
- **National Institute of Environmental Health Sciences (NIEHS)** supports research and training that investigates the interplay between environmental exposures, human biology, genetics and common diseases to help prevent disease and improve health.
- **National Institute of General Medical Sciences (NIGMS)** supports basic research and training that increases understanding of biological processes and lays the foundation for advances in disease diagnosis, treatment and prevention.
- **National Institute of Mental Health (NIMH)** funds basic and clinical research and training to transform the understanding and treatment of mental illnesses.
- **National Institute on Minority Health and Heath Disparities (NIMHD)** supports research and training programs intended to improve racial and ethnic minority health and eliminate health disparities in the United States.
- **National Institute of Neurological Disorders and Stroke (NINDS)** funds basic, translational, and clinical neuroscience research and training.
- **National Institute of Nursing Research (NINR)** supports research and training integrating biological and behavioral studies to promote health and prevent disease, to manage the symptoms and disability of illness, and to improve health care environments.

- **National Library of Medicine (NLM)** supports fundamental and applied research and training in biomedical informatics and data science.

A 25th center, the **Center for Scientific Review (CSR)**, receives all of the applications received by the NIH each year and coordinates the central review of roughly 76% of the research applications. The *NIH Guide for Grants and Contracts* weekly publishes funding opportunity announcements and notices, and the *NIH Grants Policy Statement*, published annually, provides policy guidance for NIH grants and cooperative agreements. Prepared annually, the **NIH Data Book (NDB)** provides basic summary statistics on extramural grants and contract awards, grant applications, the organizations that NIH supports, the trainees and fellows supported through NIH programs, and the national biomedical workforce.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

The National Aeronautics and Space Administration supports fellowships, as well as research in a wide range of science and technology disciplines. Proposals can be submitted in response to both solicited and unsolicited FOAs. NASA centers and facilities such as the Goddard Space Flight Center and the Jet Propulsion Laboratory provide unique opportunities for collaboration and may provide opportunities for directed research support. NASA research funding opportunities are concentrated at one site in the **NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)**.

NATIONAL ENDOWMENT FOR THE ARTS (NEA)

The **National Endowment for the Arts** awards grants to organizations and to individuals for projects only. Projects may consist of one or more specific events or activities, with matching grants ranging from $10,000 to $100,000. NEA provides direct support to creative writers and literary translators of distinction through Literature Fellowships.

NATIONAL ENDOWMENT FOR THE HUMANITIES (NEH)

The **National Endowment for the Humanities** offers a variety of grant programs to individuals and organizations for a broad range of programs to promote the humanities, leading to such varied outputs as books, publications, preservation, curriculum, workshops, faculty development, and teaching resources. Programs also include special initiative for tribal colleges and universities, Hispanic-serving institutions, community colleges, and historically black colleges and universities. NEH's Fiscal Year 2019 budget justification responded to the Administration's proposal for terminating the agency in FY2019. The proposed agency closedown has now been moved to FY2020.

NATIONAL SCIENCE FOUNDATION (NSF)

The **National Science Foundation** is an independent federal agency supporting research and education in all fields of fundamental science and engineering, except for the medical sciences. With an annual budget of $8.1 billion (FY2019), the NSF is the funding source for approximately 24% of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing. The NSF is composed of seven separate directorates, including:

- **Biological Sciences (BIO)** supports research to advance the understanding of the principals and mechanisms governing life and is organized into five divisions: Biological Infrastructure; Environmental Biology; Integrative Organismal Systems; Molecular and Cellular Biosciences; Emerging Frontiers.
- **Computer and Information Science and Engineering (CISE)** supports research and education in all areas of computer and information science and is organized into four divisions: Advanced Cyberinfrastructure; Computing and Communication Foundations; Computer and Network Systems; and Information and Intelligent Systems.
- **Engineering (ENG)** provides almost one-third of the U.S. federal funding for fundamental research in engineering at academic institutions. Six divisions support research and education programs across the engineering spectrum: Chemical, Bioengineering, Environmental and Transport Systems; Civil, Mechanical and Manufacturing Innovation; Electrical, Communications and Cyber Systems; Engineering Education and Centers; Emerging Frontiers and Multidisciplinary Activities; and Industrial Innovation and Partnerships.
- **Environmental Research & Education (ERE)** support for environmental research is primarily focused on understanding fundamental processes involved in physical, biological, and human system interactions. Relevant education programs are also funded.
- **Geosciences (GEO)** provides about 64% of the U.S. federal for basic research in the geosciences at academic institutions. The five divisions include Atmospheric and Geospace Sciences; Earth Sciences; Integrative and Collaborative Education and Research; Ocean Sciences; and Polar Programs.
- **Mathematical and Physical Sciences (MPS)** supports research and education addressing the most compelling scientific questions in the mathematical and physical sciences, and is organized into six divisions: Astronomical Sciences, Chemistry, Materials Research, Mathematical Sciences, Physics, and Office Multidisciplinary Activities.

- **Social, Behavioral and Economic Sciences (SBE)** supports basic research on people and society, supporting approximately 5,000 scientists, educators and students in a typical year. Behavioral and Cognitive Sciences; Sciences and Engineering Statistics; Social and Economic Sciences and Multidisciplinary Activities.)
- **Office of International Science and Engineering (OISE)** is the NSF focal point for international science and engineering activities both inside and outside NSF.
- **Education and Human Resources (EHR)** supports excellence in U.S. STEM education at all levels, in all settings.