



FY 2021 Appropriations Priorities

COMMERCE, JUSTICE, SCIENCE, & RELATED AGENCIES

Agency	Account	APLU FY2021 Request
National Science Foundation		\$9 billion
National Aeronautics and Space Administration (NASA)	Science Mission Directorate	\$7.25 billion
NASA	Aeronautics Research Mission Directorate	\$819 million
NASA	Space Technology Directorate	\$1.578 billion
NASA	National Space Grant College and Fellowship Program (Space Grant)	\$52 million
National Oceanic and Atmospheric Administration (NOAA)	Office of Oceanic and Atmospheric Research (OAR)	\$592 million
NOAA	National Sea Grant College Program	\$82.9 million
NOAA	Marine Aquaculture Program	\$15 million
National Institute of Standards and Technology (NIST)	Manufacturing Extension Program (MEP)	\$154 million
NIST	National Network for Manufacturing Innovation (NNMI)	\$25 million
Economic Development Administration	Regional Innovation Program	\$50 million

NATIONAL SCIENCE FOUNDATION

APLU FY2021 Request: \$9 billion

FY2021 PBR = \$7.7 B; FY2020 = \$8.280 B; FY2019 = \$8.075 B

The National Science Foundation (NSF) funds merit-based fundamental research across disciplines and supports science, math, and engineering education at universities throughout the nation. NSF-supported research has yielded groundbreaking discoveries and novel technologies – stimulating new industries and enhancing health and national security. For example, the algorithm that created Google was thanks to an NSF research grant awarded in the mid-90s to university researchers. APLU supports an appropriation of \$9 billion for NSF in FY2021. This increase would set the agency on a path to the funding levels appropriate to carry out its important mission and provide a vital boost to NSF’s core and interdisciplinary programs; further investment in NSF’s 10 Big Ideas¹, which includes the future of work and the human-technology relationship, harnessing the data revolution, the quantum leap, amongst

¹ “NSF’s 10 Big Ideas” available at https://www.nsf.gov/news/special_reports/big_ideas/

others; required enhancements in workforce development programs; and much-needed mid-scale and large research infrastructure projects.

Strong funding levels for NSF will also help develop and empower tomorrow's scientific research workforce. We need to ensure a stronger pipeline of Americans studying science, technology, engineering and mathematics (STEM) and ultimately contributing to our STEM workforce. NSF funds critical fellowship and traineeship programs that are our nation's most effective domestic science talent development programs. These programs are essential to countering the dual-pronged concerns that international competitors are enticing U.S. educated talent with foreign resources and that other countries are more effectively developing their own STEM workforces. Additional support for these efforts will help keep our nation at the forefront of scientific research and innovation.

The growth of the U.S. economy and our leadership around the world depends on our nation's continued ability to lead in scientific discovery and technological innovation. The U.S. research enterprise is at a critical inflection point and we must boost investments in science and research. With many nations increasing their investments in scientific research and facilities, we risk losing our competitive edge. As the National Science Foundation's "The State of U.S. Science and Engineering 2020"² shows, as more countries, particularly China, continue to invest heavily and narrowly in certain areas of R&D, the U.S. "is seen as an important leader rather than the uncontested leader" in the global science and engineering enterprise.

Robust, sustained funding of federal research will yield significant economic dividends and improve our nation's health and quality of life. As the Council on Foreign Relations reports in "Innovation and National Security: Keeping our Edge"³: "The United States has a time-tested playbook for technological competition. It invests in basic research and development (R&D), making discoveries that radically change understanding of existing scientific concepts and serve as springs for later-stage development activities in private industry and government."

If we want to remain at the forefront of scientific discovery and continue leading the world in science and engineering and reclaim our role as the "uncontested leader," we must invest strategically and heavily now. Unfortunately, in the past, NSF's resource constraints required it to turn away nearly \$4 billion in research proposals deemed "very good or higher" in FY2017 and also leave behind \$2 billion in mid-scale research infrastructure ideas deemed transformational to U.S. science and engineering. A significant funding increase would lead to new knowledge and technologies, igniting the U.S. economy, improving our nation's health and well-being, and better safeguarding our country from national security threats.

² *The State of U.S. Science and Engineering*, January 2020 available at <https://ncses.nsf.gov/pubs/nsb20201/executive-summary>

³ Council on Foreign Relations, "Innovation and National Security: Keeping Our Edge" September 2019, available at <https://www.cfr.org/report/keeping-our-edge/>

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

SCIENCE MISSION DIRECTORATE

APLU FY2021 Request: \$7.25 billion

FY2021 PBR = \$6.306 B; FY2020 = \$7.139 B; FY2019 = \$6.905 B

The NASA Science Mission Directorate (SMD) is an essential part of meeting the growing challenges to fully understand global changes to the Earth and answer fundamental questions regarding the universe through space exploration. New knowledge made possible from the Science Mission Directorate inspires future generations to pursue careers in STEM fields, sustaining U.S. leadership in groundbreaking discoveries. NASA Science includes four distinct divisions: Earth Science, Planetary Science, Astrophysics, and Heliophysics. This funding request maintains funding for major SMD missions within these divisions, including WFIRST, SOFIA, CLARREO and PACE, and supports funding for grant programs, new competitive mission opportunities, and the development of missions in their early stages.

AERONAUTICS RESEARCH MISSION DIRECTORATE

APLU FY2021 Request: \$819 million

FY2021 PBR = \$819 M; FY2020 = \$784 M; FY2018 = \$725 M

The Aeronautics Research Mission Directorate (ARMD) supports cutting-edge aviation research. Continued investment in research such as hypersonics, new methods of propulsion, and material science are crucial to push the envelope of civilian aeronautics. NASA aeronautics has made decades of contributions to aviation. Every U.S. commercial aircraft and U.S. air traffic control tower has NASA-developed technology on board that helps improve efficiency and maintain safety. Research conducted by ARMD directly benefits today's air transportation system, the aviation industry, and the passengers and businesses who rely on aviation every day. Increased funding will help ensure a comprehensive aviation research effort at ARMD and boost the U.S.'s global aeronautics leadership position.

SPACE TECHNOLOGY DIRECTORATE

APLU FY 2021 Request: \$1.578 billion

FY2021 PBR = \$1.578 B; FY2020 = \$1.110B; FY2019 = \$927M)

The Space Technology Directorate supports innovative research and technology development, including through grants to researchers at our nation's research universities, needed for current and future NASA missions. The scientific knowledge gained from the Space Technology Directorate has led to advancements that extend far beyond NASA, improving the lives of all Americans, such as the development of cutting-edge medical devices including pacemakers and Lasik eye surgery, increased agricultural production, and development of improved military protective armor.

NATIONAL SPACE GRANT COLLEGE AND FELLOWSHIP PROGRAM (SPACE GRANT)

APLU FY 2021 Request: \$52 million

FY2021 PBR = \$0; FY2020 = \$48 M; FY2019 = \$44 M

Space Grant is a national network of colleges and universities that expands opportunities for Americans to understand and participate in NASA's aeronautics and space projects by enhancing science and engineering education, research, and public outreach efforts. The Space Grant national network includes

over 850 affiliates from universities, colleges, industry, museums, science centers, and state and local agencies. These affiliates belong to one of 52 consortia in all 50 states and the District of Columbia. The consortia funds nearly 4,000 fellowships and scholarships for students pursuing careers in STEM, as well as curriculum enhancement and faculty development. Member colleges and universities also administer pre-college and public service education projects in their states.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH (OAR)

APLU FY 2021 Request: \$592 million

FY2021 PBR = \$327 M; FY2020 = \$548 M; FY2019 = \$525 M

The Office of Oceanic and Atmospheric Research (OAR) provides the research foundation for answering scientific questions and infrastructure challenges related to ocean research. The OAR increases the effectiveness of observations, monitoring, and modeling to help states manage their infrastructure aquaculture and water resources, fisheries, as well as natural disaster planning and response approaches.

Recent OAR research has focused on forecasting energy-demand scenarios, seasonal wildfires, and large storm events; assessing local impacts of projected sea-level rise; improving seasonal precipitation and drought predications; and understanding atmospheric rivers and other causes of extreme flooding. OAR also supports basic research that improves understanding of ocean and atmospheric processes.

Research is translated into information used by private businesses and public sector managers across all levels of business and government. NOAA's predictive capabilities would be unfulfilled without continuous improvement of OAR's facilities, analytical capabilities, and the networks of experts that are supported by OAR. The office supports sixteen extramural research partnerships through the Cooperative Institutes, which are allocated competitively as well as several NOAA laboratories.

Many researchers at APLU institutions rely on the extramural support, but equally as importantly on partnerships with the laboratories.

NATIONAL SEA GRANT COLLEGE PROGRAM

APLU FY2021 Request: \$82.9 million

FY2021 PBR = \$0; FY2020 = \$74 M; FY2019 = \$68 M

The National Sea Grant College Program is a nationwide network of 32 university-based programs for research, education, and advisory services focused on the conservation and development of marine resources. A joint federal, state, and local partnership, Sea Grant provides solutions for the issues affecting our nation's coastal communities (including the Great Lakes, Gulf of Mexico, communities on the Atlantic, Caribbean, and Pacific coasts), yielding quantifiable economic, social, and environmental benefits. Sea Grant is a leader in supporting aquaculture research and development which creates jobs and increased domestic production of safe and sustainable seafood. Through its locally-based research and extension programs, its national perspective, and its longstanding role in aquaculture, Sea Grant is ideally positioned to play an expanded role in the Commerce Department's focus on reducing the Nation's seafood trade deficit.

In 2018, the Sea Grant program:

- Created or supported 7,621 jobs;
- Helped nearly 23,741 fishers adopt safe and sustainable fishing practices;
- Helped restore an estimated 207,773 acres of coastal ecosystems; and
- Worked with about 1,300 industry and private sector, local, state and regional partners.

MARINE AQUACULTURE PROGRAM

APLU FY2021 Request: \$15 million

FY2021 PBR = \$0; FY2020 = \$13 M; FY2019 = \$12 M

The Marine Aquaculture Program supports research on breeding, rearing, and harvesting of animals and plants in water environments. Aquaculture supplies more than 50 percent of all the world's human consumption of seafood. The Sea Grant Marine and Great Lakes Aquaculture program supports the development of innovations in the aquaculture industry, technology transfer, and America's expanding aquaculture industry. Pressures from a changing climate, rising sea levels, changes in ocean chemistry, and an ever-dynamic industry places additional demands on an already small program.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

MANUFACTURING EXTENSION PROGRAM (MEP)

APLU FY2021 Request: \$154 million

FY2021 PBR = \$0 M; FY2020 = \$146 M; FY2019 = \$140 M

The Manufacturing Extension Program (MEP) increases the competitiveness of the U.S. industrial base in every state by strengthening American manufacturing. This helps transform the sector into a more efficient, globally-competitive, and powerful engine of innovation. MEP Centers are based at university, non-profit, or state-based organizations throughout the nation providing manufacturers an array of services that focus on growth, productivity, and efficiency. The Network has grown from a pilot project of just three MEP Centers to one Center in every state and Puerto Rico to a network of organizations providing manufacturers with a wide array of comprehensive and critical services for their manufacturing business. These services include cost saving process improvements, workforce hiring and training, cybersecurity practices, market development and new technology adoption, all of which enhance their customers' value within supply chains. As a public-private partnership, MEP delivers a high return on investment to taxpayers. For example, according to MEP's 2018 Annual Report⁴, for every one dollar of federal investment in FY2019, the MEP National Network generated \$33.80 in new sales growth for manufacturers and \$32.20 in new client investment.

NATIONAL NETWORK FOR MANUFACTURING INNOVATION (NNMI)

APLU FY2021 Request: \$25 million

FY2021 PBR = \$25 M; FY2020 = \$16 M; FY2019 = \$15 M

The NIST National Network for Manufacturing Innovation (NNMI), also known as Manufacturing USA, is a network of 14 manufacturing institutes where universities, industry, and government partners collaborate to develop and accelerate the commercialization of innovative manufacturing technologies. Each institute focuses on certain technologies such as 3D printing, digital manufacturing, smart

⁴ NIST MEP Annual Report, 2018 available at

https://www.nist.gov/system/files/documents/2019/11/21/MEP_Annual_Report_2018_web-508-NEW.pdf

manufacturing, and advanced robotics manufacturing. These institutes also train the workforce needed to work in advanced manufacturing industries. NNMI helps fuel our nation's position as a global leader in advanced manufacturing. APLU requests \$25 million for NNMI in FY2021 to help support the program's mission and fund an additional institute.

ECONOMIC DEVELOPMENT ADMINISTRATION (EDA)

REGIONAL INNOVATION PROGRAM

APLU FY2021 Request: \$50 million

FY2020 PBR = \$0; FY2020 = \$33 M; FY2019 = \$23.5 M

The Regional Innovation (RI) Program funds local organizations that grow jobs and economies through science, technology, innovation, and entrepreneurship. Universities successfully compete for RI grants and play a key role by conducting proof of concept testing for early-stage technologies and aiding growth of regional economies by developing funds to invest in university spin-outs and providing entrepreneurship programs and courses.

The program helps foster and develop regional strategies for boosting innovation and production by funding flexible awards with a 1:1 match. The Regional Innovation Program houses two important programs: the i6 Challenge and the Seed Fund Support Program. The i6 Challenge is a leading national initiative designed to support the creation of centers for innovation and entrepreneurship that increases the rate at which innovations, ideas, intellectual property, and research are translated into products, services, viable companies, and jobs. The Seed Fund Support Program provides funding for technical assistance to support the creation, launch, or expansion of equity-based, cluster-focused seed funds that invest regionally-managed risk capital in regionally-based startups with a potential for high growth.

Demand for the RI Program is strong across the country. EDA received 1,300 applications from across the nation over the six rounds of the RI Program while only being able to fund 224 awards. Collectively, these grants have helped create over 8,200 jobs and driven more than \$1.2 billion in follow on investment capital into startups and new venture funds. Funding the RI Program at \$50 million, which is in-line with its most recent authorization, would accelerate efforts to create high-quality jobs, revitalize the manufacturing industry, and unleash American innovation. Increased resources for the program are instrumental to cultivating entrepreneurship, growing new startups, and bringing new products and ideas to market, efforts that are crucial in building and maintaining the U.S. competitive edge.

About the Association of Public and Land-grant Universities

APLU is a research, policy, and advocacy organization dedicated to strengthening and advancing the work of public universities. With a membership of over 200 public research universities, land-grant institutions, state university systems, and affiliated organizations, APLU's agenda is built on the three pillars of increasing degree completion and academic success, advancing scientific research, and expanding engagement. Annually, our U.S. member campuses enroll 4.3 million undergraduates and 1.2 million graduate students, award 1.2 million degrees, employ 1.1 million faculty and staff, and conduct \$46.7 billion in university-based research.