Outside Witness Testimony: Fiscal Year 2022 Appropriations

Submitted by: Physical Science Education Policy Coalition, facilitated by Mr. Elborz D. Mazanderan at the American Institute of Physics

To: Senate Appropriations Committee Subcommittee on Commerce, Justice, Science, and Related Agencies

Regarding: Physical Science Education

June 25, 2021

Dear Chairwoman Shaheen, Ranking Member Moran, and Members of the Subcommittee:

The Physical Science Education Policy Coalition (PSEPC) is a diverse group of scientific non-profit organizations that works to promote issues regarding all aspects of physical science education to benefit both students and teachers.

* We urge you to accept the White House’s proposal for **NASA’s Office of STEM Engagement and fund the Office at the enacted the proposed level of $147 million.**
* We urge you to continue your support of **the National Science Foundation (NSF) Education & Human Resources (EHR) Programs.**
* We urge you to accept the White House’s proposal for **NOAA’s Office of Education and fund the Office at the proposed level of $41 million.**

**NASA, OFFICE OF STEM ENGAGEMENT**

For generations, NASA has recruited aspiring researchers and engineers and helped keep the country at the forefront of science and innovation. Today, NASA plays a key role in empowering and motivating young people to explore STEM research and career disciplines; engaging the general public in NASA's mission; and improving NASA and the nation’s STEM workforce.

The NASA Office of STEM Engagement supports programs such as the National Space Grant College and Fellowship Program (Space Grant) and the Experimental Program to Stimulate Competitive Research (EPSCoR). The Space Grant program currently funds nearly 4,000 fellowships and scholarships for students in all 50 states and the District of Columbia who are pursuing STEM careers, allowing them to participate in NASA aeronautics and space projects integrating classroom learning with on-the-job training much like apprenticeships[[1]](#footnote-1). The New Hampshire Space Grant Consortium, one of the Designated Consortiums within the project, received $760,000 in funding in fiscal year 2018 and awarded 88 NASA Internships, Fellowships, and Scholarships (NIFS) to students at universities and colleges across the state[[2]](#footnote-2). This program had profound impacts on awardees, especially those from underrepresented groups. As an example, a testimonial from a female awardee states, “The New Hampshire Space Grant funded my participation in the NASA Academy at Marshall Space Flight Center. In this program, I was able to prototype a satellite, learn Creo CAD modeling, work on a 'flat floor' with air bearings, travel to NASA Kennedy for a launch, gain outdoors experience with weekend team building, travel to NASA JPL, SpaceX, Aerojet Rocketdyne, SkunkWorks, and Virgin Galactic for company tours, and build a network of aerospace students and professionals. I would argue that this experience was pivotal in securing my job and beginning my career after graduation. It was certainly pivotal in compelling me to follow my dreams of aerospace engineer… I am an aerospace engineer at Blue Origin.”

EPSCoR programs play a key role in U.S. economic competitiveness by establishing partnerships with government, higher education and industry that are designed to effect lasting improvements in a state's or region's research infrastructure, R&D capacity and hence, its national R&D competitiveness[[3]](#footnote-3). To do so, NASA EPSCoR provides funding to enable jurisdictions to develop an academic research enterprise directed toward long-term, self-sustaining, nationally competitive capabilities in aerospace and aerospace-related research. The program is directed at those jurisdictions that have not in the past participated equitably in competitive aerospace and aerospace-related research activities. NASA EPSCoR states are home to 20 percent of the country’s population and workforce; they contain nearly 30 percent of the nation’s research institutions and more than 15 percent of the nation’s scientific and technological personnel; they bestow 20 percent of the nation’s undergraduate degrees in science and engineering and 16 percent of the nation’s doctorate degrees in these fields of study; and they are home to 20 percent of the country’s high-tech industries[[4]](#footnote-4). Furthermore, fifty-seven of the Fortune 500 companies have their corporate headquarters located in NASA EPSCoR states[[5]](#footnote-5).

Continued support for NASA’s Office of STEM Engagement is vital to ensure the United States continues to train and inspire our next generation of scientists, engineers, and technicians in order to remain globally competitive.

**NSF, EDUCATION & HUMAN RESOURCES (EHR)**

Progress in STEM depends on educating discoverers—innovators and future leaders in the nation’s science and engineering enterprise. These discoverers are critical members of the STEM workforce, filling vital roles throughout the public and private sectors, including academic, policy, research, and teaching positions.

EHR programs educate, train, and support discoverers, engage citizen scientists, and help foster a well-informed, STEM-literate citizenry prepared to handle rapid technological change and pursue STEM careers. In addition to supporting programs aimed at preparing the next generation of STEM professionals, EHR also funds the discoveries—the foundational research and the design and implementation studies—that underpin these STEM human capital development initiatives.

Just as NSF’s Research and Related Activities (R&RA) directorates are dedicated to funding basic research that accelerates progress in science and engineering, EHR supports early-stage, exploratory research that enables improvements in STEM education, learning, and assessment. EHR programs fund crucial foundational, design and development, and implementation research that is made available to inform large investments at scale made by other agencies, organizations, and the private sector. EHR currently funds $5.331 billion in active awards at research institutions and universities across the country, many of which typically span multiple years[[6]](#footnote-6).

The State of Kansas, for example, currently has over $25 million in active EHR awards that fund research at the state's colleges and universities[[7]](#footnote-7). Dr. Melanie Derby, an assistant professor of mechanical and nuclear engineering and the Hal and Mary Siegele professor of engineering at Kansas State University, is just one of many researchers that could be highlighted. Through the support of a five-year, $2.9 million NSF Research Traineeship Program (NRT) grant, Professor Derby will lead an interdisciplinary team to train graduate students to address complex challenges. This award was one of 17 NRT projects funded nationwide and is the first NRT awarded in the state of Kansas. It will help improve the resources that Kansas State University students use to become science-based leaders and advocates for resilient rural communities by combining engineering, economics, and sociological knowledge to meet the needs of farmers, industry, and society. Students will engage with farmers, government and industry through interactive sessions and will develop relevant skills through innovative coursework and teamwork.

While PSEPC does not advocate for Directorate level funding levels at NSF, the goals of NSF EHR are in line with many of the core values of the organizations within PSEPC to promote an active, inclusive and diverse physical sciences community.

**NOAA, OFFICE OF EDUCATION**

The NOAA Office of Education advances education internally within the agency and to the general public. The Office has several major areas of emphasis: the Educational Partnership Program (EPP) with Minority-Serving Institutions (MSI); the Ernest F. Hollings Undergraduate Scholarships; the Environmental Literacy Program; and the Bay Watershed Education and Training (B-WET) Program. The Office of Education also coordinates interagency educational activities and those involving external partners.

The EPP/MSI workforce development program supports four NOAA-University education and collaborative research-based Cooperative Science Centers at Florida A&M University, Howard University, CUNY City College, and the University of Maryland Eastern Shore. These four universities partner with 24 additional universities to increase the number of students who graduate within degrees in STEM and natural resource management/policy. So far more than 1800 students have graduated in NOAA-mission fields[[8]](#footnote-8). Other key EPP/MSI initiatives are the Undergraduate Scholarship Program and NOAA Experiential Research & Training Opportunities.

The Hollings Scholarship Program provides students with two years of undergraduate academic assistance and a summer internship. There are currently 150 active scholars and a network of more than 1400 alumni, of which 75% have attended graduate school[[9]](#footnote-9). Among other benefits, the program prepares students for careers in public service or as oceanic and atmospheric science teachers and educators who can improve U.S. science and environmental education.

The Environmental Literacy Program supports competitive grants and long-term external partnerships. The grants programs is the most comprehensive and enduring national funding opportunity focused on improving environmental stewardship and increasing resilience to natural hazards.

B-WET provides competitive funding in support of K-12 Meaningful Watershed Educational Experiences, which promote classroom-based and outdoor education ecosystem learning and stewardship. B-WET currently operates in California, Hawaii, and the Chesapeake Bay, Great Lakes, Gulf of Mexico, New England, and Pacific Northwest regions.

In support of PSEPC goals, these NOAA Office of Education programs broaden STEM education and promote workforce development, with focus on underserved audiences.

Endorsed by the following member organizations:

1. Sandra May, “About the Space Grant Project,” Text, NASA, July 28, 2015, http://www.nasa.gov/stem/spacegrant/about/index.html. [↑](#footnote-ref-1)
2. Frank McDonald, “New Hampshire Space Grant Consortium,” Annual Performance Document (University of New Hampshire, 2019), https://www.nasa.gov/sites/default/files/atoms/files/2018\_nh\_space\_grant.pdf. [↑](#footnote-ref-2)
3. “Established Program to Stimulate Competitive Research (EPSCoR) | NSF Â National Science Foundation,” accessed April 22, 2020, https://www.nsf.gov/od/oia/programs/epscor/. [↑](#footnote-ref-3)
4. “Science and Engineering State Profiles | NCSES | NSF,” accessed April 22, 2020, https://www.nsf.gov/statistics/states/. [↑](#footnote-ref-4)
5. “Science and Engineering State Profiles | NCSES | NSF.” [↑](#footnote-ref-5)
6. “Education and Human Resources (EHR) Active Awards | NSF - National Science Foundation,” accessed April 22, 2020, https://www.nsf.gov/awards/award\_visualization\_noscript.jsp?org=EHR&showAwardDollars=true. [↑](#footnote-ref-6)
7. “Education and Human Resources (EHR) Active Awards | NSF - National Science Foundation,” accessed May 1, 2020, https://www.nsf.gov/awards/award\_visualization.jsp?org=EHR#showAwardDollars=true&region=US-KS. [↑](#footnote-ref-7)
8. “EPP/MSI Undergraduate Scholarship Program | National Oceanic and Atmospheric Administration,” accessed April 22, 2020, https://www.noaa.gov/office-education/epp-msi/undergraduate-scholarship. [↑](#footnote-ref-8)
9. “Current Scholars | National Oceanic and Atmospheric Administration,” accessed April 22, 2020, https://www.noaa.gov/office-education/hollings-scholarship/current. [↑](#footnote-ref-9)