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To: ASME Volunteers
From: Melissa Carl, Government Relations Manager
Subject: May 2013 STEM Education, Diversity, and Workforce Policy Update
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- STEM Education Funding in the FY2014 Budget
- House Subcommittee Holds Hearing on Federal STEM Education Programs
- Final Next Generation Science Standards Released
- NSF Requests \$7.626 Billion for FY 2014 Budget
- NSF Releases Report on Baccalaureate Origins of U.S.-Trained S&E Doctorate Recipients
- ASME Co-Sponsors 4th Annual “Diversity and Inclusion Fuels Innovation in STEM” Capitol Hill Day

STEM EDUCATION FUNDING IN THE FY2014 BUDGET

The President’s Fiscal Year (FY) 2014 Budget invests \$3.1 billion in programs across the federal government on science, technology, engineering and mathematics (STEM) education, an increase of 6.7 percent over 2012 funding levels.

This budget proposes to reorganize and cut back lower-priority STEM education programs to make room for targeted increases. This includes the proposed elimination or reorganization of 114 programs, with approximately \$180 million in savings strategically reinvested in new or existing STEM programs. By decreasing the number of STEM programs from 226 to 112 (a 50 percent reduction), this reorganization effort is intended to substantially decrease the fragmentation of STEM programs across the Federal government, hopefully allowing for easier coordination and improving opportunities for rigorous evaluation of the remaining programs. The reorganization also includes increasing capacity at critical agencies.

In his testimony in front of the full House Science, Space, and Technology Committee, White House Science Advisor Dr. John Holdren said, “The Administration is proposing to reorganize STEM-education programs into four key areas: K-12 instruction; undergraduate education; graduate fellowships; and informal education activities that typically take place outside the classroom. Each key area would have a lead agency.”

Dr. Holdren continued by saying, “The Department of Education’s role in K-12 education would be to develop STEM innovation networks, support STEM Teacher Pathways to help reach the President’s goal of preparing 100,000 effective STEM teachers over the next decade, and create a STEM Master Teacher Corps to build the STEM instructional skills of others. NSF would promote reform of STEM undergraduate education and enhance graduate fellowships to reach more students and address national needs. The Smithsonian Institution would improve the reach of classroom and informal education materials and activities by ensuring they are aligned with State standards and are relevant to what is being taught in school. Efforts within the Department of Education, NSF, and the Smithsonian Institution will be closely coordinated with the activities and assets of other Federal science agencies.”

U.S. Secretary of Education Arne Duncan also recently discussed the proposed reorganization during his testimony in front of the Senate Labor, Health and Human Services, and Education Appropriations Subcommittee, saying “Reforming Federal support to support an effective, cohesive national STEM education strategy is a top Administration priority. Scientists and engineers are key innovators in our society. They play an essential role in developing new industries and opportunities that create jobs and spur economic growth. Our Nation depends on an innovation economy, and America's capacity to build and create should never be limited by a shortage of talent in the STEM fields.”

If appropriated by Congress, the 2014 Budget would provide investments in a number of areas:

- Recruiting, preparing and supporting excellent STEM teachers, with \$80 million to support the President’s goal of preparing 100,000 STEM teachers and \$35 million to launch a pilot STEM Master Teacher Corps;
- Supporting more STEM-focused high schools and districts, with an investment of \$150 million to create new STEM Innovation Networks to better connect school districts with local, regional, and national resources. In addition, the Department of Education (ED) would invest \$300 million to support the re-design of high schools to encourage partnerships with colleges, employers, or community partners, focusing on high-demand employment sectors such as STEM fields;
- Improving undergraduate STEM education, with the National Science Foundation (NSF) launching a \$123 million new program to improve retention of undergraduates in STEM fields and improve undergraduate teaching and learning in STEM subjects to help meet the President’s goal of preparing one million more STEM graduates over the next decade; and,
- Investing in breakthrough research on STEM teaching and learning, with approximately \$65 million for the Advanced Research Projects Agency for Education (ARPA-ED), which would allow the Department of Education to support high-risk, high-return research on next-generation learning technologies, including for STEM education.

Detailed information on the programs described above is available at:

http://www.whitehouse.gov/sites/default/files/microsites/ostp/2014_R&Dbudget_STEM.pdf

HOUSE SUBCOMMITTEE HOLDS HEARING ON FEDERAL STEM EDUCATION PROGRAMS

The House Subcommittee on Early Childhood, Elementary, and Secondary Education recently held a hearing to review the state of science, technology, engineering, and math (STEM) education in America. Among the topics of the hearing was a 2010 report by the Government Accountability Office (GAO) that found that “of the 209 STEM programs administered across 13 different federal agencies, eighty-three percent overlapped to some degree with at least one other program.”

In his remarks, Chairman Todd Rokita (R-IN) said, “Before we jump to simply create new federal initiatives, we must first evaluate our existing STEM education programs.” Rep. Rokita continued by saying, “In order for the United States to continue to be a global leader, we must find better ways to help our children pursue the jobs of the future.”

GAO Director of Education, Workforce, and Income Security Issues George Scott said, “We found that most agencies did not use STEM performance measures in a way that is clearly reflected in their agency performance plans. Also, the majority of programs had not conducted comprehensive evaluations since 2005 to determine their effectiveness.”

In the future, Mr. Scott stated, "It is imperative that the administration develop a strategic plan that aligns agencies' efforts to achieve government-wide goals, enhances the ability to determine program effectiveness and concentrates resources on those programs that advance the strategy in a cost-effective manner. Without these actions, federal agencies may spend funds in an inefficient and ineffective manner that ultimately may hinder efforts to improve STEM education."

Since the release of the GAO report, the Obama Administration has been reviewing the federal government's STEM education footprint. As discussed in the above article, in the Administration's FY 2014 budget, the Administration has proposed a very ambitious reorganization of federal STEM education programs, proposing to consolidate or eliminate 114 federal STEM programs. The resources for these programs would then be redirected to other federal STEM programs.

To review witness testimony from the hearing, or watch an archived webcast, go to: www.edworkforce.house.gov/hearings.

More information about the Administration's FY 2014 plan for federal STEM education programs can be found at: http://www.whitehouse.gov/sites/default/files/microsites/ostp/2014_R&Dbudget_STEM.pdf

FINAL NEXT GENERATION SCIENCE STANDARDS RELEASED

A new set of voluntary, rigorous, and internationally benchmarked standards for K-12 science education called the next generation science standards (NGSS) was recently released. For two years, a forty-one member writing team lead by twenty-six states and their broad-based teams worked together with partners to develop the standards, which "identify science and engineering practices and content that all K-12 students should master in order to be fully prepared for college, careers and citizenship." The standards are based on the *Framework for K-12 Science Education*, which was published by the National Academies' National Research Council in 2011.

The lead state partners include Arizona, Arkansas, California, Delaware, Georgia, Illinois, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Jersey, New York, North Carolina, Ohio, Oregon, Rhode Island, South Dakota, Tennessee, Vermont, Washington and West Virginia.

The NGSS effort was entirely driven by the aforementioned states, and no federal funds or incentives were used. The Carnegie Corporation of New York was the primary funder.

"The Next Generation Science Standards are going to pull together inquiry and practice, and recognize the role of engineering. Pulling together the cross-cutting concepts is going to be a challenge, but it's really effective pedagogy," said Ellen Ebert, Washington State's Director of Science for Teaching and Learning at the Office of the Superintendent of Public Instruction. "In Washington State we're looking at the NGSS to propel students into 21st century-we're looking at college and career readiness. This is a real opportunity to help students see the potential of science in their lives."

ASME has been supportive of NGSS since its inception, especially since it is the first time engineering content has been included in science standards in such a meaningful way. The ASME Board on Education was actively engaged in the NGSS process, serving as a key stakeholder and providing comments on two public drafts and one confidential draft of the standards.

To review the final NGSS, please visit: <http://www.nextgenscience.org>.

ASME's comments on the 2nd public draft of NGSS can be found at:
<http://files.asme.org/asmeorg/NewsPublicPolicy/GovRelations/PositionStatements/33991.pdf>

NSF REQUESTS \$7.626 BILLION FOR FY 2014 BUDGET

The National Science Foundation's (NSF) FY 2014 budget request is \$7.626 billion, an increase of \$592.69 million (8.4 percent) over the 2012 enacted level. NSF's annual budget represents 21 percent of the total federal budget for basic research conducted at U.S. colleges and universities, and this share increases to 58 percent when medical research supported by the National Institutes of Health is excluded. In many fields, NSF is the primary source of federal academic support.

The NSF Engineering Directorate (ENG) would receive \$911 million, which is a 10.3 percent increase over FY12 enacted. In the request, the following programs would be funded at the following levels:

- Civil, Mechanical, and Manufacturing Innovation (CMMI): \$224.02 million, an increase of \$20.44 million or 10 percent over FY12 enacted;
- Engineering and Education Centers (EEC): \$126.25 million, an increase of \$6.25 million or 5.2 percent over FY12 enacted; and,
- Small Business Innovation Research/ Small Business Technology Transfer (SBIR/STTR): \$177.15 million, an increase of \$24.39 million or 16 percent over FY 12 enacted;

NSF's FY 2014 priorities include the following NSF-wide investments:

- Enabled Materials, Manufacturing, and Smart Systems (CEMMSS): \$300 million, an increase of \$158.77 million or 112.1 percent over FY12 enacted;
- Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education (CIF21): \$155 million, an increase of \$77.47 million or 99.3 percent over FY12 enacted;
- NSF Innovation Corps (I-Corps): \$25 million, an increase of 17.35 million or 231.3 percent over FY12 enacted;
- Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE): \$63 million, an increase of \$42.65 million or 209.6 percent over FY12 enacted; and,
- Science, Engineering, and Education for Sustainability (SEES): \$223 million, an increase of \$65.79 million or 41.9 percent over FY12 enacted.

In the area of STEM education and related to the Administration's effort to reconfigure many federal STEM education programs, the FY 2014 NSF budget request seeks monies for the following initiatives:

- Catalyzing Advances in Undergraduate STEM Education (CAUSE): \$123 million, a brand new program to encourage undergraduate STEM education;
- National Graduate Research Fellowship program (NGRF): \$325 million, which would allow 2,700 new fellows over FY13; and,
- NSF Research Traineeships (NRT): \$55 million, a decrease of \$4.75 million or 8.6 percent under FY12 enacted.

Detailed information on NSF's FY 2014 budget request is available at:
<http://www.nsf.gov/about/budget/fy2014/index.jsp>

NSF RELEASES REPORT ON BACCALAUREATE ORIGINS OF U.S.-TRAINED S&E DOCTORATE RECIPIENTS

The National Science Foundation recently released a report detailing the large role played by U.S. research universities in the baccalaureate education of U.S.-trained science and engineering (S&E) doctorate recipients.

In 2011, the year the latest information is available, 35 percent of individuals earning S&E doctorates from U.S. universities held bachelor's degrees from foreign institutions, and 29 percent earned bachelor's degrees from U.S. doctorate-granting institutions with very high research activity.

Of the top 50 U.S. baccalaureate-origin institutions that awarded S&E doctorate degrees from 2002-2011, all but one are research universities with very high research activity.

Public universities also play a prominent role in the baccalaureate training of U.S. S&E doctorate recipients: approximately two-thirds of the institutions on the top 50 list are public institutions.

The report is available at: <http://www.nsf.gov/statistics/infbrief/nsf13323/>

ASME CO-SPONSORS 4th ANNUAL "DIVERSITY AND INCLUSION FUELS INNOVATION IN STEM" CAPITOL HILL DAY

On March 20-21, 2013, ASME cosponsored the 2013 "Diversity and Inclusion Fuels Innovation in Science, Technology, Engineering, and Mathematics (STEM)" Capitol Hill Day, which was organized by the Society of Women Engineers (SWE). While there are a number of successful science and technology advocacy days on Capitol Hill, none of them focus solely on the need to strengthen the diversity of the STEM workforce. The 2013 Capitol Hill Day events consisted of training for participants and a Capitol Hill reception on March 20th, followed by a Capitol Hill breakfast and Congressional visits on March 21st.

The event was made possible by a grant from the S.D. Bechtel Jr. Foundation. SWE President Alyse Stofer served as the event's moderator, with eighty-four attendees, including 3 ASME leaders. The day included a training session on how to advocate on Capitol Hill, including an overview of current public policy issues related to women and STEM and a discussion of the current tight fiscal climate on Capitol Hill.

Several Congressional and Administration champions of STEM and diversity-related issues were also recognized. These champions included: 2008 SWE President's Award recipient, The Honorable Eddie Bernice Johnson (D-TX); The Honorable Richard Hanna (R-NY); The Honorable Donna Edwards (D-MD); The Honorable Sheila Jackson Lee (D-TX); and The Honorable Patricia Falcone, Associate Director for National Security and International Affairs at the White House Office of Science and Technology Policy. At the reception, Representative Johnson also announced the introduction of her new bill, *The STEM Opportunities Act of 2013*, which combines two bills that she had introduced in past Congresses, the *Broadening Participation in STEM Education Act* and the *Fulfilling the Potential of Women in Academic Science and Engineering Act*.

Additional information about the 2013 "Diversity and Inclusion Fuels Innovation in STEM" Capitol Hill Day can be found at: <http://storify.com/SWEtalk/swe-coordinates-spring-capitol-hill->

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