

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION**

HEARING CHARTER

***STEM Education in Action:
Local Schools, Non-Profits, and Businesses Doing Their Part to Secure America's Future***

**Monday, April 30, 2012
10:00 a.m. – 12:00 p.m.
Bob Jones High School, Madison, Alabama**

1. Purpose

On Monday, April 30, 2012, at 10:00 a.m. at Bob Jones High School, 650 Hughes Road, Madison, Alabama 35758, the Subcommittee on Research and Science Education will hold a hearing entitled *STEM Education in Action: Local Schools, Non-Profits, and Businesses Doing Their Part to Secure America's Future*. The purpose of the hearing is to highlight local science, technology, engineering, and mathematics (STEM) education programs and partnerships and to examine their impact on the next generation of STEM professionals, local jobs, and the U.S. economy.

2. Witnesses

Dr. Camille H. Wright, Director of Secondary Instruction, Madison City Schools

Dr. Robert A. Altenkirch, President, University of Alabama, Huntsville

Dr. Marilyn C. Beck, President, Calhoun Community College

Dr. Neil Lamb, Director of Educational Outreach, HudsonAlpha Institute of Biotechnology

Mr. Andrew Partynski, Chief Technology Officer, Science Applications International Corporation (SAIC)

3. Overview

- An educated and well-trained workforce is essential to the economic prosperity of the United States. In the U.S, student mastery of science, technology, engineering and mathematics (STEM) subjects is essential for 21st century jobs. Today's employers are seeking specific skills and all levels of education to meet their needs. Communities that successfully marry these education needs with community workforce needs help stimulate the local economies.

- As of May 2010, there were over 202,000 occupations in Huntsville, Alabama, and the median annual wage was \$48,000. Eighteen percent (or 35,500) of those occupations were in STEM fields. The median wage for those jobs was \$86,000, nearly twice the average of occupations overall.¹
- Finding ways to improve STEM education activities beyond the scope of the federal government, including using best practices derived from non-federal sources, is key to the future prosperity of the Nation. A growing number of partnerships between industry, foundations, non-profits, and local and state governments recognize the importance of having an educated and skilled STEM workforce and are creatively motivating and inspiring future generations of scientists and engineers with little or no federal funding.
- The Madison City School System is located in Madison, Alabama, and serves the cities of Madison and Triana. The System consists of one high school, two middle schools, and seven elementary schools. The system has a \$60 million operating budget, employs over 600 certified staff members, and serves over 8600 students.
- The University of Alabama, Huntsville is a comprehensive regional university that provides an opportunity to earn a four year, graduate, and/or a doctoral degree.
- Calhoun Community College is a two-year, comprehensive community college that offers educational opportunities in traditional academic studies, occupational/technical programs, and workforce development and community services.
- HudsonAlpha Institute of Biotechnology is a nonprofit organization that develops high-throughput research tools that focus on why disease occurs and applies this knowledge to help patients.
- Science Applications International Corporation (SAIC) is a FORTUNE 500® scientific, engineering, and technology applications company that works to solve problems of vital importance to the nation and the world, in national security, energy and environment, health, and cybersecurity.
- The Administration's Fiscal Year 2013 (FY13) budget request includes nearly \$3 billion in spending for STEM education efforts.

4. Background

STEM Education and Public-Private Partnerships

In the U.S, student mastery of science, technology, engineering, and mathematics (STEM) subjects is essential for 21st century jobs. As other nations continue to gain ground in preparing their students in these critical fields, the U.S. must continue to explore a variety of ways to

¹ *Science and Engineering Indicators 2012 Appendix Tables*. National Science Board. p. 151.

inspire future generations. Finding ways to improve STEM education activities beyond the scope of the federal government, including using best practices derived from non-federal sources, is key to the future prosperity of the Nation.

A growing number of partnerships between industry, foundations, non-profits, and local and regional governments recognize the importance of having an educated and skilled STEM workforce and are creatively motivating and inspiring future generations of scientists and engineers with little or no federal funding. Such partnerships can provide alternative options for education activities outside the scope of public financing and delivery. When designed, implemented and run effectively, a successful partnership can increase efficiency and choice and expand access to educational activities not necessarily found in the classroom. Oftentimes, public-private partnerships allow state and local governments to leverage the specialized skills offered by certain private organizations. Likewise, industry seeks a substantial return on its investment with a highly skilled, highly motivated workforce.

Securing America's Future

Technology and innovation have kept the American economy strong in the face of increasing competition in the global marketplace. There is a significant role for American science and engineering graduates in helping this country's economy keep pace with this rapid change. As industry moves toward producing more high-tech products and employing technology intensive production methods, the need for technologically and scientifically literate individuals at all levels of the workforce will increase. Thus, the need for STEM education and training is now as important for the worker running the production process, as it is for the researcher who created that process.

Many reports find that there are not enough people with the requisite skills to fill the jobs that remain. Encouraging more high school graduates to obtain some form of postsecondary education is critical. Today, some high school graduates are lucky enough to land entry-level jobs in which they can enhance career skills through on-the-job training (for instance, machinists, carpenters, and executive assistants). Expanding opportunities for more high school graduates through vocational schools and community colleges is crucial. According to the *Job Creation and America's Future* report by the McKinsey Global Institute², employers are having trouble filling some positions because they cannot find qualified applicants. Some 40 percent of survey respondents who say that they plan to hire in the next 12 months have had positions open for six months or longer because they could not find the right applicant. More broadly, nearly two-thirds report they routinely have openings that are difficult to fill. Of these, management was the most frequently cited type of position. The most difficult occupational categories to fill were in science and engineering, followed by computer programmers and information technology workers. The growing shortage of workers with sought-after skills is reflected in compensation. Wages for engineers and architects grew by 3.5 percent annually from 2002 to 2010, compared with an average of 2.9 percent for all occupations.

² *Job Creation and America's Future*, McKinsey Global Institute, pg. 48
http://www.commerce.gov/sites/default/files/documents/2011/july/jobs_creation_and_americas_future.pdf

The importance for communities to work together as a whole to overcome this economic hurdle is becoming increasingly evident. Highly involved industry partners are a common theme among the most successful tech-training programs. Representatives from both industry and colleges claim that a willingness to devote time and resources to the partnership is crucial for the program to yield the most qualified graduates.

STEM Education and the Federal Government

Federal STEM Education Funding By Agency
(dollars in millions)

Agency	FY11 Actual	FY12 Estimate	FY13 Request	FY13 Request versus FY12 Estimate	
				\$	%
Department of Agriculture	91	88	91	3	3.5
Department of Commerce	58	55	44	(11)	-20.0
Department of Defense	153	164	153	(11)	-6.7
Department of Homeland Security	2	2	6	4	200.0
Department of Education	561	517	628	111	2.1
Department of Energy	49	48	37	(11)	-22.9
Environmental Protection Agency	20	26	20	(6)	-23.1
Department of Health and Human Services	560	560	554	(6)	-1.1
Department of Interior	1	1	1	-	-
NASA	157	149	117	(32)	-21.5
Nuclear Regulatory Commission	10	16	5	(11)	-68.7
National Science Foundation	1148	1154	1193	39	3.4
Department of Transportation	100	98	101	3	3.1
Totals:	2910	2877	2951	74	2.6

Shading indicates agencies within the Science, Space, and Technology Committee's jurisdiction

A consensus exists that improving STEM education throughout the Nation is a necessary condition for preserving our capacity for innovation and discovery and for ensuring U.S. economic strength and competitiveness in the international marketplace of the 21st century. The National Academies *Rising Above the Gathering Storm* report placed major emphasis on the need to improve STEM education. This recommendation was embraced by the House Science, Space, and Technology Committee following the issuance of the report and was included in the 2007 *America COMPETES Act*. The 2010 *America COMPETES Reauthorization Act* continues this emphasis.

The Fiscal Year 2013 (FY13) budget request proposes \$3 billion across the federal government for STEM education, a 2.6 percent increase over FY12. Administration priorities include \$775 million for NIH awards to prepare individuals for careers in the biomedical, behavioral, and social sciences; \$80 million for training an additional 100,000 effective STEM teachers over the

next 10 years through the Department of Education (ED); and \$176 million for minority programs at ED, the National Science Foundation (NSF), and National Aeronautics and Space Administration (NASA).

As required under the America COMPETES Reauthorization Act of 2010, the Office of Science and Technology Policy's (OSTP) National Science and Technology Council Committee on STEM Education submitted its first annual report, including an inventory of federal STEM education activities, in conjunction with the FY13 budget request. A full 5-year strategic plan is expected Summer 2012.

The annual report identified \$967 million or 28 percent of all federal STEM education funding as being spent on activities that target the specific workforce needs of science mission agencies. The remaining 72 percent of funding is spent on broader STEM education efforts primarily at NSF (47 percent) and ED (40 percent). Of the 252 federally-funded STEM activities identified in the report, none were found to have the same objectives, target audiences, products, or STEM fields of focus. The report acknowledges that "this conclusion should not be interpreted to mean there are no opportunities for improving the alignment, deployment, and efficiency of federal STEM education investments."³

The Government Accounting Office (GAO) has completed a similar report, which identified 209 programs, also totaling over \$3 billion. While this report does not identify specific duplication, it does find overlap with many of these programs.

The Science, Space, and Technology Committee will continue to hold oversight hearings and briefings on STEM education activities and will closely examine the scope and findings of both the OSTP and the GAO federal STEM education inventories, as well the upcoming OSTP strategic plan.

³ *Coordinating Federal Science, Technology, Engineering, and Mathematics (STEM) Education Investments: Progress Report*. Committee on STEM Education, National Science and Technology Council, p. 10.