



October 30, 2015

Senator Cory Gardner
Senator Gary Peters
Commerce, Science and Technology Committee
US Senate
Washington, DC 20510

Transmitted via email to: SciencePolicy@commerce.senate.gov

On behalf of the 34,000 individual members of the Society of Women Engineers (SWE), thank you for your efforts to update the America COMPETES Act. I am pleased that you have actively solicited input from important stakeholders like SWE as part of your bipartisan approach to reauthorizing a bill that is so important to the research enterprise and the country's innovation economy. Updating the bill will improve science and technology policies at government agencies like the National Science Foundation, the National Institute of Standards and Technology, and the White House Office of Science and Technology Policy, among other agencies, and will help ensure that federal STEM (science, technology, engineering and mathematics) education programs are supporting the country's STEM workforce needs.

Over the last 50 years, more than half of America's sustained economic growth was created by the five percent of the workforce who create, manage, and maintain the processes and products of innovation: engineers, scientists, and advanced-degree technologists. SWE strongly believes that federal research and STEM education policies support a thriving workforce and the place of women in it. Congress, the White House, state and local educators, the research enterprise, business and philanthropy leaders all talk publicly about the importance of STEM and STEM instruction. That message must be conveyed in a revised America COMPETES Act.

We are pleased to offer the following responses to the questions you have posed to the STEM education community:

- **How does the availability of STEM graduates affect corporate decisions about where to conduct research and manufacture goods?**

It goes without saying that the country's most innovative companies put a great deal of thought into where they are located and why. The four metro areas with the fastest tech job growth over the last decade are all outside of Silicon Valley and located in states such as Texas, North Carolina and Tennessee. What is unique about these areas are the level of support they provide to engineers and aspiring STEM professionals. This is why the Houston metro area ranks second to the Bay area in the proportion of engineers in its workforce and why Raleigh has had a 24% increase in STEM jobs over the past decade. These decisions are most directly affected by skills and knowledge of the local workforce—SWE argues that workforce diversity should also be a significant consideration. Women now comprise nearly 60 percent of all undergraduate college students, and nearly half of all master's, doctoral, law and medical students. Yet women remain underrepresented in engineering and the STEM disciplines, earning only 20 percent of all bachelor's

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degrees granted in engineering and physics, and a decreasing share of bachelor's degrees in mathematics and computer science. Of course, some schools are doing a better job than others in attracting and retaining women in STEM programs of study. These women bring skills and perspective important to innovation and research, and corporations would be well served by determining which colleges and universities are producing high-quality female professionals, locating themselves near those institutions and taking advantage of federal and private programs and partnerships to attract these women to their businesses and nurture and develop their talents and gifts.

- **How can the Federal Government, in coordination with the private sector and academia, best prioritize STEM education investments and respond to academic and private sector workforce needs?**

To remain competitive in a global economy, the U.S. must develop its technological literacy, talent, and expertise across all sectors of society. Policymakers should prioritize investments in private sector and academic expertise in STEM disciplines that promote careers in growth fields for underrepresented populations. For example, the Federal Government recently awarded the Alabama State University a \$750,000 grant to train students and teachers in nano-biotechnology just as reports showed an increase in manufacturing across six southeastern states. Policymakers should also step up enforcement of Title IX with regard to STEM disciplines, and fund programs that will help educate students and their parents, and STEM faculty, of their rights under the law. Educational institutions should fulfill their obligations under the law; examine their institutional policies, procedures or practices for gender bias; provide suggestions for areas to examine when evaluating programs for gender bias; and make this information accessible to the public. Lastly, federal funding agencies should fulfill their monitoring and enforcement obligations under the law, and make this information available to the public. Public disclosure will ensure that investments are targeted in such a way to produce diversity in engineering and other STEM fields.

- **What factors might the Federal Government consider when measuring the impact of the Federal STEM education portfolio and expanding, modifying, or replacing individual programs?**

Again, compliance with Title IX should be considered in targeting precious federal dollars. Further, the efficacy of a STEM education program should be considered, although the federal portfolio should reflect the need for many programs that reach many audiences with varied goals. A program that hopes to connect mentors with young people cannot be judged in the same way a program that invests in STEM teachers is. In addition, SWE strongly believes that the supports that young girls and women studying the STEM fields need to be successful should be reflected throughout the portfolio. Whether it's eliminating gender bias in math instruction in elementary grades or ensuring that young women are exposed to the problem-solving attributes of engineering in the first year of their undergraduate studies, it's crucial that programs consider their goals and results in ways that allow for improvement versus being at risk for cuts or elimination.

- **How can the Federal Government best identify and encourage implementation of promising, research-driven STEM education best practices and teaching models?**

Ongoing communication with the stakeholders that represent or depend on the STEM workforce is crucial to identifying and encouraging implementation of promising, research-driven STEM education best practices. The field is nimble and responsive in ways the federal government simply isn't, and agencies can learn from them. We are acting on this belief at SWE via our Invent It. Build It. Initiative in partnership with the ExxonMobil Foundation. We believe the best way to learn about something is to jump in and experience it. That is what Invent It. Build It. is all about. Invent It. Build It. is a hands-on engineering experience for middle school girls with a parallel program for parents and educators. The program actively engages SWE, parents of young would-be engineers, educators responsible for inspiring the next generation of engineers and a business that will rely on a strong engineering workforce. The federal government should carefully consider input from stakeholders and end goals when it identifies and implements teaching models as we have.

- **What actions can the Federal Government, private sector, and academia pursue to broaden STEM participation and provide education and research opportunities to students from all backgrounds?**

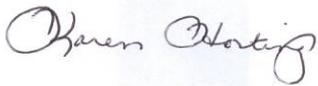
SWE strongly believes that the Federal Government can broaden STEM participation and provide education and research opportunities to students from all backgrounds by: enlarging America's talent pool by greatly improving K-12 STEM education through the recruitment, training, and retention of STEM teachers; expanding the STEM pipeline, especially targeting women and minorities, by increasing the number of students who pursue STEM coursework; and, making the United States the most appealing setting for study and research to cultivate, recruit, and retain top quality students, scientists, and engineers from within the United States and throughout the world. More specifically, the Federal Government can incentivize private sector and academia to help promote these goals. While the Administration's Educate to Innovate Campaign has highlighted industry efforts, and arguably encouraged additional private and philanthropic efforts, an exemplary public private partnership is the Memorandum of Understanding between the National Aeronautics and Space Administration (NASA) and the Girl Scouts of the United States America (GSUSA) which calls for the two organizations to work together. That effort has provided an opportunity for 17,000 leaders and girls to experience fun, hands-on NASA STEM activities that inspire young ladies to pursue careers in STEM disciplines. A revised COMPETES Act should encourage similar collaborations.

Founded in 1950, SWE is a not-for-profit educational and service organization that empowers women to succeed and advance in the field of engineering, and to be recognized for their life-changing contributions as engineers and leaders. SWE is the driving force that establishes engineering as a highly desirable career for women through an exciting array of training and development programs, networking opportunities, scholarships, and outreach and advocacy

activities. Ensuring the future of women in engineering includes nurturing interest and success in engineering from the earliest years, through their undergraduate careers and beyond.

If you or your staff have any questions about SWE's legislative goals and priorities, please do not hesitate to contact the organization's Washington, DC, representative, Della Cronin, at dcronin@wpllc.net or 202.349.2322. SWE thanks you for your attention to these views and looks forward to working with you and your colleagues as this process continues.

Sincerely,

A handwritten signature in black ink that reads "Karen Horting". The signature is written in a cursive style and is positioned above the typed name and title.

Karen Horting
Executive Director & CEO

cc: Senators Thune and Nelson