2015–2016 GSA-USGS Congressional Science Fellow Final Report

Geoscience COMPETES

Karen Paczkowski

The America COMPETES Act (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science) was introduced in 2007 in response to the National Academies of Science report, "Rising Above the Gathering Storm: Engaging and Employing America for a Brighter Economic Future." The report warned that the U.S. was falling behind other countries in federal science, technology, engineering, and mathematics (STEM) investment, and that America's position as a global leader in discovery and innovation was eroding.

The America COMPETES Act set visionary goals for STEM research and education, recognizing that U.S. leadership in discovery and innovation depends on robust support for basic science research. The act set in motion a plan to double the funding for the National Science Foundation (NSF), National Institute of Standards and Technology (NIST), and Department of Energy (DOE) Office of Science by 2017. COMPETES passed with overwhelming bipartisan support in both the U.S. Senate and the House of Representatives. However, actual funding levels have fallen far short of the act's original visionary trajectory, and since the law's expiration in 2013, Congress has been deeply divided on a new authorization bill.

One particular sticking point has been the proposal to give Congress more direct control over funding of NSF directorates. A new version of COMPETES introduced in 2015 in the House would reduce funding for the geosciences and social sciences, while other sciences would see funding increases. In response, the Senate instead drafted a bill to recapture the original vision of the 2007 COMPETES Act. A bipartisan Innovation and Competitiveness Working Group held a series of stakeholder roundtables to explore federal research and development policy priorities. The working group was led by Senators Cory Gardner (R-CO) and Gary Peters (D-MI), both members of the Senate Committee on Commerce, Science, and Transportation, which is the Committee responsible for reauthorizing funding levels and policy directions for the federal agencies covered by COMPETES.

U.S. STEM research and education has been a key cause of mine since my earliest forays into policy as a graduate student, and Senator Edward J. Markey's (D-MA) office, where I served as the GSA-USGS Congressional Science Fellow, has contributed to the creation of this new bill. In my role as a Fellow I had the opportunity to work on this legislation and draft the Senator's statements for hearings.

During a hearing on 11 May 2016, Senator Markey stated, "Our funding decisions for basic science research should be guided by the possibilities promised by science and technology, and not by politics. A recent version of COMPETES, released and passed by Republicans over in the House, has singled out certain sciences as winners and other sciences as losers, authorizing funding increases for the former and decreases for the later. This narrow view of the scientific process ignores how advances in one area of science drive breakthroughs in seemingly unrelated fields. Science operates in a complex research ecosystem, and legislation should support the full range of scientific inquiry." Senator Markey also entered two letters into the congressional record. The first letter, signed by 100 universities, research institutions, and scientific professional societies, and the second letter written by 19 geoscience organizations including GSA, the American Geophysical Union, and the American Association of Petroleum Geologists, both provide concrete examples of how geoscience plays an essential role in tackling national challenges in water and mineral resources, energy independence, environmental issues, Earth's climate and ocean system, and mitigation of natural hazards. By entering these letters into the congressional record during the hearing, Senator Markey highlighted the important role geoscience plays in the U.S. innovation ecosystem and economic health.

On 22 June 2016, the Senate revision of COMPETES was released. The bill, renamed the American Innovation and Competitiveness Act (S. 3084), took the findings the Senate had gathered from the STEM research, education, and industry communities and laid out a bipartisan vision for U.S. STEM research and education. It authorizes a 4% annual funding increase for basic STEM research, in alignment with the American Innovation Imperative, a call to action led by nine large U.S. corporations and signed by more than 500 leading organizations from American industry, higher education, and science and engineering organizations. The bill also defends the NSF peer review process as a gold standard and authorizes programs to improve tech-to-market transfer and manufacturing practices to get more American discoveries out of the lab and into people's lives.

Working with Massachusetts' constituents like the Museum of Science in Boston, Senator Markey's office noticed that although the bill supported STEM education in university settings, it lacked a section highlighting the importance of informal STEM education. Informal STEM education is an important gateway for inspiring individuals to pursue careers in STEM fields, and is especially important for the geosciences. My own dedication to understanding the natural world began at a young age with visits to museums and parks, and exploring the outdoors. Through Senator Markey's office, I worked closely with the Museum of Science, committee staff, and legislative counsel to draft an amendment to the American Innovation and Competitiveness Act. The amendment allows NSF to support programs like the National Informal STEM Education (NISE) Network, a successful, decade-long program that has connected over 500 organizations by pairing informal STEM education organizations with cutting-edge research institutions to ensure the public gets the most

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up-to-date science. We garnered support for the amendment among the Senate offices by explaining the importance of informal STEM education and by detailing for each Senator on the Commerce Committee how their state has benefitted from the NISE Network. The amendment was passed on to the bill in the managers' package during the committee markup on 29 June 2016. The bill is now making its way through the legislative process with a vote possible this fall.

This article will be my final GSA-USGS Congressional Science Fellow Report. As my fellowship comes to a close, I would like to thank both GSA and the USGS for supporting my year in the Senate. It has truly been a privilege to advance the importance of geoscience, and to help bring the wonder of discovery and innovation to all citizens. Please feel free to contact me if you have any questions. I'm always happy to talk about the intersection between science and policy, and am eager to help scientists enter the science policy world.

The manuscript is submitted for publication by Karen Paczkowski, 2015–2016 GSA-USGS Congressional Science Fellow, with the understanding that the U.S. government is authorized to reproduce and distribute reprints for governmental use. The one-year fellowship is supported by GSA and the U.S. Geological Survey, Department of the Interior, under Assistance Award No. G15AP00128. The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. government.
Paczkowski works in the office of Senator Edward J. Markey (D-MA) and can be contacted by e-mail at karen.paczkowski@gmail.com.

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2016–2017 GSA-USGS Congressional Science Fellow Named

Kirstin L. Neff

Kirstin L. Neff is thrilled to serve as the 2016–2017 GSA-USGS Congressional Science Fellow. She has accepted a placement in the office of Senator Martin Heinrich (D-NM), where she will be working on water and public lands issues.

Kirstin earned a B.A. *cum laude* from Wellesley College in 2008, with majors in political science and Russian language and literature. She wrote a senior honors thesis on U.S. immigration policy and received an award from the economics department for her paper on tariffs in the cement industry. She conducted ecological research on Lake Baikal in Siberia and studied abroad in St. Petersburg and Moscow, Russia. While at Wellesley, she was a managing editor of the *International Relations Council Journal*, a student-run peer-reviewed publication, and co-president of the College Democrats.

Kirstin received an M.S. (2013) and Ph.D. (2015) in hydrology from the University of Arizona in her hometown of Tucson. She was awarded a U.S. Environmental Protection Agency Science to Achieve Results (EPA STAR) Fellowship to support her doctoral research, which used stable water isotopes to characterize the seasonality of groundwater recharge across the Basin and Range Province of western North America. Her research has implications for climate change and development impacts to aquifers. Most recently, she was a postdoctoral scholar at NASA's Jet Propulsion Laboratory, working on satellite radar measurements of subsidence in California's Central Valley.

Kirstin has expertise in hydrologic modeling, water policy, remote sensing and spatial analysis, K–12 science outreach, and international relations. She has extensive experience in communicating scientific and technical information, having worked as a technical writer in the engineering sector and as a mentor scientist for several outdoor education programs. She speaks Spanish and Russian.

She is passionate about building a scientifically literate workforce through STEM education and conserving natural resources through public outreach and scientifically sound policymaking. In her fellowship year, she is looking forward to learning about the legislative process and further developing her science communication skills while contributing her scientific expertise to the policymaking process.