

August 17, 2015

The Honorable Cory Gardner  
U.S. Senate Committee on  
Commerce, Science, and Transportation

The Honorable Gary Peters  
U.S. Senate Committee on  
Commerce, Science, and Transportation

via [SciencePolicy@commerce.senate.gov](mailto:SciencePolicy@commerce.senate.gov)

Dear Senators Gardner and Peters,

On behalf of Boston University (BU), thank you for the opportunity to offer input on how to maximize the impact of federally supported basic research. Basic research supported by federal agencies such as the National Science Foundation (NSF) and the Department of Energy (DOE) is the foundation for efforts to address the most pressing issues facing our nation—in areas ranging from healthcare and energy to manufacturing and national security. The innovations that result from federally-funded research at our nation's universities drive economic growth and change our understanding of the world around us. Strong federal support for fundamental research across all scientific and engineering disciplines will ensure that the United States maintains its competitive edge.

BU is awarded more than \$350 million in sponsored research awards annually; as a result, there are more than 240 companies currently developing and selling products based on research conducted at Boston University. Below you will find our suggestions for addressing the questions you posed to stakeholders.

***What functions should the federal government, academia, and the private sector be encouraged to perform in driving the U.S. "innovation ecosystem" and how can they strengthen their partnerships to ensure the U.S. position as a global innovation leader?***

- ***Invest in Basic Research:*** Congress should demonstrate strong support for basic research by authorizing robust funding levels for NSF and the DOE Office of Science. Fundamental research is the foundation for new knowledge, tools, and techniques that can transform society. For example, the BU Photonics Center received an NSF Industry/University Cooperative Research Center (I/UCRC) award that enables the University to partner with industry to translate the results of biophotonics research into technologies for disease diagnosis and food and water safety.

- Support NSF Programs to Recruit and Retain Underrepresented Minorities and Women in Science: Scientific inquiry benefits from a wide variety of perspectives to ensure that our best ideas are brought to fruition and that the U.S. maintains its leadership in the science, technology, engineering, and mathematics (STEM) fields. It is in the national interest for government, academia, and industry to work together to recruit underrepresented populations into STEM majors and ensure their matriculation and post-degree success, leading to a diversified scientific workforce.

We urge the Committee to support NSF programs to increase STEM diversity. At BU, NSF's Research Experiences for Undergraduates (REU) and Research Experiences for Teachers (RET) programs make hands-on, summer laboratory experiences available to both minority undergraduates and teachers who work with underserved student populations. Congress should provide sufficient support for these and other programs, such as NSF ADVANCE, which aims to increase the involvement of women in STEM careers.

- Expand NSF's Robert Noyce Teacher Scholarship Program: Boston University utilizes the Noyce program to incentivize talented STEM undergraduates to become elementary and secondary school teachers. Putting teachers with a solid STEM background in the classroom is an excellent way to inspire young people to fall in love with science and become our future scientific workforce. We encourage Congress to bolster support for the program.

***How can the federal government best structure, coordinate, and/or prioritize its R&D investment portfolio to provide predictability for research initiatives, facilitate the discovery of new knowledge, drive lasting economic growth, and address critical emerging challenges?***

- Encourage Interdisciplinary Research: Collaboration among scientists from different disciplines can lead to unprecedented technological breakthroughs, as we are witnessing in fields such neuroscience, photonics, and data science. For example, BU neuroscientists and mathematicians are collaborating to understand the brain mechanisms that cause epileptic seizures and to develop models that can identify a patient's consciousness cycles to prevent mid-surgery awakenings. NSF's interdisciplinary Research at the Interface of the Biological, Mathematical and Physical Sciences (BioMaPS) and Physics of Living Systems (PoLS) programs make these types of collaborations possible.

Going forward, BU researchers believe there are opportunities for climate scientists, engineers, life scientists, geographers, and social scientists to collaborate in interdisciplinary domains such as infectious disease and



behavioral science. We hope Congress will continue to prioritize such research in order to unleash innovative tools and technologies that benefit national security, society, and the economy.

- Support "Fund the Scientist" Models: The NSF and DOE should pilot funding models similar to the Howard Hughes Medical Institute approach that provides multi-year support for an individual scientist to pursue breakthrough science, rather than simply a specific project. The National Institutes of Health is beginning to experiment with including this "fund the scientist" grant mechanism in its portfolio, and we believe it is worth exploring by other federal agencies.

***What steps can the federal government take to maximize the research obtained for each dollar of federal investment?***

- Reduce Regulatory Burden: Researchers face an increasingly complex and at times conflicting network of federal regulations and reporting requirements. While it is important that taxpayer dollars are wisely and ethically spent, the Federal Demonstration Project now estimates that faculty spend 42% of their research time on administrative paperwork. The result can be less focus on a faculty member's core mission to research and to educate. We support the recommendations of the National Science Board to:
  - Modify proposal requirements to include only information essential to a proposal's scientific merit;
  - Eliminate or adjust ineffective regulations such as safety precautions that may be applicable to industry but differ in a university setting; and
  - Establish a permanent, high-level, interagency committee dedicated to reducing duplicative or wasteful requirements across the federal government, among other proposals.

By reducing burden, Congress could focus resources more directly on the conduct of research.

- Develop "Proof of Concept" Funding: Some of our nation's promising basic research results do not reach their full potential as scientists struggle to make a successful transition from preliminary research to full-scale, marketable technology. Congress should encourage NSF and DOE to pilot programs that support researchers with a promising idea in bridging the so-called "valley of death" between the conduct of basic research and launch of a technology in the marketplace.

- Advance Computational and High Performance Computing: Boston University welcomes the recently announced National Strategic Computing Initiative, and looks forward to partnering with the federal government to maximize the nation's large scale computing capabilities. BU's Rafik B. Hariri Institute for Computing and Computational Science & Engineering leads the Massachusetts Open Cloud, a transformative, collaborative model for public cloud offerings, and recently received NSF's Secure and Trustworthy Cyberspace Frontier award for its Modular Approach to Cloud Security project.

***What principles should guide federal agencies in ensuring adequate transparency, oversight, and rigor in the process of funding, conducting, reviewing, and reproducing research?***

- Support All Science: BU is proud of our stellar research across all disciplines, and recognizes that the discoveries made through social, behavioral, and economic sciences have profound influence on society. For example, a BU economist is using NSF funding to investigate inflation dynamics during the 2008 financial crisis; his findings could have far-reaching implications for responding to future economic setbacks and setting monetary guidelines. Social and behavioral science leads to more effective policymaking, as well as innovative technologies that help drive our economy forward. Any COMPETES reauthorization should include robust support for research across all scientific disciplines.
- Maintain NSF's Merit Review Process: The NSF merit review process is the scientific gold standard around the world. The agency now requires new award abstracts to better communicate research to the public and improve transparency at the agency. This transparency must be balanced with peer reviewer confidentiality to safeguard the intellectual rigor of the system and ensure we are funding the best science. Congress should tread carefully when considering changes to NSF's highly regarded peer-review process.

***How can the results and value of federally-funded research be better communicated across the research community and to the private sector and general population?***

- Federally-funded research is the crown jewel of U.S. innovation. We urge Members of Congress to emphasize its value when speaking with constituents, delivering policy speeches, and meeting with representatives of other nations. Similarly, universities must do their part to clearly explain the importance of federally-funded research to the public. BU provides training to our researchers on how best to communicate their work with non-scientific audiences and industry partners. In addition, our Research and Marketing &

August 17, 2015  
Page Five

Communications offices work together to convey our exciting breakthroughs to the world (see: <http://www.bu.edu/research/>).

Once again, thank you for considering Boston University's input on these very important issues. We look forward to working with you as Congress develops legislation to support America's research enterprise.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert A. Brown". The signature is fluid and cursive, with the first name "Robert" being more prominent.

Robert A. Brown  
President

cc: Chairman John Thune  
Ranking Member Ben Nelson