

**Testimony Regarding the FY 2014 Budget Request
Submitted March 15, 2013 to the
Subcommittee on Commerce, Justice, Science, and Related Agencies
U.S. House Committee on Appropriations by
Thomas C. Skalak, Vice President for Research
University of Virginia**

This testimony is submitted for the record on behalf of the University of Virginia, a non-profit public institution of higher education located in Charlottesville, VA. The University sustains the ideal of developing, through education, leaders who are well-prepared to help shape the future of the nation. In fiscal year (FY) 2012 the University received research awards totaling over \$307 million from all sources (federal and state agencies, industry and private foundations). Of this amount, \$203 million, or 66 percent, came from federal grants and contracts.

As the Vice President of Research and on behalf of the University of Virginia (UVa), I urge the Committee to support the highest possible funding levels for the federal science agencies in the FY 2014 budget, including for the National Science Foundation (NSF), Space Technology at the National Aeronautics and Space Administration (NASA), NASA Aeronautics, and proposed manufacturing programs at NSF and the Department of Commerce. I also urge you to support robust funding for NASA Science and the Economic Development Administration (EDA).

Investments in these agencies will help universities make new discoveries at the frontiers of knowledge, conduct critical research, design and engineer new technologies that solve national challenges, and power our innovation-based economy.

UVa is aware of the difficult budgetary decisions facing the Congress in the coming years, yet federal investments in science and engineering remain absolutely critical to spurring innovation and driving the economy. According to *Science Works for US*, a project of the Association of American Universities (AAU), the Association of Public and Land-grant Universities (APLU), and The Science Coalition, federal funding for research is now at the lowest level (in real dollars) in the past decade.

More than half of our economic growth in the United States since World War II can be traced to science-driven technological innovation. The platform for this innovation has been scientific and engineering research conducted at universities and supported by the federal government through agencies such as NSF, NASA, and the Department of Commerce.

Considering the tight budget conditions that the Country faces, it is imperative to continue to make strategic investments in critical areas of science and engineering that will produce technological innovation and societal benefit. For example, UVa supports the Advanced Manufacturing Partnership to power our state's manufacturing base and help advance technologies to address challenges in energy, health, and security.

In Virginia, UVa has partnered with Virginia Tech and Virginia State University to create the Commonwealth Center for Advanced Manufacturing (CCAM) at a new Rolls-Royce manufacturing site in an impoverished section of Prince George County. Along with private partners such as Rolls-Royce North America, Siemens, and Canon, this research facility is spurring innovations that can be applied directly to real manufacturing processes and technologies. CCAM also trains students to become the next generation of manufacturing technology leaders.

National Science Foundation

The University of Virginia supports the highest possible funding level for the National Science Foundation (NSF) in FY 2014. Ground-breaking discoveries that spur innovation and help solve critical societal challenges would not be possible without the foundational work of basic research. Universities conduct most of the basic research in this country, and NSF is a critical funder of basic research in engineering and computational, physical, environmental, social, and biological sciences. In the last fiscal year, researchers at UVa received over \$24 million in competitive NSF grants that support research in all areas of science and engineering.

NSF funding has allowed faculty and students at UVa to conduct ground-breaking research to improve our nation's wireless networks, advance technologies to transform solar energy into liquid fuel, develop cutting-edge heating and cooling technologies, understand how environmental change impacts coastal ecosystems, and revolutionize tissue regeneration of nerves and ligaments, among many other initiatives. Funding has also supported critical efforts to increase the number of women and minority students in STEM fields, enhance teacher training, develop improved curricula for elementary school students in math and engineering, and extend pathways for community college students to earn four-year degrees in fields such as engineering. NSF is at the forefront of efforts to ensure that basic research is transformed into products and knowledge that improve everyday life and grow our innovation economy. UVa has utilized NSF funding to create improved networks between the university and industry in fields such as bioengineering to enhance innovation and create new jobs.

Specifically within NSF, we support robust funding for Research and Related Activities, which funds ground-breaking research across the NSF directorates, and Education and Human Resources, which funds critical education efforts.

Economic Development Administration (EDA)

I urge the Committee to provide the highest possible funding for the Economic Development Administration (EDA). EDA's mission is to lead the federal economic development agenda by promoting innovation and competitiveness, preparing American regions for growth and success in the worldwide economy. No other federal agency provides funding for local, state, and regional partners to create sustainable economic drivers, such as research parks.

UVa supports continued investments in EDA's i6 program. In September 2012, UVa partnered with all universities in the state and many corporate partners to establish the Virginia

Innovation Partnership (VIP) with \$1 million in funding from EDA's i6 program. VIP, a proof of concept funding network to support rigorous market-facing development of new technology across the Commonwealth of Virginia, links six planning districts, all of Virginia's research universities, five community colleges, over 15 corporate partners, and ten business incubators, as well as several economic development agencies and crowd-funding organizations. This year's funded projects include information technology solutions to traffic congestion, cybersecurity measures for preventing internet/web attacks, development of a vaccine for Lyme Disease, and a revolutionary method for cooling computer chips in data centers with addressable annual markets and job creation valued at over \$40 billion. Targeted investments such as EDA's i6 have an outsized impact on driving forward the nation's innovation economy.

UVa supports robust funding for a new Regional Innovation Strategies program, as authorized in the America COMPETES Act. This program would help build regional innovation clusters based on the strength of local communities and regions through competitive awards for activities relating to the formation and development of regional innovation clusters, including research parks.

National Aeronautics and Space Administration (NASA)

UVa urges the Committee to include the highest possible funding for NASA Science in FY 2014. Funding for NASA Science is critical to the exploration of our planet and universe that provides inspiration for future generations, the development of cutting-edge technologies, and knowledge to protect our country from hazards such as national disasters. ***UVa also supports funding of the Space Technology program.*** This program catalyzes partnerships between NASA, universities, and industry to develop advanced technologies in areas such as communications, sensors, robotics, materials, and propulsion.

In addition, ***UVa supports the highest possible funding for NASA Aeronautics.*** Aeronautics research funding supports efforts to develop new materials, alternative fuels, and the Next Generation Air Transportation System. Aeronautics is also a critical funder of hypersonics research that could eventually revolutionize how NASA launches payloads into space and how the US Air Force conducts long-range missions. UVa is home to the National Center for Hypersonic Combined Cycle Propulsion, a state-of-the-art center, funded through NASA Aeronautics, working to provide the analytical foundation for the development of advanced engines for a future hypersonic aircraft. Sustained funding for NASA Aeronautics ensures the nation's leadership in next-generation flight platforms.

As a member of the National Institute of Aerospace (NIA), a non-profit research and graduate education institute, UVa and other consortium members work with the NASA Langley Research Center to conduct leading-edge aerospace and atmospheric research, develop new technologies for the nation and help inspire the next generation of scientists and engineers.

Investing in U.S. “Innovation Security” – All Agencies

UVa recommends that Congress and the Administration consider the creation of a new program at each of the federal science agencies to support proof-of-concept research and development at universities. A new program was authorized at the National Institutes of Health (NIH), based on this concept, as part of the 2011 Small Business Innovation Research/Small Business Technology Transfer Research Reauthorization and UVa recommends its expansion to other research agencies. It is important to note that this initiative should not be for later stage product development or for more applied pre-commercial research; rather, it should be for true proof-of-concept research or prototype development best conducted in the settings where discoveries and innovations perceived to have commercial application are first developed. Such funding should be allocated after rigorous evaluation by carefully assembled panels of local experts in translational and proof-of-concept research – this is key to scaling success to the national level. Among the criteria for awards under this initiative should be the demonstrated willingness and capability of a university in engaging project management boards comprised of industry, start-up, venture capital, technical, and business/market experts. Additionally, successful applicants for this funding should be required to prove their performance and agility in managing translational projects stressing market-relevant milestones, in conducting rigorous oversight and management of such projects, and in their willingness to withdraw funding from projects failing to reach essential milestones so that funding can be re-allocated to projects with more potential.

UVa is devoting significant institutional resources to the process of bringing discoveries to the marketplace and has experienced considerable success. An independent audit has shown that our proof of concept funds have led to a 7:1 return on investment after five years and a 42:1 return on investment for the top ten percent of portfolio projects. We attribute UVa’s success in proof-of-concept research to the now nationally well-known Coulter process, involving a very diverse review board, in-person final review sessions, milestone-driven projects, quarterly reporting that is effective in re-directing projects, the “will to kill” projects or re-direct funds if insurmountable obstacles occur, and excellent networking to the venture capital and private sector. The key differentiators of this process as we employ it at UVa versus most prior proof-of-concept funding mechanisms is the in-person diligence on the involved people and ideas, dedicated project manager, the diverse composition of the board, the urgency of quarterly reviews, and will to re-direct funds as results emerge.

Conclusion

I would like to thank the Committee, specifically Chairman Wolf, for your support of the federal science agencies in these tough budgetary times. While we understand that overall funding is greatly constrained, I hope that you will choose to support strategic increases for the federal science agencies that spur innovation, strengthen our technology and economic base, and train the next generation of scientists and engineers. Further investment in discovery science and commercialization will help create the new discoveries and technologies essential for long-term economic growth. I thank you for your consideration of these important issues.