

Carnegie Mellon University

OVERVIEW OF THE IMPACT OF THE AMERICAN RECOVERY AND REINVESTMENT ACT ON CARNEGIE MELLON UNIVERSITY

REMARKS PREPARED FOR THE PENNSYLVANIA STIMULUS OVERSIGHT COMMISSION JULY 22, 2010

Tim McNulty
Associate Vice President for Government Relations

On behalf of President Cohon and the Carnegie Mellon community, I would like to thank the members of the Commission for the opportunity to review the impact of the American Recovery and Reinvestment Act (ARRA) on the University's ability to fulfill its research and educational mission and contribute to the vitality of Pittsburgh and Pennsylvania. My comments will highlight that the competitive funds made available through ARRA have enabled our faculty and students to advance significant scientific research in a host of fields, made tangible impacts on moving research toward business and job creation and enhanced collaboration between Carnegie Mellon and our partners throughout the region.

Let me begin with some background on Carnegie Mellon. The institution was founded by Andrew Carnegie in 1900 as a technical trade school for the sons and daughters of steelworkers. From this beginning, CMU has evolved into a global research institution with top-ranked programs in computer science, engineering, business and the arts. CMU operates the largest robotics and cyber security research programs in the United States. Carnegie Mellon has been home to 17 Nobel Prize winners and dozens of Oscar, Emmy and Tony recipients. There are 10,000 students at our Oakland campus and satellite

research and education facilities on both the Allegheny and Mon rivers. The University also delivers educational programs in Europe, Asia, the Middle East and Australia.

Carnegie Mellon retains the focus on practical problem solving and the commitment to the Pittsburgh region that was so central to its founding. In no area is this most evident than in the commitment to economic development that begins with President Cohon and extends throughout the university. A recent analysis conducted by the Association of University Technology Managers (AUTM) ranked CMU second in the nation in turning federal research funds into new companies. This focus on creating new companies has been matched by an aggressive effort to attract firms to the region that has helped to bring Google, Intel, Caterpillar and others to Pittsburgh.

To date, Carnegie Mellon has received over \$30 million in ARRA funding, approximately 10 percent of the university's annual research budget. The funding is supporting over 75 projects. Funds have been received from a variety of agencies including the National Science Foundation, the U.S. Department of Labor, the Department of Health and Human Services, the National Institutes of Health, the Department of Energy and the National Endowment for the Arts. These projects will be unfolding over the next two to three years.

The efforts of our faculty and students to compete for ARRA funding consist of activities in three major strategic areas. These three strategic thrusts include efforts to secure funding for research in the areas where the University is a recognized national and global

leader, proposals designed to enhance opportunities to advance education, community and economic development and, finally, proposals in which Carnegie Mellon has sought to enhance the competitiveness of regional and state partners in seeking stimulus funding. My remarks today will highlight developments in each of these three areas.

The primary focus of Carnegie Mellon's stimulus strategy has been to compete for funding to support its major research programs. The ARRA investment in research comes after a period in which the federal government's investment in basic research had been declining in both real terms and as a percentage of Gross Domestic Product. Recognizing the critical contribution of basic research to stimulating long term job and wealth creation, the inclusion of research funding was vital to create a balanced package of investments that could foster a sustained recovery.

Basic research funding is also a near term job creator. Studies have suggested that every \$1 million of research funding produces approximately 30 direct and indirect jobs. To provide a glimpse on this dynamic, I would highlight the experience of a major research project that pre-dates the stimulus funding but is illustrative of the role of basic research funding as a job creator: The Carnegie Mellon team that successfully competed and won the competition hosted by the Defense Advanced Research Projects Agency's (DARPA) Urban Grand Challenge for unmanned vehicles involved over 30 companies ranging from major industrial firms to small software companies and local machine shops.

Stimulus funding won by Carnegie Mellon researchers is supporting projects aimed at advancing breakthroughs in the life sciences, improving energy efficiency and supporting the competitiveness in major sectors such as the aerospace industry. The following is a summary of competitive grants received by our faculty:

- One of the largest grants was received by Dr. Ed Clarke, who received \$3.8 million from the NSF to develop revolutionary computational models that utilize methods successful in finding errors in computer circuitry and applying them to biological and complex electronic systems.
- Dr. Tuomas Sandholm received over \$800,000 to build on existing algorithms he developed with his team to improve a system that matches living kidney donors with unrelated recipients. It is expected that the research will have an immediate impact on saving lives.
- A team including Rohit Negi and Marjia Ilic received \$1.5 million to develop monitoring tools that can predict rolling blackouts on the nation's power grid.
- Jessica Hodgins and her team in the Robotics Institute received \$1.2 million to utilize the data gained from modeling human activity with lightweight wearable sensors to improve both the diagnosis and treatment of cognitive disabilities such as Parkinson's disease.
- A team from Carnegie Mellon's Lane Center for Computational Biology received \$1.3 million to make supercomputing technology available to researchers across the United States. This technology is 100 times faster than any currently used resources and is designed to accelerate research that visualizes and predicts the chemical interactions that underlie health and disease.
- Dr. Alan McGaughey in Carnegie Mellon's College of Engineering received nearly \$1 million in NSF funding to lead a team developing new materials to improve the electronic systems used throughout the aerospace industry. The team includes Dr. Mohammad Islam, an assistant professor in chemical and materials science engineering, who developed nanotube aerogels that enable the creation of ultra-light materials with great strength but with high degrees of energy efficient properties.
- Dr. Anupam Datta in Carnegie Mellon's CyLab is part of a multi-university team that received \$15 million in funding from the Department of Health and Human Services to develop new tools for ensuring the security and privacy of health data records.

The second major category of stimulus funding pursued by our faculty is focused on projects that directly contribute to the education outreach and community and economic development mission of Carnegie Mellon. Dr. Deborah Lange in Carnegie Mellon's Steinbrenner Institute was part of a team that secured a \$1.4 million grant through the U.S. Department of Labor to build an energy training partnership to aid un- and under-employed residents in the Upper Mon Valley region in becoming competitive for "green industry jobs."

The project involves collaboration with the Community College of Allegheny County, community organizations and the United Steelworkers and United Auto Workers unions. The no-cost training includes intensive classroom and field experience as well as subsidized work experience and placement experience. Carnegie Mellon's contribution is to develop and deliver curricula focused on brownfield remediation and redevelopment skills. Within this general framework of education and outreach, CMU has also received stimulus funds to enhance STEM education curricula at traditional minority-serving institutions.

From a community development perspective, Carnegie Mellon's College of Fine Arts received one of the highly competitive awards from the National Endowment for the Arts to support the creation of a blueprint for the retention of individual artists. This Creative Entrepreneurs project links art entrepreneurship to neighborhood development opportunities throughout Pittsburgh.

Applying stimulus funds to enhance community development was also an objective of the team from CMU's School of Computer Science that received nearly \$900,000 from NSF to apply advanced computer-based language technologies to enhance response to citizen complaints and service requests received on the City of Pittsburgh's 311 call center.

A major business and economic development impact from stimulus funding is reflected in the \$5 million received by Dr. Jay Whitacre of CMU's College of Engineering to develop environmentally-friendly battery technologies that can store energy from the nation's power grid and therefore accelerate the increased use of renewable energy. Whitacre's work will be split between labs at Carnegie Mellon and the spin-out company he created, Aquion Energy (formerly 44 Tech). This funding has enabled the firm to grow out of the lab and begin operations in the Lawrenceville neighborhood of Pittsburgh.

The final area of stimulus funding that CMU faculty have pursued are grants designed to enhance the competitiveness of state and local partners in seeking stimulus funding. In these proposals, CMU researchers have pursued little or no direct funding but instead have focused on providing technical assistance to help secure funding for the region. One of the most significant examples of this activity was support by faculty from CMU and researchers at the Pittsburgh Supercomputing Center working with colleagues at the University of Pittsburgh and Penn State to help secure nearly \$100 million in stimulus funding for the PennREN Internet access initiative. The award was announced at Carnegie Mellon by U.S. Commerce Secretary Locke and Pennsylvania Governor

Rendell in February. Similar but smaller collaborations have been developed to support funding requests for energy efficiency initiatives and neighborhood security projects.

The focus on pursuing stimulus projects across the spectrum of traditional basic research, educational outreach and community and economic development and on projects to enhance regional competitiveness for funding is intended to maximize Carnegie Mellon's ability to contribute to the ARRA's vision of supporting sustained and far-reaching recovery. The university believes the collaborations generated and renewed in pursuing stimulus funding will serve the competitiveness and quality of life of the state and region long after individual projects are completed.

Thank you for the opportunity to share Carnegie Mellon's experience with the American Recovery and Reinvestment Act. We will continue to monitor the impacts of the projects as they unfold over the next year to three years and welcome the opportunity to share additional findings with the Commission.