REMARKS
BEFORE THE SENATE
COMMUNICATIONS AND TECHNOLOGY COMMITTEE
BY
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Thank you Chairman Folmer, Chair Farnese, Vice Chair Baker and members of the Committee. I am pleased to join my colleagues in discussing the research initiatives of Pennsylvania universities and our contributions to economic development in the Commonwealth. I also very much welcome the opportunity to express appreciation for the strategic support that Pennsylvania has provided Carnegie Mellon and that has been so vital to our emergence both as a leading global research institution and contributor to economic development.

My remarks will cover the following topics. First, I will provide brief background on Carnegie Mellon University noting in particular how our origins continue to shape our research and education strategies. I will then summarize some of the university's major areas of research and how our approach to research emphasizes engagement with industry, collaboration with institutions across Pennsylvania and includes a particular focus on generating economic development opportunities for Pittsburgh and the Commonwealth. Finally, I will highlight how support from the Commonwealth has played a vital role in CMU's growth.

Let me begin by providing some background on Carnegie Mellon. The institution was born in 1900 to be a technical trade school for the sons and daughters of steel

workers. In endowing the institution Andrew Carnegie directed that the instruction should always include a focus on making things. Though Carnegie Mellon is now the youngest of the top 25 universities in the nation, the emphasis on practical problem solving that was embedded in Andrew Carnegie's vision remains central to the culture of the university and helps define both the environment for research and education.

Located adjacent to the University of Pittsburgh in the Oakland neighborhood, Carnegie Mellon is home to 11,500 students—almost equally divided between undergraduate and graduates—and 1,200 faculty and staff. Carnegie Mellon students are drawn from nearly 100 countries and the university is a net importer of talent to Pennsylvania.

Carnegie Mellon is home to top ranked programs in computer science, engineering, business and the arts. Carnegie Mellon has been home to eighteen Nobel laureates, thirty six members of the National Academy of Engineering, six Oscar winners, ninety six Emmy winners and five Tony winners. This fusion of arts and technology is a cornerstone of the university's environment for inter-disciplinary research—which is also a central element of our ability to grow and attract businesses to Pennsylvania.

While our $325 million annual research budget is the smallest of the four Pennsylvania AAU institutions, we focus on making "big bets" in emerging areas that maximize the ability for our research to have broad impact. Carnegie Mellon established the first School of Computer Science and the first robotics research institute in the United States—which is today the world's largest academic robotics center. Launched in 1979, one of the first major initiatives of the Robotics Institute was to develop robots for the

clean up of Three Mile Island, an example of our focus on blending cutting edge research with high impact problem solving. Carnegie Mellon's Software Engineering Institute established the world's first computer emergency response center and has developed over 127 such response centers around the world—similarly defining the field of cyber security.

This tradition is continued today in a wide range of research areas. As an offshoot of the early days of work on artificial intelligence Carnegie Mellon is home to leading research on advanced learning technologies, the products of which are at work in high schools in every state in the nation. Advances in energy efficient technologies from Carnegie Mellon research are reflected in green buildings from Pittsburgh to China.

This focus on making big bets has also fostered extensive collaborations with industry. In the early 1980's Carnegie Mellon's commitment to provide a computer for every student—unheard of in those early days of the personal computer industry—led to a multi-million dollar partnership with IBM to create the first wired campus. Combined with a similar initiative at MIT this partnership was vital in advancing networking technologies.

Today this focus on research collaboration with industry is reflected in partnerships ranging from extensive work with General Motors to develop a variety of safety technologies to joint research with Intel to create more energy efficient computer chips. This engagement with industry also enhances the university's education mission. The focus on critical problems that industry brings enables students to engage in real world challenges and be ready for the world of work. This experience directly enhances

our ability to routinely rank among the top universities in the nation in terms of rates of job placement after graduation.

Beyond our collaboration with industry the most vital contribution to Carnegie Mellon's research strength is our rich partnerships with other Pennsylvania institutions. The ability to combine Carnegie Mellon's areas of research excellence with the complementary strengths of universities across the Commonwealth is a major source of competitive advantage. Carnegie Mellon is partnered under Penn State's leadership with each of the institutions at this table in the major Department of Energy "hub" in energy efficient buildings bringing over $100 million to Pennsylvania and providing a leg up on a major growth industry of the future.

Along with the University of Pittsburgh, Penn State, West Virginia and Virginia Tech University Carnegie Mellon is part of the Regional University Alliance in partnership with the National Energy Technology Laboratory. This collaboration combines the capabilities and labs of NETL and the five universities to advance research focused on the transition to clean fossil and renewable energy.

We share a growing collaboration with the University of Pennsylvania in intelligent transporation and in a significant National Institutes of Health center. For over a decade we have collaborated with Lehigh University on materials research and in an initiative to provide research assistance to Pennsylvania manufacturers. We have also collaborated with state system universities and community colleges on curricula development.

Our richest collaboration has been with our close neighbor, the University of Pittsburgh. Over fifty CMU faculty work collaboratively with their counterparts at Pitt in

over a dozen joint centers and initiatives. These centers include work on brain imaging that has helped advance the fundamental understanding of autism. Together we have also combined our strengths to win national centers of excellence devoted to quality of life technology as well as advanced learning technologies. These two national centers have together been awarded $80 million in federal funding bringing both economic benefit and attention to critical public policy challenges to Pennsylvania. Very simply, the pursuit of research excellence is a team sport across Pennsylvania, leveraging vital resources and maximizing impact.

Underpinning the problem solving, industry focused and collaborative approach to research at Carnegie Mellon is university-wide commitment to economic development. In 1997 President Jared Cohon made regional economic development one of the university's core strategic areas and we have worked hard to integrate this focus within our overall approach to research.

In 2002 Carnegie Mellon overhauled its technology transfer policies to create a more streamlined approach to spinning out companies. Since the adoption of our plan, known as "5% go in peace", our rate of spin-outs has doubled. Carnegie Mellon now generates 20 to 30 new companies each year and ranks second in the United States in the rate of new company formation per million dollars of federal research funds received (per the Association of University Technology Managers, AUTM).

Seventy-five percent of these companies remain in the Pittsburgh region and nearly one-third involve the manufacturing of new products. These firms include medical device companies, robotics firms, entertainment technology companies, software companies and clean energy start-ups advancing green batteries and solar energy. This

focus on start-ups is energized by a campus wide support network that ranges from entrepreneurial education reaching 1,000 faculty and students each year, to embedded entrepreneurs and a faculty support program known as Project Olympus which nurtures faculty interest in commercialization in the earliest phases of the research process.

This campus network is also enriched by deep collaborations with our local economic development partners—Innovation Works, the Life Sciences Greenhouse, Idea Foundry and the Technology Collaborative. As an entrepreneur myself, who has started two energy companies in Pittsburgh, I can attest that this focus on entrepreneurship is deeply engrained in the research mission of the university—it assists in retaining and attracting the best talent and is central to ensuring that our work is cutting edge.

This focus on launching start-ups is balanced by an aggressive effort to bring the best companies in the world to Pittsburgh. CMU empowers its faculty to build deep relationships with major corporate partners and always be selling Pittsburgh as a location for collaborative research. This effort has enabled CMU to play a role in bringing Google, Apple (which purchased a CMU start-up), Intel, Disney and Caterpillar to Pittsburgh and contribute to rebuilding the economy of Pittsburgh and Pennsylvania.

The Commonwealth has been a vital partner in the research and economic development success of Carnegie Mellon. While nearly 90 percent of Carnegie Mellon's research funding is received from the federal government, strategic support from the Ben Franklin Technology Development Authority, the Tobacco Settlement Fund, from state supported local economic development organizations and the Redevelopment Capital Assistance Program have all played a vital role in critical research initiatives and, in particular, CMU's ability to contribute to economic development.

Research funding from the Tobacco Settlement Fund played a vital role in enabling CMU to build a strong partnership with Pitt and establish a leading program in life sciences research. A $500,000 seed grant from the Pittsburgh Life Sciences Greenhouse provided the catalyst to winning National Science Foundation support for the joint CMU/Pitt Quality of Life Technology Center that has brought $40 million in funding to Pittsburgh and generated several new start-up companies. Support from the General Assembly for the Pennsylvania Infrastructure Technology Alliance has enabled CMU and Lehigh to provide advanced research to over 200 companies in the Commonwealth.

Capital budget funding along with support from DCED was instrumental in the construction of the Collaborative Innovation Center on our campus. This facility was the only place in the world where Apple, Intel and Google operated engineering and research centers under one roof. Google has since outgrown the building and taken space in new facility in Pittsburgh's East Liberty neighborhood and Disney will soon occupy the Google space in the CIC.

This deep collaboration has enabled Carnegie Mellon to leverage its research strengths to make a difference in Pittsburgh and Pennsylvania—helping to fulfill the vision that brought together Andrew Carnegie and City of Pittsburgh in 1900. We are grateful for the support and confidence Pennsylvania has shown in its commitment, we recognize the challenging times before all of us and are committed to remain a vital partner to our sister institutions and the Commonwealth in advancing opportunity that can reach all Pennsylvania communities.