Testimony of
J. Michael Bowman,
Chairman and President
Delaware Technology Park Incorporated;
Association of University Research Parks Incoming President

Before the
Senate Committee on Commerce, Science and Transportation

Regarding:
Senate Bill 1373

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Senator Pryor, Senator Carper, and members of the Committee, thank you for the opportunity to testify here today in support of Senate Bill 1373, the "Building a Stronger America" act.

My name is Michael Bowman. I am the Chairman and President of Delaware Technology Park, and the incoming president of the Association of University Research Parks (AURP). I would like to provide my perspective to help you better understand science parks, and how they create economic development.

I also would like to thank you for the passage of the recent "America Competes" legislation. As you know, this important legislation calls for $43 billion of new funding over the next three fiscal years to boost federal investment in basic research in the physical sciences, expand math and science education programs at the K-12 and university levels, and revitalize policies that encourage innovation. It truly is an important element in maintaining America's future competitiveness.

Today I'd like to discuss another important element. As the "America Competes" legislation provides research funding and education for our innovative knowledge workforce, that workforce will need places in which to work.

Science parks are those places.

Introduction

The Association of University Research Parks (AURP) exists to foster the development of research and science parks. Science parks create innovation, commercialization and economic competitiveness through collaboration among universities, industry and government.

With membership consisting of planned and operating science parks in North America and across the globe, AURP's mission is to educate the world about science parks, create networks to support them, and to promote their best practices.

AURP whole-heartedly supports Senate Bill 1373, otherwise known as the "Building a Stronger America Act". As a means of fostering innovation and competitiveness, this act, if passed, would authorize the United States Department of Commerce to establish a $7.5 million competitive grant planning program to enable winning localities to fund feasibility studies for developing regional science parks, or to expand and retrofit existing parks.

The legislation would also create a loan guarantee program to be applied to the development of new science parks, or to upgrade existing science park infrastructure. The bill calls for a loan guarantee for 80 percent of the face value of qualified

construction loans, thereby increasing the ability of university science parks to make necessary investments in their infrastructure.

Science Parks as Economic Development Hubs

The world's first science park started in the early 1950's and foreshadowed the community known today as Silicon Valley. Another early science park set out to stop the "brain drain" from a rural, agricultural region, which was then dependent on the tobacco industry. Today Research Triangle Park, and the area around Raleigh and Durham, N.C., is home to many of the world's most advanced high technology businesses. These businesses employ over 40,000 people.

Science parks provide the launch pad that startup companies need when they are "spun out" from a university or company. Park-provided training in such areas as intellectual property law and business planning help the fledgling businesses to succeed. Universities, in turn, benefit by exposure to the business world, and the connection to the cutting-edge research being conducted outside their walls in industry. What all science parks have in common is that they are, at heart, knowledge partnerships that foster innovation.

As science parks harness the combined power of education, research and private investment, the result is new jobs, new industries and solutions to age-old problems of mankind. They connect the innovative thinkers of our time and harness the most powerful resource of the 21st century: mind power.

Science parks are sources of entrepreneurship, talent, and economic competitiveness for our nation, and are key elements of the infrastructure supporting the growth of today's global knowledge economy. By providing a location in which government, universities and private companies cooperate and collaborate, science parks create environments that foster collaboration and innovation. They enhance the development, transfer, and commercialization of technology.

More than 300,000 workers in North America work in university science parks. And according to the soon-to-be released AURP-Battelle Technology Practice report[1], every job in a science park generates an average of an additional 2.57 jobs in the economy. Science parks are strong sources of entrepreneurship, talent, and economic competitiveness for our states and our nation.

While parks vary widely in size and shape, from urban high-rises to suburban or rural locations, a typical American science park is located in a suburban community with a population of less than 500,000 and is operated by a university or a university-affiliated non-profit organization.

The companies in this typical science park are primarily private sector, but the science park is also home to university and government facilities. It is the combination of these three interacting elements: government, the university, and private sector companies-- that gives parks their dynamism.

The typical park provides a range of business startup assistance to its client companies, which are often small startups based on innovative new ideas from

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[1] *Characteristics and Trends in North American Research Parks: 21st Century Directions, prepared by the Battelle Technology Partnership Practice in cooperation with the Association of University Research Parks, October 2007*

university or private sector researchers. The park has an operating budget of less than $1 million a year, and of course, since it is designed as a non-profit entity, the park itself does not generate significant net revenue. 750 people work at jobs there, primarily at information technology companies, pharmaceutical firms, or scientific and engineering service providers. These sorts of companies provide 45 percent of all science park jobs.

A new model—strategically planned mixed-use campus expansions—is emerging that involves shared space in which industry and academic researchers can work side by side. These university-affiliated mixed-use campus developments are not simply real-estate ventures. They embody a commitment by universities to partake in broader activities, offering companies high-value sites for accessing researchers, specialized facilities, and students, and promoting live-work-play environments. Key features of these mixed-use developments include space for significant future research growth; multi-tenant facilities to house researchers and companies; and housing, along with other amenities which are attractive to young faculty, post-doctoral and graduate students.

Centennial Campus at North Carolina State University is a case in point. In the 1980s, pressure for space at the main North Carolina State University (NCSU) campus in Raleigh led to exploration of nearby options, including substantial holdings by the state mental-health system and the Diocese of Raleigh on 1,000 acres surrounding the old Lake Raleigh Reservoir. Starting in the 1980s, the land was conveyed to NCSU in stages, and serious planning began with the appointment of a former dean of the university's School of Design to the position of campus coordinator.

At the outset, Centennial was conceived as a "smart growth" community that would incorporate a live-work environment and minimize the need for driving, through a connection to the main campus. The plan for Centennial evolved into a unique combination of institutional and commercial space side-by-side in a dual use "campus of the future." The campus is divided into "neighborhoods" serving diverse high-tech sectors, each focusing on programmatic strengths of the university.

First to move was the College of Textiles, followed by the research components of the College of Engineering and units of other colleges. Then in 2002, some 200 additional acres already owned by the University and home to its College of Veterinary Medicine were renamed "Centennial Biomedical Campus" and will be developed using the Centennial Campus model, one that is being emulated throughout the world in new science park design.

Science parks are also being developed to leverage the assets of non-university research and development organizations such as federal laboratories. In addition to universities, major medical research centers and other research organizations can be key drivers of technology-based economic development. It is becoming increasingly common for communities in which a federal laboratory is located to create a science park to leverage laboratory resources to realize economic development.

Federal laboratories attract companies that wish to leverage the expertise of the laboratory researchers and to gain access to highly specialized, and often unique, facilities and equipment. Science parks can also provide a location for start-up companies created to commercialize technology developed in the labs.

Sandia Science and Technology Park, the National Aeronautics and Space Administration (NASA) Research Park at Ames, and the Tri-Cities Science and

Technology Park located close to the Pacific Northwest National Laboratory are examples of research parks that have been developed by or adjacent to federal laboratories. Another example is the East Tennessee Technology Park at Oak Ridge National Laboratory.

Other outstanding examples of U.S. science parks are the Cummings Research Park in Huntsville, Alabama, and the Purdue Research Park in West Lafayette, Indiana. Begun in 1962, Cummings today is home to 285 companies which employ over 25,000 employees, and Purdue, founded in the late 1950's, is today home to over 90 companies.

Science parks are succeeding in incubating and growing companies. According to the Battelle report, nearly 800 firms graduated from park incubators in the past five years, while only thirteen percent failed. About one-quarter of these graduates remain in their park. Fewer than ten percent of the graduates left the region.

And since science park jobs generate an additional 2.57 jobs, according to Battelle, the total employment impact of all science parks in the US and Canada is more than 750,000 jobs.

Science parks are truly the hubs of our nation's entrepreneurial ecosystem.

The Importance of Science Parks to America's Competitiveness

All around the world, governments are turning to science park creation as a major economic development strategy. The vital role of maintaining the United State's economic competitiveness is particularly urgent as companies outsource jobs, manufacturing -- and now, ever-increasingly, research and development -- abroad. It is crucial to the U.S. economy that we also support our science parks if we are to continue to lead the world in scientific and technology development and maintain high-wage job growth.

Last year, the Chinese government announced plans to vastly increase annual funding of research and development, and determined that 60 percent of China's economic growth would be based on this sector by 2020[2]. At the same time, the government announced plans to build 30 new science and technology parks throughout the country, to be completed by 2010.[3] According to news bulletins, the parks are to be designed as incubators for small and medium-sized high-tech companies, many of which will be set up by universities or students.

Another threat to U.S. competitiveness comes from multinational corporations, which are increasingly shipping research and development abroad. A recent study by Jerry Thursby of Emory University and Marie Thursby of Georgia Institute of Technology[4], which examined the future plans of top global corporations, found that over one-third of the companies interviewed anticipate a substantial change in the distribution of their research and development over the next three years. Nearly three-

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[2] *http://www.scidev.net/News/index.cfm?fuseaction=readnews&itemid=2654&language=1, accessed October 14, 2007*

[3] *http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=2789&language=1, accessed October 14, 2007*

[4] *REPORT TO THE GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE: HERE OR THERE ?*
A SURVEY OF FACTORS IN MULTINATIONAL R&D LOCATION by Jerry Thursby, Emory University and
Marie Thursby, Georgia Institute of Technology and National Bureau of Economic Research
NATIONAL ACADEMY OF SCIENCES, NATIONAL ACADEMY OF ENGINEERING, AND INSTITUTE OF MEDICINE OF THE
THE NATIONAL ACADEMIES PRESS
WASHINGTON D.C. www.nap.edu

quarters of the companies that do anticipate a substantial change expect most of their technical employment growth during the next few years to be in China, while expecting U.S. technology staff to decline by nearly 4 percent during the same period.

Even more important to note is that the percentage of research conducted within corporations has dropped dramatically, shifting towards universities, which are often connected to science parks. Corporations commonly turn to science parks to spin out a product, which they then develop. Without the pathway of the science park, there is increasing danger that global corporations will turn to foreign science parks at this crucial stage.

Given the emphasis on intellectual property protection in the U.S., as well as the emphasis on collaboration between scientists, faculty and the private sector embodied in our own science parks, the United States can utilize its science parks to staunch the flow of the research and development off-shore, along with the ensuing brain drain, with proper funding and support.

Across North America, where capital funding has been provided for science park construction, dramatic results have been achieved. Canadian examples include University of Victoria's Vancouver Island Technology Park (VITP), which recently released an economic impact study showing that over $280 million annually is generated from a capital investment of $20 million. Other Canadian examples include Innovation Place in Saskatoon, Saskatchewan, where capital investments of $160 million dollars over the last 27 years generate an annual impact on the local economy exceeding $248 million per year, and Technoparc St-Laurent, Metropolitan Montreal, where capital investments over the last ten years of $100 million dollars have generated additional new investments in excess of $1.5 billion dollars, with an impact on the Montreal economy exceeding $250 million dollars annually.

Finally, it is well recognized that the U.S. has been lagging in science, math and technology education. As mentioned above, the "America Competes Act" addresses the urgent need to boost teaching of the sciences and technology for students starting in kindergarten and moving through high school into their college and post-graduate education.

The "Building a Strong America Act" is a logical companion to "America Competes Act" because science parks provide locations for university students and entrepreneurs, alike, to cross-fertilize ideas and conduct research that can be translated into new technologies. Thanks to science parks, ideas can become companies that grow, attract other companies, and eventually boost the economies of their states and the U.S. economy at large.

The Need for Funding and Loan Guarantees

Senate Bill 1373 will foster U.S. competitiveness by supporting the development of new science parks throughout the country, both in rural and urban areas. It also establishes a mechanism for needed loan guarantees that will allow existing science parks to upgrade and retrofit their facilities.

Nascent science parks are urgently in need of both funding and government-backed loan guarantees. The same is true for more mature, existing science parks. Many date from the 1980s and 1990s and have out-grown their original facilities. Battelle

indicates that three out of every four science parks have expansion plans that will require financing. However, securing financing is not a given for most parks, with their three elements - university, local government, and private sector interests.

The varying nature of specific scientific research dictates laboratory design and space requirements, so science parks can't be created in a cookie-cutter fashion or replicated over and over. Each science park must be designed in a way specific to its own environment.

Add to this the fact that construction of science labs is an expensive endeavor, with flexibility needed so that laboratories can be changed frequently to meet the demands of cutting-edge research. For example, a lab built for chemistry may need to be retrofitted in the future for the study of nanotechnology. This upgrading of facilities to meet the needs of new technologies needs to be accomplished quickly, so that new industries and new jobs can be created here rather than abroad.

Since the companies in parks are usually startups with promising but uncertain futures, park facility construction is very difficult to fund in conventional ways. Private sector banks, which need collateral to back their loans, shy away from funding these sorts of facilities, due to their uncertainty.

The Delaware Technology Park is a case in point. Of the five buildings that comprise this very typical park, two were funded through bond issues that were backed by a long-term lease from an anchor tenant or the university. The three remaining buildings were privately financed through conventional bank loans.

Working with conventional banks proved to be a very difficult process at Delaware Technology Park. Despite a backlog of perspective companies and research entities, the guarantee of construction loans for new buildings was a major obstacle. It took five years to find an interim solution, but the issue persists today, impeding growth.

In fast-paced fields where new discoveries are taking place and entire new industries are being created -- not to mention fierce market competition worldwide – it is clear the U.S. cannot rely on conventional means to back the growth and development of its science parks and innovation infrastructure.

Senate Bill 1373 creates a guarantee mechanism and dramatically unleashes the support these parks need. This bill would provide the U.S. with an enormous competitive boost at this critical juncture. Without the provisions noted in this bill, the United States stands to lose competitive positioning and will witness an increasing flight of its top scientists, technology experts and high-paying jobs overseas.

Conclusion

As an important element of growing our nation's economy in today's globally-competitive environment, science parks are where smart minds go to work. In these environments of innovation, startup businesses are provided the resources they need to flourish, forming new jobs and industries. More mature companies partner with universities on projects and find easy access to an educated workforce and suppliers. As a means of creating sustainable prosperity for our country, science parks play a key role in maintaining America's competitiveness.

Science parks, however, face challenges. In today's uncertain financial climate, they must identify sources of support for both the development of new parks and the upgrading of existing parks if they are to help the U.S. remain competitive.

Science parks have the potential to translate discovery into application; develop talent; commercialize technology; and align government, higher-education, and private industry interests. They have the potential to be key elements in maintaining America's competitiveness.

Achieving this potential, however, will require enlisting leadership and support, accessing sufficient capital for park development, and recognizing the long-term nature of this endeavor. We ask for your support for S. 1373. Authorization of this bill and appropriation of the requested funds would enable science parks to help sustain the innovation edge so critical to the U.S. economy.

Thank you for taking the time to hold this hearing, for inviting me here today to participate, and for your continued interest and leadership on this crucial issue.

I am pleased to answer any questions that you may have.