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Congress of the United States

U.S. House of Representatives

Committee on Small Business

2361 Rayburn House Office Building

Washington, DC 20515-6315

Memorandum

To: Members, Subcommittee on Contracting and the Workforce
From: Committee Staff
Date: July 29, 2013
Re: Hearing: "Job Creation in Higher Education Communities: How University Research and Development Spurs Small Business Growth"

Introduction

At 10:00 am on August 5, 2013 at Binghamton University, Engineering & Science Building, Room 2008, Innovative Technologies Complex, 85 Murray Hill Road, Vestal, NY, the Subcommittee on Contracting and Workforce will hold a hearing titled "Job Creation in Higher Education Communities: How University Research and Development Spurs Small Business Growth."

The State University of New York at Binghamton (BU) is a major public research university in Broome County, NY, and the economic hub of the region. In addition to being a major employer itself, BU is engaged in high-tech research, technology transfer, and commercialization of federally funded research. The purpose of the hearing is to receive testimony on the symbiotic relationship between BU and the southern tier of New York, with a particular focus on how BU's research has led to small business creation and economic growth in Broome County.

Binghamton University

BU is a public research university and is one of the four university centers in the State University of New York (SUNY) system. Since its establishment in 1946, the University has grown from a small liberal arts college, Harpur College, to a large doctoral-granting institution, presently consisting of six colleges and schools, and home to nearly 15,000 undergraduate and graduate students. BU is currently ranked 89th among the 262 national universities ranked in the 2013 U.S. News America's Best Colleges and Universities ranking.

BU employed nearly 5,000 people in FY2011.[1] This includes faculty, staff, and student workers, and the University's expenditures supported an additional 5,500 full and part-time jobs in the local economy (Broome and neighboring Tioga Counties).[2] An additional 225 full- and part-time jobs were supported in New York State beyond those supported in Broome and Tioga Counties. In all,

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[1] BINGHAMTON UNIVERSITY, THE ECONOMIC IMPACT OF BINGHAMTON UNIVERSITY, FY2011 AT 2, (Sept. 2012), *available at:* http://www.binghamton.edu/think/results/economic-impact/EconImpact1011.pdf .
[2] *Id.*

the presence of BU directly and indirectly supported nearly 11,000 jobs in New York State in FY2011. [3]

BU is the major economic driver for both Broome and Tioga counties. Through its own expenditures and the spending of its visitors and students, Binghamton University direct and indirect expenditures totaled $622 million from July 1, 2010 to June 30, 2011.[4] These indirect and direct expenditures associated with the university resulted in an overall economic impact of approximately $965 million on Broome and Tioga counties in FY2011.[5] BU's economic output accounted for an estimated 12% of the GDP of Broome and Tioga counties between July 1, 2010, and June 30, 2011.[6]

Research Funding

In FY2012, BU applied for over $187 million in various research grants and funding, winning almost $30.5 million.[7] The federal government supplied $19.5 million with the rest coming from sources such as New York State, private industry, or local governments. Due to the weakening economy and the federal budget situation, there was a drop in committed funds from $34.9 million in FY2011,[8] and $44.3 million in FY 2010.[9]

Strategic Partnership for Industrial Resurgence (SPIR)

As part of its outreach program in the local community, BU participates in the Strategic Partnership for Industrial Resurgence (SPIR) program. SPIR was established in 1994 by the State of New York to utilize the engineering resources of the SUNY system (the Engineering Colleges and Programs at Stony Brook, Buffalo, Binghamton, and New Paltz) to help local industry compete more effectively. SPIR assists technology-based and technology-dependent companies in meeting their business objectives through development or improvement of their product(s), manufacturing, operations or service technologies by matching and placing undergraduate and graduate engineering students with a small company for a semester or two working on a specific project.

Small companies submit proposals to BU for SPIR-specific projects. Examples of projects that SPIR students have worked on range from National Science Foundation research grants, federal Small Business Innovative Research (SBIR) grants, or simply looking at ways to improve the individual firm's manufacturing process to increase efficiency.

Participating small businesses sign agreements that set the amount of funding levels that will be used for either project or student-salary costs, or both. Funding agreements vary from case to case, but the SPIR program has the capability to underwrite a significant portion of costs based on company size and financial resources and stability. Many of the SPIR students are hired as full-time employees by the businesses upon graduation and after successful completion of their projects.

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[3] *Id.*
[4] *Id.*
[5] *Id*
[6] *Id.*
[7] http://research.binghamton.edu/VicePresident/documents/Summary12.pdf.
[8] http://research.binghamton.edu/VicePresident/documents/Summary11.pdf.
[9] http://research.binghamton.edu/VicePresident/documents/FINAL_Tally10.pdf.

Technology Transfer Overview

In fiscal year 2012, the federal government funded approximately $138.9 billion in research and development activities.[10] Colleges and universities conduct the majority of basic research in the United States, and cumulatively receive more than half of their total research funding from federal agencies. Because of the large amount of funding expended by the federal government on basic research by nonprofits, efforts to improve the transfer of federally funded research are of interest to both the federal government and stakeholders across the nation.

The federal interest in the transfer of technology from government laboratories to the private sector is based on several factors. The government requires certain goods and services to operate. Much of the research it funds is directed at developing the knowledge and expertise necessary to formulate these products and processes. However, the government has neither the mandate nor the capability to commercialize the results of the federal research and development effort. Technology transfer is a mechanism to get federally generated technology and technical know-how to the business community where it can be developed, commercialized, and made available for use by the public sector and in appropriate cases, the private sector as well.

Federal involvement in technology transfer also arises from an interest in promoting the economic growth that is vital to the nation's welfare and security. It is through further development, refinement, and marketing that the results of research become diffused throughout the economy and can generate growth. Economic benefits of a technology or technique accrue when a product, process, or service is brought to the marketplace where it can be sold or used to increase productivity.[11] When technology transfer is successful, new and different products or processes become available to meet or induce market demand. Transfer from the federal laboratories and federally funded university laboratories can result in substantial increases in employment and income generated at the firm level.

In addition, cooperation with the private sector provides a means for federal scientists and engineers to obtain state-of-the-art technical information from the industrial community, which can be more advanced than that available in the government. Technology transfer is also a way to assist companies that have been dependent on defense contracts and procurement to convert to manufacturing for the civilian, commercial marketplace.

Small Business Technology Transfer Program (STTR)

One key component of the efforts to transfer technology derived from federal research is the STTR program. Central to the program is expansion of the public-private sector partnership to include the joint venture opportunities for small businesses and the nation's premier nonprofit research institutions. STTR's most important role is to foster the innovation necessary to meet the nation's scientific and technological challenges in the 21st century.

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[10] OFFICE OF MANAGEMENT AND BUDGET, FISCAL YEAR 2013 ANALYTICAL PERSPECTIVES, BUDGET OF THE UNITED STATES GOVERNMENT 370, *available at:* http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/spec.pdf.

[11] JUANITA M. BARNES, PATENT TECHNOLOGY TRANSFER AND INDUSTRIAL COMPETITION 140 (2007).

STTR is a highly competitive program that reserves a specific percentage of federal research and development (R&D) funding for award to small businesses and nonprofit research institution partners. Small business has long been where innovation and innovators thrive. But the risk and expense of conducting serious R&D efforts can be beyond the means of many small businesses.

Conversely, nonprofit research laboratories are instrumental in developing high-tech innovations. But frequently, innovation is confined to the theoretical, not the practical. STTR combines the strengths of both entities by introducing entrepreneurial skills to high-tech research efforts. The technologies and products are transferred from the laboratory to the marketplace. The small business profits from the commercialization, which, in turn, stimulates the economy.

Small businesses must meet certain eligibility criteria to participate in the STTR Program. They must be American-owned and independently operated, for-profit, with no more than 500 employees. The nonprofit research institution must also meet certain eligibility criteria, such as being located the United States and meet one of the three following definitions: a nonprofit college or university; a domestic nonprofit research organization; or a federally funded R&D center.

Each year, five federal departments and agencies are required by STTR to reserve a portion of their R&D funds for award to small business-nonprofit research institution partnerships. Those are the Department of Defense, the Department of Energy, the Department of Health and Human Services, the National Aeronautics and Space Administration, and the National Science Foundation. These agencies designate R&D topics and accept proposals.

Agencies make STTR awards based on small business-nonprofit research institution qualification, degree of innovation, and future market potential. Small businesses that receive awards then begin a three-phase program. Phase I is the startup phase where awards of up to $150,000 for approximately one year fund the exploration of the scientific, technical, and commercial feasibility of an idea or technology. Phase II awards are up to $1 million, for as long as two years, and expands Phase I results. During this period, the R&D work is performed and the developer begins to consider commercial potential. Phase III is the period during which Phase II innovation moves from the laboratory into the marketplace. No STTR funds support this phase. The small business must find funding in the private sector or other non-STTR federal agency funding.

Issues to Consider for Improving Technology Transfer

Universities, nonprofits, and other interested stakeholders are attempting to improve the transfer of technology through a number of methods. Some of the areas of focus include:

- Reducing the barriers to commercialization to ensure that technologies developed in academic and nonprofit settings make it to the public through activities such as reducing legal fees, minimizing licensing negotiations, restructuring organizational units, and building industry relationships;

- Universities and nonprofits are working with both students and faculty to promote entrepreneurship. Cross-discipline and cross-college programs have helped to connect individuals and share expertise and innovative ideas;

- Increasing collaboration between industry and innovators through federal agency research components, collaborative models, and commercialization potential in grant proposals;

- Linking technology transfer to economic development through regional and local partnerships; and

- Sharing of best practices between institutions with different levels of technology transfer capacity and experience.

Conclusion

This hearing represents an opportunity to discuss federal technology transfer efforts and examine the relationships and partnerships between large research universities, small hi-tech firms, and the communities they both serve. Witnesses will be prepared to offer suggestions to help ease the transition of technology from university laboratory to the private sector, offer suggested improvements to university and small business technology development, and examine best practices to help local economies benefit from such relationships.