

University Innovation: from Laboratory to Marketplace

I. Program Overview

The Puerto Rico Techno-Economic Corridor (PRTEC) and the Research and Development Center (RDC) of the University of Puerto Rico Mayagüez Campus share the mission¹ of promoting Puerto Rico's economic development through creative, innovative and progressive work. Both organisms are committed to advance the commercialization of intellectual property generated by researchers and students of the Mayagüez University Campus. We propose to create the program **University Innovation: from Laboratory to Marketplace** with the aim of closing the gap between the creation of intellectual property and commercialization in our university system and in our Campus. The program will have three phases: the first will have a collective nature, and the others an individual one. The goal is that after a period of three years at least three projects will have been directed towards a successful commercialization.

II. Background

In February 2009, the study "Strengthening American Competitiveness: Regaining Our Competitive Edge", prepared by the Brookings Institute of New York, identified four areas of investment that, according to its authors, should be strongly addressed in order to improve the competitiveness of the U.S. economy in the new framework of globalization and of a knowledge-based economy. These are:

1. Infrastructure
2. Innovation
3. Workforce
4. Renewable Energy

Of these four, Innovation is perhaps the most important in improving competitiveness, not only of the United States but that of any country. Innovation is, stated in other words, the commercialization of new discoveries and technologies. Innovation is vital to channel in the right direction, once again, Puerto Rico's future economic development. Much of this innovation is already occurring in the Island's universities and research centers.

There are regions in the United States where the participation and role of university centers has been vital in generating innovation in a comprehensive and consistent manner, thus helping the growth, economic development and competitiveness of these regions. Some examples of the best known are: Stanford and the University of California at Berkeley in Silicon Valley; Massachusetts Institute of Technology and Harvard at Boston's Route 38; Duke, University of North Carolina and North Carolina State University at the North Carolina Research Triangle; and the University of Texas at Austin. Other universities, like Purdue and Carnegie Mellon, have excelled in the commercialization of their technologies and have generated, at the same time,

¹ http://www.prteconline.com/prtec_about.htm / <http://cid.uprm.edu/index.php?lang=english&pid1=2>.

substantial revenues that helps them to continue investing in more research and development (R & D).

According to the article "Accelerating Innovation", published in the April 2009 edition of **Science Progress** magazine, the key to a successful transition from the laboratory to the marketplace is entrepreneurship and a viable innovation ecosystem. All the aforementioned universities have these elements. The University of Puerto Rico system, which is the higher education institution that has ventured more aggressively in research and development on the Island, especially in recent years, has not yet established these elements as part of their innovation agenda. Although the amount of funding and researchers involved in R & D activities has been increasing and has created intellectual property at the University in the form of patents, these have not been commercialized; patents have not been translated into new companies nor products that positively advance our economy.

Based on the close relationship between PRTEC and UPRM, the efforts we have jointly made to advance the commercialization initiative, and PRTEC's experience and ecosystem in the field of technological entrepreneurship development in Puerto Rico, we believe that we are the ideal team for achieve this goal. We see this as a pilot program that can serve as a foundation for future projects on other campuses of the university system.

III. Investigation Growth at the Mayagüez University Campus

Research activity at the Mayagüez Campus has grown vigorously over the past ten years, driven largely by the creation of new doctoral programs in areas such as Chemical Engineering, Applied Chemistry, and Computer and Information Science and Engineering. The increase in external funds and the recruitment of young faculty, focused on research activities centered on the UPRM and the Island, has also helped. The following statistics serve as indicators:

- 137.5% increase in doctoral degrees conferred -13.75% annual increase (table)
- 66% increase in submitted proposals - 6.6% annual increase (table)
- 100% increase in external funds - 10% annual increase (table)
- 85% increase in federal funding - 8.5% annual increase (table)
- 57% of UPR patents belong to UPRM researchers

UPRM is getting prepared to revise its *Master's / Large* Carnegie classification --the highest for universities with a Masters classification--, to a *Doctorate Granting-Doctoral / Research University*. This should occur in 2011, coinciding with the UPRM centennial celebration.

Various efforts to promote and strengthen basic and applied research, and development have been intensified and institutionalized in the Campus through initiatives by the Research and Development Center, the four colleges, and the Chancellor's Office. Some of these initiatives are:

- Bio Initiative for Science and Engineering (BioSEI)
BioSEI is a seed-funding program for cross-departmental research groups in the areas of biotechnology, bioengineering and bioinformatics. In this

initiative, UPRM has invested \$943,000 over two years to fund twelve projects involving 39 researchers from twelve departments in the Colleges of Arts and Sciences, Agricultural Sciences, and Engineering.

- Bioprocess Development and Training Complex (BDTC)
The Bioprocess Plant, located in the Guanajibo Research and Innovation Park (GRIP) at Mayagüez, was inaugurated in September 2008. It is funded with commingled funds from the government, private enterprise and the University of Puerto Rico. The conceptualization of this effort was developed from a UPRM proposal to the industry.
- Approval of NIH-EARDA Project
RDC received, in January 2009, a five-year grant from the Extramural Associate Research Development Program Award (EARDA) of the National Institute of Health (NIH) to institutionalize a Proposal Development Unit, which will provide support to UPRM researchers who submit proposals to that entity.
- Dissemination
RDC has adopted as one of its strategic objectives the dissemination of research findings of professors and their students, both inside and outside the University. For this purpose, the following venues have been initiated and maintained: a web site in the process of being updated: <http://cid.uprm.edu>, one blog: <http://blogs.uprm.edu/cid>; one newsletter: "Mío Cid / My R&D"; and, in a joint initiative with the Chancellor's Office, one research magazine: "Sin Límites".
- Management of Technology Transfer
UPRM is structuring the form it manages the transfer of technology and the intellectual property generated by our researchers. Besides the general presentations of these issues to the university community, the RDC has focused on giving direct and individual support to research groups under the BioSEI program. The first of a series of sessions to support these groups will take place in May 29, 2009.
- Management Research Academy and Other Workshops (NCURA, etc.).
A series of workshops have been created for researchers and research administrators, on topics such as: proposal preparation, proposal writing (grantsmanship), issues of compliance, and management of projects supported by external funding. In July 29 to 31, 2009, UPRM will host the workshop "Fundamentals of Sponsored Project Administration" (SPA I) offered by the National Council of University Research Administrators (NCURA).

Some 200 UPRM professors are currently conducting research with external funds managed through RDC. These 200 professors have great possibilities of generating intellectual property. It is noteworthy that 20 of the 35 patents (57%) generated by the University of Puerto Rico system belong to UPRM researchers; this figure far surpasses all other units of the system.

IV. Previous Joint Efforts by UPRM and PRTEC

- Commercialization MOU

In December 2006, UPRM, PRTEC, the Small Business Development Company (SBDC), Primex, and the Southwestern Industrial Association (SWIA) signed a collaboration agreement to promote and support commercialization and technology transfer activities at the Mayagüez Campus. The MOU was signed by the Associated Research Deanships of the four College Campuses, the Research and Development Center (RDC), the Business Center and the Technology Innovation Center --both from the College of Business Administration--, and the Chancellor's Office. The first efforts included two tours to laboratories and research centers, one related to the College of Engineering and the other to the College of Arts and Sciences. These visits helped to start identifying projects with commercialization potential at both Colleges.

- Business Opportunity Profile (BOP)

In August 2007, the Chancellor convened a meeting to launch this program with over 100 active researchers in the campus. The BOP goal is to create a profile of researchers interested in commercializing their technologies and inventions, and to help them identify business opportunities using these technologies. PRTEC, the Business Center, and the Technology Innovation Center led this effort with the active participation of RDC and the Research Associate Deans of the four UPRM Colleges. About 70 researchers attended the initial meeting, and 20 of these participated in subsequent group and individual activities. About 10 of these participants have completed their BOP. Interaction continues with these and other interested parties.

- Support for BioSEI Projects

After the BOP experience, we have focused on commercialization efforts with individuals and small groups. We consider that it is more productive to invest our efforts on projects that are closer to commercialization. For this reason, in recent months we began to meet individually with the teams participating in the BioSEI initiative. The initial response has been very positive and we have confirmed the interest of these teams in the area of commercialization.

V. PRTEC Expertise

- VITEC2

PRTEC manages Vitec2, a technology business incubator that operates since 2003. During this period it has helped create 15 new technology companies with local capital, five of which have successfully evolved from the incubation program. Vitec2 has also given advice and support to dozens of other projects and companies in Puerto Rico's West Region. We have, among our tenants, three projects of UPRM professors / researchers:

Caribbean Thermal Technologies, Phidelix, and Entevia. Besides these companies and local projects, we have helped five aerospace industry companies to settle in Puerto Rico. Four of these started their operations in our Vitec2 facilities. PRTEC has a large ecosystem of collaborators that include, among others, SBDC, Primex, PRIDCO, BDTC, the Chamber of Commerce of the West Region, SWIA, UPRM Business Center, Microsoft, and HP. The synergy of this ecosystem allows the resources and expertise of collaborators to significantly contribute to our tenants' and customers' welfare.

- "Enterprize" Winners

We have, among our tenants, four winners of the "Enterprize" Business Plan Competition of the Guayacán Group (first and third place winners of 2005 and 2006). In January 2009, PRTEC launched **Business Innovation**, our first regional competition of business ideas that has exceeded our initial expectations of success. The first five places in the 2009 competition included persons related to the Mayagüez Campus, thus confirming the great potential that exists in students and professors.

- Integration of Industrial Clusters and UPRM

Since our foundation, PRTEC has been closely linked to the concept of industrial clusters on the Island. PRTEC has coordinated the clusters of the electronics and the medical device industries, helping to create synergies and to improve competitiveness of these industries on the Island. We have also been involved recently with the formation of an aerospace cluster mentioned before. These clusters also help us to improve the interaction between academia and industry, and could provide many opportunities for technology transfer from university to industry, and for research projects hired by the industry to solve some of their needs and problems.

VI. Program Concept

The proposed program **University Innovation: from Laboratory to Marketplace** will offer direct support activities to researchers and students at UPRM that are on track to commercialize their research results. This program is the next logical step in the evolution of PRTEC efforts on Campus. It will include three main types of activities:

- Group Workshops

We will offer two workshops each year (one per semester) where experts in the field of commercialization in the university will provide resources and serve as guest speakers. Some of these will be researchers that have had success in commercializing their technologies and directors of technology transfer offices in universities with extensive experience and success in this field.

Workshops will include training through two large group seminars for researchers/inventors/entrepreneurs covering the topic, introduction to intellectual property:

- a. Determining what is patentable

- b. Protecting inventions prior to and after patent applications (with a particular emphasis on what a researcher should do to prevent their invention becoming prior art as a result of disclosures)
 - c. Knock-out searches & freedom to operate
 - d. Patent application process
 - e. International patents
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- Matchmaking Activities with Entrepreneurs and Investors

PRTEC will coordinate matchmaking activities where researchers will be invited to share time with entrepreneurs, investors, Vitec2 tenants, and others, so that they can have the opportunity to establish business contacts and potential strategic alliances that will assist and encourage them in their commercialization processes. We will coordinate four activities each year (one every three months), which will be held in the Vitec2 facilities. It should be noted that this type of activity was very successful in the PFI activities of the National Science Foundation organized by the UPR Resource Center for Science and Engineering.
 - Mentoring / Consulting Services

The technical and business personnel of PRTEC will offer individualized mentoring and consulting services to the project's participants, and will also provide incubation space in Vitec2 for those projects that are sufficiently developed or matured to have their business office and to start working on their business plans. PRTEC personnel will dedicate to this activity two hours each month for each project. RDC will train personnel to support this activity.

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