Technology Transfer Office

Puerto Rico
Science, Technology & Research Trust

David L. Gulley PhD, RTTP, CLP
Director, Technology Transfer Office
The PR Science, Technology & Research Trust

• A private nonprofit organization created in 2004 to encourage and promote:
  – Innovation
  – Transfer and commercialization of technology
  – Creation of jobs in the technology sector

• We are also responsible for Puerto Rico’s public policy for science, technology, research and development
Mission and Vision

Mission

• We invest, facilitate and build capacity to continually advance Puerto Rico's economy and its citizens’ well-being through innovation-driven enterprises, science and technology and its industrial base.

Vision

• By 2022, Puerto Rico is a globally recognized innovation hub that develops, attracts, and retains scientists, technology entrepreneurs, and enterprises to unlock world class creativity and competitiveness.
Values

INTEGRITY
ACCOMPLISHMENTS AND RESULTS
COLLABORATION
LEADERSHIP/ADAPTABILITY
ACCOUNTABILITY/COMMITMENT
OPTIMISM/RESPECT
CUSTOMER-CENTRIC
ENTREPRENEURSHIP SPIRIT
DESIRE TO INNOVATE
BE A FACILITATOR
Status of Academic Technology Transfer in Puerto Rico
Benchmarking

• In 2015, the Trust’s Technology Transfer Advisor completed a benchmarking for Puerto Rico’s research universities.*

• Three areas were included:
  – R&D performance
  – The use of “best practices” in technology transfer
  – Technology transfer metrics

* University of Puerto Rico (all campuses), Ana G. Méndez University System (all campuses), Ponce Health Sciences University, Universidad Central del Caribe
In FY2013, potential Partner institutions spent $140 million on research and development, a 23% increase over a five-year period.

Puerto Rico Higher Education R&D Expenditures (2009-2013), ranked by FY2013 expenditures

<table>
<thead>
<tr>
<th>Institution</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Puerto Rico System</td>
<td>97,953</td>
<td>99,022</td>
<td>134,473</td>
<td>114,728</td>
<td>105,014</td>
</tr>
<tr>
<td>Ana G. Méndez University System</td>
<td>1,729</td>
<td>9,880</td>
<td>10,843</td>
<td>17,905</td>
<td>16,309</td>
</tr>
<tr>
<td>Ponce Health Sciences University</td>
<td>7,085</td>
<td>8,934</td>
<td>10,502</td>
<td>11,586</td>
<td>12,243</td>
</tr>
<tr>
<td>University Central del Caribe</td>
<td>7,484</td>
<td>7,122</td>
<td>7,515</td>
<td>7,313</td>
<td>7,095</td>
</tr>
</tbody>
</table>

R&D Benchmarking Results

Source of Funds

The U.S. government and its agencies fund about two-thirds ($92.2 million in FY2013) of academic research in Puerto Rico.

Puerto Rico Higher Education R&D Expenditures, by source of funds FY2013

(Dollars in thousands)

<table>
<thead>
<tr>
<th>Institution</th>
<th>All R&amp;D expenditures</th>
<th>Federal government</th>
<th>State and local government</th>
<th>Institution funds</th>
<th>Business</th>
<th>Nonprofit organizations</th>
<th>All other sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Puerto Rico System</td>
<td>105,014</td>
<td>66,017</td>
<td>3,640</td>
<td>29,574</td>
<td>3,329</td>
<td>2,042</td>
<td>412</td>
</tr>
<tr>
<td>Ana G. Méndez University System</td>
<td>16,309</td>
<td>8,945</td>
<td>0</td>
<td>7,364</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ponce Health Sciences University</td>
<td>12,243</td>
<td>11,251</td>
<td>992</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>University Central del Caribe</td>
<td>7,095</td>
<td>5,946</td>
<td>230</td>
<td>919</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

R&D Benchmarking Results

Industry Research

• Industry sponsored R&D totaled $3.3 million, which represented 2% of the total.

In comparison:
• U.S. institutions received a total of $3.5 billion in industry sponsored R&D, which represented 5% of the total.
R&D Benchmarking Results

Fields of Research

The R&D profile of potential partner institutions includes the following major fields that provide a foundation for discovery and commercialization opportunities.

Field of Research

- Life Sciences: 53%
- Physical Sciences: 15%
- Engineering: 9%
- Environmental Sciences: 8%
- Math & Computer Sciences: 1%

R&D Benchmarking Results

Researchers

• There were 2,258 university personnel involved in R&D during FY2013 in the potential partners.

• UPR represents nearly 60% of the total, and over 80% of principal investigators.
R&D Benchmarking Results

• Of 2,258 researchers in FY2013, 511 were principal investigators that represent a cadre of researchers that may have opportunities to participate in the technology transfer process.

Puerto Rico Higher Education R&D Headcount, by control FY2013

<table>
<thead>
<tr>
<th>Institution</th>
<th>Total</th>
<th>Principal investigators</th>
<th>Other personnel</th>
<th>Postdocs</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Puerto Rico System</td>
<td>1,336</td>
<td>420</td>
<td>916</td>
<td>45</td>
</tr>
<tr>
<td>Ana G. Méndez University System</td>
<td>609</td>
<td>29</td>
<td>580</td>
<td>0</td>
</tr>
<tr>
<td>Ponce Health Sciences University</td>
<td>193</td>
<td>27</td>
<td>166</td>
<td>1</td>
</tr>
<tr>
<td>University Central del Caribe</td>
<td>120</td>
<td>35</td>
<td>85</td>
<td>2</td>
</tr>
</tbody>
</table>

• Postdocs are included in totals reported for all personnel. Postdocs are personnel with doctoral degrees generally awarded within the last 5 years and who are working for an institution under a limited-term appointment for training in research.

R&D Benchmarking Results

Publications

• A review of publication co-citation references from 2011-2012 for Puerto Rico shows distinct patterns of strong publication productivity/citation clusters:
  – Medicine: including biochemistry, genetics, and molecular biology
  – Physics and Astronomy
  – Agricultural and Biological Sciences
  – Engineering and Materials Sciences
Benchmarking Best Practices Results

• “Best Practices” include:
  – Policies (IP, conflicts, research)
  – Agreements (research, confidentiality, licensing, etc.)
  – Human Resources (staffing)
  – Legal services (patenting)
  – Resources (funds to support efforts, access to information)
  – Partnering (engagement with private sector)

• Policies are in place but tech transfer is underdeveloped: lack of standardized agreements, understaffed, poorly funded, and inexperienced with industry engagement.
Tech Transfer Benchmarking Results

• Best practices those legal, resource, and specific approaches that support academic tech transfer including:
  – Policy
  – Agreements
  – Human Resources
  – University Resources
  – Legal Services
  – Budget
  – Partnering
  – Performance Metrics

• A survey was conducted for all Potential Partner Universities.

• For Performance Metrics, 15 peer universities were selected based upon R&D expenditures and medical schools in North America and technology transfer benchmark averages were established.
Tech Transfer Benchmarking Results

Peer institutions with an average of $141 million in R&D expenditures in FY2013, with medical schools.

<table>
<thead>
<tr>
<th>United States</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tufts University</td>
<td>University of Saskatchewan</td>
</tr>
<tr>
<td>Georgetown University</td>
<td>University of Manitoba</td>
</tr>
<tr>
<td>West Virginia University</td>
<td>Dalhousie University</td>
</tr>
<tr>
<td>Oklahoma State University</td>
<td>Université de Sherbrooke</td>
</tr>
<tr>
<td>Medical College of Wisconsin</td>
<td>Memorial University of Newfoundland</td>
</tr>
<tr>
<td>Temple University</td>
<td></td>
</tr>
<tr>
<td>Tulane University</td>
<td></td>
</tr>
<tr>
<td>University of Arkansas for Medical Sciences</td>
<td></td>
</tr>
<tr>
<td>University of Central Florida</td>
<td></td>
</tr>
<tr>
<td>Drexel University</td>
<td></td>
</tr>
</tbody>
</table>

# Tech Transfer Benchmarking Results

Peer averages in FY2013

<table>
<thead>
<tr>
<th>Metric</th>
<th>Peer Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invention Disclosures</td>
<td>59</td>
</tr>
<tr>
<td>TTO Staffing (FTEs)</td>
<td>6</td>
</tr>
<tr>
<td>IP Protection/Legal Fees</td>
<td>$895,000</td>
</tr>
<tr>
<td>Total Patent Applications</td>
<td>53</td>
</tr>
<tr>
<td>Options &amp; License Agreements</td>
<td>9</td>
</tr>
<tr>
<td>Startups* Formed</td>
<td>2</td>
</tr>
<tr>
<td>Gross License Income</td>
<td>$3,489,798</td>
</tr>
</tbody>
</table>

* A new company whose formation is dependent upon licensing university intellectual property.

** Not based upon a license, but a spin-off of unique technical capabilities.

SOURCE: 2013 AUTM Annual Licensing Survey and individual surveys in Puerto Rico.
## Tech Transfer Benchmarking Results

Peer comparisons to Puerto Rico’s technology transfer performance in FY2013

<table>
<thead>
<tr>
<th>Metric</th>
<th>Peer Average</th>
<th>Puerto Rico Universities’ Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invention Disclosures</td>
<td>59</td>
<td>18</td>
</tr>
<tr>
<td>TTO Staffing (FTEs)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>IP Protection/Legal Fees</td>
<td>$895,000</td>
<td>$150,000</td>
</tr>
<tr>
<td>Total Patent Applications</td>
<td>53</td>
<td>18</td>
</tr>
<tr>
<td>Options &amp; License Agreements</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Startups* Formed</td>
<td>2</td>
<td>1**</td>
</tr>
<tr>
<td>Gross License Income</td>
<td>$3,489,798</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

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# Tech Transfer Benchmarking Results

Puerto Rico’s technology transfer output compared to peer averages in FY2013

<table>
<thead>
<tr>
<th>Metric</th>
<th>Peer Average</th>
<th>Puerto Rico Universities’ Performance</th>
<th>Puerto Rico Universities’ Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invention Disclosures</td>
<td>59</td>
<td>18</td>
<td>30%</td>
</tr>
<tr>
<td>TTO Staffing (FTEs)</td>
<td>6</td>
<td>4</td>
<td>67%</td>
</tr>
<tr>
<td>IP Protection/Legal Fees</td>
<td>$895,000</td>
<td>$150,000</td>
<td>17%</td>
</tr>
<tr>
<td>Total Patent Applications</td>
<td>53</td>
<td>18</td>
<td>34%</td>
</tr>
<tr>
<td>Options &amp; License Agreements</td>
<td>9</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Startups* Formed</td>
<td>2</td>
<td>1**</td>
<td>50%</td>
</tr>
<tr>
<td>Gross License Income</td>
<td>$3,489,798</td>
<td>$10,000</td>
<td>.003%</td>
</tr>
</tbody>
</table>

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SOURCE: 2013 AUTM Annual Licensing Survey and individual surveys in Puerto Rico.
Technology Transfer Metrics in the U.S.

Association of University Technology Managers (AUTM)  
Annual Licensing Activity Surveys  
FY 2014

Source: 2014 AUTM Licensing Activity Survey with 181 TTOs reporting

- Research Expenditures: $67.2 Billion
- TTO Staff: 2,354
- Inventions: 24,117 Disclosures
- IP Protection: 23,526 Patents Filed
- Legal Fees: $367M / $159M reimbursed
- Agreements: 5,435 Licenses/1,461 Options
- Startups: 914
- License Income: $2.7 Billion
Tech Transfer Benchmarking Results

In Puerto Rico, academic technology transfer is in a nascent state:

• Universities have not fully leveraged the research enterprise to facilitate tech transfer.

• Universities have not established fully functional technology transfer offices that:
  – use best practices in identifying scientific discoveries with commercial potential,
  – mature intellectual property, or
  – transfer those assets through licensing to the private sector.
The Trust Technology Transfer Office (TTO)
Foundational Principles

Mission
To effectively identify, assess, protect, market, and transfer the most promising research discoveries from Puerto Rico’s universities, institutions and research institutes to the private sector for commercialization and to benefit the public.

Vision
To work collaboratively with its academic partner institutions to build a robust portfolio of intellectual property disclosures, and move discoveries into businesses through industry partnerships, licensing arrangements, and start-up companies.

Deliverables
To establish and build a professionally managed, industry-friendly technology transfer office that will deliver exceptional commercialization results. This interface will be an important complement to Puerto Rico’s academic research enterprise and its key industry sectors.
Business Strategy

Operating Model

• Reflect diversity and unique research strengths of Partners.
• Provide deal evaluation and management resources to those Partners with limited capabilities.
• Manage – either independently or in collaboration with the Partner – the commercialization of those opportunities selected to move forward.
• An MOU details the approach and process.
Business Plan

Goals

• **Short term: To implement the TTO Business Plan and establish the “infrastructure”:**
  – Introduce and establish “best practices”
  – Secure expertise & resources (staff, IP services, domain specific partners);
  – Effectively engage Partner researchers; and
  – Generate a base line of invention disclosures for evaluation, patenting, marketing, and licensing.

• **Longer term: To achieve peer average by Year Five.**
Q & A

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