



**Annual Governance Report:  
Economic Development and Technology  
Commercialization**

**Joseph B. Hornett, CMA, CFE, CFM, CTP, CBM  
Senior Vice President, Treasurer & COO  
Purdue Research Foundation, Incorporated**



Figure 1

The mission of the Purdue Research Foundation is to advance Purdue University's quest for preeminence in discovery, learning, and engagement through effective stewardship of assets.

Through its New Synergies Strategic Plan, Purdue University has said that it will “catalyze research-based economic development and entrepreneurship” and “conduct field-defining research with breakthrough outcomes.” These are the statements of one of America’s leading public research universities committed to discovery with delivery, addressing important global challenges, and launching tomorrow’s leaders through education, research and service. Is Purdue succeeding? Indeed it is with Purdue University discoveries found in all 50 U.S. states and in nearly 100 countries around the world (Figure 1).

Commercialization of Purdue technology is one tangible way the University contributes to the economic vitality of Indiana, the United States, and indeed the world. Utilizing data compiled by the Association of University Technology Managers (AUTM), Purdue University has once again produced a track record of success for the most recent reporting period (2011 data).

# Technology Commercialization

## A Year in Review

Technology Transfer Activities	2011	% Change
Invention Disclosures	268	8% Increase
New U.S. Patent Applications Filed	175	41% Increase
Issued Letters Patents Worldwide	110	26% Increase
Commercial Licenses and Options	64	55% Decrease
<b>Gross Revenue</b>	<b>\$8.7 M</b>	<b>22% Increase</b>

**Figure 2**

As shown by Figure 2, invention disclosures increased by 8% over the prior year to a level of 268. In university technology transfer jargon, a disclosure is a written description of new intellectual property submitted by an inventor. Disclosures, along with other technology transfer metrics, are reflective of overall sponsored research expenditure levels along with faculty interest in the commercialization process. The level of 268 invention disclosures is a record high for Purdue University since they were first tracked in 1998.

Disclosures submitted to the Purdue Research Foundation's Office of Technology Commercialization (OTC) that qualify under national laws as patentable may have a patent application submitted to the United States Patent and Trademark Office (USPTO). During the most recent reporting period, applications for patents protecting Purdue intellectual property increased 41% from the prior year to a level of 175.

Patents actually issued worldwide achieved a level of 110 in the 2011 fiscal year. This represents a 26% increase for Purdue over the prior year, with over half of these issued patents obtained in the United States with the remainder accruing to Japan, Germany, France, the United Kingdom, Canada and Australia. The 110 issued patents is also a record level since these were first tracked in 1998.

# Technology Commercialization

## A Year in Review

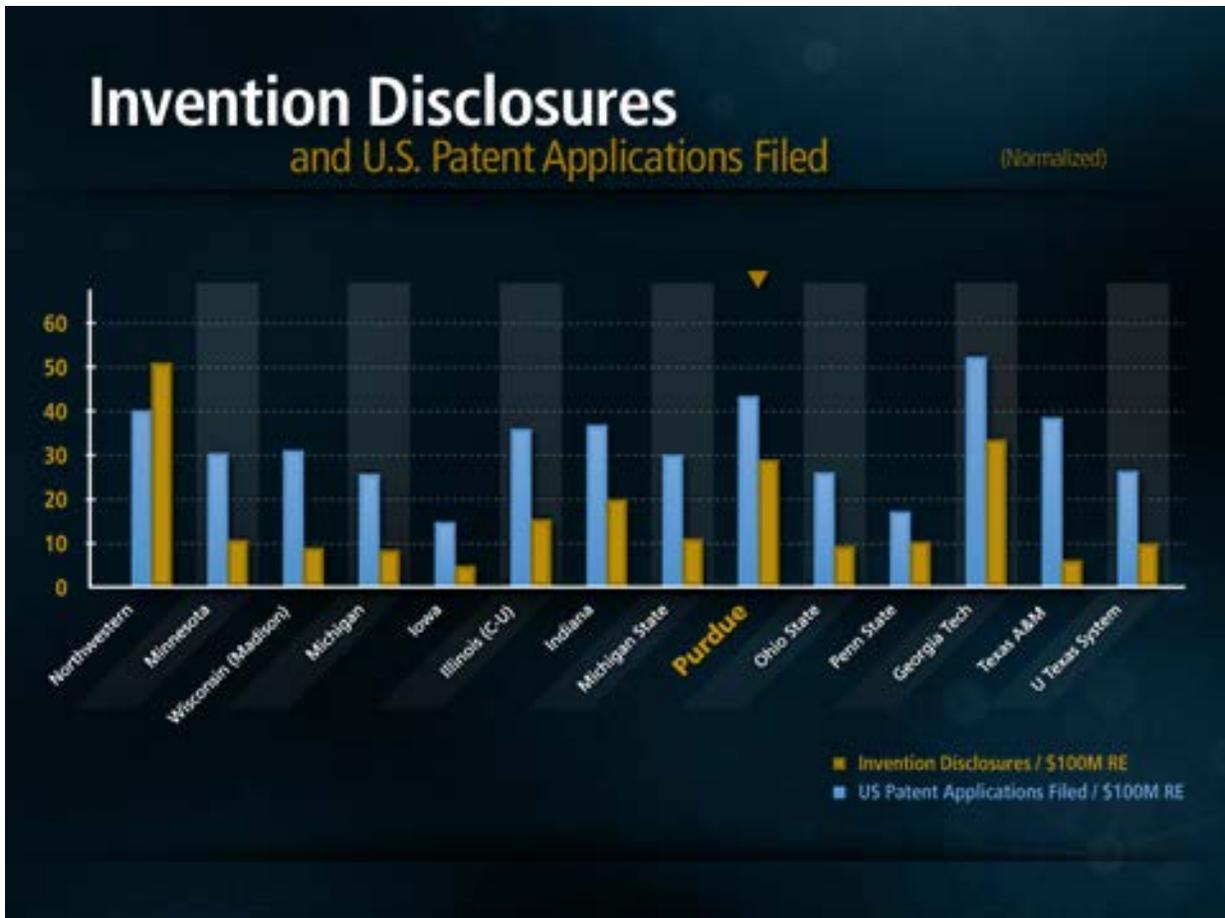
Technology Transfer Activities	2011	% Change
Invention Disclosures	268	8% Increase
New U.S. Patent Applications Filed	175	41% Increase
Issued Letters Patents Worldwide	110	26% Increase
Commercial Licenses and Options	64	55% Decrease
<b>Gross Revenue</b>	<b>\$8.7 M</b>	<b>22% Increase</b>

**Figure 2 (continued)**

The number of commercial licenses and options granted by Purdue’s OTC dropped significantly in 2011. Sixty-four licenses and options were executed, resulting in a 55% decrease from the prior year. Factors contributing to this decrease include a 49% decline in small businesses obtaining licenses, along with a 9% decrease in licenses executed by large businesses...both reflecting an economy still struggling to recover from recession.

The number of options executed increased slightly by 2%, suggesting a trend toward lighter and more exploratory technology transfer within the reporting period.

While transactional volume as represented by licenses and options executed were marked by a decline, there was a significant uptick in gross revenues received from licensing activities. Gross revenues reached a level of \$8.7 million marking a 22% increase over the prior year. This increase resulted from one licensee crossing the \$1 million royalty threshold along with a minor equity liquidation of another Purdue technology-based company.



**Figure 3**

The Purdue Research Foundation's Office of Technology Commercialization reports technology transfer activities annually to the Association of University Technology Managers (AUTM). AUTM is a nonprofit organization with an international membership of more than 3,000 technology managers and business executives. AUTM members come from more than 300 universities, research institutions and teaching hospitals. AUTM annually compiles technology transfer data from its member organizations and reports the information in an annual "Survey of Technology Licensing and Related Activity for U.S. Academic and Nonprofit Institutions and Technology Investment Firms." The information from our peers and aspirant peers outlined in this report was pulled from the 2011 AUTM report (the most recent reporting period).

Figure 3 displays innovation disclosures and patent applications normalized by sponsored research expenditure levels. This normalization allows an "apples to apples" comparison of Purdue University performance against its Big Ten and aspirational peers. In terms of innovation disclosures, Purdue ranks second in the Big 10 and second in the aspirational peer group. When it comes to patent applications, Purdue ranks first in the Big 10 and second in the aspirational peer group.



**Figure 4**

Commercial licensing activity and startup launches are displayed in Figure 4, which also compares Purdue’s performance against its Big Ten and aspirational peer groups.

The total number of commercial licenses granted by the Purdue Office of Technology Commercialization can be in the form of a commercial option, a commercial evaluation or a license that is either exclusive or non-exclusive.

In 2011, Purdue executed 64 commercial licenses, which exceeded the peer average of 59 and the peer median of 55. Startups represent a subset of the commercial licenses executed. Purdue met the peer average of 7 business startups and exceeded the peer median of 6. This relative amount is consistent with the last 5 years, which reports that an average of 11% of the Purdue Office of Technology Commercialization's annual commercial licensing activity involves the creation of a startup.

It is worth noting that deal flow across the entire cohort declined in 2011 while startup activity remained relatively constant.



**Figure 5**

As shown by Figure 5, royalty income received has little correlation with unreimbursed legal expenses associated with patent prosecution. In fact, this chart depicts the importance of the “super star” technology. Across both the Big Ten and aspirational peer groups, unreimbursed legal expenses for the entire patent portfolio show relatively little deviation from one institution to another. At the same time, there are significant differences in the royalty streams of several institutions and that is because of the contribution of one technology or a handful of technologies out of an entire patent portfolio.

Total legal expenses for Purdue were \$3.9 million; however, in the same reporting year, \$2.8 million was received in reimbursement from licensees yielding the \$1.1 million difference (in unreimbursed expenses). Using publicly available data, a similar analysis was performed on the public Big Ten and aspirant peer universities shown to compile this chart.

Relative to 2010, the legal expenses increased by 40%. This increase corresponded to the 41% increase in filings of U.S. patent applications shown earlier, and a decline in licenses granted by OTC, which is the means by which expense recovery is obtained.

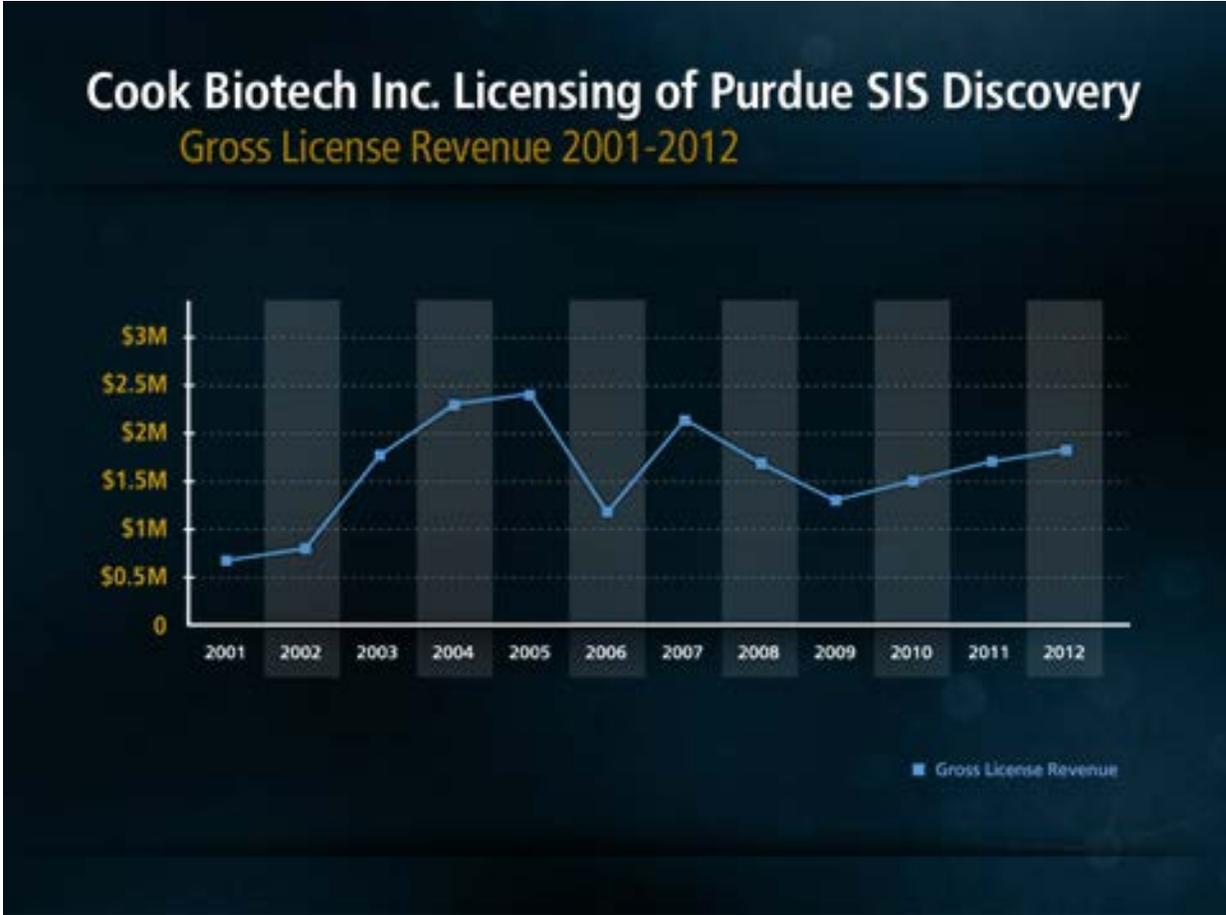


**Figure 6**

As shown by Figure 6, current Purdue University policy dictates that license revenues are distributed three ways...one-third goes to the inventor(s), one-third goes to the inventor's department, and one-third goes back as reinvestment to the Trask Endowment Fund. Thus, innovation, research and sustainability are all covered by the annual distribution of royalty payments received.

The Trask Endowment Fund is a restricted endowment that advances targeted investments in Purdue discoveries to promote future entrepreneurial opportunities for Purdue innovators. The sustainability distribution, a rare nod to the importance of saving, has proved to be a differentiator for Purdue and provides a means to invest in Purdue's future technology transfer efforts.

This chart displays a history of those distributions with a noticeable spike in 2011 that resulted from a liquidity event associated with the company known as Tripwire founded on a Purdue software security technology.



**Figure 7**

Figure 7 depicts the most valuable license to date in the Purdue intellectual property portfolio. Purdue’s Weldon School of Biomedical Engineering, College of Engineering, College of Veterinary Medicine, and Department of Chemistry have all contributed to the seminal work of the late Purdue innovator Dr. Les Geddes.

Dr. Geddes was directly involved with the successful issuance of nearly 50 patents. His innovations led to improvements in many medical procedures and biomedical devices including regenerative tissue scaffolds, defibrillators and non-invasive neo-natal monitoring units.

As one example, Cook Group Inc. licensed Dr. Geddes’ patent in small intestine submucosa (SIS) technology, now used in wound healing for patients in more than 65 countries around world. Cook Biotech Inc., the Purdue Research Park-based company created to market this technology, now employs more than 150 people.

The revenues accruing from Dr. Geddes’ work are displayed on the chart for the years 2001 through 2012 and total \$22.1 million for the period.

# Purdue Student Entrepreneurs

Student patents filed through  
the Purdue Office of Technology  
Commercialization

2011	218
------	-----

2012	355
------	-----

(63% Increase)



**Electric Motorcycle**  
Tony "Danger" Coiro



**3-D Robotic Vision**  
Yunfeng Li



**Topical Antimicrobial**  
Sean Connell and Jianming Li



**Ghost Pedal**  
Robbie Hoye and Will Black



**Portable Medical Chair**  
Kyle Amick and Leah Kenttämää-Squires

**Figure 8**

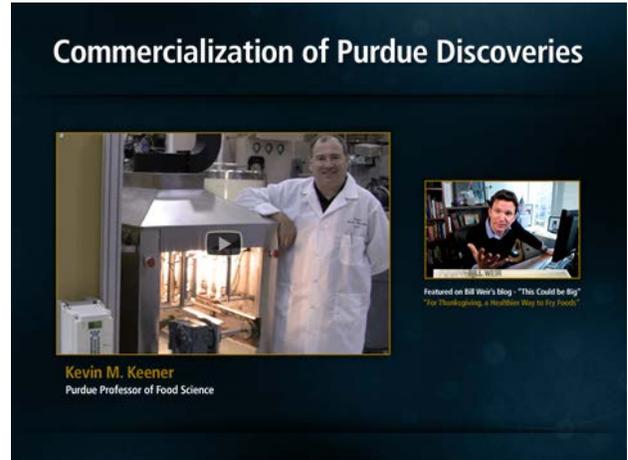
Figure 8 shows that in recent years, the Purdue Office of Technology Commercialization has begun to focus on student entrepreneurship. That focus has begun to pay dividends. During FY2011 Purdue student entrepreneurs filed 218 patent applications. In FY2012 that number rose to 355, marking a 62% increase. There is every reason to believe that these numbers will continue to increase in the years ahead.

Clockwise, students and their technologies pictured in the above figure are:

- Tony "Danger" Coiro designed a street-legal motorcycle powered through electric and solar energy.
- Yunfeng Li developed a technology to embed robots with the ability to "see" in 3-D as humans can see.
- Kyle Amick and Leah Kenttämää-Squires created a portable medical chair for use in underdeveloped countries. The device works as a dolly to carry medical supplies, folds into a medical chair and an examination table.
- Robbie Hoye and Will Black were on a team of Purdue students who designed a new type of "wah" pedal that provides on-stage mobility for electric guitarists.
- Sean Connell and Jianming Li developed an over-the-counter topical medicine that fights infections and enhances wound healing.



**Figure 9**



**Figure 10**

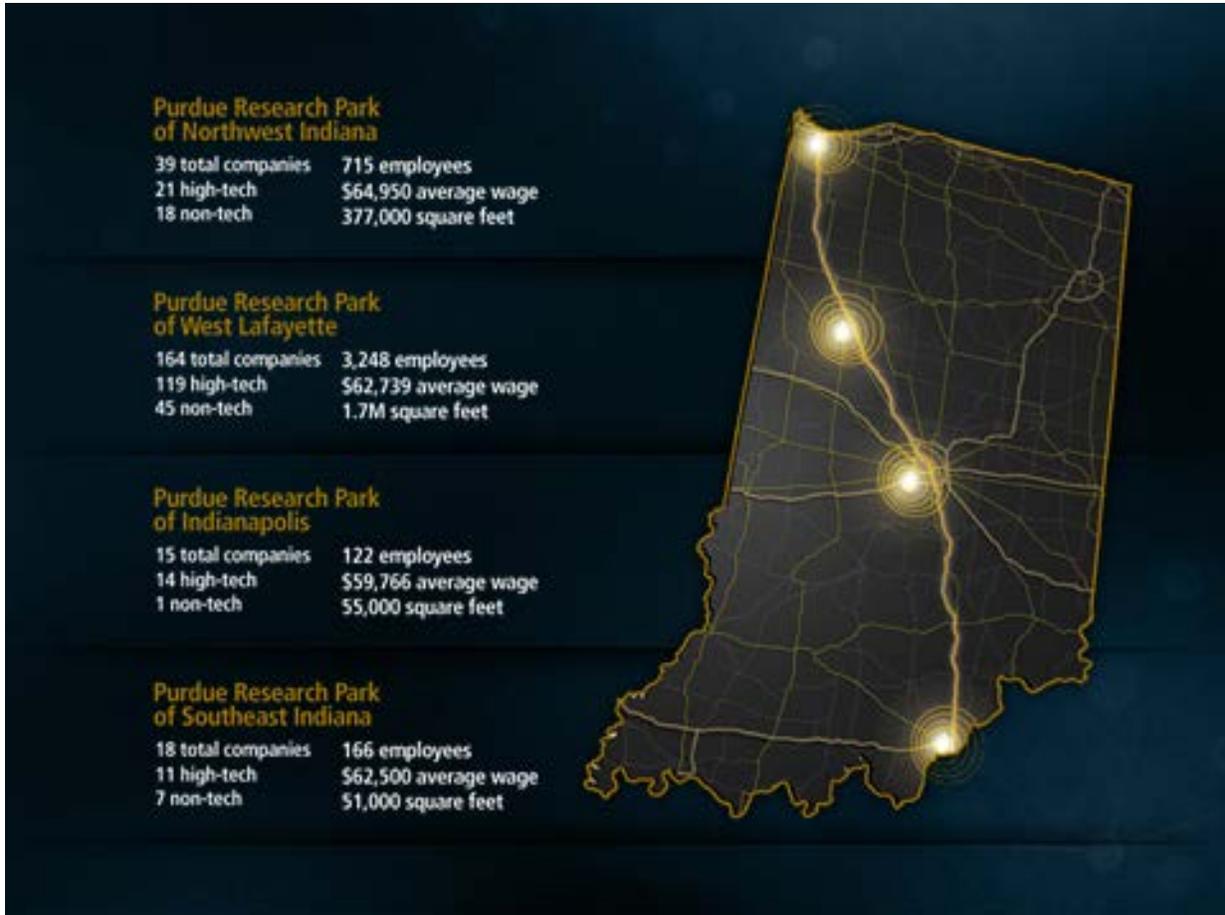
Figures 9 and 10 showcase two active technologies. Technologies must be marketed in many of the same ways that finished products are marketed to end users.

That is why a new tool was added to Purdue Office of Technology Commercialization's licensing resources. In conjunction with the Purdue Research Foundation's Marketing and Communications Department, promising Purdue technologies are now featured in customized video stories.

These stories are posted on the web and pitched to a variety of media outlets to further distribution and increase exposure to Purdue technologies.

Figure 9 represents the work of Johnny Park, CEO of Spensa Technologies Inc. in the Purdue Research Park of West Lafayette and a research and assistant professor in the School of Electrical and Computer Engineering. He developed the Z-Trap - a new way to reduce insecticide use and better control insect populations. The video story was promoted in South America in conjunction with its growing season in December. The researcher and OTC are now negotiating on a deal with Bayer CropScience in Germany to use Z-Traps throughout the company's South American fields.

Figure 10 represents the work of Purdue Food Science Professor Kevin Keener and his radiant fryer innovation. His technology could change the way partially fried foods are cooked in restaurants. Cooking partially fried foods like French fries and chicken nuggets in a radiant fryer can substantially reduce the amount of fat in the food. This story caught the attention of ABC News correspondent Bill Weir this past Thanksgiving, fueling increased licensing interest in healthier fried foods.



**Figure 11**

Figure 11 shows Purdue discoveries enter the marketplace in a variety of ways. In many instances these discoveries take root in Purdue’s showcase for economic development...the Purdue Research Park Network. As depicted in the graphic, the Network is comprised of four sites across Indiana: Merrillville, West Lafayette, Indianapolis and New Albany. Statistical highlights of each location are as follows:

- Purdue Research Park of Northwest Indiana**
- 39 companies
  - 21 technology-based companies, 18 other companies
  - 715 total employees
  - \$64,950 average annual wage
  - 377,000 square feet of space under roof

- Purdue Research Park of West Lafayette**
- 164 companies
  - 119 technology-based companies, 45 other companies
  - 3,248 total employees
  - \$62,739 average annual wage
  - 1.7 million square feet of space under roof

- Purdue Research Park of Indianapolis**
- 15 companies
  - 14 technology, 1 other company
  - 122 employees
  - \$59,766 average annual wage
  - 55,000 square feet of space under roof

- Purdue Research Park of Southeast Indiana**
- 18 companies
  - 11 technology, 7 other companies
  - 166 total employees
  - \$62,500 average annual wage
  - 51,000 square feet of space under roof



Figure 12

With 238 companies calling themselves clients of a Purdue Research Park, there is no end to stories of growth and progress.

Endocyte Inc. (Figure 12) was founded on the research of Philip S. Low, Purdue's Ralph C. Corley Distinguished Professor of Chemistry. The company, established in 1996, is a publicly traded (NASDAQ: ECTY) biopharmaceutical company developing targeted therapies for the treatment of cancer and other serious diseases.

The company currently has multiple drugs in human clinical trials, and recently entered into its Phase 3 clinical trials for one of the cancer therapies in its drug pipeline with published results expected later this year. Endocyte also is developing companion imaging diagnostics for each of its small molecule drug conjugates. It has licensed another one of its innovations to On Target Laboratories LLC.

In addition, Endocyte secured significant new outside investment as a result of a new partnership with Merck. Merck agreed to pay the company \$120 million up front with additional payouts of up to \$880 million to assist in bringing Endocyte's experimental cancer drug, Vintafolide, to the market.



- ▶ Dedicated quality seed lab
- ▶ 150% increase in job growth



**Figure 13**

In April 2012, Dow AgroSciences (Figure 13) expanded its facilities in the Purdue Research Park by relocating its Seed Quality Control Laboratory from Iowa. The Dow AgroSciences Seed Quality Control Lab will enable the future capacity and capabilities needed to support the growing Dow AgroSciences seed business.

The seed lab occupies 35,000 square feet of the Innovation Center building in the Purdue Research Park of West Lafayette. The opening of the new seed lab was the result of collaboration among the Indiana Economic Development Corporation (IEDC), City of West Lafayette, Tippecanoe County Commissioners and the Purdue Research Foundation.

The new lab is in addition to the current Dow AgroSciences presence in the Purdue Research Park, which includes a 15,000-square-foot research and development space and an 11,000-square-foot greenhouse complex. To help fund the life sciences research project in 2010, the IEDC provided a \$2.2 million grant to the Purdue Research Foundation to assist in the construction of the greenhouse.

With this new quality seed lab facility, Dow now occupies 61,000 square feet with employment growing from 35 in 2011 to 88 in 2012.



**Figure 14**

As shown by Figure 14, the Purdue Research Park closed the year with the exciting announcement that a state-of-the-art natural gas engine development and testing facility would be constructed and staffed by Automotive Robotics Proving Labs (ARPL).

The nearly 50,000-square-foot engine testing facility will create 30 new jobs in the Purdue Research Park of West Lafayette and open Phase 3 of the Park. The facility will house several test cells and prototype build areas that will analyze the performance data of Caterpillar's new natural gas engine line.

Not only does this project open new Purdue relationships with Caterpillar, it also paved the way for a nearly \$4 million investment in infrastructure by the City of West Lafayette to open this new phase of development in the Purdue Research Park. Other collaborators in the project include the State of Indiana, Tippecanoe County and the Purdue Research Foundation.

Construction will begin in the spring of 2013.

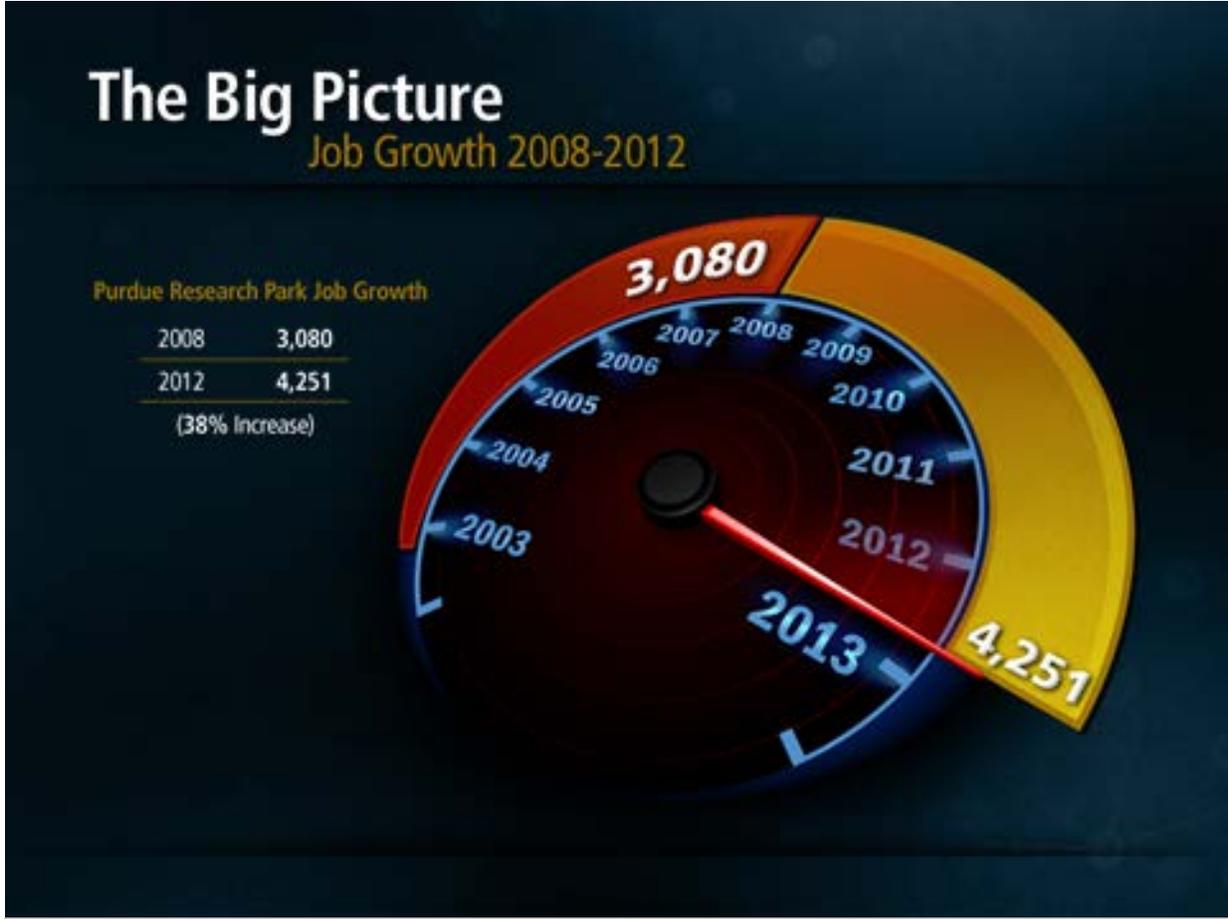


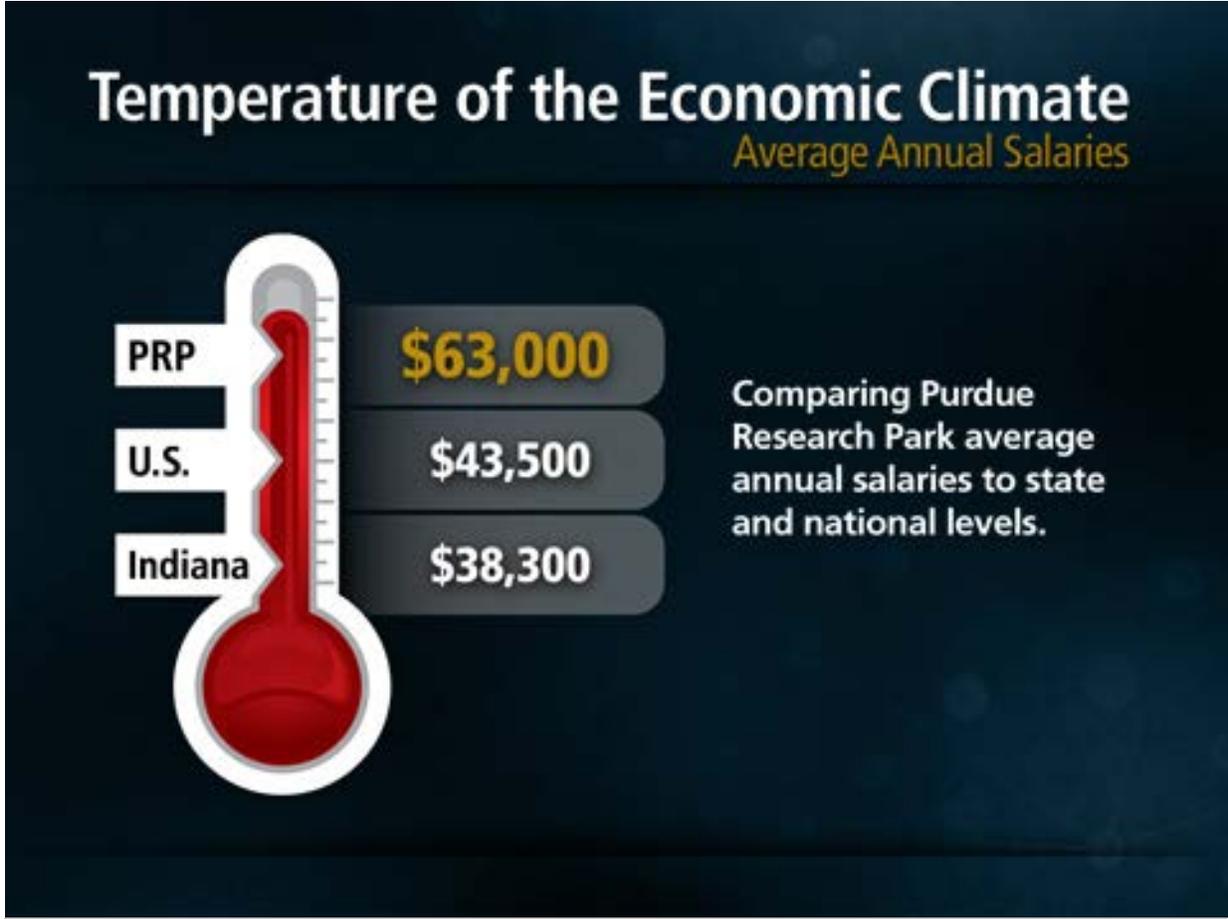
Figure 15

What is the value of the Purdue Research Park Network? Clearly one answer to this question is that the Parks firmly establish Purdue University as an engine of economic development. One way of gauging this value is in terms of job growth.

As can be seen in Figure 15, job growth in the Network increased 38% from 2008 through 2012...a particularly impressive number when one considers the magnitude of the Great Recession both statewide and nationally.

A 2011 independent study conducted by Thomas P. Miller and Associates reports that the Purdue Research Park provides a:

- \$1.3 billion annual economic impact on Indiana.
- \$63,000 average annual wage for Park employees.
- \$48 million contributed to state and local taxes.
- \$49 million received in federal grants for Park startups since 1987.
- \$257 million investment in Park facilities and infrastructure from 1999 to 2010.



**Figure 16**

Another measure of Purdue University’s value as an engine of economic development is the average wage level (Figure 16) found in the Purdue Research Park Network.

The average wage in the Network now stands at \$63,000...ranging from a low of \$59,766 in Indianapolis to a high of \$64,950 in Merrillville.

Contrast the Network average with the Indiana average of \$38,300 and the United States average of \$43,500. The value proposition of the Purdue Research Park Network is this: the Network is not only the home to jobs; the Network is the home to good jobs.

Just as Purdue University was at the forefront of the agricultural economy and the industrial economy, through this network of four University-developed research parks Purdue provides a tangible example of what is possible in the knowledge-based economy. As the logo of the Purdue Research Park proclaims, “The idea economy is here!”



**Joseph B. Hornett, CMA, CFE, CFM, CTP, CBM**  
**Senior Vice President, Treasurer & COO**  
**Purdue Research Foundation, Incorporated**