The Office of the Vice President for Engagement and the Indiana University Research and Technology Corporation (IURTC) are now in our sixth year of coordinating Indiana University’s statewide economic development efforts, introducing promising research discoveries to market, and connecting the university to regional and national business networks. INNOVATE INDIANA denotes all of these endeavors.

As the Indiana economy begins to rebound, this report shares highlights of success in areas directly linked to the health and vitality of our state. IU’s impact on the economy of the state of Indiana continues to grow, as confirmed by an independent study documenting our significant influence and that of our partnering institutions.

In fact, Indiana University and Indiana University Health generate a combined economic impact of $11.5 billion annually, supporting more than 100,000 jobs, and providing over $328 million in community benefits to the state.

The past year also witnessed a number of promising developments at IU’s Innovation Centers. In Indianapolis, the SpinUp program launched nine medical research firms, including EmphyMAb™ Biotech, where three IU School of Medicine professors are working to develop treatments to stop the progression of emphysema.

In Bloomington, grants from NASA and the Department of Homeland Security funded the management of climate data and the development of security measures for software design.

Our involvement with faculty and students has never been greater, as evidenced by our work with a professor of Informatics and a graduate student on the Bloomington campus, who developed an algorithm to analyze Twitter traffic to predict changes in the stock market. Their work product has just been patented with assistance from the IURTC, who shepherded the venture through early stage development.

With assistance from the IURTC and the Indiana Clinical and Transitional Sciences Institute’s (CTSI) Clinical Project, a faculty member from the IU School of Medicine is exploring a new method to treat antibiotic-resistant bacteria. CTSI continues to enhance efforts to accelerate research with market potential through a master’s program designed to prepare students for the complex process of developing commercial applications of research discoveries.

Other INNOVATE INDIANA initiatives also enrich education at IU. An e-text start-up, with IU as its first client, ensures materials accessible online.

We are also leveraging expertise from throughout the university to contribute to a range of regional and statewide economic development initiatives. The IU Council for Regional Engagement and Economic Development (CREED), with a representative from each IU campus, was created to foster greater communication, to enhance connectivity, and to facilitate knowledge transfer across all IU campuses and the communities they serve. In addition, the recently formed Innovate Indiana Network brings a combined wealth of expertise from schools and centers throughout the university, leveraging their subject matter expertise to further connect the needs of the state to the vast resources within IU.

These are just a few of the ways in which Indiana University works to advance the health and economic well-being of the Hoosier state and beyond. I invite you to read this report to learn more about these and the many other ways in which Indiana University is busily working to help Innovate Indiana!

Sincerely,

William B. Stephan
Vice President for Engagement
Indiana University
LEADING IN JOB CREATION FOR HOOSIERS

STUDY REVEALS IU’S ECONOMIC IMPACT

How great is Indiana University’s economic impact on the state? To see it in numbers, IU retained consulting firm Tripp Umbach to measure the economic, employment, and government revenue impact of IU’s eight campuses and Indiana University Health.

The resulting 2012 report, Economic Engine for Indiana: An Economic Impact Analysis, revealed the enormous fiscal benefits IU provides throughout Indiana via expenditures, research, and the education and employment of Hoosiers across the state.

MAKING IMPACT IN THE BILLIONS

The overall economic impact of IU and IU Health on Indiana is $11.5 billion per year, which represents 4.6% of the total state economy, according to the study. Throughout the state, IU campuses support local businesses, in large part through direct expenditures for goods and services by the university and its employees, students, and visitors.

IMPROVING HOOSIERS’ HEALTH

The renowned IU School of Medicine and its dynamic relationship with IU Health represents profound contributions to the state through innovative research, treatments, therapies, and jobs for Indiana residents.

“IF WE LOOK ACROSS THE COUNTRY, THE ECONOMIC REGIONS MAKING THE PROGRESS—even in times of challenge such as these we face today—are those regions that include a major research university or cluster of universities. The relationship between universities and regional growth is no coincidence in a knowledge-based economy.”

President Michael A. McRobbie, Indiana University
INNOVATE INDIANA REPORT

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MAPPING A STRONGER INDIANA
BUILDING ECONOMIC RESOURCES ACROSS THE STATE

Indiana University’s economic reach continues to grow across our regional campuses and into Indiana’s local communities. Through business incubators, resource centers, and unique collaborations, we’re mapping out Indiana’s future—a future of innovative approaches to business and job creation.

- **IU South Bend**: Encouraging Sustainability
  The Center for a Sustainable Future provides educational resources and encourages South Bend’s local businesses to employ sustainable business practices.

- **IPFW**: Enhancing Research and Engagement
  The IPFW Office of Research, Engagement, and Sponsored Programs supports research business endeavors and creates partnerships with area industry and government.

- **IU Kokomo**: Putting Theory into Practice
  A partnership with Chrysler gives student interns hands-on experience in areas such as leadership training, project tracking, and communication workshops.

- **IU East**: Developing Leaders
  The IU East Center for Leadership Development uses its academic resources to improve leadership where it’s needed most in the local economy.

- **IUPUC**: Advancing Excellence
  The Advanced Manufacturing Center of Excellence strengthens productivity in southeastern Indiana’s manufacturing sector and inspires students to pursue careers in science and technology.

- **IU Southeast**: Educating Entrepreneurs
  The IU Southeast School of Business and the Regional Economic Development Resource Center (REDRC) educate local business professionals through free entrepreneurship training workshops.

- **Evansville**: Creating Unique Learning Experiences
  The Bachelor/Medical Doctor program at the IU School of Medicine places undergraduates alongside faculty in unique classroom and laboratory learning experiences.

- **Crane**: Transferring Technology
  IU and the Naval Surface Warfare Center, Crane Division, formed a research and development collaboration that gives IU campuses access to private-sector technology transfer opportunities.

- **IU Bloomington**: Developing Innovative Technologies
  Researchers at the IU Innovation Center Bloomington are working on critical technology projects for NASA and the U.S. Department of Home Security. Read more on page 7.

- **IUPUI**: Growing New Companies
  The IU Innovation Center Indianapolis and the IURTC SpinUp program have introduced nine new medical research and technology companies. Read more on page 7.

- **IU Northwest**: Helping Business Owners
  The Northwest Indiana Small Business Development Center (NWI SBDC) offers no-cost assistance for entrepreneurs who want to start new or expanding existing businesses.
Discovering cures, inventing medical devices, developing IT platforms, and linking to some of the world’s most powerful supercomputers—that’s a typical day in the life in the Indiana University Innovation Centers in Bloomington and Indianapolis. In these centers, you’ll find a buzz of innovation.

IU INNOVATION CENTER BLOOMINGTON

The IU Innovation Center Bloomington is home to the Pervasive Technology Institute (PTI), several IU technology and research centers, IU administrators and staff, and offices for the IU School of Informatics and Computing.

In 2012:

• Experts in the Pervasive Technology Institute received $1.25 million from NASA to manage critical climate data for scientists on polar missions.
• The U.S. Department of Homeland Security awarded $1.9 million to the IU Center for Applied Cybersecurity Research to address vulnerabilities that arise during software development.
• The One Degree Imager, a new camera for the WIYN 3.5-meter telescope, was developed here in a collaboration between the Pervasive Technology Institute and the IU Department of Astronomy. The camera enables researchers to study the universe in big chunks instead of tiny pieces.

IU INNOVATION CENTER INDIANAPOLIS

The IU Innovation Center Indianapolis capitalizes on its close relationship with, and proximity to, the renowned IU School of Medicine. Through the new SpinUp program, the IURTC Office of Technology Commercialization has introduced nine new medical research and technology companies.

Tenants include:

• Sophia Therapeutics, which is developing a novel class of therapeutics to treat neuropathic pain and other disorders of the central nervous system.
• B9, which is working to discover and develop novel biomarkers for pancreatic cancer.
• EmphyMAb™ Biotech—read about this start-up on page 21.
• Courseload—read about this start-up on page 13.
• FAST Diagnostics, Inc., which is developing a reusable optical device and a single-use injectable fluorescent compound to provide a cost-effective, rapid, and accurate measure of kidney function.
• Hoosier Oncology Group, Inc. (“the HOG”), a working association of more than 400 dedicated community and research center physicians and clinical research practitioners who strive to increase the number of cancer patients participating in clinical research.
Tech Park North
Proton accelerator physics research and pioneering cancer treatments are conducted at the northern end of the IU Technology Park in Tech Park North, home to the Integrated Science and Accelerator Technology Hall, the IU Health Proton Therapy Center—the first of its kind in the Midwest—and the new IU Center for Exploration of Energy and Matter, where the next generation of research and technology is brewing.

Tech Park Corridor
The main artery of the Tech Park is the Technology Corridor, a model location for new businesses and technology of the future. And there’s plenty of developable real estate—173 acres—for more new and established companies.

Tech Park East
Cool, smart, and green, the Cyber Infrastructure Building (CIB) is the newest addition to Tech Park East. A design model for sustainability and collaboration, the 123,000-square-foot building is the park’s social hub and home to IU information technology personnel. At the park’s entrance is the IU Innovation Center, where modular dry and wet lab spaces and offices are available for developing technology, life sciences, and biosciences companies. Read more about our Innovation Centers on page 7. Built to withstand a category F5 tornado and able to hold more than 2.8 petabytes of information, the IU Data Center ensures the safety and security of IU’s networking, computer processing, and data storage equipment, which includes our “Big Red 2” and “Quarry” supercomputers.
TWITTER AND THE STOCK MARKET

SCHOOL OF INFORMATICS AND COMPUTING RESEARCHERS RECEIVE MOMENTOUS PATENT

A national media storm was created in October of 2010 when the research paper “Twitter mood predicts the stock market” hit the Internet. In two days, the paper had 70,000 hits, and hundreds of blogs and news sites were posting stories about what CNBC called “The Twitter Predictor.”

The trailblazing research from the IU School of Informatics and Computing team—Professor Johan Bollen and postdoctoral researcher Huining Mao—now has solid backing.

The IU Research and Technology Corporation (IURTC) received its 171st active U.S. patent in February of 2013 for Bollen and Mao’s mood mechanism, which analyses Twitter tweets based on an algorithm that parses them into six mood categories—tension, depression, anger, vigor, fatigue, and confusion. Using their proprietary algorithm to analyze millions of tweets, Bollen and Mao found they could predict the changes in the Dow three to four days later with an accuracy of 87.6 percent.

This revolution in the field of sentiment analysis has enormous financial implications. The ability to gain an edge on the stock market has investors excited, and many hedge funds are angling to leverage the technology and partner with Bollen and Mao.

Indiana University is also a key partner. Two years ago, the IURTC created an exclusive licensing agreement and software rights for the research tool with Guidewave Consulting, Bollen’s start-up company. “The great thing about this technology is that it lends itself to a number of different areas, opportunities, and industries,” says Tony Armstrong, president and CEO of the IURTC.

IU’s equity position in Guidewave provided necessary support for the venture, Bollen says. “IU moved rapidly and showed tremendous flexibility and a willingness to take my interests as a faculty member to heart.”
THE DIGITAL TEXTBOOK REVOLUTION
SOFTWARE PLATFORM LEADS THE COMPETITION

In 2000, Mickey Levitan and IU Professor Alan Dennis had an idea that was ahead of its time. Through Courseload, the start-up learning platform company they co-founded, the two endeavored to make college course materials accessible online.

A decade later, Indiana University became the first customer, implementing the Courseload platform across all its campuses. Now with 50 clients and 32 employees, Courseload is leading the online course text revolution—lowering costs for students and providing capabilities that can improve educational outcomes, while offering professors the discretion to use the platform on a course-by-course basis.

“IU’s model ensures that students will benefit from the cost savings and educational possibilities of eTexts and other online materials as their preferences shift to a blend of digital and print,” says Brad Wheeler, IU vice president for information technology and professor in the IU Kelley School of Business.

“IU has taken an approach that solves the issues that have slowed the adoption of digital course materials in higher education,” says Levitan, CEO. As Levitan and Dennis, the John T. Chambers Chair of Internet Systems at the School of Business, help other leaders in higher education make the transition to digital course materials, they are using IU as a model client. “IU is proactively molding that transition to favor its students and faculty,” Levitan says.

Levitan is grateful for the company’s broad-reaching partnership with IU. Early support from Wheeler was critical to the company’s success, Levitan says. “He’s a wonderful partner and an extraordinary leader—a visionary who is ready to go out and shape the world rather than be shaped by it.”

Levitan is also grateful for the company’s early and ongoing relationship with the IU Research and Technology Corporation (IURTC). Tony Armstrong, president and CEO of the IURTC, identified an early funding opportunity for Courseload through the Innovate Indiana Fund. Kenneth Green, manager of the Innovate Indiana Fund, sits on Courseload’s board of directors.

The company works in the IU Innovation Center in Indianapolis, where they have the additional bonus of working alongside other IU start-ups. “It’s terrific,” Levitan says. “It’s nice to be surrounded by people in other IU companies. We’re right on the north end of downtown Indianapolis, with parking. I recommend it to anyone.”
The Indiana Clinical and Translational Sciences Institute (CTSI) launched a new master’s program with the aim of addressing the lag between scientific discovery and promising new treatments and therapies.

The intent of the program is to shave off years of trial and error that often accompany translational research by providing a foundation of knowledge that will allow students pursuing advanced careers in science and medicine to navigate the clinical, financial, and regulatory channels necessary for their discoveries to reach more people. Integrating translational and clinical science into an academic curriculum represents an important step toward empowering Indiana’s next generation of scientists.

The Indiana CTSI is a cross-state partnership between Indiana University, Purdue University, and the University of Notre Dame. It was established in 2008 with funding from a $25 million NIH Clinical and Translational Sciences Award and $60 million from various public-private partnerships throughout the state.

The curriculum is designed to sharpen students’ skills in the multiple stages from research to production—crafting a research study, writing a grant, starting a business, or licensing one’s work. It focuses on collaboration and teamwork in order to bolster effective communication strategies that are necessary to partner with people across disciplines. The program currently draws from students enrolled in the IU School of Medicine.

ACCELERATING RESEARCH TO THE MARKET

CTSI MASTER’S PROGRAM BRIDGES THE GAP BETWEEN DISCOVERY AND TREATMENT

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PATENTS

A record 331 IU patents were filed by the IURTC in 2012. 26 patents were issued (12 U.S. and 14 foreign).
“OUR COMMITMENT TO INNOVATION MAKES US A KEY PARTNER IN COLLABORATION.”

President Michael A. McRobbie, Indiana University

SUPPORTING REGIONAL INITIATIVES

NEW COUNCIL BOOSTS ECONOMIC DEVELOPMENT

Three out of every four Hoosiers live within an hour’s drive of an Indiana University campus. As centers for research, education, and innovation, IU campuses are uniquely positioned to contribute to the economic vitality of their regional communities, providing opportunities in the areas where the majority of Hoosiers live.

To ensure that economic development efforts across the state are bolstered by the enormous intellectual and creative assets IU campuses provide, the IU Council for Regional Engagement and Economic Development (CREED) was born. The council’s regional representatives (one is appointed for each campus) connect budding business ventures and innovative project leaders to IU business and technology centers, faculty members, student resources, local organizations, and funding sources.

The CREED council serves as a forum where regional economic issues can be addressed. Chaired by the vice president for engagement, the council plays an instrumental role in identifying how IU can bring its resources to bear to enhance Indiana’s economy.

THE CREED RED FUND

The CREED Regional Economic Development (RED) Fund supports regional economic development initiatives. “Through the CREED RED Fund, the council provides a key resource that supports and benefits regional campus organizations,” says David Gard, assistant vice president of the IU Office of the Vice President for Engagement. CREED’s growing portfolio of RED Fund grant awards includes financial support for the Michiana Sustainability Leadership Program for the IU South Bend Center for a Sustainable Future, and the Leveraging Social Media for Business Results project for Center for Leadership Development at the IU East School of Business.

To learn more, connect with a regional Creed council representative, or apply for a CREED RED Fund grant, visit innovate.indiana.edu/council/index.shtml.
Dr. Stanley Spinola, chair of the Department of Microbiology and Immunology at the IU School of Medicine, is pioneering a new approach to the treatment of antibiotic-resistant bacteria.

In the past decade, highly resistant strains of Klebsiella and E. coli bacteria have emerged. But for the past 50 years, there have been no new developments in therapies or drugs that are able to treat this class of bacteria, Spinola says.

Spinola’s research focuses on finding an alternative way to inhibit bacteria by shutting down their ability to secrete proteins. The bacterium’s proteins enable it to escape a host’s defenses, such as our white blood cells. Spinola has found that if you activate a stress response system on a bacterium’s membrane, it shuts down its protein production in order to concentrate its energy on repairing the membrane. Once the proteins stop flowing to the bacterial surface, the host can then marshal its defenses to kill off the bacteria.

The Indiana University Research and Technology Corporation (IURTC) and the Indiana Clinical and Translational Sciences Institute (CTSI) Clinical Project Development Team have been instrumental in enabling IU faculty like Spinola to progress to the next stage of research development.

In 2011, CTSI provided Spinola with a grant that he used to conduct research that employed a high throughput screen to find compounds that activate systems in E. coli and shut off protein flow. CTSI has also been instrumental in providing important input on the National Institutes of Health grant that Spinola filed to secure federal research money.

The IURTC paired Spinola with a company that helped him file an SBIR (small business innovative research) application. For Spinola, the services IURTC provides have been extremely important. “IURTC has been interacting with me ever since I conceived of this project, from filing the provisional patent to connecting me with industry sponsors,” he says.
A BREATH OF LIFE FOR EMPHYSEMA PATIENTS

IU RESEARCHERS ARE ON THE BRINK OF A CURE

At the IU Innovation Center in Indianapolis, three professors from the IU School of Medicine (IUSM) have good reason to hope that help could be on the way for millions of patients suffering from emphysema, a debilitating form of chronic obstructive pulmonary disease (COPD) that is the third leading cause of death worldwide.

Their start-up company, EmphyMAb™ Biotech—formed with help from the IU Research and Technology Corporation (IURTC)—has developed a monoclonal antibody that stops progression of COPD in research trials with animals. “Our team discovered a molecular target that is central to disease progression,” says EmphyMAb’s Brian Johnstone, Ph.D., associate research professor of medicine at the IUSM. “It’s still early, but the data looks extremely promising.”

EmphyMAb’s novel monoclonal antibody inactivates a newly discovered pathway involved in lung diseases, arresting loss of lung function. “The antibody specifically traps a key protein in the pathway to prevent it from damaging the lungs,” says Johnstone.

EmphyMAb’s Irina Petrache, M.D., the Calvin H. English Professor of Medicine at IUSM and a practicing pulmonologist, is passionate about discovering more effective ways to treat her patients. When Petrache met Matthias Clauss, Ph.D., associate research professor of medicine at the IUSM, the two recognized that their research paths intersected. Clauss has devoted his career to studying proteins that harm blood vessels and cause inflammation, which both contribute to COPD.

Petrache and Clauss had no previous experience developing therapies for the market. “That’s when I jumped in,” says Johnstone, who has had success with start-up biotech companies. “We had a great idea, but no money to commercialize it,” Johnstone says, “until Joe Trebley and SpinUp gave us a much-needed boost.”

Trebley is head of start-up support and promotion at the IURTC—and IURTC’s SpinUp program, which helps form IU start-ups like EmphyMAb. SpinUp helped with patent costs and obtaining a $166,000 grant from the Small Business Innovation Research (SBIR) program. The next step, Trebley says, is preclinical testing of the drug, which has a potential market of at least $20 billion. Trebley and the IURTC will continue to look for additional funding sources.

“We’re very hopeful,” says Johnstone. “Stopping the disease is our driving force.”

13 FRESH STARTS

IU launched 13 new start-up companies in 2012.
Collaborate With Us

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