



BUILDING & CONNECTING IT

Throughout its history, Indiana's landscape has been dotted with silos.

Not just the kind that you would expect to see on a typical Midwestern landscape, but too often the kind that allows institutions—universities, corporations, community organizations and government, to name a few—to function in near isolation, with limited collaboration or even communication.

Tearing down those figurative silos always is a challenge. But in some regions of the state and in some key areas of economic opportunity, it's happening more and more. One of the best examples involves the strategic collaborations in the cluster of Indiana's life sciences industry.

In the late 1990s, many states in the U.S. were beginning to eye pharmaceuticals and biotechnology as new frontiers in economic development. Indiana already had a running start, with major pharmaceutical and biotech companies such as Eli Lilly and Co., Roche Diagnostics, Dow AgroSciences, Cook Group and a robust orthopedic belt in northern Indiana with corporations such as Zimmer, DePuy and Biomet. These businesses employ thousands of Hoosiers at wage rates significantly above the average wage of Indiana residents.

Eli Lilly and Co. alone employs more than 13,000 people in Marion County with average wages of \$95,000, resulting in a total annual payroll for those employees of \$1.3 billion. Also in the mix: research and teaching institutions such as Indiana University, with the nation's second largest medical school, and Purdue University, an engineering and technology powerhouse.

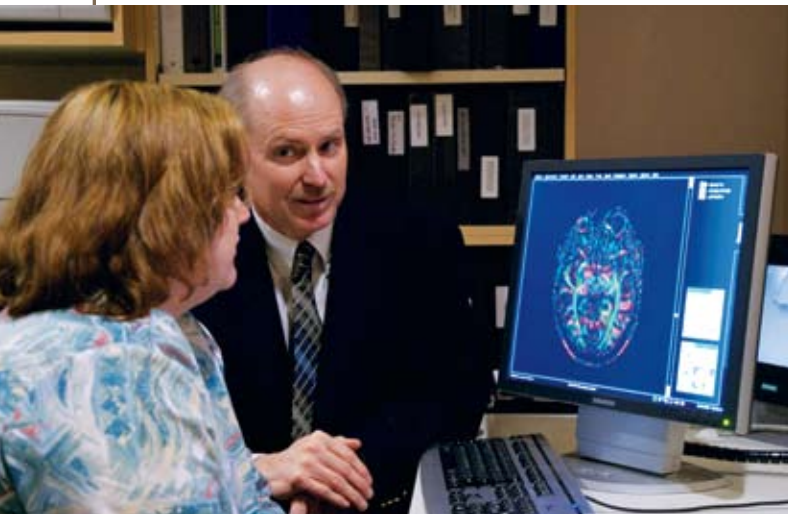
Missing was a catalyst to bring it all together, according to David Johnson, president and CEO of Indiana's life sciences group, BioCrossroads, an initiative co-founded in 2002 by the Central Indiana Corporate Partnership (CICP) and CICP Foundation, with private industry, government and higher education.

"Our life sciences strength was primarily made up of institutional silos with impressive individual components but very little collaboration among university and corporate leaders, and very little awareness by either these leaders or the surrounding community that these diverse institutions in fact were part of a much larger sector of opportunity," Johnson says.

INGEN: A FOUNDATIONAL RESOURCE

The U.S. scientists' announcement in June 2000 of the successful mapping of the human genome made headlines around the world.

Six months later, the Endowment made its largest-ever grant of \$104.9 million to Indiana University, launching the Indiana Genomics Initiative (INGEN). At the time, IU officials said that the grant could catapult IU and its School of Medicine into the highest echelon of scientific research institutions.





It was a tipping point for the medical school, securing its place on the new life sciences map, says Dr. Ora Hirsch Pescovitz, executive associate dean for research affairs at the IU School of Medicine and president and CEO of Riley Hospital for Children.

“When INGEN was first created, the words ‘life sciences’ were not even spoken,” Pescovitz recalls. “The Endowment’s grant attracted great attention to the medical school’s research strengths, and it also began to attract the kind of talent required to pursue new opportunities in new ways.”

Ask Pescovitz, who oversees INGEN, to name the opportunities, and she’ll rattle off a dozen different ways that INGEN changed IU forever:

- » recruitment of talented new researchers;
- » \$35 million toward state-of-the-art neuro-imaging equipment that helped recruit a sought-after team of investigators;
- » research support;
- » entrepreneurial activities;
- » scholarships for graduate students in medical and doctoral programs at IU;
- » collaboration between researchers at IU’s Bloomington and Indianapolis campuses, as well as with their cross-disciplinary colleagues at Purdue;
- » a new Clinical Translational

ABOVE With new medical buildings surrounding her, Dr. Ora Hirsch Pescovitz directs the INGEN life sciences effort at the IU School of Medicine.
OPPOSITE Gary D. Hutchins, director of radiology at the school, discusses new neuro-imaging possibilities with Michelle Beal, lead MRI technologist.

Science Institute, which looks at how life sciences discoveries can “translate” into advances in clinical medicine.

It’s a long list and not nearly complete. New projects are constantly in the works, in part because the original INGEN grant has been leveraged to generate nearly \$584.5 million in additional external research funding that has flowed into IU as a direct result of its expanded capacities.

“It’s not just ‘rah, rah, INGEN is good.’ We can actually measure the results in funds raised, faculty hired and research published,” Pescovitz says.

And it’s not just IU that is reaping the benefits of the original INGEN grant. Today Indiana ranks among the nation’s top four life sciences leaders as defined by number and concentration of life sciences-related jobs, according to the Biotechnology Industry Organization and the Battelle Memorial Institute.

“We have significant life sciences venture capital



ABOVE BioCrossroads' David Johnson (right) gets a quick lesson in advanced vascular-catheter technology from Ghassan S. Kassab, professor of biomedical engineering and professor of surgery at the IU medical school. **OPPOSITE** Shawn Comella is president and CEO of Monarch LifeSciences, originally one of eight BioCrossroads-inspired initiatives. With clients such as pharmaceutical companies, biotechnology firms and academic researchers, Monarch specializes in protein biomarker discovery, development and validation.

resources today, while even five years ago we had virtually none," says BioCrossroads' Johnson. "We have active technology transfer efforts leading to a wide range of promising start-up companies coming from IU, Purdue and the University of Notre Dame."

Among the new generation of start-up ventures: Monarch LifeSciences. The company was created when BioCrossroads hired a consulting firm to look at what strengths existed in the area that could become the basis for new life sciences enterprises.

In part because of the original \$104.9 million INGEN grant and a second, supplementary INGEN grant of \$50 million to IU in 2003, BioCrossroads was inspired to look at the possibilities in protein analysis for a start-up. Following the research trail carved by BioCrossroads, the IU School of Medicine, Eli Lilly and Co., Roche and Dow collaborated in establishing the Indiana Centers for Applied Protein Sciences (INCAPS). The aim: to provide research services on proteins for pharmaceutical companies interested in developing drugs and diagnostic tests.

In 2007 INCAPS changed its name to Monarch LifeSciences, but the enterprise continues its partnership with IU while providing life sciences customers with the means to expedite the research and development timeline for new therapeutics and diagnostics. Alumni from IU, Purdue and Rose-Hulman Institute of Technology

make up the staff at Monarch—an example of how expertise in the life sciences is a critical connection to the region's leading industry and to the retention of the graduates of Indiana colleges and universities.

AN ECOSYSTEM

Indiana's future depends on a mix of ingredients: economic strength, educational attainment, quality of life and civic leadership. Consequently the Endowment over the years has provided several grants to the CICP Foundation to further the charitable and educational aspects of CICP's collaborations with private industry, higher education and government. These efforts have resulted in industry "cluster initiatives" such as BioCrossroads in 2002 and Conexus Indiana, an advanced manufacturing and logistics initiative, this year. Since 2002 the Endowment has provided nearly \$13 million in grants for BioCrossroads efforts; more than \$4 million in Endowment grants has been approved to support the launch of Conexus.

Using an analogy from nature, CICP CEO Mark Miles compares Indiana to any ecosystem in which organisms depend on each other to sustain life. Strong business enterprises, large and small, employ people. Those people, in turn, contribute to their communities' arts, cultural, educational and human services organizations as patrons, donors, board members and volunteers.

It's symbiotic—and sometimes a little scary. Remove one large employer or the smaller businesses that make up an entire sector of the local economy, and the ecosystem could lose the people, brainpower, leadership and funding for the ingredients vital for a thriving community. Without the ingredients that make a community a vibrant place to live, smart, innovative people who can create jobs and opportunities will eventually leave, too.

"It's a system that keeps circulating. It isn't that it starts 'here' and ends 'there.' It's a circle," says Miles. "What the Endowment has helped us figure out is that when human capital connects to an enterprise or a cluster of businesses in the same sector and flourishes, you'll have a greater pool of talent, which will then recirculate through the community."

John C. Lechleiter, Eli Lilly and Co. president and CEO and a member of the original BioCrossroads

steering committee, agrees. “BioCrossroads’ efforts to develop a broader and deeper life sciences talent pool in the community are vitally important to the future success of Lilly and other life sciences companies in the region,” he says.

IU’s Pescovitz has seen the connection when it comes to recruiting new faculty. Central Indiana today is an easier community to sell to researchers and their families who a decade ago might have wondered why they should come to Indianapolis. A humming life sciences industry means that there’s more opportunity—more of everything—than is

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available in the communities of most medical schools. “And that doesn’t even include all that has happened in the community in the last 10 years to make life in Indianapolis more attractive,” Pescovitz says, noting that cultural life in the community is richer than ever.

BUILDING ON A LEGACY

Indiana is No. 1 in the nation in terms of manufacturing employment and the number of manufacturing plants. It’s a ranking that the state can be proud of, but it also means that Indiana is vulnerable to recessions, downsizing, outsourcing and other economic realities. Historically, the state’s manufacturing economy has supported a strong middle class. In part because of this prosperity, there was no broad recognition of the need to invest more resources in developing a workforce of people who are technologically adept, well educated and motivated to innovate and take entrepreneurial risks.

For proof, look no further than Indiana’s college attainment rank. Nationwide, a little more than 27 percent of all adults have a bachelor’s degree or higher, but only 21 percent of Indiana’s adults have earned a college degree, consigning the state to near the bottom of the 50 states for college graduates, according to recent U.S. Census data.



Although a traditional manufacturing economy may have lost its appeal, there is significant potential in advanced manufacturing, according to Joe Loughrey, president and chief operating officer of Cummins Inc., a global leader in engine design and manufacturing headquartered in Columbus, Ind. Loughrey, who also serves as the chairman of the Conexus Indiana initiative, is enthusiastic about the initiative’s efforts to bring to Indiana the successful *Dream It. Do It.* program developed by the Manufacturing Institute, the charitable affiliate of the National Association of Manufacturers. Advanced manufacturing involves sophisticated, technology-driven processes to produce goods and materials requiring a highly trained and educated workforce that uses knowledge-based skills rather than traditional physical labor.

As chairman of the institute, Loughrey knows about the capacity of *Dream It. Do It.* to promote the promising and exciting opportunities in advanced manufacturing in the state. Targeted at young people, ages 16 to 26, *Dream It. Do It.* is a grass-roots effort to expose young people to a broad range of advanced manufacturing careers through school career day fairs, factory tours and field trips, job-shadowing experiences, internships and co-op opportunities. Through *Dream It. Do It.*, Conexus representatives will work in nearly 60 high schools to educate and inform young Hoosiers about advanced manufacturing careers. Conexus also will help Indiana higher education institutions, especially Ivy Tech, develop curricula that align better with the job skills and capacities required for advanced manufacturing.

Advanced manufacturing and the distribution, transportation and logistics industries account for 27 percent of Indiana jobs and more than a third of the gross state product and tax revenues. The Indiana Department of Workforce Development reports that nine out of the top 11 occupation shortages in Indiana are in these industry sectors. “It is imperative that Conexus succeed in its efforts to develop a prepared advanced manufacturing workforce for Indiana,” says Loughrey. “We must take advantage of Indiana’s manufacturing legacy by moving into the next generation of advanced manufacturing.”