

Where ideas find life.

The evolution of BioCrossroads 2002–2012

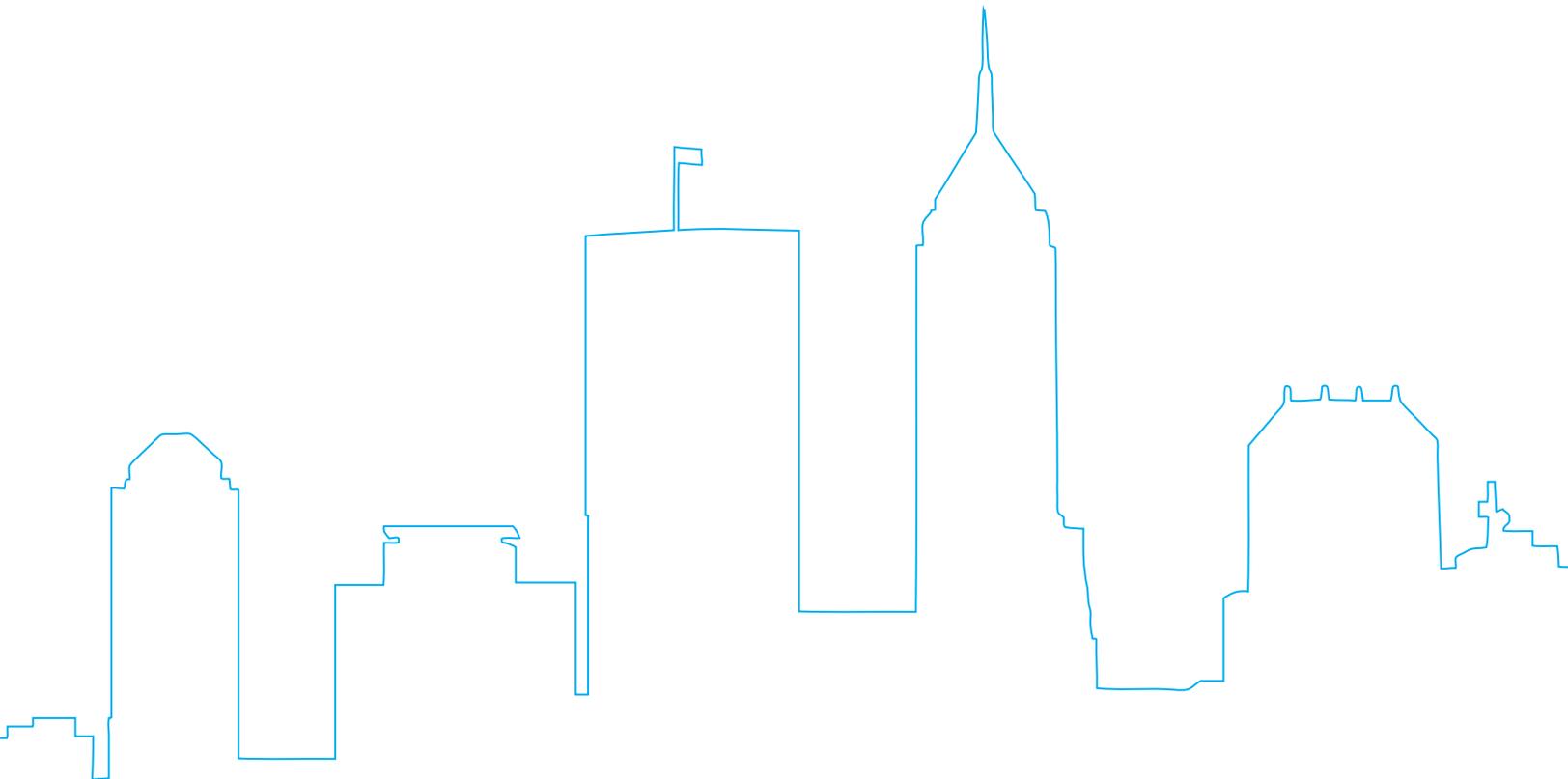
 BioCrossroads®

BioIntellex 

“I realized that the city was great because of a mixture of things, but the future of this area was going to be all about life sciences.

“What we needed was an enterprise to connect the major global players from academia and industry who were already here, and focus them on working together on big, ambitious and sensible things that would serve to build a new economy for this century.”

David Johnson, *President and CEO*



Making Connections

The year was 2001, and a task force appointed by the Mayor of Indianapolis was sketching out the future of the city.

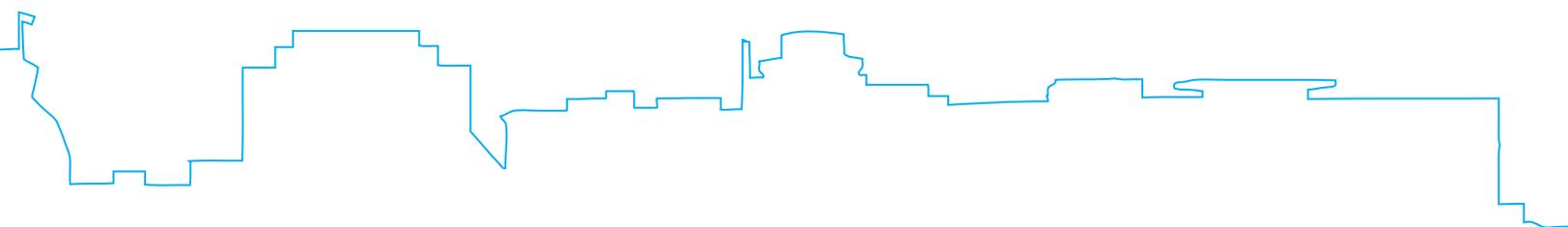
In the course of his research, task force member, local lawyer and community volunteer David Johnson kept coming back to one thing: life sciences. The study of living things, including biology, medicine and biotechnology, was a key area of focus in Indy as home to corporate headquarters of major healthcare companies and some of the nation's leading research universities – and, for that matter, the life sciences sector represented a key research and business strength all across the state. If cultivated effectively, the healthcare sector held even greater potential for driving the region's future growth.

Little more than a decade later, Indiana is recognized – and more than occasionally envied – for its role as one of the growing global leaders in the field. Throughout the state, life sciences represent today a \$44-billion industry, with economic clout and worldwide reach that have put Indiana on the map of places that count when it comes to medical technology and biotechnology.

This remarkable evolution did not happen by accident. It was the result of keen vision. Careful planning. Collaboration among the players who would pursue the dream.

And a catalyst to connect them all.

BioCrossroads.



Connecting people

At the turn of the 21st Century, Indiana already had a legacy spanning more than 100 years of starting and growing strong life sciences companies. The roots of that legacy lay in an entrepreneurial spirit that still rivals any across the nation.

In 1876, Colonel Eli Lilly embarked on a mission to develop quality pharmaceuticals, and now Indianapolis is home to one of the largest pharmaceutical companies in the world.

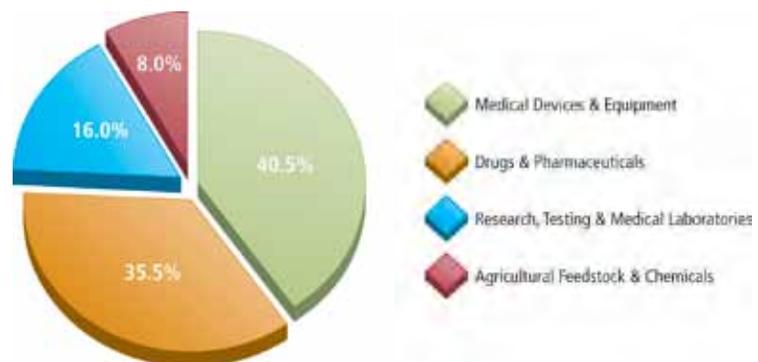
Just two decades later, visionary splints inventor Revra DePuy started his orthopedics company in the northern Indiana town of Warsaw. He soon had a new neighbor (and competitor), as former DePuy employee Justin Zimmer left his mark by founding Zimmer 20 years later. When Zimmer veteran Dane Miller formed Biomet Orthopedics in 1977, the town became home to three of the five largest global orthopedics companies – thus bestowing it with the title Orthopedics Capital of the World.

In the 1960s, Bill Cook started Cook Medical, making guide wire catheters out of his apartment in Bloomington, then a small college town about 50 miles south of Indianapolis. Today the Cook Group is the largest privately held medical company in the world. Also in the 1960s, Willard “Bill” Eason decided to leave his day-job as a chemical engineer at Ford Motor Company in Indianapolis to found a new company – BioDynamics – to develop diagnostic products that would enable physicians to analyze lab results in the office. Through a series of mergers and acquisitions, Eason’s good idea eventually grew to become the North American headquarters for Roche Diagnostics.

These and other noteworthy developments stood out to Johnson during his initial task force research. Indianapolis was home to the Indiana University School of Medicine, the second largest in the country. WellPoint (then Anthem), the nation’s largest health insurance company, was headquartered in Indy. And the state already boasted more than 550 businesses in the medical device, pharmaceutical, drug development, diagnostic and agriculture-biotech sectors.

Composition of Indiana’s Life Sciences Industry

Source: IBRC using data from the Bureau of Labor Statistics



Life sciences companies and employees also paid nearly 20% of state and local tax bills.

“There were all these major players in the life sciences, but they weren’t talking to each other,” said Johnson, who would later become president of BioCrossroads. “These were people who ought to be sitting at the table and putting new things in place.”

Building a coalition

Johnson was not the only one who thought a conversation was needed. In February 2002, Sidney Taurel, then-CEO of Eli Lilly and Company, along with colleague Dr. John Lechleiter, soon to become Lilly’s President (and eventually Taurel’s successor as CEO), invited the heads of Indiana’s research universities, medical school and hospitals, leaders of Indiana’s life sciences companies, and other experts in science and technology to a historic breakfast meeting.

“Sidney and John knew that we needed to come together and recognize that life sciences are the greatest strengths we have, and have everything to do with the future of this community,” Johnson explained. But before they could determine how best to accelerate growth in this sector, Johnson and other city leaders needed to know what they didn’t know.

In fact, in the months leading up to that Lilly community breakfast, the Central Indiana Corporate Partnership (CICP) had been conducting a series of early roundtable discussions with community leaders and, with key support from Lilly Endowment, decided to retain the Battelle Technology Partnership Practice, an internationally recognized consulting firm, to identify, quantify and analyze growth engines for the region. Not surprisingly, the Battelle consultants quickly focused on Indiana’s considerable promise as an emerging life sciences hub.

The Battelle study demonstrated many obvious things in Indiana’s favor: a broad life sciences presence from Bloomington to West Lafayette; higher average earnings among workers in life sciences; an impressive level of university-funded research and patent filings; and headquarters operations of several major research and development companies like Eli Lilly and Company, Roche Diagnostics, Cook Group, and Dow AgroSciences.

One important insight from the study was the potential partnership opportunities that lay beyond Central Indiana. Just a few hours north, the Warsaw area was home to prominent life sciences companies – Zimmer, Biomet and DePuy – that were global leaders in orthopedics; employed thousands around the world (and nearly 7,000 at home in a town of fewer than 20,000 citizens); and would, by 2009, bring in more than \$11 billion in annual revenues. The study also identified other important companies in small communities, often far from the media spotlight but still in the middle of important scientific advancements and therefore, strong potential partners to support the life sciences initiative.

“Of course, we knew all those companies were based here, but it had never been put into that kind of context before,” Johnson said. “It was like finding out what you already had.”

But Battelle’s report pointed to some missing pieces as well. Indiana had no real infrastructure that bred either collaboration or proliferation. If a research scientist at a major Indiana university discovered the next big blockbuster drug opportunity or a game-changing medical device, that discovery was going to need to be rapidly commercialized and heavily funded to realize its potential. And that funding wasn’t going to happen in venture capital-starved Indiana. Similarly, there were no incubator facilities that could house emerging companies at those critical, early stages of growth. Clearly, the region needed investment dollars and a stronger partnership among industry, universities and government to unify its development strategy.

Using the Battelle report as a launching pad, and following that Lilly community breakfast, in February 2002 a coalition of organizations established the Central Indiana Life Sciences Initiative (CILSI), which would eventually become BioCrossroads. The goal of the coalition – initially managed by CICP, and including the office of Indianapolis Mayor Bart Peterson, Indiana University, Purdue University, Lilly, and the Indiana Health Industry Forum (IHIF) – was to generate more investment dollars and create a true collaborative network. That network could then foster the development of a broad range of companies which could support life sciences work inside and outside the state.

“Initially, there was a great deal of skepticism about what exactly CILSI was and how it could add value to the life and health sciences industry in the area,” noted Anne Shane, an early consultant to CICP who helped organize and staff CILSI in its early days, and eventually drove the strategic planning process that resulted in BioCrossroads.

“Everyone seemed to adopt a ‘wait and see’ attitude.”

Early support from CICP and the Lilly Endowment helped to keep the players at the table. But if the initiative was going to be successful, especially when it came to the very important requirement to raise substantial philanthropic and investment funds, it needed something more: the enthusiastic participation of influential city leaders.

Engaging leaders

The support of the mayor's office was critical, but Melina Kennedy, then-director of economic development for the city of Indianapolis, knew a broader base was needed.

"We needed the universities coming together with business and government for this to be successful," Kennedy said. While Mayor Bart Peterson was on board, Kennedy said he also understood the importance of engaging others at the highest levels. "He knew that he would be making a commitment of both time and money, but he also knew it would not be successful if it was just about him."

Partners would be needed to help address the four imperatives the Battelle research had identified as key to unlocking the state's life sciences future: better information about and brand identity for the sector; training and talent development (by local government, vocational and academic institutions); linking talent and business through effective collaborations; and finding sufficient venture capital to begin to build a real local market. By this time, CILSI had also conducted its own study, called "Targeting for the Future," and had identified several possible areas of life sciences focus.

With this information in hand, four key players took the lead in driving the formation of partnerships and support that were critical to success, according to Kennedy: David Goodrich of CICP, Wade Lange of IHIF, David Johnson – at the time representing the private sector as an attorney at Baker & Daniels – and Mayor Peterson. Early in the process, Peterson contacted Taurel and Lechleiter at Lilly, along with other corporate leaders and the deans at IU and Purdue, about becoming active participants.

Lilly and the City of Indianapolis spearheaded the early efforts to build support for the initiative, with the city contributing \$500,000 toward initial marketing outreach activities, and with Lilly Endowment, through the CICIP Foundation, contributing substantial grant funds to study best practices and formulate a strategic plan that could catalyze community growth around life sciences opportunities. Peterson, who was also a member of the organization's first executive committee, said the outreach programs worked because there was a strong story to tell – strong enough, in fact, to match those of established life sciences hotbeds across the country and to garner local support.

“We had a good, organized plan to move forward,” Peterson explained. “Other cities and towns thought they could compete, too, but they didn’t have the assets we had. When you have one of the largest and most innovative pharmaceutical companies in the world, when you have the North American headquarters of Roche Diagnostics, when you have a true industry leader in Dow AgroSciences – you can’t make all this stuff up. You can’t hype second and third-tier companies. That’s why we can compete with San Diego and Boston.”

The formation of a clear strategy and the enthusiastic response of community leaders meant that a successful foundation had been laid. But by the end of 2003, it became apparent that moving the initiative to the next level would require a stronger enterprise offering new leadership with more sophisticated expertise in the life sciences.

Gathering expertise

The coalition didn’t have to look far. Dr. August Watanabe, a globally revered scientist and industry leader, had just retired as head of Lilly Research Labs. Moving with impressive speed, Anne Shane and CICIP’s David Goodrich approached Watanabe to gauge – and stimulate – his interest in strategizing and then leading a new governing structure for CILSI and recruiting other industry leaders and experts to support the growing effort.

Watanabe agreed, and brought to the organization a rare combination of academic, industry and entrepreneurial vision. His academic credentials and brilliant scientific insight came from many years as Chairman of the Department of Medicine at the IU School of Medicine. At Lilly, he had also been Executive Vice President of Science and Technology and had presided over more than a decade of blockbuster drug launches. The founder of multiple promising biotechnology companies, Watanabe had entrepreneurship in his blood and was the perfect person to give direction to the new organization and chart its future.

Watanabe was soon joined in his recruiting effort by Charles (“Chuck”) Schalliol, a Lilly executive on loan to serve as the organization’s first president and chief executive officer. With this duo’s arrival in early 2004, CILSI was officially renamed, duly incorporated and established as BioCrossroads.

The first item on the agenda for Watanabe and Schalliol: develop a list of potential board members with expertise in life sciences and start knocking on doors to ask for help. The simple strategy worked.

Along with then-new BioCrossroads Vice President Anne Shane, Watanabe and Schalliol recruited to the BioCrossroads Board of Directors some of the most influential leaders in Indiana’s academic, corporate and government sectors: Dr. Craig Brater, Dean of the IU School of Medicine; Dr. Martin Jischke, then-President of Purdue University; Indianapolis Mayor Bart Peterson; Dr. Steven Paul, then-President of Lilly Research Laboratories; and Dr. Sam Nussbaum, Chief Medical Officer of Anthem Blue Cross Blue Shield of Indiana (now WellPoint, the nation’s largest health insurance provider). Watanabe, Schalliol, Jischke, Peterson and Brater also comprised an executive committee that would drive formative initiatives for BioCrossroads.

“I only wanted to do this if we had the support of the life sciences community,” Schalliol said. “We spent the first couple of months making sure we were attracting the right people.”

With the right leadership and support in place, the next step was building a partnership framework. Over the next 18 months, the BioCrossroads leadership team began to explore connections to partners that could help create the broad infrastructure needed to help foster growth in the life sciences.

Or, as it soon became known at BioCrossroads – *to help ideas find life.*

BioCrossroads Initiatives: The First Decade



Datalys Center for Sports Injury Research & Prevention – a national non-profit providing research and surveillance services to sports and health organizations.



OrthoWorx – a Warsaw-based, industry, community and educational non-profit initiative to advance and support growth and innovation within northern Indiana's uniquely concentrated, globally significant orthopedics device sector.



ExibHIT Indiana (Expanding Indiana's Breakthroughs in Health Information Technology) – a branding initiative focused on advancing the development and effective use of HIT within Indiana and across the U.S. To date, and with BioCrossroads' direct facilitation, Indiana and Indiana-based organizations have received over \$50 million in federal American Recovery and Reinvestment Act funds to advance Indiana HIT.

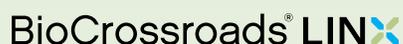


Indiana Health Information Exchange

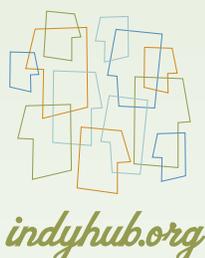
IHIE – Indiana Health Information Exchange, Inc. – a non-profit corporation advancing a national, revenue-based model for the secure sharing of clinical information among healthcare patients, providers and other healthcare entities; largest and most comprehensive medical informatics laboratories in the world.



Fairbanks Institute for Healthy Communities – a non-profit enterprise utilizing Indiana’s vast clinical resources to gather comprehensive patient clinical and biological information for the prediction, prevention and treatment of disease.



BioCrossroadsLINX – an initiative that advances Indiana’s drug development sector and facilitates connections with the biotechnology and pharmaceutical industries.



Indy Hub – formed in June 2005 by the City of Indianapolis and BioCrossroads to help Indianapolis attract and retain young professionals and create a more vibrant young professional community in the City. Indy Hub hosts a variety of events for young professionals, and it promotes other cool and interesting opportunities throughout Indianapolis and central Indiana.

“Indiana has seen a decade of substantial growth and tremendous progress across a wide range of nationally significant indicators. This is in large part due to the efforts of BioCrossroads and the major support of its founding stakeholders, especially Lilly Endowment.”

Craig Brater, M.D., *Dean of the IU School of Medicine and current Chairman of the Board of BioCrossroads*

Connecting partners

One of the early discoveries that surfaced in the search for partners was the enormous potential of forging closer ties with Indiana's centers of academic research.

Several high-profile institutions, including Indiana University, the IU School of Medicine, Purdue University and the University of Notre Dame, soon joined BioCrossroads in the journey. And it quickly became apparent that the benefits were mutual. But in the preliminary conversations, the response from academia was tentative at best.

"When I first heard about the concept, I thought it might be a stretch," said Dr. Craig Brater, M.D., Dean of the IU School of Medicine and current Chairman of the Board of BioCrossroads. "I realized that it would take substantial education of community leadership to position us as a research engine rather than just an academic health center." But it was a much-needed stretch, from Brater's perspective. The medical school was trying to advance public understanding of the impact of its research upon the community's health and economic well-being. "We saw BioCrossroads as a way to not only enable us to address what we were doing, but to help us spread the message."

Thanks to the collaboration with BioCrossroads, several IU faculty members launched start-up companies, such as ImmuneWorks (see sidebar). "And never in their wildest dreams did they think they would be doing that," Brater pointed out.

The benefits of the partnership have clearly been mutual, according to Brater. "Whether it's BioCrossroads helping to educate leaders about the importance of university-based research, or us making sure faculty are more vigilant about partnering with other companies, we can help position each other for more success."

Another example of a productive partnership with academic institutions arrived in the 2008 announcement that the National Institutes of Health (NIH) had made a \$25 million Clinical and Translational Sciences Award (CTSA) to the IU School of Medicine, Purdue University and the University of Notre Dame to fund collaborative university-industry translational research. BioCrossroads took an important supporting role in advancing Indiana's CTSA application, helping to connect the proposed Indiana Clinical and Translational Sciences Institute (CTSI) to a broad array of resources from multiple partner institutions throughout the state. The resources included a novel disease modeling program with Eli Lilly, a health economics program with WellPoint, and the Fairbanks Institute for Healthy Communities, a new non-profit organization conducting a longitudinal study of various chronic diseases, like diabetes, across the Central Indiana population (the Indiana Health Study).

Creating a landmark information exchange

As much as any project, the Indiana Health Information Exchange (IHIE) represented the power of BioCrossroads to serve as a catalyst to bring parties together for mutual benefit. A regional health information network established by BioCrossroads in 2004, IHIE was later described as “the most advanced in the United States” by a prominent health policy publication (Health Affairs, August 2007), and by Vice President Joe Biden as “the country’s largest health information exchange” in 2010 (Announcement of American Recovery and Reinvestment Act-Health and Human Services Beacon Community Grants, May 4, 2010).

This healthcare information technology success story began when BioCrossroads convened a broad group of business, community and public health stakeholders, including the CEOs of all of the large hospital systems in Indianapolis, to better understand how to expand the use of technology in a medical setting. BioCrossroads hired outside consultants to facilitate the meetings, to help prevent normal competitive pressures from derailing the process, and to produce a sustainable business plan for success.

With the help of the Regenstrief Institute, one of the world’s largest and most comprehensive medical informatics laboratories housed at the IU School of Medicine, the non-profit Indiana Health Information Exchange was soon launched. The network today connects 90 hospitals, 19,000 clinicians and physicians and more than 10 million patients to securely aggregate and accurately deliver lab results, reports, medication histories, and treatment histories to all providers regardless of hospital system or location.

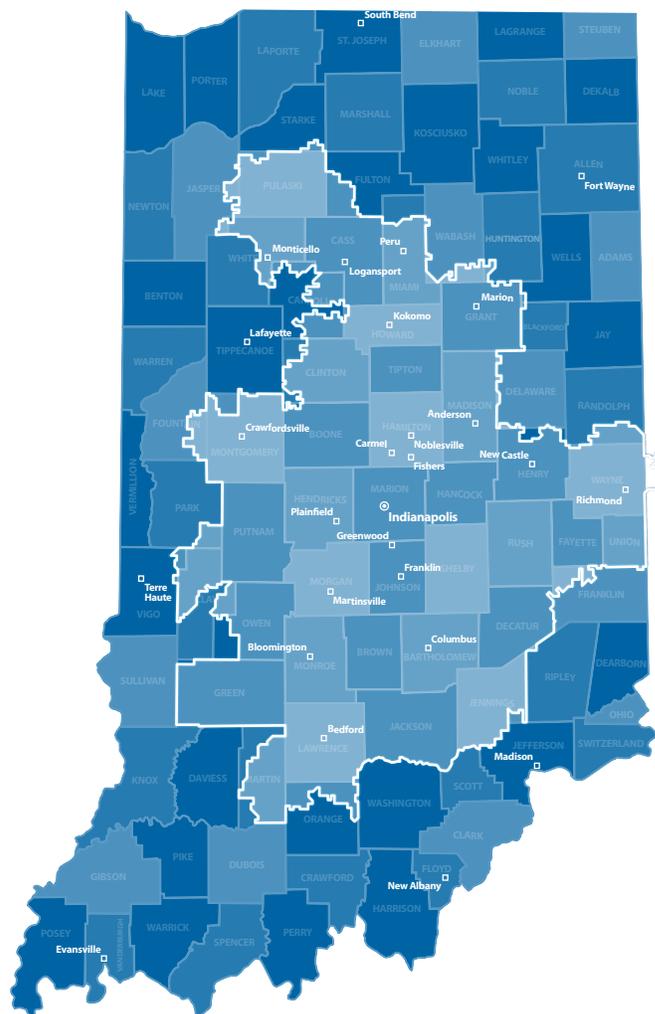
IU Health, Community Health Network, Franciscan St. Francis Health, Wishard Health Services (today, Eskanazi Health) and St. Vincent Health all pre-paid for clinical messaging services to help get IHIE off the ground. In no other community in the country had so many competing healthcare organizations come together before to form such a productive collaboration for the benefit of all.

Through the process of establishing IHIE, BioCrossroads began to earn a reputation as a neutral third-party convener that could help facilitate important strategic conversations about multi-institutional opportunities and challenges.

“IHIE is one classic example of how we were able to help broker a tremendous opportunity across institutions with a lot of expertise, and now it’s a national model that is getting ready to expand,” explained Anne Shane. “That was just building upon the strengths we already have here. No one had figured out how to leverage what we had in all this medical information technology expertise until we were able to create IHIE.”

Shane’s BioCrossroads colleagues agreed. “The drive for higher quality and lower cost care through healthcare reform is creating a new generation of opportunities and potential for IHIE beyond those initially envisioned. IHIE is a great example of an idea that was nascent and risky, but was supported and nurtured through community investments and collaboration to the point that it was able to take on a life of its own – a life that is now providing great benefit to the State of Indiana and eventually beyond our borders,” observed Troy Hege, a BioCrossroads project director since 2004. Hege has worked with leaders at IHIE and its members from the beginning, as well as assuming key roles in the success of other BioCrossroads-related collaborations like The Datalys Center and the Indiana CTSI.

Central Indiana Beacon Community



ImmuneWorks

Developing a therapy to prevent organ rejection for lung transplant patients



ImmuneWorks (www.immuneworks.com) was founded in 2006 to develop a novel treatment to prevent progression of idiopathic pulmonary fibrosis (IPF), a life-threatening disease for which there has never before been an effective therapy.

Founders David Wilkes, M.D., and Michael Klemsz, M.D., of the IU School of Medicine identified a specific auto-antigen, or disease trigger, that causes IPF and lung transplant rejection. That research led to the development of an immune tolerance therapy that can arrest the progression of IPF and prevent organ rejection following lung transplantation.

BioCrossroads encouraged Wilkes and Klemsz to found the company in the first place, and then helped ImmuneWorks through the Indiana Seed Fund I, Indiana's only targeted life sciences seed stage investment fund, which is managed by BioCrossroads. At a critical, early time, the Seed Fund invested a total of \$500,000 in ImmuneWorks. This funding supported development of the manufacturing process that served as a core element of Immuneworks' Investigational New Drug Exemption (IND) submission to the U.S. Food and Drug Administration.

ImmuneWorks also received investments from Indiana's 21st Century Research and Technology Fund, other seed stage funds and angels to advance its technology. In June 2010, the company announced a development agreement with Lung Rx, a wholly-owned subsidiary of United Therapeutics, to fund its lead compound through Phase I and Phase II clinical trials, leading to a possible strategic acquisition of ImmuneWorks by Lung Rx.



Connecting capital

Indiana's life sciences efforts faced an especially vexing problem at the start of the new millennium. Despite the presence of significant academic institutions like Notre Dame, Purdue, and IU – as well as important corporate discovery organizations like Lilly, Roche Diagnostics, Dow AgroSciences, Zimmer, Biomet and Cook – the state was not known as a life sciences player nationally. There were many reasons for this low profile – but one stood out more than any other: Indiana ranked nearly dead last nationally when it came to the availability of venture capital dollars to fund the commercialization of promising ideas coming out of nearby university laboratories or spinning out of corporate portfolios.

So one of the initial goals for BioCrossroads was to develop at least the beginnings of adequate sources of venture capital to advance Indiana's growing life sciences companies and build a local VC market that could support those companies through all stages of their growth. The first step – raising a fund with at least \$50 million for life sciences start-ups – was admittedly a big step but still seemed like a natural extension of the organization's role as the new “movers” in the life sciences arena.

An aggressive campaign led by David Johnson ultimately raised \$73 million to create Indiana's first major life sciences venture capital fund, the Indiana Future Fund (IFF) in 2003, from a remarkable coalition of 11 of the state's leading institutional investors, including state pension funds, university foundations and corporate treasuries. Eli Lilly and Company, in an effort coordinated by then-Lilly executive Chuck Schalliol, stepped forward early to play a pivotal leadership role with many of these investors.

Unusual if not unique among public-private partnerships intended to spur economic activity, the IFF was designed from the start to be a “real” return-driven investor fund, one that would succeed not by subsidizing development but by insisting on finding the very best ideas that could bring a competitive rate of return to the Fund's institutional investors. As a so-called “fund of funds”, and similar to a mutual fund, the IFF's managers (the Customized Fund Investment Group of Credit Suisse) invested in venture capital funds which, in turn, made investments in the most promising life sciences companies they could find, with a goal (though not a requirement) that as many good Indiana companies as possible find funding in the process.

Credit Suisse and the participating VCs had no shortage of good Indiana-based opportunities. For example, CoLucid Pharmaceuticals, an Indianapolis-based biopharmaceutical company formed in January 2006 as a Lilly spinoff, fit nicely into the

In January 2011, Endocyte achieved another landmark by becoming the first Indiana start-up life sciences company to launch a successful initial public offering – thereby also becoming Indiana’s second largest publicly traded pharmaceutical company, behind only Eli Lilly and Company.

BioCrossroads strategy – and as a promising IFF investment. Through funding from the IFF, Pappas Ventures, a North Carolina-based firm with a sole focus on life sciences, and other investors provided a total of \$16.5 million in initial funding to support CoLucid, a developer of innovative compounds to treat central nervous system disorders. By early 2010, CoLucid – now supported by over \$40 million in investments – was developing a series of potential treatments, including an investigational compound for migraine headaches in Phase II trials, and others for sleep disorders and Alzheimer’s disease.

Another promising IFF portfolio company was Endocyte – a cancer therapy company founded by Purdue University researchers in 1996. Though the development of new therapies to fight cancer is a risky, expensive and time-consuming business, Endocyte has made substantial progress in the fight against cancer with a proprietary system for delivering anti-cancer treatment to diseased cells while avoiding healthy tissue. Today, the company has several Phase II trials in progress for oncology product candidates, as well as a collaborative agreement with Bristol-Myers Squibb. It has also raised more than \$90 million in additional private equity since the initial investment from the IFF. In January 2011, Endocyte achieved another landmark by becoming the first Indiana start-up life sciences company to launch a successful initial public offering – thereby also becoming Indiana’s second largest publicly traded pharmaceutical company, behind only Eli Lilly and Company.

In reviewing the progress of the IFF, Mike Arpey, the former Credit Suisse managing director who oversaw the organization and initial management of the Fund, observed that life sciences investments have created a significant number of new important companies, as well as yielding additional scientific and financial dividends. The IFF’s 24 Indiana-based start-ups have drawn not only more than \$60 million in funding from participating IFF venture capital firms but, as they have grown, have brought in over \$270 million in additional venture capital investments – mostly from investors outside Indiana.

Directly seeding innovation

Once the Indiana Future Fund opened for business in late 2003, BioCrossroads discovered an even more basic need: a shortage of capital for the earliest activities of promising young companies. These companies typically needed \$100,000-\$500,000 to qualify for venture capital investments from firms like those participating in the IFF. By early 2005, David Johnson had succeeded Chuck Schalliol as BioCrossroads CEO, following Schalliol's departure to serve as Director of the Office of Management and Budget for newly elected Indiana Governor Mitch Daniels. According to Johnson, "By this point, Chuck and I found ourselves with a venture capital fund – the IFF – that could bring serious Series A funding to fully formed, young life sciences companies, if those companies could get formed in the first place. But there was no seed funding available to get them started. In a sense, in our hurry to run to venture capital, all of us sort of forgot that we needed to learn to walk first." Accordingly, in June 2005, BioCrossroads completed the launch of the Indiana Seed Fund, a \$6 million return-driven fund building on Schalliol's initial efforts and now housed at BioCrossroads to provide critically needed investments for Indiana life sciences companies at the preliminary stages of operation.

Six years later, the Seed Fund – which BioCrossroads directly and actively manages – had invested in a dozen new Indiana companies, including ImmuneWorks (see sidebar page 13) and AgeneBio, an Indianapolis-based biotechnology start-up company focused on the development of therapeutic products for mild cognitive impairment (an early predictor of Alzheimer's disease), dementia and other memory disorders.



"The Seed Fund has been a critical tool in supporting life sciences entrepreneurs. By taking a market approach to investing and providing an early connection point with venture capital, we have been able to have a positive impact on new company formation in life sciences. Getting an innovative product to any market is difficult, and even more so in life sciences. Most don't make it, but these

breakthroughs represent important achievements and are worth doing,” said Nora Doherty, Vice President of Finance for BioCrossroads since 2003 and Manager of the Indiana Seed Fund. “The Seed Fund has been able to play a role in helping to make sure some of Indiana’s entrepreneurs had the opportunity to do just that.”

The IFF proved so successful that, despite the challenges of one of the worst economic environments in years, BioCrossroads announced the successful formation of a follow-on fund to the IFF in late 2009. Similar to the IFF, the \$58 million INext Fund – another fund-of-funds featuring some of the state’s most prestigious institutional investors – is a capital pool that invests in venture capital funds focused on the life sciences, including some of the top healthcare VC funds in the U.S. today. These national funds are also now focused on Indiana life sciences opportunities. Thus, BioCrossroads continues the promise of local capital access for some of the most promising companies seeking to drive the next installment of the state’s success as a life sciences center.

Indiana has a long way to go in its efforts to build adequate supplies of venture capital to fuel the growth of the ever-more expensive sectors of biotechnology and medical technology development. Still, the region has made significant strides in stirring sufficient venture capital activity at home, and in attracting even more significant venture capital funding from around the U.S., to give start-up life sciences companies a real chance for success on the Hoosier landscape. Much of the success for this “work in progress” can be attributed to the vision of BioCrossroads’ leadership, according to Nate Feltman, who was Indiana’s Secretary of Commerce and CEO of the Indiana Economic Development Corporation in the early days of BioCrossroads. “They were the first group to identify the need for more investment money in Indiana, and they brought the issue to the forefront before others were ready to do that,” Feltman said. “They were really the early adopters regarding the fact that we had to find more money to keep the best research and the best companies in the state of Indiana.”

Preparing the future workforce through STEM education

By 2006, BioCrossroads had concluded that it would do little good to seek to create the best opportunities for Indiana’s future if Indiana’s next generation was not prepared to seize them. Accordingly, BioCrossroads began working to expand science, technology, engineering and math (STEM) education in grades K-12 and higher learning institutions through partnerships with Indiana’s higher education institutions, the State and business leaders.

In 2007, in close collaboration with the Governor's office and with partners from universities and colleges across Indiana, BioCrossroads spearheaded the creation and deployment of the Indiana Science, Technology, Engineering and Mathematics (I-STEM) Resource Network. I-STEM's mission is simple to state but enormously challenging to achieve: to improve science, technology, engineering and mathematics education for Indiana's students through effective teacher training and curriculum development. To date, thanks to generous support from the Lilly Endowment, Eli Lilly and Company Foundation, numerous corporate participants, and Purdue University as I-STEM Manager, the I-STEM Network has involved 17 Indiana institutions of higher learning – and delivered critically important STEM content to more than 8,000 teachers and nearly one-quarter million Hoosier students. Much of the I-STEM curriculum and approach has also now been embraced by the Indiana Department of Education. I-STEM is just getting fully implemented, and its programs will require further support, expansion and extension throughout the State. But for Indiana's next generation, it's a start – and a start in the right direction.

“Though every state wants to be a hub for life sciences, Indiana really is one...”

The Economist Newspaper Limited London, June 4, 2009

Earning a place on the national stage

A 2009 study by the Indiana Business Research Center (IBRC) at the Indiana University Kelley School of Business for the State of Indiana found that life sciences companies now comprise the largest manufacturing sector in Indiana, surpassing automobiles – the state's top product for more than a decade.

A follow-up IBRC study for BioCrossroads found Indiana's life sciences exports reaching \$9.1 billion in 2010, ranking the state as third highest in the United States, behind only California and Texas – and comprising nearly one-third of all Indiana exports of manufactured products for the year. Indiana's life sciences companies have also made considerable progress in discovering and commercializing thousands of new products over the past decade. Indiana was home to 2,226 U.S. Food and Drug Administration filings between 2005 and 2010 – the 10th largest number of applications of all 50 states.

This increasingly clear economic impact of the state's established life sciences companies – coupled with the convergence of collaborative partnerships and investment dollars to spur dozens of new companies – has led to visibility for the state on a national level. “We’re no longer under the radar,” noted Brater. “We’re not in the middle of the radar screen yet, but we’re on it. Indiana is no longer a place you just fly over.”



Indeed, Indiana has been receiving accolades for its life sciences prowess outside of the state. In June 2009, *The Economist* published an article observing, “Though every state wants to be a hub for life sciences, Indiana really is one...” A year later, *TIME magazine* recognized Indianapolis and San Diego together as “global players in life sciences.” And by 2011, *The Wall Street Journal* was singling out Indianapolis as one of “seven hot hubs for start-ups” nationally – and the only one in the life sciences. In an article entitled “Where the Action Is,” the *Journal* painted an attractive profile of a city that “used to be the quintessential Rust Belt city. Now it’s at the center of a statewide boom in the life-sciences business.”

“What BioCrossroads does is unique, and it’s a case study for how it should be done,” said Mike Arpey, the initial manager of the IFF for Credit Suisse, who added that states like Ohio, Michigan and Oregon have used BioCrossroads as a model for their own life science initiatives. “It’s community-based, with universities, government and business all coming together to support these young companies. What keeps these companies going is their value to their communities.”

The success of the “innovation cluster” model that BioCrossroads has established can also be seen in economic development attraction efforts beyond Indiana’s borders. “I often heard that we have a model that is much different and much better than other states’,” said Feltman, the former Indiana Secretary of Commerce. “I usually heard about it when we were out recruiting for more business. What we always heard is that Indiana ‘gets it’ – and by extension, that means BioCrossroads gets it.”

Connecting resources

Part of the reason for Indiana's rise to national prominence in the life sciences arena is its increasing role as a national model for inter-regional collaboration, spearheaded by BioCrossroads. In a unique partnership, via the BioCrossroadsLINX initiative launched in 2007, Indiana is working with San Diego, the globally recognized home to more than 400 biotechnology start-ups, to connect the two regions' complementary strengths and resources in biotechnology innovation: Indiana's biopharma development and manufacturing assets and San Diego's hub of biotech discovery. BioCrossroads has also established an ongoing partnership with San Diego-based CONNECT, one of the country's most successful non-profit organizations dedicated to creating and sustaining innovative, technology-based enterprises.

"Contract drug development and manufacturing service providers are increasingly interconnected with pharmaceutical and biotechnology companies. The pharmaceutical industry is partnering with them to improve the speed and flexibility of their product development efforts. Several years ago, we discovered that Indiana has one of the strongest concentrations of these companies in the United States," explained Brian Stemme, a project director at BioCrossroads for more than five years and head of BioCrossroadsLINX. "The idea for BioCrossroadsLINX was that we want to leverage this unique cluster of more than 50 companies and their experienced workers as their importance within the industry increases. Their presence here differentiates us from other states that focus primarily on drug discovery."

To support these initiatives, BioCrossroads published "BioPharma Discovery and Development Contract Services – Indiana Market Opportunities and Funding Options," a comprehensive report for national companies addressing the pharmaceutical, biotech, and manufacturing opportunities in Indiana. In addition, BioCrossroads launched www.biocrossroadslinx.com a searchable database with information about Indiana's 50+ contract pharmaceutical research and manufacturing providers.

One of the reasons for the Indiana-San Diego collaboration's success is that the two regions have complementary goals and the partnership benefits both parties.

"I think what BioCrossroads is attempting to do is in contrast to CONNECT, but it's equally important," said Mary Walshok, an internationally recognized expert on new economies and Associate Vice Chancellor for public programs



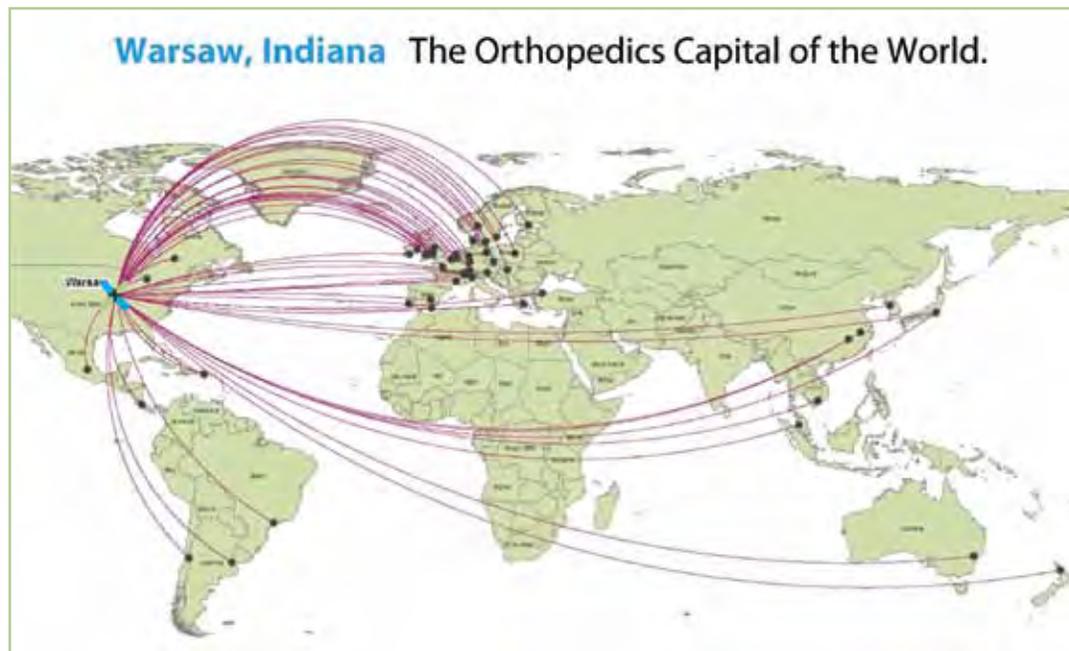
at the University of California at San Diego. "We've been really focused on helping grow clusters of entrepreneurial life science companies. Not just one or two or three, but hundreds in order to create high-paying jobs. At BioCrossroads, they are doing a lot of that kind of start-up assistance as well, but they are also linking their manufacturing and entrepreneurial capabilities to places like San Diego and Research Triangle Park in North Carolina and saying, 'Let us be your partner.' They are branding themselves as a state that is good at partnering, and letting people know that you don't have to go to India or China to find help. What I admire about Indiana is they took stock of what they are good at and also identified their gaps, and then designed significant components of their plan around that. We should all do more of that."

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Another key BioCrossroads-sponsored initiative to connect Indiana's world-class resources – OrthoWorx – launched in 2009 through a major grant from Lilly Endowment. Seeking in a sense to accomplish for Warsaw what BioCrossroads is attempting to do for the State, OrthoWorx is focused on helping the Warsaw-based orthopedics industry – whose \$11 billion in annual revenues represent more than half the U.S. market and nearly a third of global orthopedic sales – continue to maintain its strong economic presence and position itself for future growth. Such an industry-community focused initiative is particularly important in an era of intense worldwide competition and changing financial and regulatory markets. Through earlier pilot funding from Lilly Endowment, BioCrossroads conducted extensive research on the Warsaw orthopedics cluster and published its findings in a signature report, essentially a blueprint for future industry and community growth. The result was the formation of OrthoWorx, an industry, community and education initiative created to support the continued vitality and growth of the region and to advance innovation within its globally significant orthopedic device sector.

OrthoWorx CEO David Floyd noted, "The vision and leadership of BioCrossroads, and the strategic blueprint in their report, paved the way for OrthoWorx to quickly become a highly successful, industry-community organization. For the first time in history, orthopedic companies and community stakeholders are collaborating to build on the community's strengths, ensuring that we will continue to be The Orthopedic Capital of the World."



Connecting stakeholders

Without the shared vision of key partners for the high potential of Indiana's life sciences sector, BioCrossroads simply would never have found its footing in the pursuit of ambitious goals for the betterment of the state and its citizens.

From the start, critical support for the life sciences initiative has come from the Lilly Endowment, which has served as a catalyst – accelerating the life sciences research and educational capabilities of Indiana's colleges and universities, advancing Indiana's communities and community foundations, and supporting a wide range of key charitable, educational and scientific projects and initiatives. From 2000 to 2011, Lilly Endowment grants totaling over \$450 million have been instrumental in helping a variety of organizations build a foundation for life sciences education and community enhancement, with the Endowment's active and continued commitment further fostering collaboration and growth.

The biggest shot in the arm for continued education and collaboration came in the form of two grants from Lilly Endowment totaling \$155 million to launch the Indiana Genomics Initiative. This funding, given in 2000 and 2002, bolstered the visibility and research capabilities of IU School of Medicine following the announcement of the successful mapping of the human genome and the resulting demand for stronger research capabilities in genomics, proteomics and analytical chemistry. Grants from Lilly Endowment for the BioCrossroads initiative, now nearly \$27 million, go to the CICP Foundation, which also supports other eligible charitable, educational and scientific initiatives and activities of the Central Indiana Corporate Partnership.

"We recognize that Lilly Endowment's significant investment in our initiative has been a game-changer for the success of Indiana's life sciences sector and, therefore, for our entire community," said Brater. "Indiana has seen a decade of substantial growth and tremendous progress across a wide range of nationally significant indicators. This is in large part due to the efforts of BioCrossroads and the major support of its founding stakeholders, especially Lilly Endowment."

Other foundations have also played a major role in developing Indiana's life sciences assets. The Regenstrief Foundation has provided approximately \$100 million in funding to support life sciences, including developing the world's leading medical informatics program at the Regenstrief Institute at Indiana University.

The Richard M. Fairbanks Foundation, Inc. (RMFF), has granted over \$50 million in support of healthcare and life sciences-related organizations, including Indiana University's School of Public Health, the IU School of Medicine, the Indiana Clinical and Translational Sciences Institute and the Indiana Health Information Exchange. RMFF has also granted a total of \$3.75 million to BioCrossroads through the CICP Foundation since 2007. These grants have funded BioCrossroads' further support of several key initiatives promoting the digital collection, analysis and use of clinical information to advance better health outcomes, as well as new projects to explore the expanding role of healthcare systems in stimulating clinical and technical innovation.

Major RMFF funding in 2007 drove the establishment (and naming) of the Fairbanks Institute for Healthy Communities, a separate non-profit organization working to address diabetes, coronary artery disease and other chronic illnesses that are prevalent in Central Indiana's demographically diverse population and can be successfully studied here over time through readily available clinical data and tissue samples. The result is a novel resource available to academic, government and commercial researchers alike that can lead to more effective personalized medicines and better health for the Central Indiana community – a platform for change that would never have been possible without the RMFF's approach to "strategic philanthropy."

"The Fairbanks Foundation is making a significant impact on the public and economic health of our community, and the Foundation's strategic commitment to the improvement of healthcare through the effective use of clinical information and responsive innovation aligns perfectly with our broader mission," said Johnson. "These generous grants enable BioCrossroads to continue working with the Fairbanks Foundation in shared efforts to develop existing programs and identify new ways to make our community an even better – and healthier – place to live."

Connecting to the future

Organizing a strategy for Indiana's life sciences sector became the BioCrossroads mission nearly a decade ago, so the next generation of Indiana's economic and entrepreneurial success could be based upon solid research and tangible business and community strengths.

To date, BioCrossroads has raised more than one-quarter billion dollars (in both grant funds and capital investments) for life sciences opportunities, organized four venture capital funds, launched eight new sustainable enterprises to advance signature life sciences strengths, partnered with state and local government to attract hundreds of new jobs in the life sciences and healthcare-related fields, and elevated Indiana's national visibility as a leader in biotechnology, medical devices and healthcare information technology.

The vitality of the life sciences sector translates into direct and indirect economic benefits. The impact of the industry on the state begins with more than 50,000 life sciences jobs – housed in a number of life sciences businesses that has grown from 550 in 2002 to more than 825 today. But it certainly doesn't end there. Those jobs give rise to another 105,000 jobs – for a total of 155,000 jobs, with an overall estimated economic impact of \$44 billion on the state.

The next decade holds great promise for more of the same, as BioCrossroads continues to make connections among people, resources and ideas to help build healthier communities and a healthier economy.

“Do I think Indiana will need a BioCrossroads five to 10 years from now? At one point I was not sure,” said the late Gus Watanabe, the organization's first chairman. “But yes, it will continue to go on. This is a longer-term institution that will be around for quite some time, although we may have different roles. BioCrossroads will continue to grow and have influence.”



Gus Watanabe

Life sciences for the next generation

BioCrossroads' continuing impact on the life sciences sector and on the state of Indiana over the next five, 10 or 20 years is not yet clear, but signs are certainly promising, based on the journey to date. At the very least, according to Anne Shane – one of the pioneers who made the BioCrossroads vision a reality – a more vibrant community will evolve.

“Data shows most jobs are created by small and medium-sized companies,” Shane said. “Vibrant technology jobs really are centered on new business formation and entrepreneurs. You can have good talent and research universities...but if you don't have an entrepreneurial infrastructure, a lot of the talent will go somewhere else.”

A follow-up study by Battelle in 2010 reported that Indiana life sciences companies see building alliances and partnerships with other life sciences firms as the key to their future success. The ongoing efforts by BioCrossroads to encourage collaboration fit well with current industry strategies. Indiana has already been identified as one of the nation's innovation cluster success stories. And since Indiana's life sciences sector has been strengthened over the last decade through an expansion of research funding, jobs, establishments, and exports, even more opportunities are on the horizon for firms to partner.

“Compared to other states and regions, Indiana has a significant competitive advantage,” said Johnson. “Not only do we already have a strong life sciences foundation, but we have engaged university research partners, strong philanthropic support, novel public-private partnerships, decent access to capital and a positive business climate. Our goal is to capitalize on Indiana's existing assets and emerging opportunities to create even stronger research capabilities and commercial success for Indiana's next generation. From what we've already seen, the Hoosier spirit is alive and well – and remarkably entrepreneurial. We're in great shape to get this big job done.”

A decade of market analysis and reporting

BioCrossroads has authored a number of reports and analyses on Indiana's life sciences industry which have provided comprehensive references and metrics for the state's sector, as well as have examined how national and global trends will have a local impact. Market development reports such as the ones listed below have also served as the blueprints for some of the organization's initiatives such as BioCrossroadsLINX and OrthoWorx.

- ◆ **2004** A Strategic Plan for Indiana's Agricultural Economy
- ◆ **2008** Biopharma Discovery and Development Contract Services – Indiana Market Opportunities and Funding Options: An analysis of the pharmaceutical and biotech development and manufacturing sector
- ◆ **2009** Warsaw, Indiana: The Orthopedics Capital of the World – An overview, analysis and blueprint for future industry and community growth
- ◆ **2010** Industry Developments in U.S. Biopharmaceutical Contract Service Providers
- ◆ **2011** From Dishwashers to Digital Medical Records – Indiana's Leadership in Health Information Technology
- ◆ **2011** Indiana's Life Sciences Industry: 2002-2010 – Tracking Progress and Charting the Course for Continued Success
- ◆ **2012** From Hearts to Hips: Indiana's Leadership in Medical Devices
- ◆ **2012** Advancing Indiana's Life Sciences Competitiveness and Strategic Collaborations among Industry, Universities and Academic Health Centers in Targeted Areas of Opportunity



A decade of life sciences thought leaders

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Seeding Indiana's future life sciences companies

From A to Z, a dozen promising and innovative life sciences start-up companies have received funding from the \$6 million Indiana Seed Fund I since the fund's inception in 2005, including:



Aarden Pharmaceuticals – a biotech company developing novel technologies to attack difficult-to-treat diseases through a focus on specific intracellular disease targets; lead program is for tuberculosis.



AgeneBio – an Indianapolis-based biotechnology start-up company focused on the development of therapeutic products for Alzheimer's disease, dementia and other memory disorders.



Bioscience Vaccines – a West Lafayette-based company developing a vaccine adjuvant for infectious diseases based on a license of small intestinal submucosa (SIS) product from Cook Medical.



FAST – a novel start-up developing a point of care kidney function measurement device.



ImmuneWorks – a start-up company based on research at the Indiana University School of Medicine and developing effective treatments for serious lung diseases; specifically, a novel treatment to prevent progression of idiopathic pulmonary fibrosis and prevent lung transplant rejection.



SonarMed – a start-up with a product already in the market: the SonarMed AirWave, a non-invasive, adjunctive device that provides continuous, precise, real-time monitoring of breathing tube position and function.



Zorion Medical – the Seed Fund's most recent investment, developing an absorbable vascular stent with novel biomaterials and unique design.

Our team brings ideas to life

To date, the BioCrossroads team has supported nearly 300 start-up companies and collaborations by connecting them with industry partners, providing basic business planning guidance, advising on patent and intellectual property strategies, opening connections to sources for further commercial development and linking them with additional funding sources.

Writing reports on the marketplace, starting, carrying out due diligence, and investing in new enterprises and initiatives (and maintaining their success), spreading the word about Indiana's life sciences strengths and educating through conferences and summits round out the dozens of activities that the BioCrossroads team engages in to grow and advance Indiana's life sciences industry.

David Johnson, *President and CEO*

Nora Doherty, *Vice President of Finance and Indiana Seed Fund Managing Director*

Matt Hall, *Project Director*

Troy Hege, *Project Director*

Lori LeRoy, *Public Relations and Marketing Director*

Brenda Pope, *Executive Assistant to the President*

Julie Routt, *Office Manager and Executive Assistant to the VP of Finance*

Brian Stemme, *Project Director*

Recognizing excellence and achievement

In 2008, BioCrossroads established the Life Sciences Champion of the Year award to recognize people in Indiana's scientific and professional community who have made significant achievements in the development and promotion of the state's life sciences sector; personify the emerging face of the Indiana life sciences industry; and promote innovative development of the life sciences in Indiana.

The award was renamed the Watanabe Life Sciences Champion of the Year Award as a tribute to and in honor of BioCrossroads' late Chairman Gus Watanabe, who died in 2009.

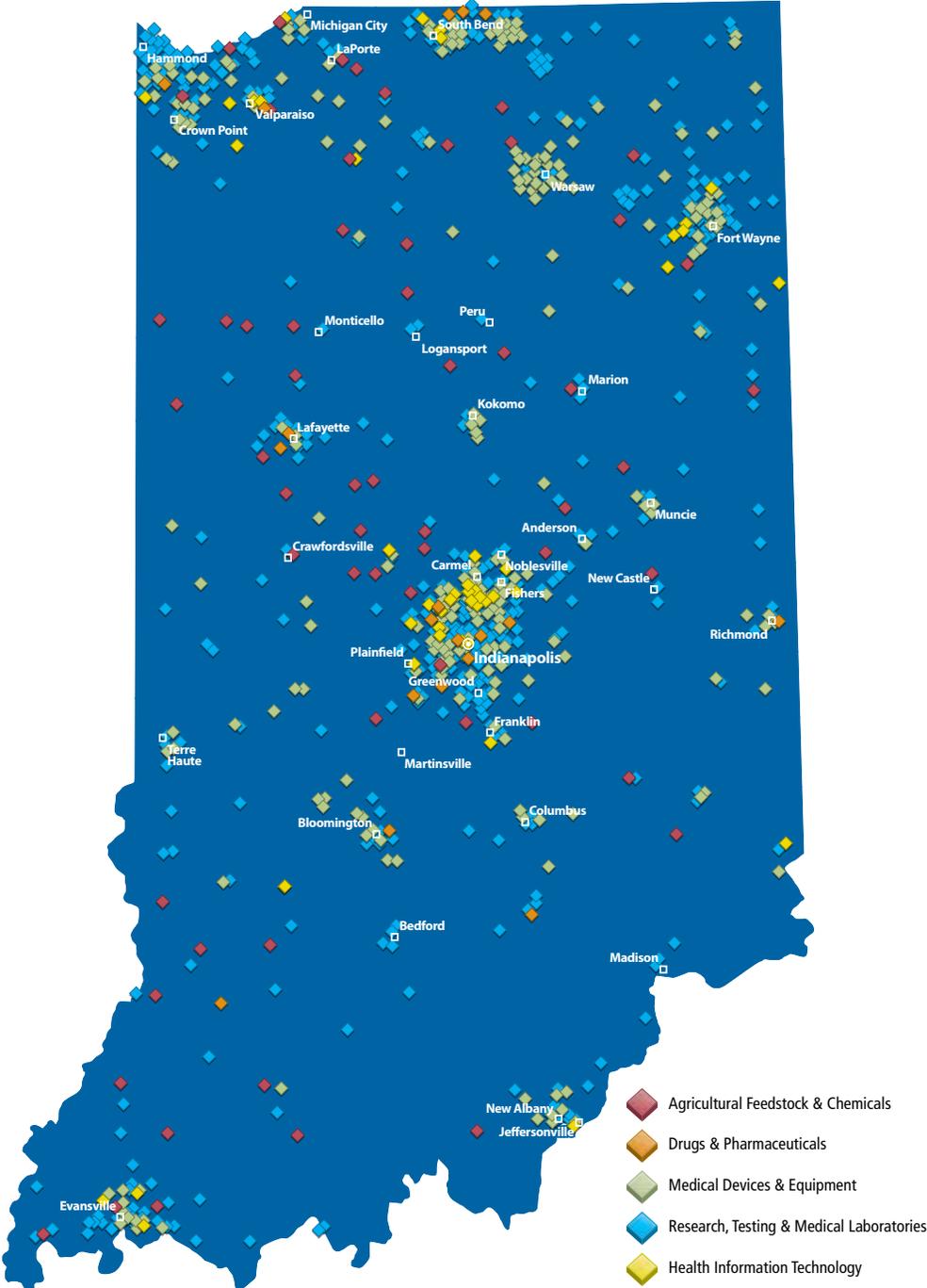


- ◆ **2008** - **Leonard Betley**, *Chairman and President Richard M. Fairbanks Foundation, Inc. and the Regenstrief Foundation and Chairman, Walther Cancer Foundation*
- ◆ **2009** - **Dr. Richard DiMarchi**, *the Linda & Jack Gill Chair in Biomolecular Sciences and Professor of Chemistry at Indiana University and founder of Marcadia Biotech*
- ◆ **2010** - **Dr. Dane Miller**, *Founder and former Chief Executive Officer of Biomet*
- ◆ **2011** - **Bill Cook**, *Founder and Chairman of Cook Group (posthumous award)*

The BioCrossroads Catalyst Award honors an individual who has been an accelerator and activator for Indiana's life sciences industry – one who has helped to bring the sector together, and further helped to sustain it through targeted, strategic and collaborative efforts. Established in 2011, the award will be given from time to time, as merited.

- ◆ **2011** - **Anne Shane**, *a longtime community leader and one of the original organizers of the collaboration that ultimately became BioCrossroads*

Indiana Life Sciences Companies



Source: IBRC/BioCrossroads



Where ideas find life.

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