

A future by design

Community

at the crossroads

“A decade from now, outsiders will look at Central Indiana and describe a region...that is a diversified innovation center in manufacturing, life sciences and information technologies.”

Battelle Memorial Institute, December 2000

When Marie Kerbeshian announced last year that she was leaving the University of Virginia to accept a position as vice president for technology commercialization at the Indiana University Research and Technology Corp. (IURTC) in Indianapolis, a bewildered colleague asked, “Why is everyone going to Indiana?” Kerbeshian, an honors graduate of Wellesley College with a PhD in zoology from the University of Texas, is a registered patent agent who specializes in protecting and licensing discoveries derived from faculty research. Her highly marketable skills, in demand on university campuses from coast to coast, could have taken her anywhere.

Why Indiana?

“Many states talk about entrepreneurship and how they want to get their universities involved in starting home-grown biotech industries,” she explains. “Indiana is one of the few places where people are committed to making it happen. There’s a fantastic cohesive network in place here. Everybody is in it together to make sure it works for Indiana.”

This “cohesive network” is by design and has been a decade in the making. Its catalyst was an Endowment-funded study conducted in 2000 by Battelle Memorial Institute that recognized Indiana’s potential to become a hotspot of biotech innovation.

No pie-in-the-sky notion, Battelle’s vision was based on existing resources that could be coordinated and expanded to boost the region’s economy and improve its prospects for the future. Among the entities already in place were:

Three large research institutions – Indiana University, Purdue University and the University of Notre Dame – that were nationally recognized for their strengths in the life sciences, information technology, engineering and medical records

The IU School of Medicine with its more than 1,500 full-time faculty members and dozens of research centers and institutes

Pharmaceutical and biotech giants – Eli Lilly and Co., Roche Diagnostics, Dow AgroSciences, Cook Group, Guidant – plus Zimmer, Biomet, DePuy and several other orthopedic corporations in Northern Indiana

A diverse mix of stakeholders – governmental, corporate, academic and philanthropic – embraced the vision and agreed to help build capacity, remove obstacles, fill gaps and create opportunities. The initiative generated enthusiasm because its supporters realized that a united effort, if successful, would yield benefits that no single partner could achieve. In short, everyone had something to gain by positioning Indiana as a progressive state with the



human capital, expertise and infrastructure to compete and thrive in the global marketplace.

“You can’t base collaboration strictly on altruism,” says David Johnson, president of BioCrossroads, the Endowment-supported initiative founded in 2002 by the Central Indiana Corporate Partnership (CICP) and the CICP Foundation to link resources, forge alliances and promote entrepreneurship on behalf of the life sciences. “People will come forward and attend a few meetings to discuss what’s great for the community, but if you’re not building something of value that will advance their mission, they’re not going to invest in the project.”

The concept had its skeptics. “When we began,” recalls Johnson, “segments of the community believed that biotechnology and the life sciences were exciting parts of somebody *else’s* future. They thought the life sciences belonged to San Diego or Boston and couldn’t happen here.”

At 254,000 square feet, the IU School of Medicine’s Walther Hall in Indianapolis is the largest of the school’s new facilities. Dedicated in 2009, it is also the newest. The seven-story structure sits between two other research buildings, thus creating a massive, integrated biomedical complex that encourages research collaboration among more than 300 scientists and physicians.

The challenge of BioCrossroads, which since it began has benefited from more than \$22 million in Endowment funding for its charitable and educational programs, was to convince doubters – including universities and companies that historically competed with each other for research dollars and market share – to join forces. Johnson jokes that in the early days of the initiative he sometimes likened BioCrossroads to Noah’s ark. The daunting task facing both of them: getting unlikely partners to come onboard for what promised to be a lengthy journey. “This is not a short-term strategy,” says Johnson. “We’re in it for the long haul.”



As president and CEO of BioCrossroads, David Johnson is in the thick of the intentional strategy to foster the continued growth of Indiana's robust life sciences industry. BioCrossroads also played an instrumental role in establishing OrthoWorx (see page 15).

Convergence of factors

Several factors converged, before and after

BioCrossroads' founding, to propel the collaboration forward. A pair of Endowment grants in 2000 and 2002 totaling \$155 million launched the Indiana Genomics Initiative (INGEN) and brought heightened visibility to the IU School of Medicine and its research capabilities. A few years later, some pharmaceutical companies adopted a business model that had them downsizing their in-house workforce and assembling a network of outside entrepreneurial research organizations to participate in product development. The model encouraged the formation and growth of startup companies, contract research organizations and clinical trial labs. Many of these lean enterprises were supported by funding from BioCrossroads.

"This (business model) allows us to cast a wider net for ideas, for molecules, for talent and for resources," explained John C. Lechleiter, chairman, president and CEO of Eli Lilly and Co., to a September gathering of policymakers in Washington. "In the process, we can greatly expand the pool of opportunity (and)

leverage our financial resources by sharing investment, risk and reward."

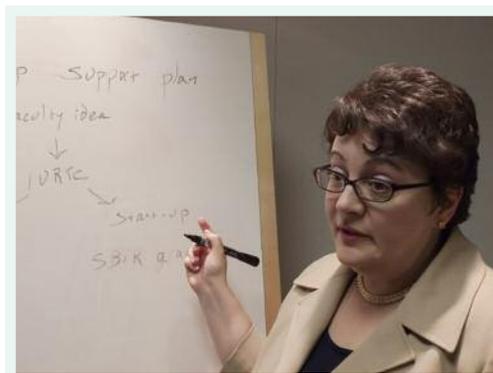
The incentive for university researchers to become part of the entrepreneurial "pool of opportunity" was ensured years earlier with the passage of the Bayh-Dole Act in 1980. Before Congress enacted the bipartisan bill, all research conducted in a university setting and funded

by federal grants became the property of the government. The Bayh-Dole legislation shifted ownership of the research to the university, and "that was the birth of universities' getting into the technology commercialization process," explains Kerbeshian, who directed the University of Virginia Patent Foundation before joining IURTC.

Kerbeshian now guides campus researchers through the many steps required to turn their laboratory breakthroughs into marketable products. Physicians call the procedure of transforming research into reality "translational science" or the "bench to bedside" process, and it can unfold in a variety of ways. "We either help faculty do translational research within the university setting, or we help get the technology into the hands of a startup company that will continue to develop it until it's

ready for the larger industry players," says Kerbeshian.

With the stepped-up focus on translational science, IURTC has expanded its staff, established a business incubator and built partnerships with area industries. In 2010 it announced year-end statistics that broke all previous records. Licensing revenues from commercializing IU technologies jumped from \$6 million to



Marie Kerbeshian, vice president for technology commercialization at IU's Research and Technology Corp. in Indianapolis, jumped at the chance to come to IU. "There's a fantastic cohesive network in place here," she said. Kerbeshian is a registered patent agent who specializes in protecting and licensing discoveries derived from faculty research.

\$14.2 million; faculty invention disclosures rose by 15 percent, and the number of patent applications increased significantly. Since its launch, IURTC has helped establish 38 companies.

Wanted: physician scientists

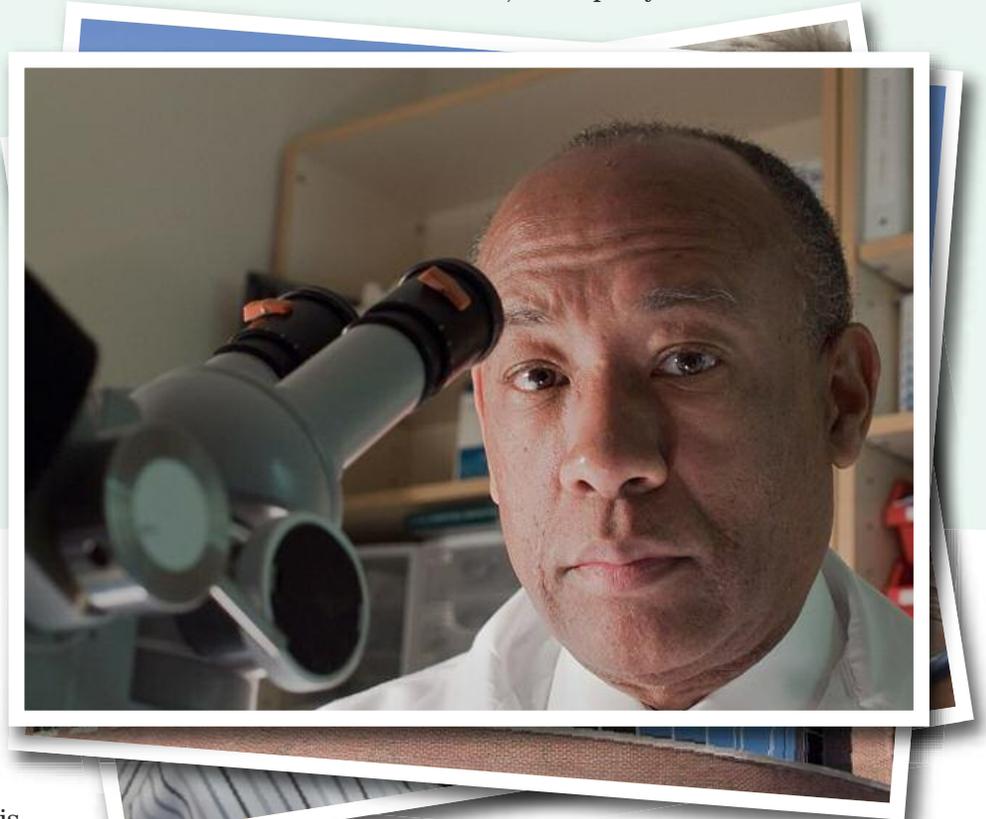
A key to continuing this momentum is the ongoing recruitment of physician scientists who conduct “bench to bedside” research. These highly trained professionals often hold both MDs and PhDs and “live at the interface of science and medicine,” says David S. Wilkes, executive associate dean for research affairs at the IU School of Medicine. Wilkes also is a practicing physician scientist and cofounder of ImmuneWorks, a locally based biotech company. A recent Endowment grant of \$60 million for the IU medical school includes funds to recruit 20 physician scientists to Indiana by 2014. Wilkes, who is directing the effort, already has hired two top-tier researchers and is actively pursuing other candidates.

“The pool of physician scientists is shrinking, and that’s a challenge all university medical centers are facing,” he says. “We’re competing on a national level with major institutions that are very prominent in the research world.” Although entrepreneurship isn’t a prerequisite for applicants, “we’re creating a culture here at the university that strongly encourages that,” says Wilkes.

When candidates come on campus he makes sure they meet with researchers who are working to turn their laboratory discoveries into treatments and products to benefit patients. “They know, as part of the recruitment process, that we’re inter-

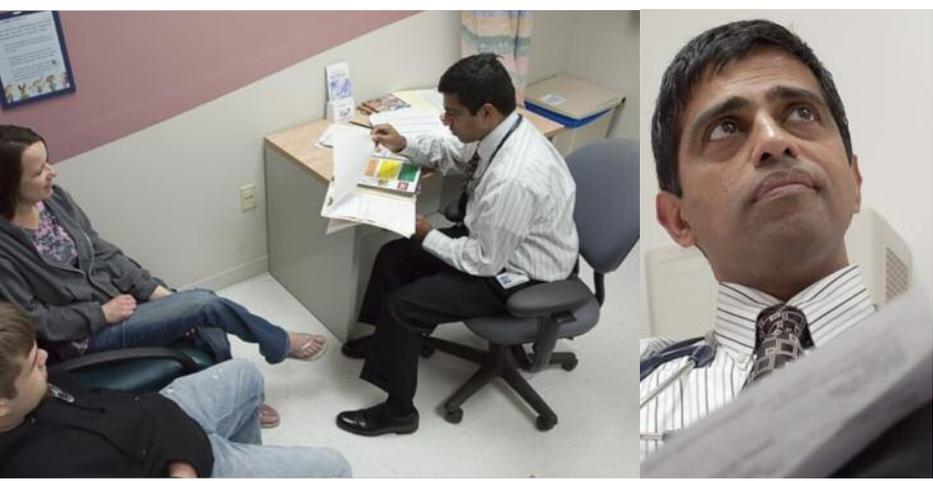
ested in entrepreneurial activity and the generation of intellectual property,” Wilkes says.

Convincing physician scientists to visit Indianapolis is a challenge, but once here, they generally like what they see. Wilkes says most potential recruits are interested in two things. First, they want assurance that moving to Indiana will offer them more research opportunities than they have in their current situations. Second, and equally



important, are lifestyle issues. They ask about schools. Is housing affordable? How long is the commute to campus? Are there appealing cultural and entertainment opportunities? What is the job market like for spouses? Many cities haven’t grown their private business sector to the point where they can provide career opportunities for

David Wilkes recognizes the challenges in recruiting future physician scientists to Indiana – and the competition can be fierce on the national level. Yet Wilkes – who 18 years ago chose the IU medical school over Denver, Dallas and San Francisco – says Indianapolis has a “first-class scientific environment, wonderful arts and cultural amenities, and an ease about living.”



With a doctoral degree in molecular biology and a medical degree, Raghu Mirmira is definitely a physician scientist. He is the Eli Lilly and Co. chair in pediatric diabetes and director of the pediatric diabetes research group at IU. He also directs a research lab, teaches in the medical school and is an editor of the journal *Diabetes*. Here he chats with Nicholas Thacker and his mother, Melissa, about Nicholas' diabetes in the Riley Hospital Outpatient Clinic.

what recruiters call “the trailing spouse.”

Wilkes speaks from personal experience when he compares Indianapolis' assets to those of other cities. A native of Philadelphia and self-described “urbanite,” he chose the IU School of Medicine 18 years ago over facilities in Dallas, Denver and San Francisco. “This is an extraordinary place to raise a family,” he says. “We have wonderful arts and cultural amenities here that many larger cities don't have. Not only do we provide a first-class scientific environment, but there's also an ease about living in Indianapolis. I think we're doing a better job of marketing the area, and the perception is changing. Still, if you live in New York City or you're part of the Harvard system, you might wonder what Indianapolis has to offer. When people come out and take a look, they're amazed. They say, ‘You've got all this plus the science? We've got to talk...’”

Success breeds success

Raghu G. Mirmira says his decision to relocate his family and his 10-member research team from the East Coast to Indianapolis two years ago was “almost a no-brainer.” A skilled physician scientist

with a PhD and MD from the University of Chicago, Mirmira chose to come to Indiana because of the School of Medicine's commitment to building a strong translational research program. This commitment was affirmed when the National Institutes of Health awarded IU a \$25 million grant to help fund the Indiana Clinical and Translational Sciences Institute. “That's a very competitive grant,” says Mirmira, whose specialization is pediatric diabetes research. “Only a handful of institutions around the country receive it.”

Bringing his research team to Indiana was a win-win situation. It enabled Mirmira's research efforts to move forward without the downtime of hiring and training

a new cadre of investigators, and it expanded the growing life sciences community in Indianapolis by 10 – practically overnight. The off-campus business community also benefited with the relocation of Mirmira's wife, Veena, a chemical engineer with an MBA degree. “Many physician scientists don't leave the big cities because of the dual-career nature of their families,” says Mirmira. “My wife and I were recruited simultaneously and were able to find positions independently that we both liked.”

Helping ensure that Indiana has the full complement of resources and opportunities to attract and retain families such as the Mirmiras is a priority of BioCrossroads and its supporters. “Our medical school happens to be smack-dab in the geographic middle of the commercial sector,” notes BioCrossroads' Johnson, whose efforts include cultivating “smaller, more nimble companies as well as big institutions” as a way to diversify and strengthen the overall business landscape. He believes such a thriving setting will appeal to persons who want to be “part of a rich cultural stew” of colleagues who have similar interests and backgrounds.

The importance of building a local community

of camaraderie was affirmed by leaders of several prominent life science groups from around the country when they convened in October at the seventh annual Indiana Life Sciences Summit hosted by BioCrossroads. “Most of these (physician scientists) have lived in places like Boston, San Diego and Silicon Valley at some point in their careers,” said Bajju Shah, founder, president and CEO of BioEnterprise, a business acceleration initiative in Cleveland. “They’re used to having an accessible network in their region to call on for mentorship, advice and talent for new enterprises.”

Access to information

Besides providing funds to recruit and retain a network of physician scientists, the Endowment’s \$60 million grant includes \$6 million to help create the Indiana BioBank. It will collect, store and catalogue DNA and other biologic samples for use by researchers. The BioBank will add to the rich resources already contained within the Regenstrief Institute, the internationally recognized informatics and health-care research organization on the Indianapolis campus of the IU School of Medicine.

“We often think of translational research as taking a great idea developed at the bench (laboratory) and then bringing it to patient care,” says Mirmira. “In reality, much of it involves utilizing patient samples and information. Having the BioBank and Regenstrief available provides us with great resources to do experiments that are translational in nature without having to recruit patients, which can take a long time.”

Building on its reputation as a leader in health information technology, Regenstrief collaborated with BioCrossroads and its partners, including both the Richard M. Fairbanks and the Regenstrief

foundations, to launch the Indiana Health Information Exchange (IHIE) in 2004. Wishard Hospital and Regenstrief had had a successful data exchange system in place for several years, and IHIE expanded that effort to enable thousands of physicians throughout Indiana and the Chicago area to receive electronic patient information – lab results, radiology reports, medication histories – whenever and wherever needed for patient care.

IHIE is now considered the most advanced electronic health information network in the country. In May it received \$16 million from the federal government to participate in the Beacon Community Program to further advance the technology. The grant brought national attention to IHIE and reflected favorably on Indiana’s comprehensive life sciences initiative.

“It provided external validation,” says physician scientist J. Marc Overhage, director of medical informatics at Regenstrief and founder, president and CEO of IHIE. “It was as if the government was saying, ‘You guys are doing good work, and we’re watching you. Now we want you to step up to the next level and take on another set of goals.’”

The 2010 Indiana Life Sciences Summit brought entrepreneurs, executives, venture capitalists, researchers and academicians to Downtown Indianapolis. In just a few years, Indiana has made huge strides in the life sciences, but the field is crowded with promising life science centers, and competition for talent is keen.



A decade of progress

Ten years after the release of the Battelle study, Indiana is well on its way to fulfilling the report's vision. The state is now home to more than 800 businesses in the medical device, pharmaceutical, drug development, diagnostic and ag-biotech sectors. The annual wage of a typical life sciences job in Indiana is



College seniors interested in the IU medical school's rigorous physician scientist program were invited to meet students already in the program, as well as medical school leaders. Students already working toward their MD and/or PhD degrees (below) presented overviews of their research. Among those on hand to chat with prospective students were (left to right) David Wilkes; Craig Brater, medical school dean, and Maryellen Gusic, executive associate dean for educational affairs and professor of pediatrics.

\$82,000, more than double the average wage of Hoosiers. BC Initiative, a for-profit offshoot of BioCrossroads, has raised more than \$144 million in venture capital for life sciences enterprises. The funds have leveraged more than \$185 million in additional venture capital from other investors. Indiana life sciences exports more than doubled between 2002 and 2007, from \$2.5 billion in 2002 to \$5.1 billion in 2007, a figure that is the third-highest among all states.

Two \$25 million Endowment grants in 2006 enabled Purdue and Butler universities to upgrade their well-respected pharmacy schools, the presence of which helped persuade Medco Health Solutions to establish a facility in Indiana expected to employ some 1,300 people. A \$35 million grant awarded in 2010 to Manchester

College will help establish a school of pharmacy in Fort Wayne, Ind., whose graduates and faculty will also build the state's human capital in the life sciences.

The Endowment-funded Indiana Pervasive Computer Research Initiative at IU has led to the development of six advanced information technology labs. A consortium of 14 higher education institu-

tions works to promote science, technology, engineering and math in Indiana's elementary and secondary schools via the Endowment-funded I-STEM initiative sponsored by BioCrossroads and administered by Purdue.

Affirmation for these efforts has come from the Brookings Institution that recently included Indiana on its short list of "emerging-industry clusters" and cited BioCrossroads as the catalyst. Last year an article in

The Economist noted that "though every state wants to be a hub for life sciences, Indiana really is one." Indexes that rank the country's life sciences sectors typically position Indiana among the top 10, but the challenge to step up to the next level is ongoing.

In acknowledging the Endowment's most recent \$1.4 million grant for BioCrossroads' charitable and educational endeavors, Craig Brater, dean of the IU School of Medicine and chairman of the BioCrossroads board, noted that Indiana is now "on the map

as home to a major, regional innovation cluster." Lilly's Lechleiter agrees and adds: "Indiana's growth in the life sciences did not happen by accident. The strategic and intentional efforts of BioCrossroads have played an important role in this success."

