Breaking a world record was one of the first things Wayne Knox achieved after earning his graduate degree.

Knox in 1985 created the shortest light pulse, 8 femto seconds—eight quadrillionths of a second—as a post-doctoral researcher at Bell Labs, the innovation engine behind Lucent Technologies Inc. It earned him a spot in the Guinness Book of World Records.

Knox’s technical achievements, love for academics and industry experience were among the reasons University of Rochester officials lured him back here to head its Institute of Optics some two years ago.

“He was a well-known person. We knew his academic training well and he had very good blend of academic and industry experience. Also, he had incredible energy and he would bring it back to the Institute of Optics,” says Thomas LeBlanc, vice provost and the Robert and Mary Sproull dean of faculty for the College of Arts, Sciences and Engineering.

As its director, Knox is eager to apply that energy and enthusiasm to growing the Institute of Optics and pushing it further into the spotlight.

“We have to keep moving, recruiting the best faculty, graduate students and continue to build our optics program,” Knox says. “Optics is an extraordinarily competitive field.”

Knox, 45, is responsible for recruiting and retaining faculty, determining teaching assignments and attracting new students. He also teaches an optics course.

The institute has 100 graduate students and 82 undergraduate students studying courses in optics.

Some 16 full-time faculty and 11 staff members report to Knox. Roughly eight UR professors from the departments of physics, electrical engineering, medicine and others hold joint appointments at the institute. Knox expects to boost employment at the institute to 24 full-time faculty members within the next few years.

Since his arrival, Knox has hired four faculty members and launched a $30 million optics/biomedical engineering project expected to create hundreds of jobs.

It hopes to play a role in technology transfer and validation. CIV plans to line up three to five venture capitalists this year to support the center’s efforts.

“The Center for Institute Ventures would have a large impact on the department, significantly increasing intellectual property revenues,” Knox says. “Also it will encourage faculty to stay.”

The optics/BME plan was created to support fundamental research through several stages until it reaches a product form. It is expected to retain faculty and students in the Rochester area.

“We think it is going to be a really exciting program,” Knox says. “I was just in San Francisco and venture capitalists in the Bay area are very interested. The ventures program is a critical part of the project. VCs need something to attract them and optics and medicine can be a very strong attractor.”

Knox expects the entire facility to become operational by early 2006. The project has received $3.38 million in funds, including a $3 million gift from Charles Munnerlyn, co-founder of Visx Inc. and a former student of the institute. His donation was the largest gift in the institute’s history.

“We are still in fund-raising mode but we need to have the whole thing finished by 2006,” Knox says. “We are in discussions with several alumni and state officials. The business community should know we really need their help to get this going.”

Knox hopes to contact architects this summer.

The plan calls for the building to connect the Institute of Optics and the bio...
medical engineering departments. The institute is housed in the Wilmot building on the River Campus. Biomedical engineering faculty and staff are in five buildings. The five-story structure will connect to the Wilmot building through a glass atrium.

It also will have research laboratories and classrooms for optics and biomedical engineering faculty and students. Proximity to UR’s medical center is expected to increase interaction among faculty from optics, BME and URMC researchers. Introducing a distance-learning program and a renovated science and engineering quad also are planned.

Expanding the Institute of Optics is critical to its future success, Knox says.

“Boston University’s photonics center is a 200,000-square-foot building and built into that is a 25,000-square-foot incubator space,” he adds. “The amazing thing is that here in the Wilmot building we have 25,000 square feet of space. This shows how competition is so seriously outbuilding us, that our building fits just into their incubator space.”

The Institute of Optics, begun in 1929, has awarded more than half of the optics degrees in the United States. But the institute has seen increasing competition from schools such as University of Arizona, Boston University and Duke University.

Knox expects UR’s expansion to boost the institute’s presence and gain a stronger foothold in the optics world.

“The biggest success is getting strong support from the administration to do these things to remain competitive,” he says.

“The administration has really wanted to see these great things come out of the department. We have to do things to stay ahead.”

Rochester roots

Born into a family of UR alumni, Knox grew up in the Cobbs Hill area.

“I came from a scientific musical family. My mother came to Rochester for music and my father came here to be at the university’s physics department,” Knox says. “I was studying flute at the Eastman School of Music when I was in seventh grade.”

But excelling at studies came later, he adds.

“I was a late bloomer,” Knox says with a laugh. “When I met this woman Victoria Visiko, who later became my wife, I decided it was time to start doing well so I signed up for AP math and AP chemistry and my teachers were wondering what happened to me.”

Rochester Institute of Technology’s co-op program attracted Knox.

“I was very interested in RIT because of its co-op program; it seemed like a good idea to have a source of income because I was seeing Victoria at that point,” Knox says. “I started in electrical engineering, but quickly switched over to physics.”

His life and career paths began to take form. Knox married Visiko when he turned 18. At RIT, he took a course in optics, paving the way to a career in the field.

“I came across the one optics course that they had at RIT and one day I heard one of the other physics professor in the hall who was talking about co-op jobs at the laser lab,” Knox says. “I couldn’t help overhearing and I went over to him and said maybe I could get a summer job.”

While pursuing a degree at RIT, Knox was hired to work part time at UR’s Laboratory for Laser Energetics.

“I was very much involved in the initial phases of building the laser,” Knox says. “But one night we were out at a German restaurant and these guys told me if you are that interested in optics, why don’t you join the Institute of Optics. It is 100 percent optics. I had been born in Rochester and I had never heard of the place.”

Knox transferred to UR during his sophomore year.

“In my senior year I started thinking about some other places for my graduate studies,” he says. “But I was already publishing papers and doing many things so I considered staying here.”

Knox graduated with a bachelor of science in optics in 1979 and immediately began pursuing a doctoral degree.

“I continued to do research at the laser lab,” Knox says. “It was such a world-class place and I had a great experience working. It is important to have that experience in the lab and the classroom.”

Knox won many accolades during his years as a graduate student, including fellowships from the laser lab and IBM Corp. He also was a visiting staff member at Los Alamos National Laboratory in New Mexico and at the Laboratoire d’Optique Appliquee in France.

“He always had this raw enthusiasm and was very personable and sociable,” says James Zavislans, associate professor at the Institute of Optics and CIV’s director. Zavislans and Knox were graduate students together at UR.

The bell sounds

In early 1984, Knox was hired as a post-doctoral member of the technical staff at Bell Labs’ optical physics research department. He and his family moved to New Jersey.

“My adviser told me, ‘There is only one place for you Wayne and that is Bell Labs,’” Knox recalls. “He practically would not allow me to go any other place; it was pretty funny. And I kind of wondered you know, what is the big deal?”

So Knox turned down a full-time position at California-based Hughes Research Laboratories LLC, another leading optics lab.

“I walked into a lab with millions of dollars worth of equipment,” Knox says. “I was working with very famous people and was able to do a large amount of research in the ultrafast science and technology area.”

Knox’s world record in 1985 helped him grab a post as a member of the technical staff in the optical physics research department, he says.

“I think that convinced Bell Labs to convert me to a permanent position within one year,” he laughs. “So they probably said, ‘Just hire the guy!’”

The new post allowed him to start his own laboratory.

“That was a big difference,” Knox says. “At Bell Labs you walk into an empty lab and they say here is a million bucks and all you have to do is become famous in whatever field you work in and if you screw it up don’t ask us for any more money.”

“That is a tremendous amount of pressure because it is research and you don’t know how it is going to turn out unless you have the right intuition—that is when you find out if you are a good scientist.”

Knox was promoted in 1993 to distinguish member of technical staff at Bell Labs’ advanced photonics research department.

“He was quite exceptional. Wayne was creative and had the ability to think outside the box. He is very excited about optics and science; it oozes out of his every pore,” says Alastair Glass, director of the information and communications technology division at the Science Foundation of Ireland. Glass formerly was vice president of photonics research at Bell Labs.

Traditionally, however, Bell Labs rarely promoted distinguished researchers, Knox says.

“It was a big honor, but people also said when they make you a member of distinguished staff, they are doing this to retain you. But it also means they are never going to promote you any further,” he adds.

“I never believed those things.”

Four years later, Knox was asked to take a position as director of the advanced photonics research department.

“I had a department of 20 wild and crazy Bell Lab researchers, including some scientists that were 30 years my senior who had been there the whole time and I was told to start acting like a boss,” Knox says. “The huge challenge is when you have been given all that management responsibility, not only do you have to clear the way for your own research, you have now been given the responsibility to clear the way for all these other researchers.

“For them to respect you as a manager, you have to make them respect you as a scientist and for that you have to keep pumping out research. Dropping research is a point of no return for a scientist.”

With an annual discretionary budget of $1.5 million, Knox’s lab focused on projects such as fundamental semiconductor physics and nonlinear optics. He was responsible for managing multimillion-dollar projects funded by other business units.

Knox had a knack for spotting talent, Glass says.

“One of his very great strengths is his ability to hire good people,” he adds. “He found some incredibly good people.”

Renewing ties to Rochester

In 1998, UR contacted Knox to serve on a visiting trustees committee that conducted an annual review of its laser lab. He accepted and began making regular visits to UR.

A year later, Knox was honored with the Richtmyer Memorial award from the American Association of Physics Teachers.

“The award made me feel teaching was in my future,” Knox says.

His prediction turned out to be accurate. In 2000, while attending a visiting trustees meeting for UR’s laser lab, he learned of an opening at the Institute of Optics.

“The previous director had left to go to Vanderbilt University,” Knox says. “It left this place without this rudder. It was a very difficult time in the optics industry, because of the telecom bubble and all of the speculation.

“VCs were dumping so much money into very shaky ideas. People in companies were leaving to start up their own companies.”

Knox noticed similarities between the Institute of Optics’ issues and his department at Bell Labs. Faculty members also were interested in industry opportunities, which resulted in losing professors and graduate students who were interested in a particular professor’s expertise.

“At Bell Labs it became a full-time job to try to convince my department members not to run off to manage startup companies,” Knox says. “It was really interesting to hear that one of the challenges in this department was not only were other places trying to pick off faculty members, but faculty members also left to start up companies.”

The institute needed a new leader to bring it back on track.

“The institute is one of our jewels and, frankly, it was beginning to languish. Wayne has made an enormous difference already,” says Robert McCrory, director of UR’s laser lab.

Knox applied for and landed the job in 2001.

“He has a number of strengths that made him the ideal person. He was very strong scientifically and worked at one of the leading labs in the world,” says Gary Wicks, professor and associate director of the institute.

“He was well-watched by the faculty,” adds Dean LeBlanc.

A $1 million startup package from the state’s office of science, technology and academic research also helped draw Knox to UR. When he joined the institute, Knox brought roughly $500,000 dollars of equipment as a university donation from Bell Labs.

Knox quickly had to switch gears to adapt to teaching and the academic environment.

“Coming in to chair a department of professors when you haven’t been a professor yourself is a challenge. The only thing I can say is that you better learn quickly,” he says.

Knox is known to bring fun into the classroom. It is not uncommon for the professor to enter a class wheeling in a box of toys to demonstrate optical networking principles.

“He is a very visual person and is playful,” UR’s Zavislac says. “He brings a sense of fun and innocence to education.”

Continued on next page
Knox also is a consultant to the optics industry. He owns and operates WHK Consulting and works closely with local and national optics firms.

“Everybody in the industry knows Wayne. He has such a wealth of information and doesn’t lack ideas. He is able to conceptualize ideas and put them into words that anybody can understand,” says Richard Corey, president of Optics-Professionals LLC, a career consultancy firm focused on the optics industry. Corey assists Knox with his consulting practice.

Knox is involved in the optics community worldwide. He serves on industry boards, including the Optical Society of America, Rochester Regional Photonics Cluster and the Science Foundation of Ireland. On the corporate front, he is a member of Michigan-based Translume Inc.’s technical advisory board.

“The position of the director of the Institute of Optics is a very visible position,” UR’s Wicks says. “It is a leading department and it naturally places one in the front of the field of optics. He has done a fantastic job.”

Knox and his family live in Pittsford. His wife runs a Hawaiian dance studio and Tiki theater called Gallery Kauai.

He still plays a variety of musical instruments, including the Hawaiian and bass guitar, flute, lute and the piano. Skiing, ice skating and kayaking are among his other interests.

Knox also appears to have an affinity for gadgets—ensconced among the many awards and toys in his office are a few computers. One computer streams out information to a screen display in the hallway that features the institute’s alumni that own companies or have business connections.

Using the optics/BME project as a tool, Knox sees his focus on connecting business and academic research as a way to grow the local optics industry and bring attention to the institute.

“We have to have a bricks-and-mortar component, new programs, new faculty hires, students, we have to have all of it, from research to getting ready to start a company,” he says. “Any one of these individual things is not enough. So here is my answer based on the community slogan. ‘Rochester. Made for investing.’”

sjacob@rbj.net / 585-546-8303