



Center of Excellence Moves Forward

Bioinformatics and Life Sciences

BY SUE WUETCHER



Photos by KE ERATT



BARELY FOUR YEARS after Governor George Pataki announced an ambitious proposal to create jobs and jump-start the New York State economy through the creation of high-technology “centers of excellence,” UB’s New York State Center of Excellence in Bioinformatics and Life Sciences is well on its way toward fulfilling its dual mission of improving health care while facilitating economic development in Upstate New York.

The new building on the Buffalo Niagara Medical Campus is nearing completion, the scientific agenda has been solidified, corporate partners identified, and a formal organizational and governance structure adopted.

“If you look at where we were eight to ten months ago, there’s been a tremendous amount of progress,” says Satish K. Tripathi, PhD, University at Buffalo provost and executive vice president for academic affairs.

Perhaps the most visible example of progress is the center’s new building at Virginia and Ellicott streets on the Buffalo Niagara Medical Campus. Construction of the four-story building is on track for completion in November 2005, with occupancy anticipated in December or January, according to

Kevin Thompson, director of facilities planning and design, University Facilities.

The building will feature two floors of information-technology research space and two floors of wet-lab research space. It will be connected via common corridors and a skywalk to new buildings housing the Hauptman-Woodward Medical Research Institute (HWI), which was formally dedicated on May 12 (see story on page 44), and the Center for Genetics and Pharmacology of Roswell Park Cancer Institute (RPCI), which also is nearing completion.

Leadership and Focus

Bruce Holm, PhD, executive director of the Center of Excellence, says 500 scientists are expected to be working at the center within the next five years—with half already affiliated with UB, HWI or RPCI, and half being new hires. The new hires, he explains, will be made in areas identified jointly with UB deans as part of the UB 2020 strategic planning process. (Bioinformatics and health sciences represent one of the 10 strategic strengths of the university identified by UB 2020, although formal planning for the center began well before the nine other areas of strategic strengths.)

The center’s updated business plan, finalized in December 2004, establishes the center’s governance structure, which includes an executive council overseeing both the scientific and the economic development efforts, as well as a scientific advisory council and advisory boards in the areas of education and training, and economic development.

Holm notes that the center is in the process of naming members to the councils and boards.

The center’s scientific agenda was established as a result of an all-day retreat attended by about 60 investigators from UB, RPCI and HWI—similar to the “envisioning retreats” being held with the other nine strengths identified by UB 2020. The areas of scientific focus, Holm says, are based on the specific areas of strength of the center’s partners and the work the center has been doing since its creation in 2001.

“We looked at what we have that’s great, what we have that really needs work, and right now, what are the initiatives that we can go after and pull in,” explains Norma Nowak, PhD, the center’s director of scientific planning.

Nowak also is director of the center’s Data Intensive Analytical Bioinformatics Core Group, which currently includes more than three dozen researchers in three areas: bioinformatics sciences, functional genomics/systems biology sciences and bioengineering sciences. Among those researchers is Jeffrey Skolnick, PhD, professor of structural biology. The core group also includes the research group Nowak directs at RPCI, which has a long track record working on the Human Genome Project and in developing tools to look at the entire genome, rather than at just one gene, in a single experiment.

Nowak was a featured speaker on bioinformatics and genome research, along with other renowned experts, at a conference, “Beyond Genome 2005: The Future of Medicine Conference,” held in June in San Francisco.

The core group serves as a fundamental technology and support resource for center members, working with groups of researchers in the center’s five focus areas: cancer biology, headed

by John Cowell, PhD, DSc, and Michael Brattain, PhD; neurodegenerative diseases, headed by L. Nelson Hopkins, MD; cardiovascular diseases, headed by John Canty, MD; pathogenesis and biodefense, headed by Anthony Campagnari, PhD; and drug discovery and delivery, headed by William Jusko, PhD, and Huw Davies, PhD. More than 50 researchers currently are associated with the five groups.

“These broad areas give us enough focus to do our job in areas where we already have excellence, and at the same time they have enough breadth to them that we can do innovative things and work in other areas,” Holm says.

Impact on Health Care and Research

Nowak notes that with the appointment in April 2004 of Holm as executive director, the overall focus of the center shifted from one that was highly theoretical and computational to one that “actually directly impacts on health sciences and biomedical research.”

“The idea is that what we really want to do within the center is to improve health care,” she says. “The road to the human genome started in Buffalo,” she adds, referring to her work, as well as that of colleagues at RPCI, on the Human Genome Project. “We’re trying to continue that so you’re not just making the tools that sequence the genome, but are using that information to better treat patients and improve the health-care situation.”

To accomplish its work, Nowak says, the center needs genetic epidemiologists and bioinformaticians to analyze data, as well as individuals with strong backgrounds in the basic and clinical sciences.

All such efforts are tied to informatics, Nowak explains. “The real challenge is to integrate medical records with the data that comes out of the labs. And that will allow us then to clearly link those research tidbits with clinical phenotypes.”

Nowak says researchers hope to develop better prognostic tools that would indicate, based on a person’s genotype, whether he or she likely will respond to a specific treatment.

“We want to be able to tailor medical care to the individual and not just to the disease entities,” she says.

Computation and Tech Transfer

The key to all this work is computational ability, according to Nowak, who explains that scientists are no longer able to keep databases on their computer desktops and there is a need to store and process a lot of data while making it accessible to scientists.



Although it always has been affiliated with the Center of Excellence, the Center for Computational Research (CCR) now has a direct reporting relationship, Holm says. The new arrangement, he adds, puts CCR in a better position to attract funding from the NIH and the state, while continuing to serve the needs of the broader university community.

The scientific discoveries made by center researchers will lead to new processes and products that are licensed to existing companies, as well as startup companies.

To facilitate technology transfer, the center has developed a commercialization resource network that includes such entities as the UB Office of Science, Technology Transfer and Economic Outreach (STOR); RPCI's Technology Transfer Office; CUBRC (Calspan-UB Research Center Inc.); Buffalo Niagara Enterprise; and BuffLink Inc., a private, nonprofit organization geared

toward developing economic development opportunities in the life sciences, as well as corporate partners and other community-based organizations.

For example, the center is working with corporate partner GE Healthcare, Niagara Falls Memorial Medical, Niagara University and BuffLink to develop and evaluate the use of non-invasive approaches to cardiovascular disease, specifically regarding a new imaging system that can detect cardiac problems in 10 seconds, compared with traditional methods of inserting a catheter in the body, an invasive procedure that can take hours.

The center also is working on drug production with such corporate partners as Invitrogen, Amgen and Biogen. Holm points out that its work with the center has prompted Invitrogen, which supplies cell-growth material for biotech research, to keep its 550-job plant on Grand Island, and possibly add another 200 jobs.

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Holm and Nowak advised staff in Albany working on legislation to create a \$90 million economic development program tied to the centers of excellence. The program, Holm says, will provide funding to assist in the earliest stages of licensing and product development, before most venture capitalists are interested in investing.

In addition, the center has played a key role in numerous events designed to promote the work of the center and the advancement of the life sciences industry in Western New York.

Holm and Nowak spoke last October at the Western New York Technology and Biomedical Informatics Forum, a cross-industry forum that provided computer experts a chance to connect with

life science researchers and explore partnership opportunities. The event drew more than 300 attendees and 50 exhibitors to the Niagara Falls Conference Center.

Center staff also assisted in planning and coordinating a conference, "Life Science Technologies: Innovations and Opportunities in Biotechnology, Biomedical Informatics and Medical Devices," held in Buffalo in March. Cosponsored by Senator Hillary Rodham Clinton, the conference attracted a large group of executives from the life-science units of GE, Intel and Oracle, as well as bioscience companies. **BP**

BY ELLEN GOLDBAUM

New Home for Structural Biology

Hauptman-Woodward Medical Research Institute Opens

In May 2005, the Hauptman-Woodward Medical Research Institute (HWI) and its Structural Biology Research Center became the first building to open on the Buffalo Niagara Medical Campus.

Located on Ellicott and Virginia streets just north of downtown Buffalo, the 73,000-square-foot building also is the new home of UB's Department of Structural Biology.

While passersby stop to admire the HWI facility's gleaming curved facade, metallic

aluminum panels and staggered window openings, it's the interior space that's already changing how the world beyond Buffalo sees the first piece of the life sciences complex.

"There are few things scientists care more about than the quality of the laboratory space they're going to inhabit," says George DeTitta, PhD, HWI executive director, CEO, principal scientist and chair of the Department of Structural Biology, a unit of the School of Medicine and Biomedical Sciences.

Noting that lab size is significantly limited in some of the nation's most prestigious institutions because of their location in dense population centers, DeTitta says that lab space in the new HWI facility is a major asset.

"My feeling is that, right now, we probably have some of the most spacious and well-designed laboratory space in the country," he says.

That's an automatic plus for recruitment. "We've recruited people into what was at the time



Photos by Gloria del Ben



still a concrete shell," he explains, "and once the UB and Roswell Park buildings are up, the three will represent what I think is premier laboratory space in the U.S." (See article on page 42.)

HWI plans to double its size within the next seven to 10 years, with the Department of Structural Biology also greatly increasing the number of faculty members.

DeTitta adds that the department is seeking to boost the number of its graduate students as well, from its current level of seven to between 20 and 25.

"We see it as part of an effort of the university to emphasize the biological sciences," he says.

"Over the next few years, we hope to have a lot more students coming into the medical school through the Interdisciplinary Graduate Program in Biomedical Sciences, while we're also deliberately going after students who are strong in the physical sciences and want to become part of the biological revolution."

The \$24 million HWI facility was designed to encourage interaction among scientists, both inside and outside the lab spaces. "When the architect asked what we wanted, I said I'd like a building in which you maximize the chances for people to meet one another and you minimize the chances of people 'hiding out,'" DeTitta recalls.

"In the little time we've been here, just since mid-April, I've sensed that even though the new building is much larger than the old one, people meet one another more frequently," he observes.

Those interactions are not only occurring within the building's atrium area and its grand central stairway, they also are taking place in the core facility, which houses scientific instrumentation and which is available to all of the building's scientists.

"We built the lab space around a very robust common space so the core facility serves all of the scientists," says DeTitta. "What you see is maximum interaction and minimum turf-building." **BP**