

# Pritzker Institute

## Expands Reach Through New Centers and Facilities

In 2005, two new research centers joined the Medical Imaging Research Center (MIRC) under the umbrella of IIT's Pritzker Institute of Biomedical Science and Engineering.

Formed last spring, the Engineering Center for Diabetes Research and Education (ECDRE) is the first engineering center in the United States dedicated to the treatment and cure of diabetes and arrives at a particularly important time, with diagnoses of diabetes reaching an all-time high.

Under the leadership of Director Ali Cinar and Co-director Emmanuel Opara, ECDRE includes IIT faculty members from the biomedical, chemical and environmental, and mechanical, materials, and aerospace engineering departments. Through partnerships with faculty, medical investigators, and

The Center for Integrative Neuroscience and Neuroengineering Research (CINNR), inaugurated last October, was created to nurture research in systems and behavioral neuroscience at the University of Chicago and in neural engineering at IIT. Led by Philip Ulinski, director, and Vincent Turitto, co-director, the CINNR extends its work from basic science and clinical efforts and stresses an interdisciplinary approach.

"The interaction of engineers from IIT with clinical and basic scientists at the University of Chicago will lead to the better treatment and eventual cure of neurological diseases," says Turitto, who is also chair of the Department of Biomedical Engineering and director of the Pritzker Institute.

Neuroengineering faculty members now occupy new laboratory space in the Engineering Research Building (ERB), a facility shared with bioengineering faculty as well as researchers working in the new Incubator at University Technology Park At IIT. This fall, MIRC faculty plan to move into the ERB.

"We're in the process of expanding the role of the institute across the campus," says Turitto. "I want to build upon the prescient vision that Bob Pritzker had in making his original gift to IIT in the biomedical area, so that the institute will become a premier environment for the better understanding of disease processes and the advancement of human health through science and engineering approaches."



clinicians at the University of Chicago and Argonne National Laboratory, ECDRE will focus on the development of new knowledge, techniques, and tools to improve the technologies and procedures for treating patients with Type 1 and Type 2 diabetes, as well as the development of educational and training tools for patients suffering from diabetes and its complications. ECDRE recently received a National Science Foundation grant for undergraduate summer research focused on science and engineering approaches to diabetes.

Current CINNR research focuses on understanding the neural code, creating brain-machine and tissue-device interfaces such as prosthetic vision, diagnosing and treating epilepsy, developing neuroimaging techniques to understand cognitive behavior, and applying engineering and biomolecular approaches to better understand normal and diseased states. CINNR members include faculty and staff from numerous fields at IIT and the University of Chicago in addition to affiliate members from Argonne Labs.

The Pritzker Institute was founded in 1982 through an endowment from IIT's Chairman of the Board of Trustees Robert A. Pritzker. The institute is currently linked with a number of engineering departments on campus, the biomedical engineering department in particular. [www.pritzker.iit.edu](http://www.pritzker.iit.edu)

# researchspotlight

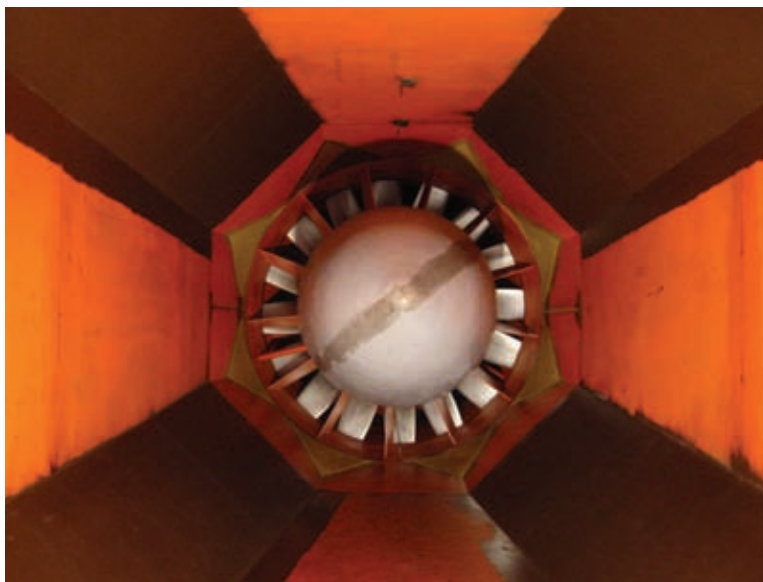
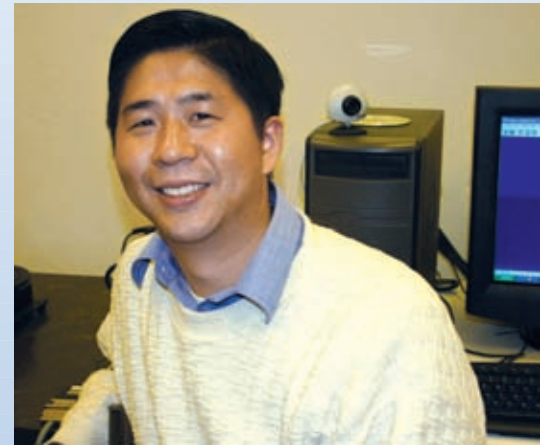
## Xiaoping Qian Receives NSF Grant to Develop 3D Computer Modeling System

Shortly after receiving GE's New Innovator award in 2004, Xiaoping Qian joined the ranks of IIT as an assistant professor of mechanical, materials, and aerospace engineering. His work at IIT has focused on computer-aided design and manufacturing and research on a process called "reverse engineering." He takes an object, scans it, and comes up with a computer-aided design of the object. Currently, manufacturers typically cannot make an exact prototype of a part made by designers, but with reverse engineering, engineers can analyze products more accurately and more reliably before they go to full-scale production, thereby reducing errors and costs.

Although systems with these capabilities do exist, they have a number of limitations. For example, some equipment uses mechanical probes to scan the surface

of larger objects, but the process is very slow. Others scan using light. However, surface and light conditions can affect the accuracy of readings. Qian hopes to create technology that integrates the capabilities of each. The applications of his findings will impact manufacturing industries, including aviation, automotive, and consumer products.

In 2005, in recognition for his work, Qian received an internal award on "Direct Fabrication of Sculptured 3D Microstructures by X-ray Milling" from IIT's Educational and Research Initiative Fund, which provides funding to tenure and tenure-track faculty with high-risk or innovative ideas that are expected to receive outside funding. Qian then won a \$246,500 National Science Foundation grant for his project. In collaboration with researchers from University of Wisconsin, who were also awarded \$452,000 for contributions to this project, Qian will begin work on these 3D computer-modeling systems in May 2006.



*The center maintains several wind tunnels and water channels, including the National Diagnostic Facility (NDF), a large wind tunnel with very high quality flow. [Left, the fan that powers the NDF wind tunnel]*

## Fluid Dynamics Research Center Celebrates 20 Years

The Fluid Dynamics Research Center (FDRC) at IIT was established in 1985 to continue the tradition of innovative research in fluid dynamics begun in the 1960s by professors Mark Morkovin and Andrew Fejer. Selected by the Air Force Office

of Scientific Research in 1986 as one of three National Centers of Excellence, the center has gained international recognition due to researchers' use of advanced experimental techniques in areas such as flow control, fluid-structure interaction, turbulence, stability theory, and aeroacoustics. The research facilities are equipped with state-of-the-art wind tunnels, an axial flow compressor for

turbomachinery research, and several particle image velocimeter systems.

In recent years, the center has established expertise in computational fluid dynamics to complement its strengths in experimental research, and has partnered increasingly with industry—in particular, with Honeywell and Boeing—to augment its traditional base of funding through Department of Defense agencies. FDRC Director David Williams believes that this partnership with industry has contributed to the steady increase in enrollment in IIT's aerospace engineering program over the past nine years. "Our students benefit from direct exposure to industry even at the undergraduate level," says Williams. He notes that this exposure often results in career connections, as it did for two recent IIT graduates hired by Honeywell.

As the center passes the 20-year mark, Williams anticipates that the center's flow control activities will continue to expand as the interface between control theory and fluid dynamics opens new paths in the field.

<http://fdrc.iit.edu>