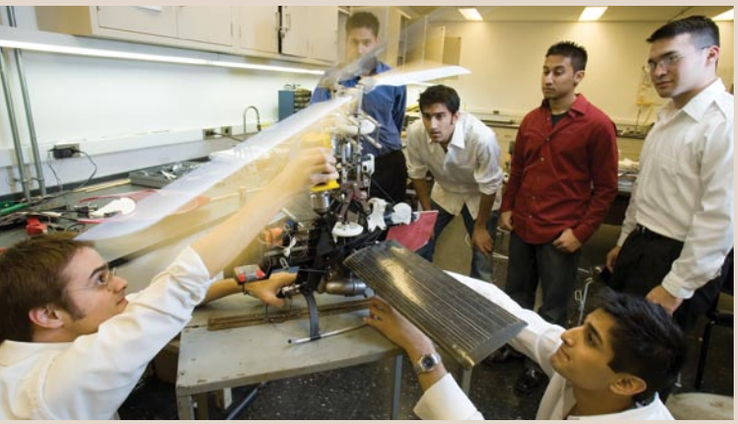
Expanding and Assessing the IPRO Program

After more than a decade of innovative learning through the Interprofessional Projects (IPRO) program, faculty and staff are taking IPRO to the next level by working to incorporate elements of a renowned service-learning initiative into the university's signature program.

The Engineering Projects in Community Service, or EPICS, program was founded at Purdue University in 1995. Purdue remains the headquarters, but 30 other schools throughout the country and the world now participate, including Princeton, Notre Dame, Penn State, Dartmouth, Georgia Institute of Technology, and University of Auckland, New Zealand. IPRO has a long history of service learning projects, and the EPICS program allows for its expansion and formalization as well as relationships with other universities dedicated to similar service-learning models. EPICS service-learning initiatives assist nonprofit community organizations with specific problems they are facing and cover four broad areas of service learning: human services, access and abilities, education and outreach, and the environment.



The Interprofessional Projects (IPRO) program brings together students from different disciplines to solve real-world challenges. [Above] An IPRO team tests a prototype of a Vertical Take-off and Landing aircraft.

IIT is more than just another participant. Last year, IIT was awarded a National Science Foundation grant to review best practices of the program while moving to incorporate it into IPRO. There are three distinct goals for the NSF grant. The first initiative, headed by Director of Interprofessional Studies Tom Jacobius, the project's principal investigator, is a concerted effort to establish relationships with community partners. While IPRO has successfully engaged community partners in the past (including organizations such as the Holocaust Museum and Engineers Without Borders), Jacobius is working to move from project efforts to lasting relationships. He has already solidified partnerships with Access Health Network, Chicago Public Schools, and the Museum of Science and Industry. These organizations will then benefit from one or more IPRO projects every semester. Additional partnership talks are underway with a number of organizations.

Institute of Psychology Professor Margaret Huyck, a co-PI on the project, is spearheading an effort to incorporate reflective thinking principals into the EPICS program. This assessment system is intended as a tool for monitoring and managing the projects, student teams, and faculty of the IPRO program through the collection of systematic data with measures that have evidence of reliability and validity, and by providing the data for reports that assess the system performance. There are 12 IPROs already participating in the endeavor this year.

Dan Ferguson, senior lecturer at Stuart School of Business, is heading the third effort of the NSF project—to develop a team-leader training program and to identify IPRO Fellows. Ferguson has sought out students who have the ability to develop leadership and project management skills within the context of the IPRO program. This section of the grant is in its first year, and three IPRO Fellows have been chosen; Ferguson is aiming to appoint 10 more next fall.

The program already has 10 service learning-oriented projects this semester, and team members have presented their findings at annual EPICS meetings, as well as continuously shared their research with the national EPICS group.
http://ipro.iit.edu

facultyhonors&awards

Elie Geisler

Stuart School of Business Professor Elie Geisler was named a distinguished professor of IIT. Geisler's work includes the areas of metrics and the management of science, technology innovation and engineering, knowledge management, and the management of medical technology.

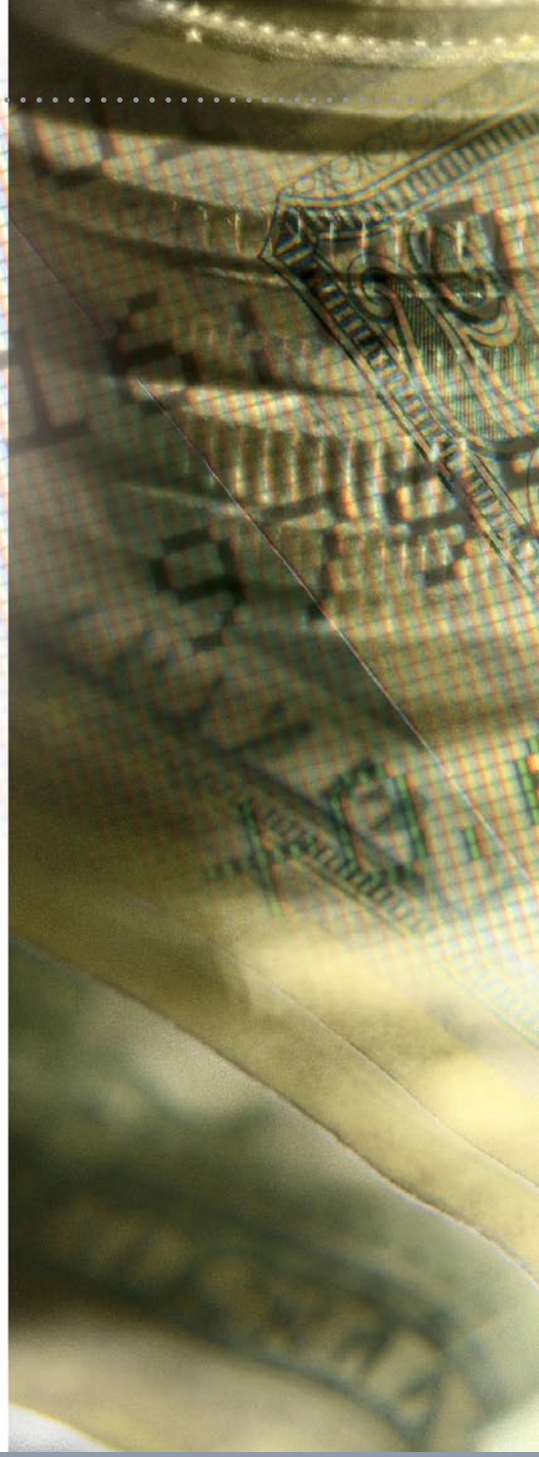
Joseph Orgel

Assistant Professor of Biology Joseph Orgel was a recipient of a 2007 National Science Foundation CAREER Award. The award is considered one of the top honors given to junior faculty in the United States and is intended to recognize future leaders in his or her field. Orgel uses X-ray diffraction to determine the molecular structure of collagen, providing a three-dimensional picture of how it builds tissues and interacts with cells. This research is expected to help scientists understand how the body is built from the molecular level up, and consequently help understand how cancer and heart disease develop.

Ronald Staudt

The Legal Services Corporation (LSC) honored Chicago-Kent College of Law Professor and Associate Vice President Ronald Staudt as a recipient of its first technology award for outstanding contributions to the LSC's

Investing in Investing



Stuart School of Business has long espoused real-world learning. Now Stuart is making a smart investment in the abilities of its own students by giving members of the Stuart Investment (SI) Club the ultimate real-world experience—allocating $250,000 of the university's endowment for them to manage.

The group began as a student-run club in January 2005 with the goal of funding scholarships and other endeavors. The original fund, which was established as a charity independent of the university, was financed through donations from students and faculty. It ran for more than a year and earned approximately $6,000 in profits.

Trustee and Center of Financial Markets founder Jack Wing was impressed by the group and was a proponent of the SI proposal to invest a portion of the university's endowment. Stuart's Finance and Financial Markets master's programs have long ranked among the best worldwide, and other top-tier finance programs have similar student groups in place. Stuart faculty member Russell Wojcik now oversees the group of students and imposes a structure and guidelines but gives students latitude within this framework.

The SI investment policy reflects this thinking, following a growth at a reasonable price philosophy when selecting equity investments that combine both value and growth investing. The idea is to find healthy but undervalued stocks with a growth rate that exceeds most value stocks. In order for a stock to be selected for consideration, it has to have positive earnings and its PE multiple cannot be twice that of the market.

The money is allocated evenly in five sections: consumer, finance, health care, technology, and machines and materials. Students are divided into five teams that reflect these areas, each with a sector leader and analysts. A fund manager and executive director sit above the five sector leaders and oversee the group. The team members must conduct thorough research on the stocks being considered for their portfolio and make a formal presentation to the group. SI presents about six to eight new stocks per quarter. SI is still extracurricular but draws approximately 20 students each quarter. Students start out on the analyst level and can move up to be sector leaders after proving themselves to the group. This dynamic promotes teamwork, stock analysis, and verbal and written presentation skills.

Solomon Shields, the current fund manager and financial markets major, believes that SI is beneficial to students on three levels: "The club's endowment supports scholarships for graduate business students, and the fund affords students the opportunity to put their financial education into practice. SI also provides an assessment of students' knowledge and the performance of the graduate business program. I participate in SI because I want to support my institution, test my abilities, and take part in the success of my program."

www.stuart.iit.edu/si/events.htm

Technology Initiative Grants program. Staudt is director of Chicago-Kent's Center for Access to Justice, which uses the Internet and Web to provide assistance to legal service advocates and pro bono volunteers and litigants.

Fred Hickernell

Applied Mathematics Professor and Chair Fred Hickernell was named a fellow of the Institute of Mathematical Statistics "for innovations in the construction and analysis of quasi-Monte Carlo methods and their applications to experimental design." Fellows are recognized for demonstrated distinction in research in statistics or probability.

2007 Sigma Xi Awards

Recipients of the IIT Sigma Xi Awards, which recognize faculty and graduate students for their research, teaching, and creative endeavors, include the following:

Senior faculty division: Thomas Irving, professor of biology, director of the Center for Synchrotron Radiation Research and Instrumentation, and director of the Biophysics Collaborative Access Team at Argonne National Laboratory

Junior faculty division: Konstantinos Arfanakis, professor of biomedical engineering


Nick Menhart

On the Right Track:
Dystrophin Research

In the nursery, an infant's eyes trace the circuit of a moth.

Already the child's hands are grasping at things, and he has begun incessantly rehearsing the sounds that will eventually blossom into language. The youngster's progress appears on schedule. A chromosomal glitch, however, will soon make itself evident.

This boy was born with a disease known as Duchenne Muscular Dystrophy (DMD). The root of this ailment is a defect in a complex human gene known as dystrophin, and is a focus of research for IIT's Nick Menhart.

The challenges of studying dystrophin, the largest human gene, are formidable. "This gene by itself is .1 percent of the total genetic material," Menhart explains. "So it's 300 times larger than your average gene." In healthy individuals, the dystrophin gene codes for a protein of the same name, one vitally important to muscle cells.

"Most cells just sit there," Menhart says. "They don't change shape." Muscle cells are different. "If you think of a piece of sheet metal bent back and forth, eventually it will break due to metal fatigue. This is what happens to muscle cells when they lack [the protein] dystrophin," Menhart adds.

Duchenne's is one of many so-called X-linked recessive gene diseases. Should a child inherit a defective X chromosome from his mother—one in which the dystrophin gene is damaged—his body will fail to produce the dystrophin protein, and the result is DMD.

But DMD is a peculiar genetic disease in that about 50 percent of cases are not inherited. Rather, they are the result of new mutations specific to the individual. Because the gene is so large, thousands of underlying defects are possible, making genetic treatment especially vexing.

Duchenne is the most common form of muscular dystrophy, striking 1 in 3,500 boys. It is also one of the most pitiless. The first signs occur between two and six years of age. The calves of the child's legs may appear oddly muscular and enlarged. Soon, the boy is walking with a peculiar, waddling gait. By the time he is in his teens, the child's confinement to a wheelchair will be permanent. Most stricken with DMD die by their mid-20s. Few survive past age 30.

At the microscopic level, the trouble begins when the language needed to make the muscle protein is mistranslated from the dystrophin gene. Nucleotides—which act like lettered beads on a charm bracelet—combine to form three letter sequences, known as codons. With Duchenne, such nucleotides may be spuriously added or deleted, corrupting the codon 'words' and making them illegible. The result of these genetic misspellings is known as a frameshift mutation.

"It's like a train derailment," Menhart explains. The "tracks" in question are segments of DNA on the gene known as exons. These critical pieces combine to form the proper recipe for the dystrophin protein. If the body misreads the code, synthesis of the protein cannot proceed properly. As Menhart points out, "It doesn't really matter where the train tracks are broken. If I don't get all the way to the end, I don't get the protein."

And what if there were a way to skip over a defective segment of track and continue the journey, producing a slightly altered or abbreviated, but nevertheless functional dystrophin protein? Such technology is now being attempted in human trials. It is considered among the most promising approaches to the treatment of Duchenne's.

As Menhart explains, "If they can skip some of these defective exons, that person would be cured and start making his own dystrophin again, minus the little defective piece. We can get to the end of the track, and we're fine."

If the theory sounds straightforward, the practice of treating Duchenne by exon skipping is frustratingly complex. Many intricacies of the gene and the affected exons have not been satisfactorily studied. Menhart insists that current attempts to re-engage the train without a more thorough understanding of the segments of track is a strategy largely relying on luck. "Here's the problem: nobody knows what the effects are of putting this thing back together," he says.

Hence, efforts to compensate for the track derailment—to ferry passengers by bus around the accident site, as it were—are usually unsuccessful. The bus driver has no idea where to drop off the passengers. As Menhart puts it, "Sometimes they can see the station and walk to it, sometimes they are way off and they just wander around in a bad part of town until they are mugged."

So Menhart and IIT students are trying to fill in this deficit by researching the detailed structure of the dystrophin gene. "What we're doing is studying all the little pieces, to see which ones go together and how they can work if you remove them. Nobody knows which exons to skip—how to get the train back on track. That's what we're doing."

Those with Duchenne have considerable cause for hope, according to Menhart: "If we can learn more about the structural consequences of exon skipping, I would be hopeful for a treatment within a decade, maybe sooner."

—*Richard Harth*