

# cse pipeline

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING | FALL 2006 | COLLEGE OF ENGINEERING

## Punch Teams with Physicists to Work on Decades-Old Scientific Mystery

What started out as a quest for a graduate research project may have produced the first steps toward solving a 20-year-old scientific mystery. William Punch, associate professor, and Dave Cherba, his former PhD student, went looking for a research project for Cherba's dissertation last year and decided to join together with Simon Billinge, Philip Duxbury, and Pavol Juhás from the College of Natural Science. What they found was a way to characterize the structure of non-crystalline matter—a research breakthrough worthy of publication in the March 30, 2006, issue of *Nature*.

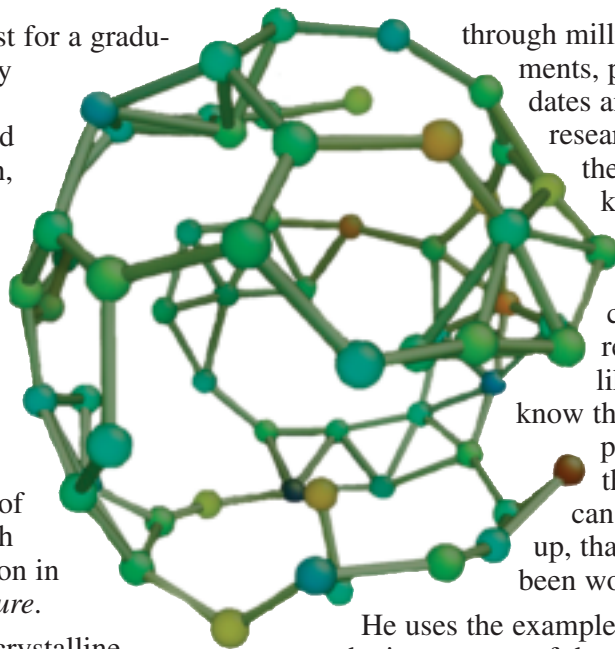
Determining the arrangement of crystalline structures is a relatively well-established procedure that uses X-rays to view the position of atoms. Some matter, however, does not easily crystallize and cannot readily be submitted to the process. Going on the assumption that matter tends to take on the most compact shape to maintain stability, Punch and the rest of the team began working on a genetic algorithm to predict how different numbers of atoms would structure themselves under certain constraints. The algorithm can run

through millions of possible atomic arrangements, promoting good structural candidates and relegating poor ones. The researchers have tested the veracity of their algorithm using matter with known atomic structures, and the results have been promising.

According to Punch, this new characterization method has far-reaching implications for fields like bioengineering. "We have to know the structures of biomolecules like proteins in order to understand their functions," he says. "If we can predict how a molecule will fold up, that's a huge thing. People have been working on this for 20 years."

He uses the example of sickle cell anemia to illustrate the importance of the discovery. "Sickle cell anemia is caused by an abnormality in the three-dimensional shape of hemoglobin," says Punch. "If we can know the shape of proteins like hemoglobin, we can manipulate their structures or interrupt their functions."

The algorithm is significant to the computing field as well. Computer scientists hope to understand the atomic arrangements of the nanotubes used in quantum computing so they can manipulate and expand the uses of these structures. "There are numerous applications for this algorithm," says Punch. "It's a very exciting field." For more information on non-crystalline structural determination, visit *Nature's* Web site at [www.nature.com](http://www.nature.com).



*William Punch, associate professor, worked with an interdisciplinary team of scientists to find a way to characterize the structure of non-crystalline matter.*

## Chair's Message



*Left to right: Betty Cheng, professor; Laura Dillon, professor and chairperson; and Mary Jean Harrold, professor, College of Computing, Georgia Institute of Technology in front of the Oriental Pearl in the PuDong Development Zone in Shanghai, China.*

This afternoon finds me in the city of Shanghai—the “pearl of the orient”—sitting in a sixteenth-floor hotel room in the PuDong Development Zone, enjoying a view of the Bund and the Huangpo River, only a stone’s throw from the Oriental Pearl TV tower. Tomorrow, I join over a thousand computer scientists representing 38 countries to engage in focused discussions of the latest “pearls” of software engineering research and practice. This city—where the east meets the west—is a fitting location for a premier meeting to foster the integration of software engineering research and practice across all the countries of the world. In the last decade, Shanghai has emerged as a key player in the world economy—due in no small part to embracing

opportunities stemming from the ongoing “IT revolution.”

The timing of this theme of emergence is ideal for those of us in academia. Fall marks the end of one academic year and the beginning of another. It’s a time when we evaluate accomplishments of the old year and set goals for the new one. Gathering with our colleagues from around the world to discuss research, invention, and discovery, we exchange ideas and set collective and individual objectives for the future. We come away inspired with energy and new strategies for the coming year.

This then is the context for my message. Inclined at the moment to look ahead with anticipation, I am pulled back momentarily to reflect on the accomplishments of the year just done. In this issue of *CSE Pipeline*, you will find ample evidence that 2005-2006 was a full and productive year for faculty, students, staff, and alumni. Integrating our research with the work of other disciplines has propelled us—and our colleagues—forward in our common endeavors concerning the vital issues that affect our daily lives. Collaborative strength is at the forefront of this issue, which highlights interdisciplinary investigations leading to new technological breakthroughs, and the expertise and outstanding service our students and alumni have demonstrated to the community. The past year has seen the ongoing advancement of our own “pearls”—the department’s solid research and academic programs. Building on the momentum of past success, we look forward to another fruitful year of research and education. Thanks to all of the department’s faculty, staff, students, alumni, and friends for their continued hard work and support.

~ Laura Dillon

Professor and Chairperson

Department of Computer Science and Engineering

## Cyber Cops: Microsoft and Enbody Work for a Safer Online Community

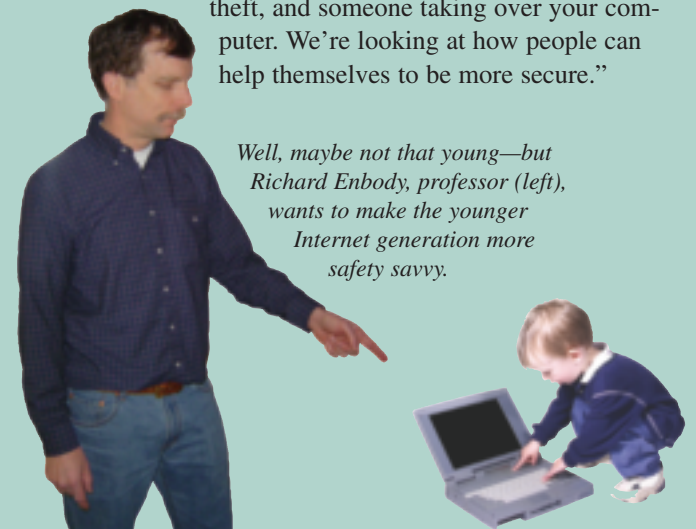
If Richard Enbody has his way, your kids will know even more about the Internet—namely how to use it safely. Enbody, associate professor; Robert Larose, telecommunications professor; and Nora Rifon, advertising associate professor, were recently given a \$50,000 gift from the Microsoft Corporation to develop an Internet safety curriculum for school-age children. The course content is aimed at high-school kids and attempts to give them the skills necessary to protect their hard drives, finances, and identities in a cyber world fraught with virtual crime.

“There’s a whole, very well-established underground market for buying and selling identities, viruses, and spy ware,” says Enbody. “We need to know how we can help people keep themselves safe on the Internet.”

Results of a previous NSF-funded study suggested that Internet users were more likely to take safety precautions—like buying and maintaining virus software—if they felt confident they had the computer skills necessary to do it properly. This result led Enbody, Larose, and Rifon to hypothesize that safety courses were needed for younger users to help them gain confidence in their abilities at an early age. “If skill level is important, then we want to figure out how young we need to start giving them the tools necessary to protect themselves,” says Enbody. “It’s apparent that online safety problems can’t be solved with technology alone. Whenever we’re talking about security issues, we have to consider the user as well.”

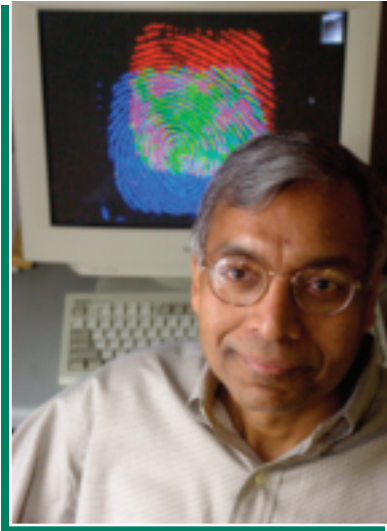
The gift was given as part of Microsoft’s Trustworthy Computing Curriculum Program. This program was set up through Microsoft Research and funds a variety of projects to create, test, and disseminate new curricula introducing the fundamentals of trustworthy computing. “Microsoft recognizes that people are pretty clearly not safe on the Internet,”

says Enbody. “There’s identity theft, fraud, real theft, and someone taking over your computer. We’re looking at how people can help themselves to be more secure.”



*Well, maybe not that young—but Richard Enbody, professor (left), wants to make the younger Internet generation more safety savvy.*

# Who Are You? Jain Looks at the Many Faces of Biometrics



Anil Jain, University Distinguished Professor (Photo courtesy of Greg Kohuth, MSU public relations photographer.)

Two things are certain about biometrics: It is the hot buzzword in identity management for convenience and protection from terrorists and identity thieves—and it's not foolproof. Anil Jain, University Distinguished Professor, says the wizardry world of identifying people by unique physical characteristics—fingerprints, the landscape of the iris, the digitized appearance and structure of the face—is filled with promise. But science still has work to do to deliver technology that

meets the demands brought by threats of terrorism and identity theft.

"The advantages of biometrics are that it is based on who you are as opposed to what you have and what you know, such as ID cards or passwords," Jain said at the American Association for the Advancement of Science annual meeting session on "Strengthening the Scientific Basis of Biometric Identification and Authentication." "Biometrics is not necessarily proposed to replace the existing methods of identification, but to strengthen them. Having said that, there are always practical problems in deployment."

Jain says that science is developing better sensors to gather the data that pinpoint an individual's identity, and that science also has an opportunity to manage expectations and improve accuracy rates. Biometrics has leaped from the world of fingerprinting criminals on blotters to the world of high-tech scanners which are popping up at airports and grocery store cash registers. And it's not just fingers—the iris of the eye also holds unique, and highly accurate, identifying traits. Even faces—susceptible as they can be to age, weight, and fashion—are succumbing to the algorithms and data fusion that science offers.

The precision of biometrics is impressive. While the performance depends on the testing protocol and environmental conditions, it can exceed 99 percent accuracy. Yet Jain notes that as the technology becomes more pervasive, even small margins of error can have consequences that range from inconvenient and embarrassing to tragic. One highly publicized example is the case of Brandon Mayfield, a Portland, Oregon, U.S. citizen

held for two weeks as a suspect in the Madrid train bombings in 2004. The FBI fingerprint system matched prints at the scene to Mayfield, and an independent examiner verified the match. But Spanish National Police examiners eventually identified another man who matched the prints. The FBI acknowledged the error and Mayfield was released.

Jain identifies four areas of scientific emphasis in the development of biometrics:

**Building better sensors.** Jain notes that many of the problems with biometrics come because the scans are noisy and distorted. Fingerprints, for example, can be smudged or hard to read. Even new digital readers have downfalls. The act of pressing a finger to a glass plate can leave a residue that can be copied, allowing a fake finger to be made that can become a key to access. Jain says that already better sensors are being developed that can differentiate between a live finger and a fake one. New methods are also being developed to gather fingerprint information below the skin surface, charting even pores.

**Improving image quality.** As a way of better using current data, researchers are working on ways to sharpen existing scans and improve the millions of prints in the legacy databases.

**Combining biometric traits to improve accuracy.** Some applications may demand fingerprints and iris scans and facial identification—for added security, or simply for convenience. For example, in a cold climate, it may be preferable to offer an iris scan at times when users don't want to have to remove gloves. Jain says it will be increasingly important to customize methods to meet different needs.

**Better testing.** It will become more important to understand performance on a large scale and what that will mean for actual deployments. Jain points out that even a one percent failure rate of false positives and false negatives could be disastrous if used at a major airport with high volume traffic. As commercial uses become more popular, Jain says science will have a greater role not only in improving biometrics, but also accurately representing the strengths and weaknesses of systems.

"Until recently vendors were providing the performance data, but numbers were not realistic," says Jain. "In the field of biometrics the academic community has started playing a role only recently. Vendors don't always have the best interests of science at heart, but are more interested in selling the system and making a profit. Scientists have to tell the honest story and provide realistic performance forecasts—and explain that it is not foolproof—that it is not foolproof no matter what people say."

~ Sue Nichols, University Relations Senior Communications Manager for Science and Research



# Faculty and Staff Pipeline

## Cheng, Zhang Receive Distinguished Paper Award

Betty Cheng, professor, and PhD student Ji Zhang earned one of only two Distinguished Paper Awards presented at the 2006 International Conference on Software Engineering held in May in Shanghai, China. Their paper was titled “Model-Based Development of Dynamically Adaptive Software.”

## Jain Receives Withrow Distinguished Senior Scholar Award



Anil Jain

Anil Jain, University Distinguished Professor, received the Withrow Distinguished Senior Scholar Award at the annual College of Engineering Awards Luncheon Thursday, March 30. He is a renowned researcher in pattern recognition who has applied his work to a number of application domains including medical image analysis, image database retrieval, remote sensing, fingerprint matching, and industrial inspection. Jain has received six U.S. patents for fingerprint-matching technology, which have been transferred to IBM.

He has published over 500 research articles and has received multiple best paper awards and certificates of outstanding contribution from the Pattern Recognition Society. Jain’s paper on feature extraction received the 1996 Institute of Electrical and Electronics Engineers (IEEE) Trans Neural Networks Outstanding Paper Award. He has also published several books—including two works that have become standard references in the field, *Algorithms for Clustering Data*, Prentice Hall, 1988; and *BIOMETRICS: Personal Identification in Networked Society*, Kluwer, 1999. His *Handbook of Fingerprint Recognition*, Springer, 2003, is one of the most comprehensive books published on this topic. Jain was also recently appointed as an associate editor of the new Association for Computing Machinery journal, *ACM Transactions on Knowledge Discovery from Data*.

Jain is a Fellow of the IEEE, the International Association of Pattern Recognition, the American Association for the Advancement of Science (AAAS), and the International Society for Optical Engineering. He currently serves on two National Academies study panels. Jain’s recent presentations include addresses at the National Academies on Forensic Science and the AAAS.

## Ofria Receives Withrow Distinguished Junior Scholar Award



Charles Ofria

Charles Ofria, assistant professor, received the Withrow Distinguished Junior Scholar Award at the College of Engineering Awards Luncheon Thursday, March 30. Ofria is internationally recognized for his unique research at the interface of computer science and evolutionary biology. He developed the *Avida Digital Evolution Research Platform* where self-replicating “digital organisms” evolve by natural selection in response to simulated environmental pressures. The platform allows

researchers to experimentally study evolutionary processes and apply what they learn to computational problems. Ofria’s Avida software is used by more than two dozen research groups worldwide, and is downloaded approximately one thousand times per month.

In addition to receiving significant attention from the popular press, Ofria has also been published in each of the top four interdisciplinary research journals: *Nature*, *Science*, the *Proceedings of the National Academy of Science*, and the *Proceedings of the Royal Society of London*. His research was featured in the cover story of the February 2005 issue of *Discover Magazine*.

## Stirewalt Receives Withrow Teaching Excellence Award

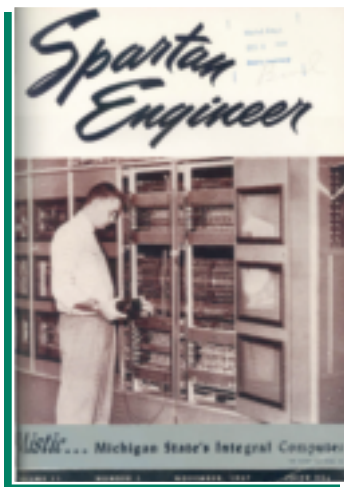


Kurt Stirewalt

Kurt Stirewalt, associate professor, received the Withrow Teaching Excellence Award at the annual College of Engineering Awards Luncheon Thursday, March 30. He is a dedicated instructor and mentor who teaches undergraduate programming courses and undergraduate- and graduate-level software engineering courses with a contagious enthusiasm. His outstanding command of the subject matter allows him to provide discerning and clear explanations,

despite the complexity of the topics. Stirewalt’s class assignments are carefully planned to help students build strong portfolios. According to one student, “Dr. Stirewalt is a brilliant teacher. His lectures are well-organized, insightful, and useful. In class, he’s able to understand your questions and provide good answers.”

## Reid recognized as MSURA Volunteer of the Year



Richard Reid, professor emeritus, shown here in a November 1957 photograph with the MISTIC, MSU's first computer, was given the MSURA Volunteer of the Year Award.

Richard Reid, professor emeritus and CSE founding chairperson, was named the 2006 MSU Retirees Association (MSURA) Volunteer of the Year. Reid modernized the association's computer system and has been instrumental in helping the MSURA keep track of its members by implementing new mailing procedures and updating mailing lists.

Reid came to MSU in 1956 as an electrical engineering PhD student and instructor.

Over the next 43 years,

he was active in advancing the university's computing capabilities and enhancing the quality of undergraduate education in computer science. In addition to being a founding member of the Department of Computer Science and Engineering and serving as the department's first chairperson, he helped design and build MISTIC, the university's first computer. He coached the MSU Association for Computing Machinery Programming team for nearly two decades and received the CSE department's first College of Engineering Withrow Teaching Excellence Award. Reid retired in 1999 and continues to serve MSU as an active member of both the MSURA and the MSU Faculty Emeriti Association.

## Satish Udpa Named College of Engineering Dean



Satish Udpa

As we went to press, Satish Udpa, acting dean of the College of the Engineering for the past year, was approved by the MSU Board of Trustees to permanently fill the dean position. Please visit the MSU University Relations Web site at <http://newsroom.msu.edu/site/indexer/2816/content.htm> for more information.

# From Vacation Photos to X-Rays: Jin Hopes "Learning" Computers Can Help Sort Chaos, Diagnose Disease

If you've ever waded through thousands of personal photos looking for that one vacation shot of the kids from 1985, then you understand the value of Rong Jin's research. As part of an interagency group funded by Intel, Jin, assistant professor, is working on software that can use abstract text queries to search enormous databases of digital images quickly and accurately.

The project grew out of demand from businesses, medical facilities, and government agencies that deal with massive stores of non-indexed, complex digital images, but lack a way to sort and search for critical information. "We want the user to be able to type in a description of an image and have the computer locate that image from millions of possibilities," says Jin. "This means that we have to teach the computer what things—like a bridge or a child—look like. That's a massive effort."

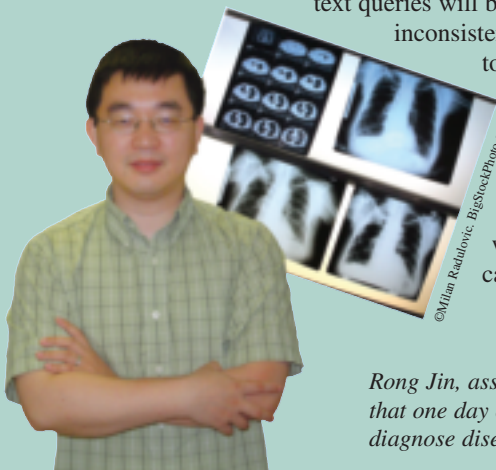
To get around writing an infinite and complex set of software instructions, Jin is using the concept of semi-supervised learning. He and his fellow researchers will write a set of simple, broad instructions, teaching the computer how to bridge the heterogeneity between images and text questions. Then, through interaction with the user, the computer will learn how to associate different text queries with picture attributes.

According to Jin, the program will learn over time what users want when they type in a certain description. "Let's say that the user wants the image of a sunset and a bridge. The computer can use its broad understanding of those concepts to present a variety of choices. The user picks the photo he was looking for, and the computer says, 'Okay, that's what a sunset and a bridge look like.' Then, the next time that query comes up, the computer has a better idea what to look for."

While the average person with a large photo collection would love to have this capability, Jin's research is focused on more critical applications. As part of the Intel "Interactive Exploration of Non-indexed Data" project, Jin is working with radiologists to help computers diagnose disease. "At the end of the day, we would like computers to examine x-rays and associate those patterns with previous, similar images," says Jin. "Then the computer can lay out possible candidate diseases for the physician and he or she can say, 'The computer is recognizing similar patterns between this patient's x-rays and the images from a patient who had lung cancer; we should consider this possibility.'"

The development of this technology hinges on enabling the system to draw inference from uncertain inputs. "Because it's human input, the text queries will be presented in a variety of inconsistent ways," says Jin. "We need

to help the computer develop uncertainty artificial intelligence—to make it think like a human in the face of vague and subjective inputs. Then we can see what this technology is really capable of."



Rong Jin, assistant professor, and Intel think that one day computers can help doctors diagnose disease.

# \$1 Million Endowed Scholarship Program Established



*James R. Von Ehr, II*

James R. Von Ehr II, a 1972 computer science graduate and entrepreneur, has established the James Von Ehr Scholars Program, a \$1 million endowed scholarship fund to benefit College of Engineering undergraduates.

Von Ehr, who has long demonstrated his commitment to MSU and the college through service and philanthropy, made the official

announcement at the College of Engineering commencement ceremonies on Sunday, May 7.

“In creating this scholarship, my intention is to provide financial assistance to outstanding undergraduate students who come from humble backgrounds, as I did,” he says.

Born in Grand Rapids and raised in New Buffalo, Michigan, Von Ehr was first recruited to MSU as a National Merit Scholar and studied computer science in the era of punch cards and paper printouts. He says the immensity of MSU was quite an eye opener when he arrived as a freshman. Of Brody Complex, his first MSU residence, he says, “I was surrounded by the same number of people as the population of my hometown, but they were all my age!

“The education I got here at MSU made a big difference in my life. I want to extend some of the same opportunity that I have enjoyed to those who come after me.”

This spring, four freshmen were selected to each receive a \$4,000 scholarship for fall semester 2006. Qualified prospective students—those scoring in the 90th percentile and above on national placement exams and who have a proven financial need—were invited to apply for the scholarships, which are renewable for four years. Incoming freshman applicants were required to write a brief essay that described their idea of the meaning of “free enterprise,” “liberty,” and “open world markets,” and relate how these principles help to promote creativity and the transmission of technological benefits to different world cultures and society in general.

“Von Ehr Scholars should become good communicators, because technology should be the servant of humanity, and communication is vital to society’s understanding and acceptance of technology,” says Von Ehr.

For more than 20 years, Von Ehr has made significant contributions to the computer software and nanotechnology industries.

After completing his bachelor’s degree, he was employed by Texas Instruments (TI) as a software engineer, programming computer graphics in the company’s computer-aided design division. Later, he was a manager and senior member of the technical staff. In 1981, he earned his MS degree in mathematical sciences (computer science) from the University of Texas at Dallas. He then founded his first company, Altsys Corporation—the developer of *FreeHand* and *Fontographer* software programs—and served as CEO and chairman from 1984 to 1995. He then sold the company to Macromedia, where he was subsequently a vice president and served on the board of directors.

His current interest is in the developing field of nanotechnology. He is the founder, chairman, and chief executive officer of Zyvex Corporation, a leading nanotechnology company located in Richardson, Texas. He is widely considered to be a nanotechnology pioneer and is regarded as an industry leader in that field. He has delivered more than 100 invited talks to well over 10,000 people worldwide and has six patents in software and nanotechnology. He was also instrumental in the passage of the 21st Century Nanotechnology Research and Development Act, which authorized \$3.7 billion for research and development programs for four years, and he was present in the Oval Office when President George W. Bush signed the bill into law.

In addition, Von Ehr has been a long-time supporter of the College of Engineering, particularly the Department of Computer Science and Engineering (CSE). He served on the college Alumni Board and on the CSE Board of Visitors/Strategic Partners Council. He is presently a college campaign consultant for The Campaign for MSU.

In recognition of his many achievements, he received the MSU Distinguished Alumni Award in 2004. In 2006, he received both the Computer Science and Engineering Distinguished Alumni Award and the Claud R. Erickson Distinguished Alumnus Award in the College of Engineering. He was named Ernst & Young Entrepreneur of the Year in 2003, and was awarded the City of Richardson’s Ernest Randall Award for Economic Development in 2004.

“My hope is that Von Ehr scholars will become leaders and pathfinders who improve the world by building links from technology to society by their entrepreneurial action,” he says. “I also hope, and expect, that my example leads them to give back to the next generation of MSU students and to the greater communities in which the scholars operate.”



# in College of Engineering

“Our college and our community have already benefited tremendously from Jim Von Ehr’s ongoing dedication and support. He is a remarkable alumnus,” says Satish Udpa, dean of the College of Engineering. “Now, this generous contribution comes at a time when recruitment of outstanding students to the fields of engineering and science couldn’t be more critical for our state and our nation. The Von Ehr Scholars Program will enable some of the top students in the country—many of whom may otherwise be unable to attend MSU—to achieve their dreams of becoming engineers.”

Tom Wolff, associate dean for undergraduate studies, adds, “Students in the top ten percent of the nation’s graduating seniors are widely recruited by many, many schools. The size of these scholarships will give the MSU College of Engineering significantly more capability to attract students of this caliber to MSU.”

“And one of my wishes,” says Von Ehr, “is that all Von Ehr scholars will enjoy the fellowship and intellectual challenge of each other while on campus.”

To that end, each fall, all Von Ehr scholars will gather to meet each other, to network, and to select from voluntary service projects that serve the college, the community, or the engineering profession. There will be additional opportunities each semester for the recipients to interact with one another and meet with college administrators, faculty, and special visitors. A reception and dinner will also be held annually on campus to honor the new recipients of the scholarships.

Designating the fund as an endowment means that the principal of the gift will be invested and only a portion of the investment earnings will be spent annually to distribute the awards. This allows the fund to be reinvested for growth and eventually helps many more students over time, as opposed to an expendable fund, which is depleted once the original gift is spent.

“I am very grateful for the opportunities that I have had in life,” Von Ehr says. “I benefited greatly from being born in the United States, where our unique mix of free enterprise and liberty offers residents the opportunity and freedom to achieve our human potential. I hope that this gift, this program, and the Von Ehr scholars themselves will always promote the ideals of human advancement through the enabling factors of individual liberty, free markets, and the rule of law—not only in this country, but around the world.”

~Laura Luptowski-Seeley

## Auto-Owners Insurance Recognizes Partnership with CSE 498 Capstone Course



*Left to right: Wayne Dyksen, Bob Buchanan, and Laura Dillon*

In recognition of the value of their partnership with the CSE Capstone Course, Michigan-based Auto-Owners Insurance presented Wayne Dyksen, professor and capstone course instructor, with a gift of \$2,000 to support CSE 498.

Bob Buchanan, Auto-Owners Insurance senior vice president of application development, offered a letter and check to Dyksen at the start of class on Monday, February 6.

As part of the collaborative design course, teams of students pair up with industry representatives to develop a comprehensive software and/or hardware solution to a problem presented by the client. Auto-Owners, one of the largest property and casualty insurance companies in Michigan, has been involved with the course for three semesters.

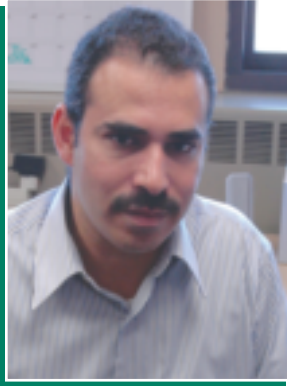
“One of the major reasons we are doing this is the excellent candidates that we have been able to interview and hire,” Buchanan says. Auto-Owners has hired 17 of the department’s graduating seniors since spring 2005, and the Fortune 500 company hopes to attract more candidates through its partnership with the capstone course. Dyksen explains that Auto-Owners was not successful in recruiting MSU computer science graduates prior to becoming a capstone course client.

The collaborative design course is one aspect of the department’s dedication to providing students with high-quality instruction and hands-on learning while strengthening ties to the community. “The Department of Computer Science and Engineering is committed to workforce development in IT both regionally and statewide,” says Dyksen. “During the past two academic years, I have aggressively recruited Michigan-based companies including Auto-Owners Insurance, Channel Vantage, DaimlerChrysler, Ford, Image Space, TechSmith, TWO MEN AND A TRUCK, and Universal Map.”

Laura Dillon, professor and department chairperson, notes that the collaborative design class is a mutually-beneficial experience for students and clients. “Capstone course projects afford outstanding corporate experiences for our students while providing significant visibility at MSU for our corporate clients.”

~ Kimberly Thompson

# Help Not Wanted: Abujarad Keeps Criminals Out of Long-Term Care Facilities



*Fuad Abujarad, PhD student, was part of a state initiative to safeguard residents in Michigan's long-term care facilities.*

Computer science and engineering PhD student Fuad Abujarad doesn't consider himself a hero, but senior and disabled residents in long-term care facilities around the nation might. Abujarad was part of a federally-sponsored program to design a background-check system to screen caregivers for the nation's most vulnerable population—elderly, mentally impaired, and physically handicapped patients. Until recently, not all employers in Michigan's long-term care settings were required to investigate the backgrounds of their employees. Moreover, employers did not have easy access to state- and national-level criminal databases. This meant that a convict from another state could easily gain employment in Michigan—and care-facility managers would never be aware of past offenses.

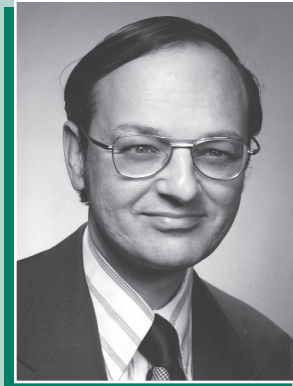
That started to change in 2004 when the Michigan Departments of Community Health and Human Services joined with Governor Jennifer Granholm and a group of bipartisan legislators to develop a computer system to afford employers easy access to multiple state and federal criminal registries. Enter Abujarad and his team of computer programmers—CSE alums Thi Nguyen (BS '05) and Ee Foong Lee (BS '05), and CSE undergraduate student Sonny Gupta.

Working with Robert Fulk, chief technology officer in the MSU College of Communication Arts and Sciences, the group built a front-end system that queries multiple state and federal registries for criminal infractions that would have been missed in a single-database search. The prototype for the system went live March 1 of this year as part of a seven-state pilot program. Alaska, Idaho, Illinois, Michigan, Nevada, New Mexico, and Wisconsin all participated in the study. The outcome of the program is being closely monitored by the federal government—who is requiring all 50 states to have similar procedures in place within the next three years.

The new background-check system currently queries five databases including the Health and Human Services Medicare/Medicaid Exclusion List, Public Sex Offender Registry, and Offender Tracking Information System. "The measure of a good society is how it treats the elderly population," says Lori Ann Post, communication arts and sciences assistant dean for research and primary investigator on the project. "We are going to make the world safer for vulnerable people."

The new computer system allowed Governor Granholm to sign legislation requiring state and federal background checks on all long-term care employees who have direct access to elderly and disabled patients. The new laws define institutional responsibilities and outline criminal acts that bar facility applicants from employment. Disqualifying offenses include criminal sexual conduct, assault, neglect, and weapons charges. Abujarad says he was honored to be part of this project, "This is important. We need to do this for people who trust others with their lives."

# A "Pattern" of Giving in Memory of a Respected Professor



*Richard Dubes*

A highly esteemed and beloved member of the computer science and engineering faculty, Richard Dubes was internationally renowned for his research in pattern recognition and revered across the MSU campus for excellence in the classroom. Twelve years after his death, former students, col-

leagues, and friends continue to feel the impact he made on their lives.

As a way of perpetuating Dubes's commitment to his students and passion for his research, Anil Jain, University Distinguished Professor of Computer Science, recently initiated the creation of the Richard C. Dubes Endowed Scholarship/Fellowship Fund. This endowed fund is intended to support deserving undergraduate and graduate students who are pursuing a degree in computer science and engineering, with preference given to students who are affiliated with the Pattern Recognition and Image Processing (PRIP) Laboratory and/or who have an interest in the areas of pattern recognition, image processing, and computer vision.

This endowment went from concept to reality in a short period of time. After pledging \$5,000 of his own in August 2005, Jain sent an e-mail to several of Dubes's and his own former students and colleagues, as well as friends of the Department of Computer Science and Engineering, encouraging each to make a contribution in memory of Dubes. Over a two-week period, \$200,000 was pledged by 87 donors, most of whom made their gifts online.

The College of Engineering invites alumni and friends to support endowments such as this. For information on how to contribute to the Dubes endowment, to request a list of other endowments for which you may provide support, or to explore the possibility of creating an endowment of your own, please contact the engineering development office at (517) 355-8339, or [egrdevel@egr.msu.edu](mailto:egrdevel@egr.msu.edu).

~ Bobbi Burns  
Engineering Development



# Contributors to the Richard Dubes Endowment

## Gifts received by College of Engineering Development as of June 21, 2006.

Dr. Reddiar S. Anbalagan  
Eric Backer  
Dr. Thomas A. and Mrs. Nyla J. Bailey  
Philippe Ballard  
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# Student Pipeline

## 2006 Academic and Service Recognition Award Winners

Congratulations to the students from the department who were recognized for academic excellence and service to the community during the 2006 College of Engineering Student Awards Reception April 6 in the engineering auditorium. This year's award recipients included:

**Outstanding Graduate Student Award:** Dirk Joel Colbry

**Service Award:** James Adam Pita

**2005 – 2006 Ambassador:** Keith Brian Barber

**Undergraduate Academic Awards:** Keith Brian Barber, Michael Roy DaPra, Brian James Hasselbeck, Andrew Scott Kreling, Alexander Christopher Kuhn, Mathew William Newman, James Adam Pita, and Robert David Walsh

## 2006 Poster Workshop Winners

The 2006 CSE Poster Workshop took place on Friday, April 21. Forty-four groups of student researchers displayed their posters in the third floor hallways of the Engineering Building and explained their work as part of a 10-year tradition that promotes recognition of student research. This year's winners were:

### Presentation:

**First Place:** Hong Chen and Carol Novak (Adviser: Anil K. Jain, University Distinguished Professor) "Automatic Analysis of Hand and Dental Radiographs Using Fast Marching Methods"

**Second Place:** Yi Chen and Meltem Demirkus (Adviser: Anil K. Jain, University Distinguished Professor) "Fingerprint Matching Using Level 3 Features"

**Third Place:** Samah Fodeh (Adviser: Pang-Ning Tan, assistant professor) "Mining Patterns and Linkages in Medical Data"

**Fourth Place:** Farshad A. Samimi and Zhinan Zhou (Adviser: Philip McKinley, professor) "Mobile Service Clouds: An Autonomic Infrastructure for Pervasive Mobile Computing"

### Research:

**First Place:** Meltem Demirkus (Adviser: Anil K. Jain, University Distinguished Professor) "Multispectral Fingerprint Imaging"

**Second Place:** Charles Otto and Dirk Colbry (Adviser: George Stockman, professor) "High Performance Three-Dimensional Face Recognition"

**Third Place:** Brian D. Connelly (Adviser: Li Xiao, assistant professor) "Adaptively Routing P2P Queries Using Association Analysis"

**Fourth Place:** Hamed Valizadegan (Adviser: Pang-Ning Tan, assistant professor) "Prototype-Driven Classification of Data Streams"

### Overall:

**First Place:** Borzoo Bonakdarpour (Adviser: Sandeep Kulkarni, assistant professor) "Automated Revision of Existing

Real-Time Programs"

**Second Place:** Sascha Konrad (Adviser: Betty Cheng, professor) "Model-driven Development and Analysis of High Assurance Systems"

**Third Place:** Gregory Roger Brown, Heather Goldsby, and Ji Zhang (Adviser: Betty Cheng, professor) "Goal-driven Modeling of Adaptation Semantics"

**Fourth Place:** Kanthakumar Pongaliur (Adviser: Li Xiao, assistant professor) "Maintaining Functional Module Integrity in Sensor Networks"

## CSE Students Participate in Google Workshop



*Seven CSE students were selected to participate in Google's workshop for women engineers.*

Seven CSE students participated in the 2006 Google Workshop for Women Engineers at Google headquarters in Mountain View, California. Students received an all-expense-paid trip from Google, explored new technology and potential career opportunities, and met with other women engineers in their field. Workshop participants were selected from a highly competitive pool of applicants nationwide. These exceptional students had to demonstrate strong leadership skills, campus and community involvement, and unique and inspiring career plans and goals.

They were also required to maintain a minimum 3.5 grade point average. Attendees included Randee Bierlein, Niharika Joglekar (BS '05), Kira Johns, Xiaomei Liu, April Noren, Kirsten Partyka, and Mahnaz Shafii.

## Bierlein Receives Outstanding Senior Award



*Randee Bierlein*

Randee Bierlein received the Outstanding Senior in Computer Science Award from the Society of Women Engineers and Ford Motor Company at the Women in Engineering Awards Banquet on February 2. She has been on the Dean's List for seven semesters, garnering multiple scholarships for academic excellence and involvement in the computer science community. Bierlein acted as the student representative on the CSE Undergraduate

Curriculum Committee and worked as a volunteer at MSU Science Engineering and Technology Day. She is a founding member of MSU Women in Computing and served as the group's president through June of 2006.

## Antonuk Wins IBM Race to “Master the Mainframe”

Alan Antonuk, CSE and physics senior, was one of only five students nationwide to complete the IBM race to “Master the Mainframe.” The Ann Arbor native participated in the IBM



Alan Antonuk

Academic Initiative program that challenged students to understand, trouble shoot, and complete 18 tasks of increasing difficulty on an IBM mainframe computer. The contest was specifically designed to challenge the skills of

even the most experienced mainframe programmer—and 695 of the original contestants were unable to complete the requirements.

“It was difficult, to be sure,” says Antonuk. “I spent about a week and a half on it over the winter break, but I saw that they were offering a laptop computer—what more could a computer science major want?”

Antonuk and the four other winners were flown to Poughkeepsie, New York, to collect their prizes and meet with the IBM Academic Initiative Coordinator, Michael Todd. Recruiters from Citibank and IBM also attended the event. For more information on the IBM Academic Initiative, visit their Web site at <http://www.304.ibm.com/jct09002c/university/scholars/>.

## Alumni Pipeline



Paul Albee

**Paul Albee** (PhD '04) and **Laura Campbell** (PhD '04) shared their knowledge and expertise at the recent MSU Women in Computing (WIC) Hardware Workshop. The two faculty members in the Computer Science Department at Central Michigan University returned to East Lansing over the weekend to assist with a workshop that went beyond disassembling

machines and identifying parts. Participants looked at the differences in PC construction and explored other forms of hardware technology, including cell phones and small robots. Albee and Campbell answered questions, provided background on the history of hardware components, and facilitated an animated discussion about computer forensics.



Laura Campbell

**Charles Severance** (BS '84, MS '90, PhD '96) was named executive director of the Sakai Foundation Board during the Sakai Foundation 2006 conference in Vancouver, British Columbia. Severance, who is a software architect and high-performance computing researcher at the University of Michigan, has served on the organization's board since its inception. The Sakai Project, announced in January 2004, promised to develop

an open-source collaboration and learning environment for the needs of higher education. The Sakai software is already deployed as the primary teaching and learning system at the University of Michigan with over 35,000 users. Major pilot projects and rollouts are underway at Stanford University; University of California, Berkeley; Massachusetts Institute of Technology; Rutgers University; Yale University; University of California, Merced; University of South Africa; Universitat de Lleida in Spain; Roskilde Universitetscenter in Denmark; and Universidade Fernando Pessoa in Portugal. For more information on the Sakai Foundation, visit [SakaiProject.org](http://SakaiProject.org).

**Patrick J. Flynn** (BS, Elec. Egr. '85; MS, Comp. Sci. Egr. '86; PhD, Comp. Sci. Egr. '90) is a professor in Notre Dame's Department of Computer Science and Engineering with a concurrent position as professor of electrical engineering. His research involves computer vision, biometric applications of signal and image processing, 3D sensing and modeling, and medical imaging. Flynn is a member of the MSU CSE Strategic Partners Council.



Patrick J. Flynn

**Jason Dennis Watson** (BS '03) is a research engineer with Oasis Advanced Engineering, Inc., in Auburn Hills, Michigan. He married Kimberly Star Cardwell (BS, Human Biology, '04) on August 12, 2005 and plans to receive his master's in computer science from Oakland University in May 2007.



**MSU DEPARTMENT OF  
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