configurations

A Newsletter of the Department of Computer Science and Engineering at the University of Notre Dame

Notre Dame Programming Team Places Ninth of 140

The Association for Computing Machinery (ACM) programming contest, which began in 1970 at Texas A & M University to encourage students in the field of computer science, has grown to become a major international event. According to contest guidelines, the University of Notre Dame is part of the East Central Region, which consists of Indiana, Ohio, Michigan, western Pennsylvania, and eastern Ontario, Canada. The Department of Computer Science and Engineering sent two teams to the 2005 contest.

During the contest, each three-person team is asked to solve eight complex, real-world problems. Each team is given a computer, a problem statement, example test data, and five hours to solve the problems. The team that solves the most problems in the least amount of time wins.

Senior **Andy Magee,** junior **Jeff Smith,** and sophomore **Dan Dugovich** were the *Irish Blue.* Their team finished ninth — the top 6 percent — out of 140 teams participating in this year's regional. This is the highest Notre Dame finish since 1999. The *Irish Gold* team — sophomores **Ben Keller** and **Pavan Sadarangani** — finished 56th, roughly the top third, though they had the disadvantage of being a two-man collaboration competing against three-member teams.

Ray Sepeta, First Year of Studies adviser, serves as faculty adviser for the Notre Dame ACM Chapter.
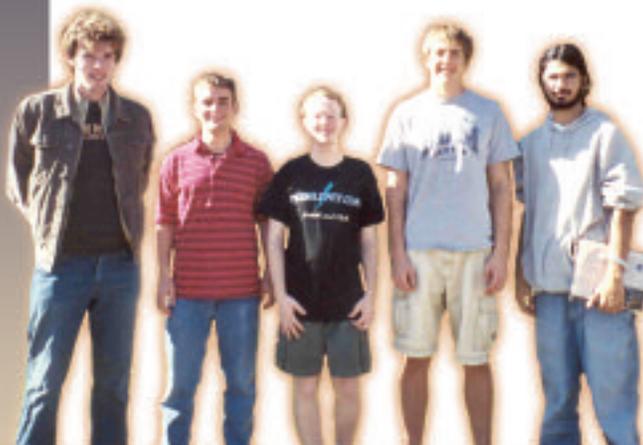
Congratulations are in order for Irish Blue — (left to right) Jeff Smith, Andy Magee, and Dan Dugovich — and Irish Gold — Ben Keller and Pavan Sadarangani. These two student teams represented the Department of Computer Science and Engineering well at the 2005 Association for Computing Machinery International Collegiate Programming Contest on November 5. Irish Blue placed ninth out of 140 teams; Irish Gold placed 56th.

HP Sponsors 2006 Design Contest

Hewlett-Packard (HP) continues to support the senior design contest in the Department of Computer Science and Engineering. During the fall semester, HP representatives **Darrin Mertz, Sandy Kovar,** and **Sieu Diep** visited the department and presented a check to support this year's design contest. The contest is held in conjunction with the senior design course, *CSE 422: Computer System Design,* taught by Assistant Professor **Aaron Striegel.** Students are typically divided into teams to work on the HP sponsored projects. Their efforts are supervised by their instructor and HP representatives. Projects have ranged from the development of covert wireless sniffing devices to simplified photohub centers for the home to caller identification systems for the disabled.

Hewlett-Packard representatives (left to right) **Sieu Diep, Darrin Mertz,** *and* **Sandy Kovar** *present a check to* **Kevin W. Bowyer,** *the Schubmehl-Prein Chair of Computer Science and Engineering, in support of the department's annual HP Design Contest.*

Department Breaks Last Year's Record Ph.D. Enrollment

In August 2005, the Department of Computer Science and Engineering admitted 20 new students to its Ph.D. program. This was a new record, topping the previous record set in August 2004. In fact, over the last four years, Ph.D. program enrollment in the department has increased approximately 50 percent.

Meurer Endowment Enables New Undergraduate Electives

The Thomas Meurer Endowment for Excellence in Computer Science has made it possible to acquire software licenses to support the offering of exciting and important new undergraduate electives. In fall 2004, *CSE 498: Technical Concepts of Visual Effects* was taught for the first time. Software licenses for the "Maya" software system were acquired for use in this course, which was taught by **Allen Hemberger.** Hemberger, who graduated from the University in 2001 with a bachelor's degree in computer engineering, has worked on special effects on two of the *Matrix* movies, *Catwoman,* and most recently, the remake of *King Kong.* This course was very popular with students. One student, **Nick Petrella,** credits the "demo reel" that he developed during the course with helping him land a job with Sony Entertainment.

The Meurer endowment also supported the acquisition of software for a new bioinformatics computing course offered in fall 2005. This course was team-taught by **Gregory R. Madey,** associate professor of computer science and engineering, and **Frank H. Collins,** the George and Winifred Clark Professor of Biological Sciences. The Department of Computer Science and Engineering was excited to be able to offer this course at the cutting edge of an interdisciplinary field.

Although **Meurer** (B.S., EE '66) received his engineering degree from Notre Dame before the Department of Computer Science and Engineering was formed, he has been heavily involved in software development throughout his career. Currently, he serves as the president of *eClassicSystems,* the latest of several companies that he has founded.

Undergraduates **Andrew Sheehan** *(left) and* **Ryan Butler** *pose in one of the labs in the Department of Biology. They are working on the computer systems in conjunction with the bioinformatics course being taught by* **Gregory R. Madey,** *associate professor of computer science and engineering, and* **Frank H. Collins,** *the George and Winifred Clark Professor of Biological Sciences.*

Essay Contest on Social Impact of Computing

The Department of Computer Science and Engineering has established the Schubmehl-Prein Prize for the Best Essay on the Social Impact of Computing. Open to high school juniors, the purpose of the competition is to encourage students to develop a deeper understanding of how computing technology impacts our society.

The competition, made possible by the Schubmehl-Prein Family Chair Endowment at the University of Notre Dame, is judged by Notre Dame's **Kevin W. Bowyer,** the Schubmehl-Prein Chair of Computer Science and Engineering, and Professor **C. Dianne Martin,** chair of the Department of Computer Science at The George Washington University. The winners of the 2005 contest were:

Jennifer Fujawa poses with her first-place award from **Kevin W. Bowyer,** *the Schubmehl-Prein Chair of Computer Science and Engineering, during a visit to campus this fall.*

Jennifer Fujawa, first place; **Amanda Woodcock,** second place; and **Patrick Kosciuk,** third.

The topic for the 2006 competition is: *Is the Computing Technology for Electronic Voting Secure and Reliable Enough for National Use?* Information on the 2006 competition can be found on the competition web site, http://www.cse.nd.edu/EssayContest/.

The endowment was established in 1989 as a gift from **H. Edward Prein** and his wife, **June,** in memory of June's father, **Raymond J. Schubmehl,** a member of the Notre Dame Engineering faculty for 50 years. Raymond Schubmehl received his bachelor's degree in engineering in 1921, and was the valedictorian of his class. During his career as a faculty member at Notre Dame, he served as professor, assistant dean, and acting dean of the College of Engineering. As a teacher, adviser, and administrator, he was an integral part of the College of Engineering's development.

Researchers Receive Grant for Wireless Phone Emergency Response System

Gregory R. Madey, associate professor of computer science and engineering, and **Albert-László Barabási,** the Emil T. Hofman Professor of Physics, received a $500,000 three-year grant from the National Science Foundation, part of the Dynamic Data Driven Applications Systems (DDDAS) program, to develop an integrated wireless phone-based emergency response system.

The goal of the project is to develop a Wireless Phone-based Emergency Response System (WIPER) that is capable of the real-time monitoring of normal social and geographical communication and activity patterns of millions of wireless phone users. Multiple distributed data collection, monitoring, analysis, simulation, and decision support modules will be developed to generate traffic forecasts and emergency alerts for engineering, public safety, and emergency response personnel. Assisting Madey and Barabási on the project is Associate Professor David Hachen, sociology.

Madey

Chawla Receives the Frontiers in Education New Faculty Fellowship

Chawla

Nitesh V. Chawla, research assistant professor, received the Frontiers in Education (FIE) New Faculty Fellowship for his paper, "Teaching Data Mining by Coalescing Theory and Applications." Chawla presented his findings during the *Innovative Courses Session* at the FIE Conference in October 2005. The fellowship was awarded to fellows, each chosen based on their conference paper, rigorous peer-review process, curriculum vitae, and letters of recommendation. As an FIE fellow, he was also required to produce a poster about his career, teaching, and research interests for display during the Focus on Exhibits session of the conference. Chawla joined the department in 2004. His research interests are in data mining, machine learning, pattern recognition, and their applications.

Thain Receives NSF CyberTrust Grant

Assistant Professor **Douglas Thain** received a Small Grant for Exploratory Research (SGER) from the National Science Foundation via the CyberTrust program. A successful SGER application is characterized by preliminary work on novel ideas or emerging research approaches that require quick response or specialized equipment.

Thain's project, entitled "Enabling Electronic Self-defense with Dynamic Identities," will develop operating systems that allow ordinary users to better protect themselves from untrusted programs by using dynamic identities. For example, in many current systems only privileged users are allowed to create new users, making it more difficult for a user to create a more restricted environment in which to "test" unfamiliar applications. A user in a system that carries a dynamic identity could create a sub-identity without interacting with the system's administrator. This will also simplify the administration of distributed systems.

Thain

Thain joined the University in 2004. His research interests are in cooperative computing, distributed computing, operating systems, file and storage systems, and grid computing.

CSE Women Engineers Hold Luncheons

Women engineers (from left to right) **Jill [Reinauer] Frank** (B.S., CSE '98), **Kathleen Otten, Virginia Ho, Megan Lussier, Shannon Morrison,** *and* **Bryn Mohan** *chat about engineering and career options during one of the Women in Engineering networking luncheons scheduled by the Department of Computer Science and Engineering. Frank works in the technical writing area at Microsoft. Another aluma,* **Brandy Hutton** *(B.S., CSE '04), who works on AIX core kernel development at IBM, participated in a second luncheon this fall.*

Alumni Present at Grand Challenge Workshop

Peter M. Kogge, the Ted H. McCourtney Professor of Computer Science and Engineering and Associate Dean for Research in the College of Engineering, and **Shekhar Y. Borkar** (M.S., EE '81) gave two of five invited talks at the Computing Research Association (CRA) Grand Research Challenges in Computer Computer Science and Engineering, December 4-7, in Aptos, Calif. The CRA conference is a series of non-traditional meetings, whose attendance which is by invitation only is limited to 50 people, where the goal is to discuss important themes and ideas yet to be met in computing research. The topic for this particular conference was "Revitalizing Computer Architecture Research." Kogge presented "Funding Trends in Computer Architecture." Borkar spoke on "Architectural Challenges in Nanoscale Technologies."

Kogge, a retired IBM fellow, graduated from the University with a B.S. in electrical engineering in 1968. His expertise is in the areas of processing-in-memory architectures, parallel processing, nanotechnologies, and low-power computer architectures. He has edited and co-edited nine books and holds numerous patents.

Borkar, an Intel Fellow, is the director of the Microprocessor Technology Lab for the Intel Corporation, where he is responsible for directing research in technologies for the company's future microprocessors. He has published more than 60 articles and holds 41 patents.

Kogge

configurations

Chen Receives Grant for Algorithms in Radiation Cancer Treatment and Medical Imaging

Professor **Danny Chen** received a three-year grant from the National Science Foundation, part of the Numeric, Symbolic, and Geometric Computation program which supports fundamental research in algorithmic and computational techniques, for his project entitled, "Computational Geometry Algorithms for Medical Problems in Radiation Therapy and Medical Imaging."

This project investigates a number of important computational geometry problems that arise in radiation therapy, medical imaging, and other applications. These problems play crucial roles in current medical research and clinical practice, especially in diagnostic imaging and radio-surgical treatment of cancers and other diseases. The project has broader impacts beyond computational geometry and computer science. New algorithmic approaches and software for computing radio-surgical plans of much better quality for cancer treatment than those used in current clinical practice will be developed. Optimal quality 3-D and 4-D medical image segmentation algorithms for various anatomical structures and their motions will be obtained, helping unite the powers of computer algorithms and modern medicine in order to improve the quality of life for patients.
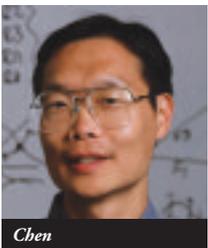
Chen

Research Group Supports Iris Challenge Evaluation

Researchers in the Computer Vision Research Laboratory, led by Professor **Patrick J. Flynn** and **Kevin W. Bowyer,** the Schubmehl-Prein Chair of Computer Science and Engineering, continue their high-visibility work in the area of biometrics. Currently, the group is providing support to two major biometrics evaluation programs sponsored by the federal government, the Face Recognition Vendor Test (FRVT) and the Iris Challenge Evaluation (ICE).

The FRVT 2006 is the latest in a series of large-scale independent evaluations for face recognition systems. One of the goals of the FRVT is to independently determine if the objectives of the Face Recognition Grand Challenge (FRGC) were achieved, specifically developing face recognition algorithms capable of performance an order of magnitude better than FRVT 2002.

The ICE is the first large-scale, open, independent technology evaluation for iris recognition. The primary goal of the ICE is to promote the development and advancement of iris recognition technology and assess its state-of-the-art capability. The Notre Dame research group has supplied image data sets and software used by the government in both FRGC and ICE.