Department Graduates 63 at 2004 Commencement Exercises

The Department of Computer Science and Engineering (CSE) graduated 63 students on Sunday, May 16, 2004. The departmental ceremony was held in the morning and attended by the graduates, their families, and CSE professors. This year’s faculty speaker, selected by the students, was Professor Ramzi Bualuan, director of undergraduate studies. The master of ceremonies was Schumehl-Prein Professor Kevin Bowyer, the department’s chair.

The departmental ceremony was organized and coordinated by seniors Kelly Deckelman and Adolfo Fabrega with help from administrative assistant Ginny Johns and graduate student (and former CSE undergraduate) Trevor Cickovski.

This year’s Outstanding CS Senior Award went to Dominic Antonelli. This year’s Outstanding CPEG Senior Award went to James Ward. Earlier in the week, Regis Rogers received the Steiner Award from the College of Engineering. Professor Ramzi Bualuan received this year’s Outstanding Teacher Award selected by the department undergraduates. Also, Professor Danny Chen received the Kaneb Award from the College of Engineering.

Among the graduates at the departmental ceremony was Ph.D. graduate Jeffrey Squyres. Squyres also received his undergraduate degree from our department a “few” years ago and, with the completion of his Ph.D., he became only the 14th “quadruple domer” in the history of Notre Dame.

Forty-nine of our graduates are planning to take a position in industry, four are pursuing a dual-degree program, seven are entering graduate school, and three are joining the military.

Congratulations to all of our 2004 graduates!
Notre Dame Charters Local Chapter of Upsilon Pi Epsilon Honor Society

by Paul Madrid

On April 29, a historic event took place for Notre Dame's computer science department when 25 students took the pledge of honor and became Notre Dame's first members of Upsilon Pi Epsilon (UPE). UPE is the first and only international honor society in the computing and information disciplines. It has received endorsements from the two largest computer organizations in the world, the Association for Computing Machinery (ACM) and the IEEE Computer Society (IEEE-CS). UPE is a member of the Association of College Honor Societies (ACHS). It was founded in 1967 at Texas A&M University, and its purposes are to recognize and promote scholarship in the computing sciences. To that end, UPE sponsors many scholarships for members and nonmembers who are pursuing CS and CPEG studies. The organization also co-sponsors the ACM intercollegiate programming competition. Its many chapters have additional duties. For example, Notre Dame's chapter, the Indiana Delta chapter, also has a goal of being involved in service to both the Notre Dame community and the greater community.

Robert Roggio, the past-president of the international association, presided over the inaugural ceremony and conferred on the chapter its charter. Nineteen undergraduates and six graduate students make up the chapter's charter class of members. They are:

William Acosta
Dominic Antonelli
Andrew Callan
Eric Cherrstrom
Trevor Cickovski
Timothy Dysart
Bryce Harward
Michael Heilman
James Kleckner

Paul Madrid
Swati Malik
Brian McRoskey
Ewa Misoieko
Brandon Moore
Matthew Nyerges
Walter Pruchnik
Jeffrey Serpas
Gautam Shewakramani

Notre Dame alumni are also eligible for membership in UPE through Notre Dame's chapter. UPE allows alumni who meet the requirements of UPE and graduated no more than three years before the founding of a chapter to gain membership in the international association. For those with a bachelor's degree from Notre Dame, the qualifications are at least a 3.0 GPA, a ranking in the top third of their major in terms of cumulative GPA, and at least 18 credit hours of computer science courses. For those with a master's degree or doctorate from Notre Dame, a 3.5 cumulative graduate GPA and an academic adviser in the Department of Computer Science and Engineering are the only requirements.

If you would like to know more about the chapter's activities or inquire about eligibility, please contact Paul Madrid, the current chapter president. His e-mail address is pmadrid@nd.edu.

Striegel to Receive NSF CAREER Award

Assistant professor Aaron Striegel has received the prestigious Faculty Early Career Development (CAREER) award from the National Science Foundation (NSF). The CAREER program recognizes and supports the early career development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. Honorees are junior faculty whose research is not only groundbreaking but also provides exceptional opportunities for students.

Striegel was recognized for his proposal titled "Transparent Bandwidth Conservation Techniques." A primary information dissemination tool, the traditional point-to-point nature of the Internet has created a trend of increasingly redundant data across the network as applications and information sources increase in both scope and scale. A wide variety of techniques have emerged to increase the efficiency of the network, but they have met with varying degrees of success. Striegel's work aims to develop novel techniques for network efficiency through transparent bandwidth conservation while avoiding many of the pitfalls associated with previous approaches. Specific facets of his work include a paradigm-shifting approach to multicast, inter-domain peering protocols for expanding the benefits of bandwidth conservation, and extensive analysis/exploitation of existing applications. Serving as a catalyst for the development of large-scale group-oriented applications, this work will have a direct impact on the efficiency of the Internet, pricing and resource management, and how applications are designed to cooperate with the underlying network.

Educational initiatives stemming from this work will include studies on classroom methodologies (grid computing, undergraduate research, and network visualization), inverted curriculum projects, and student development contests. Results of these initiatives will be conveyed to industry and academia through high-quality publications and the development of prototypes freely available via open-source.
Research Group Led by Flynn and Bowyer Studies Advanced Biometrics

In fall 2001 Professor Patrick Flynn joined the Department of Computer Science and Engineering. He came to Notre Dame from Ohio State University. That same year the University hired Kevin Bowyer as department chair. He came from the University of South Florida. Since coming to Notre Dame, these faculty members have led a research group that has attracted more than $2 million in external funding for the study of advanced biometric techniques.

A “biometric” is an aspect of an individual that can be measured and used to verify the person’s identity. Although face recognition systems have been in the news more often since the terrorist attacks of 9-11, a fingerprint is probably the best-known type of biometric. Other biometrics include the texture pattern found in a person’s iris, the shape of an individual’s hand, the properties of a person’s voice, and even the pattern and pacing of limb movement as a person walks — his or her gait. Notre Dame’s biometric research group is involved with development and evaluation efforts related to all of these various biometric measurements.

During this academic year in particular, a large number of undergraduate research assistants have worked with Flynn and Bowyer in the Computer Vision Research Laboratory (CVRL). Supported by grants from the National Science Foundation and other funding agencies, they have been involved in data acquisition, research, and development tasks. Undergraduates who worked in the CVRL during the 2003-04 academic year include Shana Blair, Andy Callan, Kevin Hess, Brandy Hutton, Erin Laird, Ryan Lichtenwalter, Paul Madrid, Kristen Pio, Tara Pio, Jeff Smith, Jared Sylvester, James Ward, Michael Wittman, and Alex Wood.

An example of one of the “high-risk/high-payoff” topics studied in the CVRL is whether or not additional weight — from a bomb or other package — changes an individual’s gait or pattern of walking. Ward and Wittman worked on this project, and they obtained some interesting initial results. In fact, at the end of the spring semester, they submitted a paper describing their work to a professional conference.

Face recognition using normal intensity images, 3-D images of the shape of a person’s face, and infra-red images of the pattern of heat radiated from a person’s face is another part of the work in advanced biometrics in the CVRL. One important focus of this research is the combination of multiple biometrics, such as mixing normal intensity images with 3-D shape images, to achieve more accurate results. One type of multi-modal technique would be the combination of infra-red imaging with visible-light imaging. The CVRL is at the forefront of multi-modal face recognition.

Similar to the study of images of the face, it is possible to recognize an individual from an image of his or her ear. CVRL researchers have published the largest experimental study dealing with ear recognition. They are also working on recognition based on the texture pattern in an image of a person’s iris and on methods of recognizing a person from 3-D images of the hand.

Doctoral candidates involved in this work include Chris Boehnen, who received his CSE undergraduate degree from Notre Dame last year, Kyong Chang, Xin Chen, Xiaomei Liu, Haoshu Wang, Damon Woodard, and Ping Yan; post-doctoral scholar Jaesik Min is also working in the CVRL. This past year Chang traveled to France to present his work at the IEEE International Workshop on Analysis and Modeling of Faces and Gestures and to Korea to present at the Automated Face and Gesture Recognition conference. Chen presented his work at the Workshop on Multi-modal User Authentication in Santa Barbara, Calif., and Woodard traveled to Prague to present his work at the Biometric Authentication Workshop. Boehnen will be spending this summer as an intern at the Sandia National Laboratories in New Mexico, where he will be studying 3-D face recognition.

I blow the whistle, the drums start playing, and 350 people run out of the tunnel into Notre Dame Stadium. It’s a typical Saturday afternoon for me during the fall. Being the drum major of the Notre Dame Band as well as being a computer science major did require a balancing act on my part. The key to not watching my GPA plummet was being efficient with my time. Being in band required several hours a day for practice and little free time on football weekends, but it will always remain a wonderful and exciting part of my Notre Dame experience. Those blissful, pre-pipelining days of my youth are behind me now, as is my time as drum major. I now look forward to the new and exciting roads ahead.

Jeff Serpas completed his undergraduate degree in computer science and graduated in the May ceremony. Prior to his life as drum major, he worked as an undergraduate research assistant in the Computer Vision Research Lab with Professors Flynn and Bowyer. Jeff is headed off to work with GE Healthcare Technologies.
From the Department Chair

As the 2003-04 academic year ends, our department can celebrate successes in several areas. In the area of undergraduate enrollment, over 50 of this year’s first-year students selected a major in our department. This is up from approximately 40 the previous year. Also, the spring semester saw us charter a local chapter of the Upsilon Pi Epsilon (UPE) Honor Society. (See the article in this newsletter.) In the area of graduate enrollment, 17 students accepted an offer of admission to our Ph.D. program for this coming August. This is our largest entering Ph.D. class to date, and at the same time average GRE scores increased over the last year. The expansion of Ph.D. program enrollment and the increasing number and variety of opportunities for undergraduate research experiences are made possible largely through our faculty members’ continued success in attracting external grant funds. We surpassed the previous year’s funding total in the first six months of this year!

— Kevin Bowyer
Schubmehl-Prein Professor and Department Chair
July 2004

HP Equipment Grant Supports Experimental Systems Lab

The Notre Dame CSE department was awarded two Itanium2 servers through the Hewlett-Packard (HP) Philanthropy & Education Grant for the purpose of strengthening our experimental systems curriculum. One important aspect of experimental systems education is the ability to involve students in hands-on experiments using modern hardware. HP will provide one quad and one dual 1.5 GHz Itanium2 server each with 8 GB of memory (valued at over $110K). These servers will complement the eight dedicated desktops available in the Experimental Systems Laboratory. Students can install and modify custom OS kernels and generally create isolated clusters of nodes for experimentation and performance evaluation purposes.

Professor Surendar Chandra explains that the primary goal is to allow experimentation on high-end servers at the pace of each student’s capabilities, striving to transition students from directed, structured projects to more open research ideas.

Chandra