Robert Szczerba was recently designated a Lockheed Martin Fellow. The Fellow designation represents the top technical level within the Lockheed Martin Corporation. Szczerba was the first from the company’s Owego, N.Y., facility to receive such an honor. He was recognized for his efforts in leading the design and development of advanced Mission Management Systems for unmanned vehicle teams (mainly unmanned rotorcraft).

Szczerba is a Triple Domer, having received his B.S., ECE, in 1990; M.S., ECE, in 1993 (when the electrical engineering and computer science and engineering programs were contained within the same department); and his Ph.D. in 1996 from the Department of Computer Science and Engineering. Professors Danny Z. Chen and John J. Uhran were co-advisors for his Ph.D. dissertation, titled “New Cell Decomposition Techniques for Planning Optimal Paths.”

After receiving his Ph.D. from Notre Dame, Szczerba performed post-doctoral research for the Jet Propulsion Laboratory under the direction of Peter M. Kogge, the Ted H. McCourtney Professor of Computer Science and Engineering and Associate Dean for Research in the College of Engineering. He has been at Lockheed Martin since 1996 and is currently the chief scientist for the Unmanned Systems Group. Szczerba lives in Endicott, N.Y., with his wife, Ellen, and newborn son, Andrew.
A paper detailing Dominic Antonelli’s undergraduate work and titled “Quantum-dot Cellular Automata Circuit Partitioning: Problem Modeling and Solutions” was presented at the 41st Design Automation Conference (DAC) held this past June in San Diego, Calif. It was co-authored by Antonelli, a 2004 computer engineering graduate; Timothy J. Dysart; Professor Danny Z. Chen; Associate Professor X. Sharon Hu; Andrew B. Kahng; Peter M. Kogge, the Ted H. McCartney Professor of Computer Science and Engineering and Associate Dean for Research in the College of Engineering; Richard C. Murphy; and Michael T. Niemier. Dysart, Murphy, Kogge, and Niemier are alumni of the University’s undergraduate program. Dysart and Murphy are currently in the department’s Ph.D. program. Niemier received his Ph.D. from Notre Dame and is currently a faculty member at Georgia Institute of Technology. Kogge received his Ph.D. at Stanford University. Antonelli joined the Ph.D. program at the University of California at Berkeley in fall 2004. Murphy presented the paper at the conference.

Student Paper
Presented at DAC

X. Sharon Hu Begins Term as Associate Editor

Associate Professor X. Sharon Hu begins a term as associate editor of the ACM Transactions on Design Automation of Electronic Systems (TODAES) in January 2005. TODAES is part of the family of journals produced by the ACM and a top journal in the rapidly changing field of design technology of electronic systems. The journal provides comprehensive coverage of innovative work concerning the specification, design, analysis, simulation, testing, and evaluation of very large-scale integrated electronic systems, emphasizing a computer science/engineering orientation. It has been published by the ACM for nine years. An associate editor is responsible for managing the peer review process for the submitted manuscripts assigned to him/her, such as identifying and securing reviewers, communicating with authors and publication offices, and making recommendations to the editor-in-chief.

Dual Majors Share Their Vision

Many of the students in the Department of Computer Science and Engineering have broad intellectual interests. Some even spend an extra year as an undergraduate in order to couple their degree in engineering with a degree in a very different area. For example, Ryan Hurd, a senior in computer science, chose a dual major in Japanese, and Rebecca Camus, also a senior in computer science, chose a dual major in theology.

According to Hurd, his interest in Japanese started when he was reviewing college requirements and the electives that were available to him. “I really wanted to take a language,” he said, “and I chose Japanese because I had an interest in Japan, its history, and its culture. I also thought that a majority of the recent technological advancements had come from Japan, so if I had some background in the language, it would make me more marketable when I was ready to enter the job market.”

After taking a year of Japanese, Hurd found it to be very interesting, as well as serving as a “little break from the engineering world.” He had already been considering spending five years as an undergraduate, and the requirements for a supplementary major in Japanese were reachable.

“Since committing to the dual major program, I have been able to do many fun things with Japanese,” he said. “Last summer, I spent two months in Hakodate, Japan, studying Japanese and living with a host family, with whom I still stay in touch. It was my first experience overseas, and it was incredible.”

“I’ve always had a passion for theology and technology,” says Camus. “I took all the science and math courses my school offered and volunteered at my church during my free time.” When she came to Notre Dame, Camus chose engineering as her major. But during her freshman year, she became fascinated with the topics discussed during the required Foundations of Theology course. “I wanted to learn more,” she says, “not just about the Liberation Theology movement in Central America — what we were studying at the time — but about Catholic social teaching and its historical and biblical roots.”

Yet she found it difficult to schedule theology courses around her engineering curriculum, which was very rigorous. “I was unwilling to sacrifice engineering for theology or theology for engineering,” Camus says, “so I decided to stay an extra year and add theology as a second major.”

Camus believes that the dual degree has made her a more well balanced person and someone who will be able to contribute more effectively not only in the work place but also in the community. She has already lined up a job with a pharmaceutical company and plans on volunteering at her local parish, helping children and teens, after she graduates.
The “PIM Lite” name refers to a “Processing-in-Memory” approach to high-performance computing. Details of the design of the “PIM Lite” chip were presented at the Workshop on Memory Performance Issues held at the International Symposium on Computer Architecture this past September.

The chip was fully functional on its first silicon, meaning roughly that there were no design errors on its first fabrication. The VLSI implementation was done mostly by a single Notre Dame graduate student, Shyam Thoziyoor.

Other graduate students who participated in the design and simulation of the architecture include Shannon Kutz, Edward Kang, and undergraduate Steven Balensiiever. SRAM macros and standard cell libraries were developed by Tanner EDA. Functional testing of the chip was performed on the TestosterIC system developed by David Harris of One Hot Logic and Harvey Mudd College, by Harvey Mudd student Daniel Rinzler.

The project was led by Associate Professor Jay B. Brockman, with much of the design work conducted at the Center for Advanced Computing Research at the California Institute of Technology. Peter M. Kogge, the Ted H. McCourtney Professor of Computer Science and Engineering, provided advice throughout the project.

Conceptual design of PIM Lite began under the HTMT project, the DARPA Data-intensive Computing program through the DIVA project, and the DARPA PACC program through the Morph project. The VLSI implementation and fabrication was completely supported under the DARPA HPCS program through the Cascade project.

Faculty Paper on “Most Highly Cited” Lists

The paper, “Data Clustering: A Review,” by A.K. Jain, M. Murty, and Patrick J. Flynn, professor of computer science and engineering, appeared in ACM Computing Surveys in September 1999. In the most recent issue of Communications of the ACM, it was recognized as the fourth-most-downloaded article from Computing Surveys in August 2004, and the second-most-downloaded article in its publication year. ISI Web of Science lists 130 citations for this article, and CiteSeer lists it as the 23rd-most-frequently cited article in its publication year, noting 154 citations.

An overview of data clustering, a key component of large-scale data analysis, model discovery, and data mining systems, the paper assists those who do not have a prior model for data and wish to “explore” the structure of the data to find natural groupings using cluster analysis, which is one of the most powerful tools available. The paper encapsulates and organizes a large amount of prior work by the community.
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Three Students Present Papers at Biometrics Meeting

The Notre Dame Computer Vision Research Laboratory was well represented at the research session of the 2004 Biometric Consortium Conference in Washington, D.C., in September. Damon Woodard, a recent Ph.D. graduate, presented a paper titled “Finger Surface as a Biometric Identifier,” which was co-authored with Professor Patrick J. Flynn. Ph.D. candidate Ping Yan presented a poster paper titled “2D and 3D Ear Recognition,” which was co-authored with Professor Kevin W. Bowyer, the Schubmehl-Prein Chair of the Department of Computer Science and Engineering. Undergraduate Michael Wittman presented a poster paper titled “Visual Analysis of the Effects of Load Carriage on Gait,” co-authored with James Ward, a 2004 graduate of the department, and Professor Flynn. Professor Bowyer participated in a panel discussion “Multi-biometrics, Deja Vu?” that was organized by Jonathan Phillips of the National Institute of Standards and Technology, Paul Griffin, chief technology officer of Identix Corporation, and Douglas Reynolds of the Massachusetts Institute of Technology’s Lincoln Laboratory.