



Newsletter
For Alumni and Friends of the Department

Thomas M. Siebel Center for Computer Science

The University of Illinois

Inside

Computer Science Student Wins World
Chess Championship

Could Formal Methods Have Saved the
Death Star?

Lockheed Martin Seeds National Center
for Systems Integration at UIUC

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Calendar of Events

March 10-11

Engineering Open House

March 30

Alumni Event at Oakbrook Marriott

March 31

Donald B. Gillies Chair in Computer Science Investiture

April 7

Celebration of Women in Computing

April 26-28

Illinois Department of Computer Science Affiliates Conference

April (date TBD)

Student and Alumni Awards Ceremony

May 13

Graduating Student Reception



Thomas M. Siebel Center for Computer Science
University of Illinois

This newsletter is published twice a year for members of the DCS Alumni Association and friends of the Department of Computer Science.

Marc Snir, Michael Faiman and Saburo Muroga Professor
Head of Department of Computer Science

Tammy Nicastro, Associate Director of Development and Alumni Relations

Your letters, comments and editorial contributions are always welcome. Please direct them to: alumni@cs.uiuc.edu

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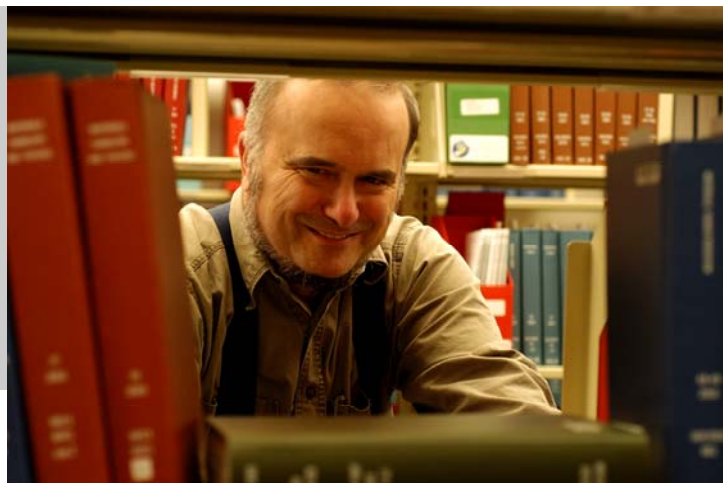
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Transformations, Growth and Accomplishments

By Marc Snir, Michael Faiman and Sabura Muroga
Professor and Head




I am now in my fifth year as head of Computer Science at UIUC. The time has gone fast – as it always goes when one is engrossed in a challenging and satisfying job. I had the privilege to recruit twenty-two new faculty members since joining – close to half of the current faculty. We have now an outstanding new generation of researchers in the department who are already amassing recognition and prizes: Thus, Prof. Anhai Doan got the ACM Distinguished Dissertation award in 2004 – recognizing his PhD thesis as the best of its year; this year Prof. Yuan Yuan Zhou received the Anita Borg Career award (see page 10) and Prof. ChengXiang Zhai was the recipient of the prestigious Presidential Early Career award (see page 12); and twelve of our young assistant professors got NSF Career awards – the most prestigious NSF award in support of early career development.

We have also established a strong presence in areas that were barely or not at all represented in the department. We have now a very strong group in Formal Methods for the specification, verification and validation of software, a research area that is going to be crucial to the Grand Challenge of ensuring the safety and trustworthiness of critical software; we have a strong group in Databases and Information System, developing the technologies needed to extract information from the wealth of data available in proprietary and public databases and on the Web; we have established a research group in Human Computer Interaction and Social Computing; we have a growing research group on Information Assurance and Computer Security; and we have started hiring people in Bioinformatics and Computational Biology.

With a department of 53 faculty we are clearly at the focus of the activities in Computing and Information Science and Engineering on this campus. But such activities are not restricted to our department; an increasing number of collaborations and interactions tie us with faculty of other departments in cognate areas.

We have recently established in our College the Information Trust Institute [www.iti.uiuc.edu] to lead research in trustworthy and secure information systems; about half of the faculty members of this institute are in CS. We have established the Cultural Computing Program to house collaborations between CS faculty and Fine Art faculty. Several of our faculty members are part of the Institute for Genomic Biology [www.igb.uiuc.edu]; we have multiple collaborations with the School of Library and Information Science, with the Human Factors Division in the Institute of Aviation, with the Department of Linguistics, and so on. As computers become pervasive in every human endeavor, Computer Science interacts with an increasingly large fraction of campus activities.

We are close to establishing our goal of a department of 60 faculty members. But research and education in Computing and Information Sciences continues to evolve rapidly. While our department may slow its growth in coming years, it will not slow its transformation.

This transformation will require the establishment of new education programs and of new research programs, in strong collaboration with other departments on campus. To enable this fast change, in a time of flat or decreasing state and federal budgets, the support of our alumni will be as important as ever. 



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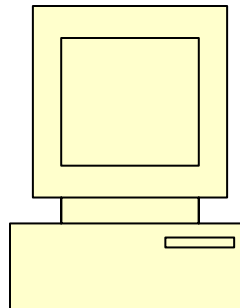
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Faculty Awards and Honors

Faculty/Lecturers:



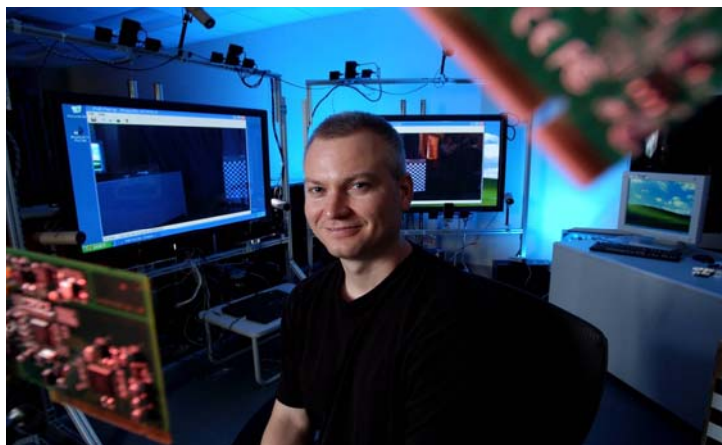
Sarita Adve: University Scholar (\$10,000 per year for three years and IBM Faculty award (\$30,000), see article on page 9.



Vikram Adve: Best Paper, PLDI 2005, the premier compilers conference, with student Chris Lattner, *Automatic Pool Allocation: Improving Performance by Controlling Data Structure Layout in the Heap*



Geneva Belford: Graduate College Outstanding Mentor Award (\$500 for personal use, Tuition Waiver+\$6,000 Fellowship to the CS Graduate Program, \$1,000 for graduate students' travel).



Brian Bailey: Incomplete List of Teachers Ranked as Excellent, Fall 2004



Stephen Bond: Accenture Outstanding Advisor and Incomplete List of Teachers Ranked as Excellent, Fall 2004



Roy Campbell: IEEE Fellow



AnHai Doan: 2004 Outstanding Alumnus Award, University of Wisconsin

Milwaukee



Michael Garland: Fall 2004 Incomplete List of Teachers Ranked as Excellent



Indranil Gupta:

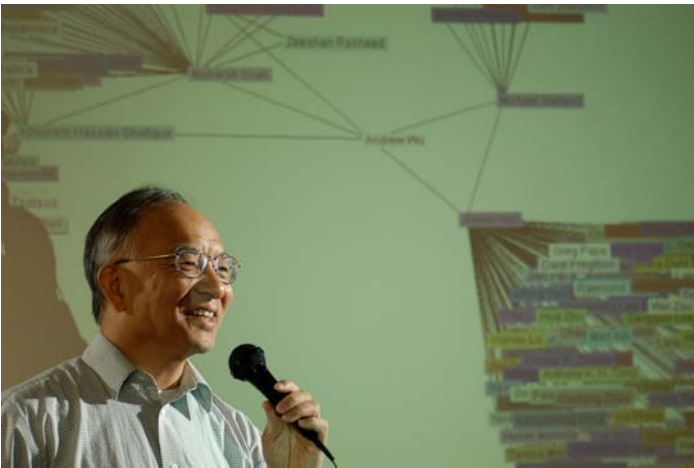
NSF CAREER Award (\$450,000 over 5 years)

Incomplete List of Teachers Ranked as Excellent, Fall 2004



Robin Kravets:

Incomplete List of Teachers Ranked as Excellent, Fall 2004



Ralph Johnson: ACM SIG-PLAN 2005 Programming Languages Achievement Award (shared for the book *Design Patterns* with co-authors Erich Gamma, Richard Helm, and John Vlissides).

Ralph riding his bike in the Siebel Center.



Jiawei Han:

IEEE Computer Society 2004 Technical Achievement Award, see article on page 13

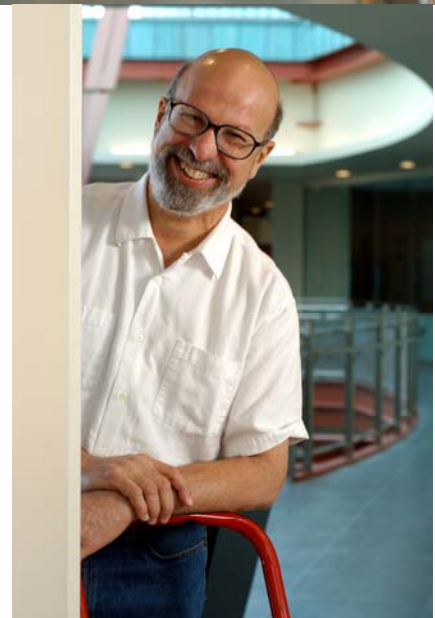
Incomplete List of Teachers Ranked as Excellent, Fall 2004



Sam Kamin: Campus Award for Excellence in Advising Undergraduate Students (\$2,000 for personal use)

David Padua: Donald Biggar Willett

Professorship in Engineering, see story on page



Faculty Awards and Honors Continued



Dan Roth: Senior Xerox Award for Faculty Research



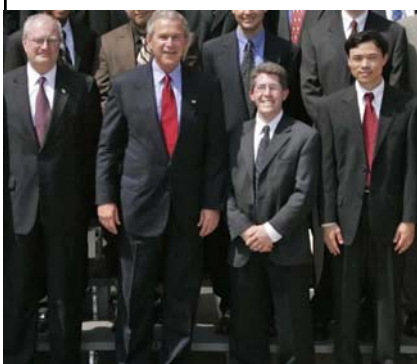
Marsha Woodbury: Incomplete List of Teachers Ranked as Excellent, Fall 2004

Grigore Rosu:

C.W. Gear Junior Faculty Award, NSF CAREER Award (\$400,000 over 5 years), Incomplete List of Teachers Ranked as Excellent, Fall 2004



Craig Zilles: Incomplete List of Teachers Ranked as Excellent, Fall 2004



ChengXiang Zhai: Presidential Early Career Award, see article on page



Steve Herzog: Accenture Outstanding Advisor



Mahesh Viswanathan: NSF CAREER Award (\$400,000 over 5 years), Accenture Outstanding Advisor, SIGIR Best Paper Award, ACM, 2004



Yuanyuan Zhou: 2005 CRA-W Anita Borg Early Career Award, DOE Early Career Principal Investigator Award, and IBM Faculty Award, see article on page 13

Are you an alumnus or alumna of this department and a faculty member at another University?

Please let us know where you are and if you have been recognized for your achievements so we can share the good news with your fellow alumni and former faculty members.

Contact us at: alumni@cs.uiuc.edu

Agha Et. Al.

Win SIGSOFT Distinguished Paper Award



Agha



Marinov

Graduate student Koushik Sen, Assistant Professor [Darko Marinov](#), and Professor [Gul Agha](#) received the [ACM SIGSOFT Distinguished Paper Award](#) for their paper entitled "CUTE: A Concolic Unit Testing Engine for C" early this September.

Their paper was honored during the 10th [European Software Engineering Conference and the 13th ACM SIGSOFT International Symposium on Foundations of Software Engineering](#), a five-day event from Sept. 5 to Sept 9 held in Lisbon, Portugal.

David Washburn, Technology Manager at the University's Office of Technology Management, said the paper details a way to test software for bugs.

"The invention is a new approach to doing software testing," Washburn said. "It automates the testing."

In a study conducted by the National Institute of Standards and Technology in 2002, software bugs, or errors cost the U.S. economy an estimated \$59.5 billion annually. This study also reports that about a third of these costs (about \$22.2 billion) could be eliminated by an improved testing infrastructure enabling earlier and more effective identification and removal of software defects—an indication that improved technology in software testing holds great promise for the economy.

CUTE provides software companies with the ability to improve product quality and release software earlier, Washburn said. It benefits consumers by giving them more robust and less buggy software, he added.

The award winning paper addresses a method to "represent and track constraints that capture the behavior of a symbolic execution of a unit with memory graphs as inputs." CUTE (Concolic Unit Testing Engine) refers to a tool that implements the method. Current research is extending these methods to the problem of testing concurrent programs for bugs, said Professor Agha.

ESEC/FSE 2005 is the premiere conference and international forum for researchers, practitioners, and educators to present and discuss the most recent innovations, trends, experiences, and challenges in the field of software engineering, according to its official Web site. It is held every two years and brings together experts from academic institutions and the industry to exchange research results.

Assistant Professor Marinov was one of three authors to receive the ACM SIGSOFT Distinguished Paper Award in 2002 for a paper titled "Korat: Automated Testing Based on Java Predicates." He focuses his research on software engineering.

Sen was one of three writers of a paper titled "DART: Directed Automated Random Testing." This paper is now in the patent process. He has co-authored 30 papers focusing on software engineering and formal methods and is the primary architect of four software tools. He is currently in his final academic year as a Ph.D. student in the Department of Computer Science. Professor Agha is a professor in the Department of Computer Science, and the goal of his research is to understand the nature of concurrent computation. He has received numerous additional honors and awards including the Incentive for Excellence Award, recognition through the Digital Equipment Corporation, being part of the UI Center for Advanced Study, ONR Young Investigator, ACM International Lecturer, Editor-In-Chief of IEEE Parallel and Distributed Technology, Editor of Theory and Practice of Object Systems, Editor-In-Chief of IEEE Concurrency, Golden Core Member, IEEE Computer Society, and Meritorious Service Award, and a member of the IEEE Computer Society. He was elected to the European Academy of Sciences and is an IEEE Fellow. He is currently Editor-In-Chief for ACM Computing Surveys.a

Professor Zhou

Research and Service is Recognized and Awarded



Assistant professor [Yuanyuan Zhou](#) has received this year's IBM Faculty Award, a Department of Energy (DOE) Early Career Principle Investigator award, and the Anita Borg Career Award.

The IBM Faculty Award is intended to recognize outstanding research efforts in the field and includes a grant for \$30,000 to encourage further research and projects of interest to the corporate and academic world.

The DOE Early Career Principle Investigator award selects research applications for funding under its Mathematical, Information and Computational Sciences Division. Professor Zhou's application, "Run-Time Support for Debugging Parallel Programs on Large Scale Systems" was selected for a recommended grant totaling nearly \$295,000 over a period of three years.

Professor Zhou has also been honored by the Committee on the Status of Women in Computing Research (CRA-W) as the recipient of the Anita Borg Early Career Award. The award honors the late Anita Borg, who was an early member of CRA-W and an inspiration for her commitment in increasing the participation of women in computing research.

The award is bestowed annually upon a woman in computer science and/or engineering who has made significant research contributions and who has contributed to her profession, especially in the outreach to women. This award recognizes work in areas of academia and industrial research labs that has had a positive and significant impact on advancing women in the computing research community and is targeted at women that are relatively early in their careers. Professor Zhou will receive financial assistance toward travel to a conference at which the award will be presented.

Professor Zhou's areas of research span operating systems, computer architecture and databases. Her research addresses the challenges in designing the next generation of system, including energy and thermal management for data centers, architectural and system support for software debugging and storage systems. She is one of the first to create an architecture and operating system support for software debugging, and to apply data mining to program analysis for bug detection. a



Professor Adve

Receives IBM Faculty Award

Computer science professor [Sarita Adve](#) was granted a 2005 IBM Faculty Award in recognition of her work in computer architecture and its importance to IBM. These \$30,000 awards are intended to recognize outstanding achievement and encourage exploratory projects of interest to the company.

Adve's project, "Integrated Architectural Solutions for Hard and Soft Errors on Single- and Multi-threaded Systems," addresses the increasing processor reliability problems that occur in scaling of CMOS technology. CMOS (complementary metal oxide semiconductor) is a major class of integrated circuits.

Professor Torrellas

Elected

*Chairman of the IEEE Committee on
Computer Architecture*



Professor and Willett Faculty Scholar in the [Department of Computer Science](#), has been elected Chair of the [IEEE](#) Computer Society's Technical Committee on Computer Architecture (TCCA). The Chair serves a two-year term beginning July 1. The TCCA acts as an international forum to promote research and development in the integrated hardware and software design of general- and special-purpose uni-processors and parallel computers. The IEEE TCCA annually sponsors/cosponsors with ACM SIGARCH the leading international conferences in computer architecture, including the International Symposium on Computer Architecture and the International Symposium on High-Performance Computer Architecture. It also jointly administers the most prestigious awards in computer architecture, including the Eckert-Mauchly Award for contributions to computer architecture. TCCA also helps organize special issues of society periodicals and publishes a newsletter periodically, containing meeting reports and other announcements.

Professor Torrellas received his Ph.D. in Electrical Engineering from [Stanford University](#) in 1992 before joining the Computer Science Department at Illinois in 1992. He spent a sabbatical year as Research Staff Member at IBM's [T.J. Watson Research Center](#). He is an IEEE Fellow and the lead PI on six current research awards, including the DARPA-funded IBM PERCS High-Productivity Computer System project at Illinois. He has served on numerous conference program committees related to computer architecture, including recent stints as Program Chair of HPCA-2005 and the 2005 IEEE Micro Top Picks in Computer Architecture, and as General Chair PACT-2005 and PPOPP-2006. Professor Torrellas has co-authored more than 120 articles in peer-reviewed journals and conferences, and his main areas of research are parallel computer architecture, processor-memory integration, thread-level speculation, low power design, and reliability. He is an associate editor for the ACM Journal of Transactions on Architecture and Code Optimization (TACO) and a member of the Editorial Board of the IEEE Journal of Computer Architecture Letters (CAL). At Illinois, he leads a group of talented graduate students, some of which have gone on to academic positions at leading universities such as Cornell, GaTech, NCSU, Rochester, and UCSC. ☞

Continued CMOS scaling has resulted in steady performance increases in the last few decades. However, as CMOS scaling enters the sub100 nm era, future performance gains are threatened by reliability concerns. These problems are due to wear-out related hard errors (referred to as lifetime reliability) and soft errors from high energy particle strikes at the architecture level.

The project goals are to develop models, metrics, and tools to evaluate processor reliability, to develop novel architectural solutions to improve reliability without significant impact on performance and area, and to develop an integrated framework for managing energy, temperature, and reliability.

Adve's work on lifetime reliability aware architecture has opened up a new field in architecture. This project builds on a foundation of close collaboration with IBM researchers, including Pradip Bose, MS 81 and PhD 83 in ECE, and Jude Rivers. The next phase will involve making the architecture tools she has developed ready for commercial use and to use them to develop solutions to further address reliability problems. ☞

Professor Zhai

Honored with Presidential Early Career Award

President Bush has honored CS Professor [ChengXiang Zhai](#) with the nation's highest distinction for investigators in the early stages of promising research careers, awarding him this year's Presidential Early Career Award for Scientists and Engineers (PECASE). Zhai is one of only 20 young National Science Foundation-supported scientists and engineers selected to receive this honor. It is awarded in recognition of substantial research accomplishments and the integration of that research with significant educational contributions. The 20 National Science Foundation-supported researchers received their awards from John H. Marburger III, science adviser to the president and director of the Office of Science and Technology Policy, at an awards ceremony held at the White House on June 13.

"These Presidential awardees are the young people who will lead our nation's progress in science and engineering as they leap the fences, cross the boundaries and build the blocks of new and exciting areas of science," said Arden L. Bement Jr., National Science Foundation director. "They also pass on to many students their imaginative thinking, built into creative educational activities - a form of leadership that can influence.

The Presidential award recognizes Zhai's work on user-centered, adaptive intelligent information access, which aims to improve search-engine performance, support better information organization and enable understanding of voluminous data. Zhai's research is fueling a \$5 million, five-year, cross-disciplinary Bioinformatics project funded by the National Science Foundation to create [BeeSpace](#), a system to help scientists analyze information characterizing the mechanisms of social behavior.

Zhai completed his doctorate in Language and Information Technologies at Carnegie Mellon University in 2002. He then joined the computer science department at UIUC in 2002 where he has joint appointments in the Institute of Genomic Biology as well as the Graduate School of Library and Information Science.



Professor Zhai stands at far right

He is the recipient of the 2004 Best Paper Award from the Association of Computing Machinery's SIGIR and, also in 2004, received the National Science Foundation's Faculty Early Career Development (CAREER) Award, which recognizes the early career development activities of scholars most likely to become the academic leaders of the 21st century. ☞

"These Presidential awardees are the young people who will lead our nation's progress in science and engineering as they leap the fences, cross the boundaries and build the blocks of new and exciting areas of science.

They also pass on to many students their imaginative thinking, built into creative educational activities - a form of leadership that can influence."

Arden L. Bement Jr., National Science Foundation director

Professor Han

RECEIVES PRESTIGIOUS IEEE AWARD



The IEEE Computer Society has bestowed the internationally renowned "Technical Achievement Award" upon Computer Science Professor [Jiawei Han](#). This award recognizes Professor Han for his outstanding contributions in data mining and knowledge discovery, data warehousing, deductive and object-oriented databases.

Professor Han pioneered several important concepts and developments in data mining. His most significant technical contributions are on pattern-growth methodology for mining frequent, sequential, and structured patterns. A few such algorithms are popularly cited or used in the data mining community, including FPgrowth, Closet+, PrefixSpan, CloSpan, gSpan, CloseGraph, and GraphIndex. He and his collaborators have also developed a stream data mining system called MAIDS (mining alarming incidents in data streams) and a few scalable online stream mining methods for stream cubing, stream clustering, and stream classification. Moreover, he and his collaborators have invented a few efficient data cube computation methods, including H-cubing, star-cubing, MM-cubing, cube-gradient computation, and high-dimensional OLAP. Han and his colleagues have also set up the foundation and developed efficient methods for multi-relational data mining, constraint-based frequent pattern mining, constraint-based clustering, scalable support vector machine, associative classification, and attribute-oriented induction. Besides his work on data mining, he has also made good contributions to deductive and object-oriented databases, including deductive query compilation and evaluation, object-oriented join indexing, spatial indexing, and spatial data warehousing.

The [Institute for Electrical and Electronics Engineers](#) (IEEE) Computer Society's Technical Achievement Award honors a person who, over a period of years, has made outstanding technical contributions to the theory and/or practice in technical areas within the scope of the Society, as demonstrated by publications, patents, or recognized impact on the field.

An ACM Fellow, Han has pursued a distinguished career that has included pioneering research into data mining, data warehousing, stream data mining, spatiotemporal and multimedia data mining, biological data mining, social network analysis, text and Web mining, and software bug mining. He is the author of the seminal textbook "Data Mining: Concepts and Techniques" (Morgan Kaufmann, 2001) as well as more than 300 journal and conference publications.

Currently serving on the Board of Directors for the Executive Committee of [ACM Special Interest Group on Knowledge Discovery and Data Mining](#) (SIGKDD), Han is actively engaged in service to the data mining research community. He has served on the editorial boards of all of the leading data mining journals including: Data Mining and Knowledge Discovery, IEEE Transactions on Knowledge and Data Engineering, Journal of Computer Science and Technology, and Journal of Intelligent Information Systems, and is serving as the Editor-in-Chief of a new journal: ACM Transactions on Knowledge Discovery from Data. No stranger to international recognition, Han is the recipient of three IBM Faculty Awards, the Outstanding Contribution Award at the 2002 International Conference on Data Mining, an ACM Service Award (1999) and the ACM SIGKDD Innovations Award (2004).

Han studied Computer Sciences at the [University of Wisconsin-Madison](#), receiving his PhD in 1985. Afterwards he took an Assistant Professorship at [Northwestern University](#) and then went on to [Simon Fraser University](#) where he, ultimately, was awarded an Endowed University Professorship before accepting his current appointment at Illinois. He was appointed Professor of Computer Science at UIUC in 2001. In addition to his academic achievements, Professor Han has close collaborations with researchers at [IBM](#), [Microsoft](#), [Intel](#), [HP Labs](#), a

GUPTA, VISWANATHAN, AND ROSU EARN NSF CAREER AWARDS



Viswanathan



Rosu

Adding to a record breaking list of 14 active NSF Early Career Awards, three more Computer Science faculty members has been awarded the most prestigious honor given to young faculty by the [National Science Foundation](#) (NSF). UIUC Assistant Professors Indranil Gupta, [Mahesh Viswanathan](#) and Grigore Rosu have received the NSF Faculty Early Career Development Award (CAREER), recognizing them among the nation's "faculty members most likely to become the academic leaders of the 21st century." The CAREER Award carries a stipend of \$80,000 that is awarded annually for 5 years, totaling \$400K.

"The Early Career Award is the highest honor that the National Science Foundation bestows on young faculty," said Professor [Marc Snir](#), head of the Department of Computer Science (DCS). "It is given only to exemplary researchers who incorporate a solid research component into the educational experiences of their students. The Department is extremely proud to have Professors Gupta, Viswanathan, and Grigore join the distinguished cadre of eight junior faculty members who have won this very prestigious award in the past two years."

Assistant Professor [Indranil Gupta](#) will receive research funding in support of his project entitled "Systematic Design of Distributed Protocols - from Methodologies and Toolkits to Systems." This project will study and advance systematic design methodologies aiming to protect distributed systems during failures and attacks.

Assistant Professor Viswanathan's award winning proposal, entitled "Next Generation Model Checking," addresses the need to increase the reliability of software by integrating ideas from computational learning theory and developing model checking algorithms with provably formal guarantees of software validity.

Rosu was awarded for his proposal entitled "Runtime Verification and Monitoring," which aims to detect errors in complex software systems and allow a program's specification to play an active role in its execution. Rosu's work promises to lead to novel, scalable techniques for detecting errors in software systems and to new programming methodologies that facilitate the development of robust and dependable software.

These awards are a key source of support to the department's goal of enriching student learning by using research activities to foster, in students, the development of investigative skills, critical thinking skills, and relevant subject knowledge.

The NSF established the CAREER award in 1995 to support "exceptionally promising junior faculty who are committed to the integration of research and education". Early Career awardees are selected on the basis of "creative and effective research and education career development plans that build a firm foundation for a lifetime of integrated contributions to research and education".



Gupta

IBM NAMES BIN YU AS EMERGING LEADER IN MULTIMEDIA



Bin Yu, a Ph.D. student in Computer Science, was one of eight students selected from the top universities in the country for the first annual IBM "Emerging Leaders in Multimedia" seminar series. The seminar series was a one-day event held late last July at the [IBM T J Watson Research Center](#) in Hawthorne, New York.

Participants were selected based on recommendations from IBM researchers, the students' thesis advisors, their publication record, and research experience. The eight selected reflect a variety of related research topics within multimedia.

According to Deepak Turaga, a research staff member at IBM, the goal of the event was to have leading research students in multimedia visit IBM, present their research, and interact with IBM researchers.

"It is an acknowledgement of your work," Yu said regarding the benefits of the honor. "The other thing is that you meet a lot of researchers in similar areas."

Participants presented a 20-minute overview of their research, and then allowed 10 minutes for questions. Yu said the fact that the eight awardees were chosen from related fields made the presentations more interesting and allowed for more relevant questions.

Following presentations, participants were divided into two groups and given 2-3 topics, selected by IBM, for discussion. The groups were diverse and included the students, IBM interns and IBM researchers. After discussion, each group presented a summary to the other, allowing for some fascinating conversation, said Yu.

Students also were exposed to IBM research through demonstrations of various IBM multimedia projects. There were a total of six different demos. Yu said the presentations provided valuable exposure to emerging research and technology.

"It's good to see what is going on with IBM research," he said. "It shows their current thinking, which is important to understand."

Yu hopes to graduate next summer with a Ph.D. He focuses on automatic customized rendering of correlated visual streams, essentially managing streams of visual data. Professor Klara Nahrstedt is his advisor for the Ph.D. program. Yu is a Microsoft ConferenceXP RFP Winner and received the honor of Best Graduate of Year 2000 from the Computer Science Department of Tsinghua University in Beijing. ☞

ACM Programming Team Garner's International Prominence



Technology, Georgia Tech, Carnegie Mellon University, New York University, and other peer institutions.

"Our performance really improved over last year, and if we continue at this rate, we could reach the top 12 places in the competition," explained Team Coach Marsha Cook Woodbury. "As it was, we tied for seventeenth. Eastern Europe, and, of course, China, certainly dominate the team standings now."

It was really interesting to visit China and see a Chinese university run the whole contest," Gordon-Schlosberg added. "I was impressed with the hard-working nature of all the Chinese people we met, including the programmers who

As the Fighting Illini men's basketball team was completing its most successful year ever, another Illini team was battling it out for a world title...in computer programming.

At the 29th Annual Computing Machinery International Collegiate Programming Contest (ACM-ICPC), the team from the University of Illinois at Urbana-Champaign tied for 17th place, the best result for any U.S. team. The World Finals, held April 3-7 and sponsored by IBM, was hosted by Shanghai Jiao Tong University in Shanghai, China.

The contest involved students in computing disciplines at over 1,300 universities from 68 countries on six continents. Seventy-eight teams of three students each took part in the world final. Shanghai Jiao Tong University, which hosted the contest, won the trophy by completing 8 (of 10) problems successfully within the five-hour time limit. The other top places went to universities from Russia, Poland, and Canada.

The University of Illinois team, Jeff Tamer, Steven Downing, and John Carrino, was the only U.S. university team which managed to complete at least five problems.

"I think those guys are really brilliant," explained Team Manager Ari Gordon-Schlosberg. "They are really smart and really creative, and they worked really well together. They all went to Illinois Math and Science Academy, and they've been together through all of high school and college. Since they will all be going their separate ways after graduation, this was like a crowning achievement on their time together."

According to Gordon-Schlosberg, the Illinois students scored ahead teams from California Institute of Technology, Duke, Massachusetts Institute of Technology, Illinois Institute of

took the title."

Although Illinois topped the list of U.S. teams, it was noted that this year's overall results represented the worst performance for U.S. institutions in the 29 years of the competition. Many observers believe the result is indicative of a variety of factors that have resulted in a striking shift in technological pre-eminence away from U.S. schools and companies who once dominated the competition.

According to David Patterson, president of the Association for Computing Machinery, and a computer science professor at the University of California, Berkeley, the U.S. used to dominate these kinds of programming Olympics. As recently as 1997, the United States came out on top, when a team from Harvey Mudd College won the competition.



Department of Computer Science Partners with NDU for Graduate Study

The Department of Computer Science recently formed a partnership with the Information Resources Management College in the National Defense University, which will allow transfer credit in graduate studies.

The partnership with the Washington, D.C. school will allow NDU students to attend UI to pursue graduate degrees with transfer credit. Students in the information assurance program at NDU, which is a broad program dealing with computer security and reliability issues, will be able to transfer 9 credit hours toward a graduate degree at UI. The credit can be applied to the following degrees: Master of Computer Science, Master of Science in Computer Science, and Master of Science in Bioinformatics.

The partnership benefit UI as well. Associate head of DCS [Mehdi Harandi](#) said it will allow for beneficial collaborations between faculty and students. A variety of perspectives from different students - NDU focus on military and national security education for government employees- can only enhance efforts to advance the field.

He added that the partnership will also benefit UI's credentials as a Center of Academic Excellence in Information Assurance. The partnership will increase the depth and maturity of our information assurance program at both the undergraduate and graduate level.

"It will strengthen our institution as one of the designated centers," Harandi said.

Professor [Roy Campbell](#) initiated the partnership and said it was received with open arms. He added that the partnership agreement is a two-way street. UI does not get nearly as many government employees as NDU, a shortage that the department was eager to address. The agreement offers an incentive to these employees to come to UI to pursue a degree, enabling them to transfer credit they've already earned at NDU and apply it toward their degree requirements at Illinois.

"It's sort of a pipeline for government employees; offering them a more expedient way of getting a U of I degree," Campbell said. "It benefits U of I by enticing people from the East coast to apply to the program."

Both Campbell and Harandi agree: the university will benefit from the variety of perspectives in the student body that the partnership is certain to create.

NDU's Information Resources Management College currently has partnerships with 20 other universities, including those with Johns Hopkin University and the University of Tulsa. As listed on the website, the University of Illinois is the first Illinois school to form a partnership with NDU.

Computer Security Gets a Jumpstart at Illinois with Professor Carl Gunter

Not a day goes by when you can't learn about a security breach in a computer system in the news. Gone are the days when we could protect our computers from unauthorized access with cute passwords. Gone are the days when all Internet users were honest techies. Gone are the days when spam simply referred to a canned meat. The good news is that researchers are moving closer to beating the perpetrators-from the annoying Viagra spammer to the sinister member of a crime cell-at their own game.

Carl Gunter is leading the Department of Computer Science at Illinois into becoming a cyber-security powerhouse. Having arrived a little more than a year ago from University of Pennsylvania, Gunter said that he came to Illinois because "the potential for security research at UIUC is enormous. There are lots of different projects that have connections to security, and dozens of people are working in this area. We just need to draw these people together."

The recent hiring by Illinois of researchers like Carl Gunter and the launching of the Information Trust Institute (ITI), of which he is a member of the steering committee, has given Illinois to a great start. Within ITI, Gunter joins about 40 faculty members on campus in an interdisciplinary effort to research and develop trustworthy and secure information systems.

Working in security is a lot like a Hollywood action movie that pits good against evil-the lone and outgunned hero against all odds, with nothing but his ingenuity and wits to save himself and hence the world. It's an area of computer science Gunter relishes. "It's intriguing in terms of human nature. One of the more sinister and interesting aspects is the relationship between spammers and virus writers. The recent German attack is a probable instance of using large numbers of machines to disguise a political statement. In this case, there is an advertising motive, but it is not economic." This was the Sober mass-mailing worm that barraged inboxes last May with politically-themed messages in German.

Three security projects in particular that Gunter is involved with and that have generated a lot of momentum in the computer science department are AMPol, LocFlow, and Con-tessa. "The underlying theme of my research is to look for things people don't do because of security, and if we solved the security issue, we can still do them without the privacy risk," he said.

PhDs Awarded in 2005

MAY 2005

Lawlor, Orion – L. V. Kale

“Impostors For Parallel Interactive Computer Graphics”

Lee, Kuang-Chih – David Kriegman

“Representing The Appearances of Human Faces For Recognition”

Parks, Michael – Eric deSturler

“The Iterative Solution of a Sequence of Linear Systems Arising From Nonlinear Finite Element Analysis”

Wilmarth, Terry – L. V. Kale

“Pose: Scalable General-Purpose Parallel Discrete Event Simulation”

Wong, Chi-Leung – David Padua

“Thread Escape Analysis For A Memory Consistency-Aware Compiler”

Qian, Minglun – Benjamin Wah

“Neural Network Learning For Time-Series Predictions Using Constrained Formulations”

Zelinka, Stephen – Michael Garland

“Object Modeling By Example”

Yih, Wen-Tau – Dan Roth

“Learning and Inference For Information Extraction”

Agarwal, Shivani – Dan Roth

“A Study of the Bipartite Ranking Problem In Machine Learning”

Pae, Sung-II – Michael Loui

“Random Number Generation Using A biased Source”

Wang, Wei – Robert Skeel

“Fast Polarizable Force Field Compu-

tation In Biomolecular Simulations”

Zhang, Lynn – Lui Sha

“A Distributed Open Environment For Real-Time Applications”

Hwang, Seung-Won – Kevin Chang

“Supporting Ranking For Data Retrieval”

Kumar, Sameer – L. V. Kale

“Optimizing Communication for Massively Parallel Processing”

Lattner, Christopher – Vikram Adve

“Macroscopic Data Structure Analysis and Optimization”

OCTOBER 2005

Thite, Shripad – Jeff Erickson

“Spacetime Meshing for Discontinuous Galerkin Methods”

Uttamchandani, Sandeep – Gul Agha

“POLUS: A Self-Evolving Model-Based Approach for Automating the Observe-Analyze-Act Loop”

Cui, Yi – Klara Nahrstedt

“Content Distribution in Overlay Multicast”

Carvalho, Dulcinea – Roy Campbell

“A Software Architecture for User Environments in Ubiquitous Systems”

Shah, Samarth – Klara Nahrstedt

“Dynamic Channel-Aware Bandwidth Management in IEEE 802.11 Networks”

Derisavi, Salem – William Sand-

ers

“Solution of Large Markov Models Using Lumping Techniques and Symbolic Data Structures”

Al-Muhtadi-Jalal – Dennis Mickunas

“An Intelligent Authentication Infrastructure for Ubiquitous Computing Environments”

Chen, Zhifeng - Yuanyuan Zhou

“Optimization of Data Accesses for Database Applications”

Garrido, Alejandra – Ralph Johnson

“Program Refactoring in the Presence of Preprocessor Directives”

Xue, Yuan – Klara Nahrstedt

“Price-Based Optimal Resource Allocation in Multi-Hop Wireless Networks”

Chen, Yixin – Benjamin Wah

“Solving Nonlinear Constrained Optimization Problems Through Constraint Partitioning”

Magalhaes, Luiz – Robin Kravets

“A Transport Layer Approach to Host Mobility”

McGrath, Robert – Roy Campbell

“Semantic Infrastructure for a Ubiquitous Computing Environment”

Zhang, Honghai - Jennifer Hou

“Understanding Performance Limits in Wireless Sensor Networks”

Kapadia, Apu – Roy Campbell

“Models for Privacy in Ubiquitous Computing Environments”

The Alumni Website

The alumni website which can be found at: <http://www.cs.uiuc.edu/alumni/> will be going through a growth spurt soon.

Alumni Profiles

We have been gathering profiles and pictures of alumni that will help tell the story of the diversity of fields in which you work. Soon we will be adding a page underneath the main alumni page that will showcase these profiles. If you would like to submit a profile please send it to: alumni@cs.uiuc.edu.

How will this benefit the department?

1. Your careers speak to the strength of this department. The more we talk about your success, the more visibility the department receives.
2. We can direct prospective students to this page so they can see that computer science can lead to a career in programming as well as hundreds of other areas.
3. This will allow alumni, students, and faculty to find people who are working in areas that might have relevance to their work.

Companies and Research Labs that are run by, founded by, or owned by alumni

We would like to create a similar page to the alumni profile page described above. Please send us a profile of your company or research lab so we can get this page populated.

Cheng, Peng – Steve LaValle

“Sampling-Based Motion Planning with Differential Constraints”

Baliga, Girish – P. R. Kumar

“A Middleware Framework for Networked Control Systems”

Lu, Charng-Da – Dan Reed

“Scalable Diskless Checkpointing for Large Parallel Systems”

Ziaei, Mahmood – Gul Agha

“An Equational Logic and a Coordination Language for Distributed Objects”

Shaffer, Eric – Michael Garland

“Scalable Methods for Processing Massive Geometric Meshes”

Ranganathan, Anand – Roy Campbell

“A Task Execution Framework for Autonomic Ubiquitous Computing”

Li, Ning – Jennifer Hou

“Localized Topology Control in Wireless Networks”

Xiao, Li – Klara Nahrstedt

“Resilient Interdomain Routing with BGP – Protocols and Reliability Engineering”

Hartman-Baker, Rebecca – Michael Heath

“The Diffusion Equation Method for Global Optimization and Its Application to Magnetotelluric Geoprospecting”

Sampemane, Geetanjali – Roy Campbell

“Access Control for Active Spaces”

Sasanka, Ruchira – Sarita Adve

“Energy Efficient Support for All Levels of Parallelism for Complex Media Applications”

Zhao, Rongkai - Geneva Belford

“Digitizing a Three-Dimensional Brain Atlas-Image Sequence Alignment and Volumetric Encoding”

Ozidal, Muhammet – Martin

Wong “Routing Algorithms for High-Performance VLSI Packaging”

Li, Xin – Dan Roth

“Toward Concept-Based Text Understanding and Mining”

Yi, Seung – Robin Kravets

“Situation-Aware Security for Wireless Ad Hoc Networks”

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engineering.uiuc.edu/
email/signup.htm](https://engineering.uiuc.edu/email/signup.htm)
to register for this
free service.**



Marc Snir visits with Fontaine '68 PhD and Judy '65 MS ACES at their home in Carlisle, MA. Fontaine holds the 2nd PhD ever awarded by the department.

ANTHONY COZZIE

WINS WORLD COMPUTER CHESS CHAMPIONSHIP

UIUC Department of Computer Science student, Anthony Cozzie, confirmed his world-class programming talent earlier this month when his computer chess program, ZAPPA, defeated the world's most prominent international veterans to take first place in the 13th World Computer Chess Championship, held in Reykjavik, Iceland from August 13th-21st, 2005.

In an eleven-round tournament, ZAPPA came away with ten wins and one draw to beat out former world champion programs including JUNIOR, by Israelis Amir Ban and Shay Bushinsky, and SHREDDER, by Stefan Meyer-Kahlen of Germany.

"ZAPPA played really impressively," said Meyer-Kahlen, author and operator of the program that has won ten world champion computer chess titles including the 2003 World Computer Chess Championship. "It undoubtedly deserved the title."

Cozzie, an Iowa native who graduated two years ago from Carnegie Mellon University with a Masters degree in Computer Engineering, entered the department's graduate program this fall. He has spent the last two years working as a government contractor for Sparta Incorporated. Anthony is especially interested in artificial intelligence including computer vision and robotics.

"I came to UIUC for the faculty after a good deal of research on the resources at various top-tier schools," said Cozzie. "I was particularly impressed with Professors Forsyth, Ponce, and Amir and recognized the program here as outstanding."

He traces the inception of his interest in both chess and computer science back to his junior year at Prairie High School



in Cedar Rapids. Not entirely satisfied with his performance in the school's chess club, he set out to design a computer program that could surpass his own ability to win at chess.

"Whenever I can't do something well enough," said Cozzie, "I write a program to do it."

In this case, the program was called ZAPPA and it has been refined and expanded over the past six years. Although officially recognized as version two, the championship winning program is actually the fifth iteration of Cozzie's effort and represents a substantial improvement over previous versions.

"My cousin," he reported, "could beat the forth version."

His interest in using computers to play chess puts Cozzie in some very distinguished company. The first chess program was written by Alan Turing even before computers had been invented. Turing, of course, is one of history's greatest mathematicians and was the leader of the group that broke the

"Enigma" code, helping to determine the outcome of the Second World War. Anticipating the advent of computers, Turing wrote instructions that a machine could use to play chess. He challenged a colleague to a game in which Turing acted as a human CPU, executing the instructions himself and requiring more than half an hour per move. In 1956, a proposal by another great mathematician, Claude Shannon of the Bell Laboratories, led to the first computer chess game played by Los Alamos' MANIAC system.

Chess programs appear to have taken on a life of their own over the last 50 years. In 1997, IBM's Deep Blue beat world champion Garry Kasparov in a highly publicized match and lately, the story of man verses machine has been one in which computers increasingly have exercised the upper hand. All the while, chess programs continue to employ the same, seemingly simple, algorithm that was the basis of Turing's program: if-this-then-that.

The engineering tradeoff central to designing computer chess programs is balancing search speed with the amount of chess knowledge encoded in the machine. Practically speaking, computers emphasize search because they do it so well. The search function generates all possible move sequences to a certain depth. The complexity of chess-playing algorithms is a result of the large number of continuations possible.

There are, on average, approximately 40 legal moves possible for any given position of the chess board. This means that, after a single move (or two ply in the vernacular of chess

aficionados), 1600 different positions can arise. After two moves that number jumps to 2.5 million positions, and after three moves it is no less than 4.1 billion. Since the average game lasts 40 moves, the resulting assortment of potential positions is on the order of 10^{128} .

Each end position is ranked, numerically, by an evaluation function that assigns value to the various assets of a given position in chess. The evaluation must reflect chess knowledge, assessing such factors as the value of material in play (the pieces on the board), the safety of the king, the mobility of various pieces, and so forth. Its goal is to identify the move that will result in a position that has the highest score. It is these evaluation and search functions that determine the winner of computer verses computer chess matches.

"The computer's strength is that it sees everything," Cozzie said, "but in some lines, it doesn't see as deep as a human Grand Master can. In the match against FUTE, the only match that ZAPPA did not win outright, ZAPPA was in a questionable position at the end of the opening book, but FUTE didn't know it."

Cozzie is already planning for next year's competition, which is scheduled to take place in Torino, Italy in May 2006. He's actively looking for a sponsor to donate the hardware that he will need for the new system he intends to procure for ZAPPA. This year he arrived in Reykjavik with a system of his own funding, design, and implementation.

"Bringing your own computer does have advantages," he said. "Many of the players struggled with network connections to their remote systems and other problems that I didn't have to contend with."

For his outstanding performance, he was awarded the Claude Shannon trophy, which is proudly displayed in Siebel Center's academic office. The thrill of the victory is still evident on Cozzie's face, although it is undoubtedly lost on ZAPPA. This is a small wonder. As the program's namesake, singer/songwriter Frank Zappa once said, "The computer can't tell you the emotional story. It can give you the exact mathematical design, but what's missing is the eyebrows." ☞

Coming Back to Campus for a Visit?

Would you like a tour of our new living laboratory, The Thomas M. Siebel Center for Computer Science?

Would you like to meet with faculty and catch up on research in the department?

**Send us an email at:
alumni@cs.uiuc.edu**

So we can help arrange your visit.

Would you prefer to receive the newsletter online?

Please send an email to:
alumni@cs.uiuc.edu

Just give us your email address and we'll send you the spring issue online.

Also...coming soon

A new electronic alumni news update. This publication will be distributed through email only and will contain up to the minute information on alumni events, alumni start-ups, departmental news and anything else we think you might be interested in reading about.

CULTURAL COMPUTING

INTERSECTING ART AND TECHNOLOGY



Creativity is the shared foundation of art, science, the humanities, and technology. The Cultural Computing Program (CCP) at the Siebel Center, under the direction of Roy Campbell and Guy Garnett, creates and transforms culture with computers; it explores and develops technology to foster creative activities and to seize opportunities for making a positive impact on our life and culture. The program seeks to increase the quality of life, and further communication and understanding within and between diverse communities. It will develop cul-creative achieve-

The CCP

on the nascent field of [cultural computing](#). Building in computer science, and collaborating with cultural arts in the fine arts and humanities, the Siebel Center develop new technologies to cultural computing seminated and form the basis for new art and scholarship.

Major research goals for the Siebel Cultural partnership with, among others, the new media pro- the School of Music, Dept of Dance, Dept of Theater, Krannert Center, Krannert Art Museum, as well as with partners in the sci- ences and NCSA and Beckman, are as follows:

Innovation using and furthering the emerging synergy between technology research and creativity in the Arts, Music, Theatre, Dance, and Computer Science.

Collaboration between computer scientists and artists by creating interdisciplinary teams of undergraduates, graduates, and faculty to work on research and educational projects.

Propagation of new research and education specializations: computer gaming; digital theatre; digital dance; innovative art installations; ubiquitous computing, sensor and tracking technologies, multimodal user interfaces, visualization and sonification; interdisciplinary creativity-based curricula.

You might say our philosophy is: The blending of the sciences, the arts, and humanities will lead to new paradigms that will positively transform culture. Some of the technologies we are using and developing include:

ubiquitous computing, sensor and tracking technologies; visualization and sonification, including interactive video and audio; 3D real-time virtual worlds; gesture, sound and **visual-based user interfaces**.

We urgently seek financial support to sustain and extend this innovative and unique program. In the short term, private funding would be used for undergraduate and graduate student support, student travel to present their work, additional course development, equipment and development tools, and support staff. In the long term we will need a significant endowment in order to put this initiative on a sound, long-range trajectory toward creative transformation of the University and our culture for the 21st Century. If you are interested in funding the CCP please contact Tammy Nicastro, Associate Director of Development at nicastro@uiuc.edu.



tural context as well as content for technological ment.

seeks large-scale impact on the existing strengths practitioners and scholar- ter can contribute and that can be widely dis- arship in the 21st Cen-

Computing Program, in gram in Art and Design,



WOMEN IN COMPUTER SCIENCE

A CELEBRATION OF WOMEN

The Department of Computer Science at the University of Illinois held its first "Celebration of Women in Computing" at the Siebel Center for Computer Science from April 1 to 3. The event consisted of computer related activities and speakers for girls and women of all ages. The aim was to demonstrate first-hand the sense of accomplishment and joy that can come from choosing Computer Science as a college major and career.

The event featured speakers and a roundtable discussion between U of I Women in Computer Science members and WCS members from other universities, as well as activities such as deconstructing and constructing a computer. According to Cinda Heeren, Faculty Advisor for the Women in Computer Science program at the university, "Young women should have come away impressed and challenged by what they experienced at the event, but also have gotten a sense of the joy the women receive from their accomplishments."

As part of the celebration, elementary and middle school students were invited to participate in an introductory workshop on an exciting new programming language called Squeak. Using Squeak, students can make media rich programming projects via a programming interface that requires almost no typing skills. Simple drawings can be animated to interact

with their environments in sophisticated ways, resulting in game design projects, animated art, or scientific simulations.

The celebration also included an awards gala for



two WCS competitions "Games 4 Girls" and "Technical Ambassadors." In Games 4 Girls, a competition sponsored by Electronic Arts Incorporated, teams of college age women designed computer games specifically targeted at middle or high school age girls. Each member on the first place team received \$1000, while second and third place team members were awarded \$500. The Technical Ambassadors competition (TAC), sponsored by Microsoft, gave teams of girls in high school, under the supervision of a faculty advisor, the chance to work on a technical project that would benefit a local not-for-profit organization. At the event, members of the top three TAC teams were awarded cash prizes ranging from \$100 to \$250.

ChicTech, a group of WCS members, visits high schools to stir interest in the Technical Ambassadors competition, dispel myths about Computer Science and make girls aware of the diverse opportunities within the field. Jenna Hill, a ChicTech member and administrator of Technical Ambassadors, said the event was intended to promote young women working together in teams on technical issues and to spark or further develop their curiosity.

"We hope that they gained a liking for technology and that they'll decide to join us when they go to college," Hill said. "Numbers of women in Computer Science have been declining, and we're trying to change that." ☞

University of Illinois Team

Highest Ranked U.S. Participant in International Hackers Competition

In the world of computer security, sometimes it's good to be bad...

This past year UIUC's ACM's SIGMil team placed fourth overall in the UCSB International Capture the Flag competition (also known as the iCTF). The competition pits teams of student hackers from around the world against each other for a day-long battle for information technology supremacy.

For some participants, the payoff is an A-plus grade for the term, but for most of the teams, it's about the global bragging rights that come with a good showing.

"Although we placed fourth overall, ours was the top U.S. team in the competition," stated Chris Grier, a graduate student in electrical and computer engineering and research assistant at the Information Trust Institute (ITI) at Illinois. "There were 22 teams total, from 18 different universities and four different continents."

The Capture The Flag contest is a multi-site, multi-team hacking contest in which a number of teams compete independently against each other. The competition, which originated at the University of California at Santa Barbara (UCSB) is a distributed, wide-area security exercise, whose goal is to test the security skills of the participants from both the attack and defense viewpoints.

For students of computer security, competition hacking equates to "big fun."

"We don't get to do this very often-once or twice a year at most, so that makes it special," Grier remarked. "It is 'really applied' computer security, which is something that we don't get every day in the classroom, even working on projects.

"This was our third year doing it; previously we have placed within the middle of the pack," said Grier. It's not really that much fun unless you have a lot of people to compete against."

The Special Interest Group for Military Applications (SIGMil) is a special interest group (SIG) that is part of the department's local chapter of the Association for Computing Machinery. Among its many activities, SIGMil has a rich history of computer security research and education.

"We had about 15 participants on the team this year-about double the size of last year," Grier added. This year's team included two alumni (off campus), three graduate students, and the remainder were undergraduates from several different disciplines. ☞

Interested in a Social Networking Platform?

The Department is working on providing our alumni with a social networking tool. If you would like to provide input on this project or have ideas on this topic, please contact Tammy Nicastro at nicastro@uiuc.edu.

The Department of Computer Science Alumni Association

**Would like to plan a series of alumni
events in:**

**The Silicon Valley
Southern California**

Seattle

New York

Chicago

And

Boston

**If you would like to help plan an event,
please contact us at alumni@cs.uiuc.edu**

COULD WE HAVE SAVED THE DEATH STAR?

By [Judy Tolliver](#)

Had Darth Vader employed formal methods to the design of his Death Star, perhaps it would not have been vulnerable to the Starfighter attack that led to its destruction. The same could be said for the security holes in the Windows OS that make it a frequent target for hackers.

What if someone could hack into the flight control system of a plane via the onboard entertainment system? What about other complex systems? How can we guarantee their reliability? How do we make these systems secure without sacrificing interoperability and ease of use? These are some of the questions that researchers at Illinois are answering using formal methods.

As our computer systems become increasingly large and complex and we rely upon them more, the branch of software engineering called "formal methods" is vital. It is especially critical for applications in which the cost of failure is death or considered to be very high.

Formal methods are mathematically based techniques for the specification, development, and verification of software and hardware systems. Although formal methods have been around for more than 50 years, recent advances have allowed practical applications to real hardware and software systems. The field is now enjoying resurgence and garnering some media buzz.

Formal methods is a major thrust of the [Information Trust Institute](#) (ITI), the nation's leading research and education center devoted to trustworthy and secure information systems. Based at [University of Illinois at Urbana-Champaign](#), about half of ITI's researchers are from the computer science department, which has, perhaps, the strongest team of formal methods researchers in the country-eight experts in the field, including senior faculty members [Gul Agha](#), [Carl Gunter](#), [Elsa Gunter](#), and [Jose Meseguer](#), plus rising stars [Darko Marinov](#), [Madhu Parthasarathy](#), [Grigore Rosu](#), and [Mahesh Viswanathan](#). Additionally, the Illinois mathematics department boasts one of the country's strongest groups in mathematical logic, the underpinning of formal methods, making the opportunities for powerful collaborations both exciting and abundant.

"They are all excellent people," said Meseguer, referring to talent pool at Illinois. "We can all do things individually, but together we can make a bigger impact by embarking on longer-term, challenge problems. We can show that difficult problems can be solved by combining our technical strengths in a more ambitious way."

In 2002, Bill Gates pointed out Microsoft's use of formal methods, saying that, "For things like software verification, this has been the Holy Grail of computer science for many decades. But now, in some very key areas-for example driver verification-we're building tools that can do actual proofs of the software and how it works in order to guarantee the reliability."

Intel used formal methods to prove the reliability of parts of the Pentium 4 and Itanium chips. Most recently, Green Hills Software announced its use of formal systems in the specifications of their latest OS security policy and architecture. As computers are becoming pervasive in safety-, security-, and mission-critical systems, the importance of formal specification, verification and validation increases dramatically. One can expect that in a not-too-distant future it will be mandatory to use of best-of-breed formal methods in the development of the most critical software systems.

In traditional software engineering, designers attempt to prove that a system will be reliable and secure by exhaustive testing, probability theory, and simulation. No one would argue that it is better to develop software with no bugs than to write it with multiple bugs and spend lots of time getting rid of them. But in the rush to get a product out the door, "buggy" software has become a fact of life.

Formal methods can help, but they have some way to go before being universally adopted by industry as de rigeur in the design process, partly because they are not well understood and because there are not enough practitioners in field. In fact, Microsoft issued a request for proposals last year to introduce formal methods into the undergraduate computer science curriculum.

Computer Science Professors Jose Meseguer and Grigore Rosu work on the frontier of formal methods research. They understand the futility of using traditional testing methods for large and complex systems.

"People have very few ways to understand how systems work," said Meseguer. "They may have some drawings, or some text, and so forth, but until they actually build a system, they won't know what will happen. It is when you test the system that you discover all kinds of problems, and by that time, it is often too late. They have to scramble around to make it work because they already have too much invested in the project. Plus, there may be more combinations and permutations of conditions than there are atoms in the universe."

Continued on next page

Continued from previous page

Rosu agreed. "Testing never proves correctness," he stated. "You have a higher degree of confidence the more you test, but you can never test everything. For instance, you could never test all the different programs that will be run on a particular system. On the other hand, applying formal methods during the design phase gives designers both analytic and predictive power and can prevent system designers from proceeding down a path that ultimately won't work."

One of Rosu's current projects is Runtime Verification and Monitoring. By checking the properties of a program while it is running, specifications that are violated can be discovered and repaired. This avoids the difficult task of having to prove all possible behaviors by looking only at the behavior that is taking place.

"We run the program and observe it," Rosu explained. "We know what properties to check against, so we check them at runtime and observe and monitor them. If we detect a problem, we recover and fix it. Then we can guarantee that part. There may still be a bad combination somewhere, but it is so unlikely to happen that we don't worry about it."

According to Rosu, this method can not only detect errors in concurrent programs, but it also scales well and can be performed online. Special versions of Runtime Verification and Monitoring have been used by NASA to find bugs in their software.

Another related project is Domain-specific Certification of Software which uses "certifiers" make sure a program is error-free. The certifiers only check specific aspects of a program and generate proofs of correctness that count as a certificate. This certificate can be independently checked, both dynamically and statistically.

Meseguer works on Formal Executable Specifications, an idea based on mathematical models. These models are collections of mathematical axioms-fundamental assumptions or formulas that are universally valid.

For Meseguer, the question is, "Can you make these axioms executable so that, in fact, they are a high-level program that models or simulates an intended system before it is built?"

"After all," he explained, "a computer program is a formal specification that tells the computer what to do, and a programming language is a formally defined language with precise semantics."


To answer this question, Meseguer has developed a language called Maude. Maude is a rewriting engine used to write, execute, and analyze executable models of the logic of complex systems.

"We need better programming languages," explained Rosu, who is also involved in the design and implementation of programming languages. "The ones we have now allow program-

mers to do too many crazy things." His approach is to use a universal model based on "term rewriting," in which structures keep transforming according to certain rules so patterns transform into other patterns. The goal is to find places where these patterns match, and as terms keep evolving, the result is a very simple computation model with full computability power. Using rewrite rules, complex algorithms can be defined.

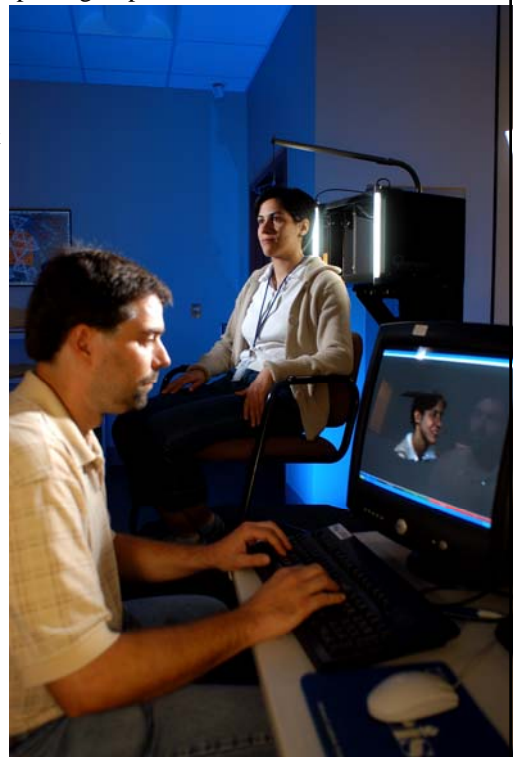
"It's an interesting and human-like model of computation," Rosu added. "Many earlier languages were designed to be sequential. By rewriting, you can rewrite these rules concurrently. We have to do something special to make it sequential."

"The future is all about concurrency, and the future of programming languages will be concurrent. Rewriting itself is powerful enough to be a language."

But Rosu admits that it is hard to change people's favorite programming languages; only researchers are using rewriting engines like Maude. Rosu also noted that Europe leads the U.S. in formal methods research activity. Hopefully, he said, as students here are educated about formal methods, they will bring it with them into the mainstream. 

Professor Hart works with Shadi Ashnai who is in the second year of her Ph.D. program here in computer graphics. In this photo, they are using one of the tools in the graphics lab, a Cyberware laser scanner, to digitize both the texture and the geometry of Shadi's head. Shadi and Professor Hart are working with Kelly Snapka, Studio Art Director at Volition, on tools to help artists paint and organize textures on game characters.

Professor Hart's graphics group works with Volition, NVIDIA, Adobe and others to ensure that their research explores ideas that are both intellectually interesting and help overcome the limitations of existing commercial graphics software.



Padua's Collaborative Research

Is Driving Force

Behind Revolutionary New Tool for Writing Software Codes



Professor David Padua's team has developed "SPIRAL" software that automatically produces code for signal-processing applications to improve the performance of computer operations while reducing their cost. SPIRAL generates code for new and old applications in as little as 10 minutes, reducing the time, money, and frustration experienced by users, Padua states. SPIRAL was employed by IBM researchers to produce a highly optimized FFT library for the Blue Gene/L supercomputer.

"An ultra-fast supercomputer like Blue Gene/L is useless if we are not able to harness that power to run a range of applications," explains IBM Research Blue Gene systems architect Jose Moreira. "Using SPIRAL has played a key role in enabling IBM researchers to optimize applications to run on the system, including life sciences applications involving molecular dynamics."

National Instruments' Shawn McCaslin says SPIRAL offers a wide array of solutions to optimize signal-processing and math functions. Other members of the SPIRAL team include: Franz Franchetti of the Technical University of Vienna, Carnegie Mellon professor Markus Pueschel, Maria Manuela Veloso with Carnegie Mellon's School of Computer Science, Professor Jose M.F. Moura of Carnegie Mellon University's Department of Electrical and Computer Engineering, and Drexel University computer science professor Jeremy Johnson. ☞

Nominate CS alumni for the Young Alumni or Distinguished Alumni Awards

Computer Science Young Alumni Achievement Award

Established in the fall of 2005, the CS Young Alumni Achievement Award recognizes young alumni (less than 40 years old as of April 1 in the year of the award) who have made outstanding professional contributions to their field since graduating from the U of I CS Department.

Computer Science Distinguished Alumni Award

Established in the fall of 2005, the CS Distinguished Alumni Award is designed to honor Computer Science graduates who have made professional and technical contributions that bring distinction to the department and university.

One or two Young Alumni Achievement Awards and Distinguished Alumni Awards will be presented each year. For 2006, these awards will be presented in April at the annual Awards Banquet in Urbana. Winner(s) will receive a plaque and be given the opportunity to make a brief expression of appreciation at the banquet.

To nominate someone for the Young Alumni Achievement Award, please complete the nomination form at <https://webtools.uiuc.edu/survey/OrganizationSecure?id=8333047>. To nominate someone for the Distinguished Alumni Award, please complete the nomination form at <https://webtools.uiuc.edu/survey/OrganizationSecure?id=8066563>. The deadline for submission is March 15, 2006. Winners will be selected by a faculty review committee.

Lockheed Martin Seeds National Center for Systems Integration Technology at Illinois DCS



by J. William Bell

People don't go into computer science for the cheering crowds, but a few years ago Lui Sha got his rock-star moment, nonetheless. At an IEEE symposium, the topic was the real-time system kernel for NASA's Mars Pathfinder. Pathfinder worked brilliantly upon landing in 1997, but after time it became trapped in a cycle of failures and restarts. Days of debugging later, engineers identified and resolved the problem.

According to the CTO of the company that designed the kernel, the solution came from a paper he'd seen presented by Sha years before that discussed solutions to such issues. Word broke out that the authors happened to be in the room, followed by the applause.

As one attendee said, "When was the last time you saw a room of people cheer a group of computer scientists for their significant practical contribution to advancing human knowledge? It was quite a moment."

Transforming real-time computing

Those significant practical contributions are important to Sha, a computer science professor at the University of Illinois at Urbana-Champaign. As testament to that, one of his longest-standing partners, Lockheed Martin recently joined the Department of Computer Science's new Industrial Affiliates program after more than a decade of collaboration. This program fosters efficient technical exchange with a focus on topics that are a natural outgrowth of members' interests.

"An invention no one uses is not a success" says Marc Snir, the department's head. "We have a large, balanced distribution of skills, and an environment where people work together easily."

Sha's input and ideas on real-time computing and dependable systems integration have played an important role in many of Lockheed's fighter programs, including the F-16, F/A-22, and the new F-35. "Sustaining such a long chain of collaborative research and transition success is extremely rare," says Jonathan Preston, a technical fellow at Lockheed Martin. "Lui has a unique mindset that combines a strong practical orientation with leading-edge research. He communicates his ideas in ways that directly target the problems facing industry."

Those writing the standards must agree. His work has been incorporated into nearly all the open standards on real-time computing, approved by the FAA for use in civil aviation, and

supported by commercial operating systems and middleware for real-time computing.

It's Simplex, really

Your car probably has 50 microprocessors that make it run efficiently. An airplane might have hundreds. If your refrigerator's on the fancy end, it probably has a few, too. The incumbent software must be carefully orchestrated such that memory and processors are properly shared and different commands are given time to finish. These sorts of issues gave the Mars Pathfinder team its headaches.

Contrary to the cliché, however, timing is far from everything in real-time embedded computing systems. Whether it's regulating a power plant or a car, software has to protect the system's core functions from failure, and perfect software is uncommon. Companies rarely have the resources and technologies to make software systems flawless. Frequently, designers also have to deal with the fact that less than 15 percent of a system's code is newly created for a particular project.

"It boils down to having different grades of code in practical systems. Different pieces come with different levels of quality and different price tags," Sha says.

Sha's theory for fault-tolerant embedded computing embraces this reality. Under what he calls a Simplex architecture, systems have two parts. There is a full-feature control system called the high-performance subsystem. Its complexity makes it difficult to verify the quality and interoperability of every feature.

In addition, a Simplex system includes a high-assurance control subsystem that is simple, custom-designed, and rigorously tested. It is responsible for vital functions and services. More importantly, it monitors the system's behavior, putting the system back on track when necessary. This setup maintains stability and controllability, no matter what faults present themselves in the less trusted high-performance subsystem. With a safety net in place, the high-performance subsystem can rely on experimental software in many industrial applications that are not critical to safety. "If a system employs this framework, essential services will be delivered even if all else goes haywire," Sha says. In other words, your car might be less fuel efficient if the high-performance control software hits a snag, but it will still get you to work in the morning. ☞

2005 Student Awards

Undergraduate Awards

Jeffrey P. Blahut Memorial Scholarship

Timothy Lantz

Sara and Louis Cohen Undergraduate Scholarship

Huong Nguyen

Crowe Chizek and Company LLC Outstanding Computer Science Student

Jeff Huang

Timothy Lantz

C.W. Gear Outstanding Undergraduate Award (Engineering)

Pouya Kheradpour

Jessica Schoen



Dunn Systems Undergraduate Scholarship

Daniel Kador

Franz Hohn and J.P. Nash Scholarship

Thomas Januszyk

Michael S. Hughes Software Engineering Award

William Baker

Eric Johnson

Cameron Cole

William Del Genio

Adam Eidukas

Duncan H. Lawrie Leadership Award

Daniel Peterson

Daniel L. Slotnick Scholarship

Haley Miller

John R. Pasta Award (Engineering)

Lukasz Wesolowski

Haley Miller

Proctor & Gamble Scholarship

Rafael Alba

Haley Miller

James N. Snyder Outstanding Undergraduate Awards

Brian Cho

Shawn Temmin

Spyglass Undergraduate Scholarship

Malgorzata Myslinkska

Emily Tse

Anusha Priya

Soumi Sinha

William and Ruth Witt Scholarship

Anusha Priya

Soumi Sinha

Graduate Awards

C.W. Gear Outstanding Graduate Student

Koushink Sen

David J. Kuck Outstanding Ph.D. Thesis Award

Nathan A. Carr

David J. Kuck Outstanding Master's Thesis Award

Smruti Ranjan Sarangi

C.L. and Jane Liu Award

Feng Chen

W.J. Poppelbaum Memorial Award

Luis Ceze

Sohaib and Sara Abbasi Fellowship

Khan, Fariba

Saleem, Moazzam Ali

Bakht, Mehedi

Hameed Chaudhry, J

Richard T. Cheng Fellowship

Arizumi, Nana

Sahoo, Swarup

Debra and Ira Cohen Fellowship

James Lin

Andrew and Shana Laursen Fellowship

Stout, Ryan

Maji, Hemantakumar

Jayachandran, Praveen

Saburo Muroga Fellowship

Chang, Ming-Wei

Ray Ozzie Fellowship

Chris Osborn

Siebel Scholars

Patrick Meredith

Mark Gates

James Newell

Neelav Shah

Jay Vasanth

Each of these awards, scholarships, and fellowships have been made possible by the generous support of alumni and friends of the Department of Computer Science. These awards are funded through endowments that will last in perpetuity and ensure that outstanding students will have the support they need.



DCS CHANGES CURRICULUM TO MEET FUTURE IT CHALLENGES

In the coming year, the Computer Science Department will institute significant curriculum changes to better prepare its graduates to contribute to the rapid advance of the field and to address such major issues as technology's expanding reach into society. Recently approved by the University Senate, the changes will apply to all students entering as freshmen in the fall, 2005, semester and after.

The new curriculum, planned over the past several years, was motivated by several perceived needs and trends, said Professor [Sam Kamin](#), director of Undergraduate Programs in the Department of Computer Science.

"We wanted to make sure that students were leaving with good programming skills; to allow for greater flexibility, especially at the junior and senior level; to prepare for the future broadening of the Computer Science major; and to improve students' ability to think with precision," Kamin said. "In conjunction with a significant lowering of the student/faculty ratio in our department - a result of expanding our faculty and lowering our student intake - we expect the new curriculum to effect a marked improvement in the quality of our undergraduate program in Computer Science."

Stated broadly, the changes create a stronger core of 100- and 200-level courses, including the addition of two new courses, add more flexibility in the upper-level courses, and make the senior project or senior thesis a requirement.

At the core, the department has added a 200-level course - to be taken concurrently with computer architecture (CS 232) - in systems programming (CS 241). This is a more pragmatic version of the operating systems course, and will replace it as a core requirement. The goal was to create a better foundation of programming skills for upper-level courses, and to cover some material - notably networking - that is not otherwise covered in required courses. Following this, the "capstone" of the lower-level courses is a new "programming studio" course (CS 242). This course has a unique structure, in which most of the students' classroom time is spent in small discussion sections (averaging five students, plus a TA) presenting and discussing the week's programming assignments. These assignments cover a broad range of topics and skills - from programming style to low-level optimization to class structure - and are

much more open-ended than traditional programming assignments. The goal of this course is to solidify the students' programming skills and ensure that each student can take a program from specification to implementation on his or her own.

At the upper-levels the department has created a system of "tracks," allowing for a degree of specialization. Currently the tracks are Computer Science (with further subdivision into concentration areas), Mathematics, and Computational Science. All tracks require that students take, as a capstone, either the senior project sequence (CS 492/493), software engineering sequence (427/428), or senior thesis (CS 499). Whatever the student's area of interest, this requirement will ensure that they are capable of using computers to solve large problems in a team environment, or, if they plan to pursue a career in research, ensure that they get a good start.

"In the future," said Kamin, "we anticipate that the set of tracks will expand to include areas not traditionally included in a Computer Science curriculum, such as graphic arts, e-commerce, and bio-informatics. By strengthening the lower-level core, and requiring a senior capstone course, we believe we can ensure a strong understanding of computer science - the ability to "think like a computer scientist" - without requiring the traditional upper-level courses."

To strengthen students' mathematical skills, the department has added an hour to the introductory discrete mathematics course (CS 173) and restructured the theory of computation course (CS 273) to include much of what was previously covered in the





higher-level CS 475.

At the same time, changes in the student/faculty ratio have allowed the department to make some upper-level courses smaller by splitting them. In particular, the required algorithms course (CS 473) - considered one of our most challenging courses - has been split between undergraduate and graduate sections. The same is being done for upper-level computer architecture, and, with the introduction of CS 241, this is, in effect, being done for operating systems as well.

To make room for the new courses and requirements, some courses, of course, have had to be dropped. The department is no longer requiring all students to take differential equations (though this is covered to some extent in the numerical methods course, which is still required), and has dropped the requirement for a circuits course (ECE 205). More significantly, in anticipation of expanding the track system, the "application sequence" requirement has been dropped. These changes have allowed the department to increase the number of free electives from 12 hours to 20 hours, while strengthening the CS requirements.

The new requirements promise to produce students who are better trained in both thinking and doing - with more mathematical skills, better speaking and writing ability, and more programming experience. The added courses - especially the programming studio and senior project - feature more individualized instruction than typical CS courses. The structure of the curriculum provides greater flexibility to train students for the ever-changing needs of a society increasingly dependent on computers and on the people trained to operate them. ☞

DEGREES AND CERTIFICATES OFFERED IN THE DEPARTMENT OF COMPUTER SCIENCE

Undergraduate Programs

College of Engineering Degree:

[Bachelor of Science in Computer Science \(B.S.\)](#)

[5 Year Bachelor of Science/Master of Science in Computer Science](#)

College of Liberal Arts and Sciences Degrees

[Bachelor of Science in Math and Computer Science](#)

[Bachelor of Science in Statistics and Computer Science](#)

Other Programs

[Minor in Computer Science](#)

[Software Engineering Certificate](#)

Graduate Programs

Thesis Programs

[Doctor of Philosophy \(PhD.\)](#)

[Master of Science \(M.S.\)](#)

Non-Thesis Programs

[Master of Computer Science \(M.C.S.\)](#) - also available [online](#)

[Master of Science in Bioinformatics \(M.S. BIOINFORMATICS\)](#)

Joint Programs with Computer Science

Masters Programs

[M.S. with Computational Science and Engineering \(CSE\) Option](#)

[M.C.S./Bachelor of Science in Accountancy](#)

[M.C.S./Master of Architecture](#)

[M.C.S./MBA](#)

[M.C.S./J.D.](#)

Doctoral Programs

[Ph.D. with Computational Science and Engineering \(CSE\) Option](#)

[Ph.D./MD](#)

Siebel Center Hosts First Annual Industrial Affiliate's Conference

Industry executives and experts from around the world convened on the UIUC campus for the first annual Illinois Department of Computer Science Affiliates Conference on April 28-April 30, 2005.

"The purpose of the Conference was to highlight emerging technologies and demonstrate the innovative ways in which the department's resources are being used in activities that blend computers, art, and entertainment," explained Marc Snir, head of the Department of Computer Science (DCS). According to Snir, the purpose of the event was to encourage more interactions with industry and provide a more transparent window into top-notch DCS talents.

"With engineering research, you eventually want to see your work incorporated into the products of different corporations," Snir added. "To do that, it is important to maintain strong ties with industry."

The conference began with a security workshop featuring a panel comprised of academicians and leading industry representatives. They focused on emerging tools and technologies as they examined the opportunities and challenges faced by today's security professionals. Gary Cristiano, Corporate Vice President of Engineering at Motorola, Nicholas Multari, Senior Manager of Information Assurance R&D at Boeing Phantom Works, and Bruce Lane, Systems Security Analyst at State Farm joined CS Professors Gul Agha, Carl Gunter, and Marianne Winslett to outline and underscore the cross-cutting issues facing industry today and to identify the areas where university research efforts are most likely to benefit industry. A demo and poster session followed the panel and featured research being conducted as part of the Illinois Trust Institute by of many DCS students and faculty. <http://www.iti.uiuc.edu/>

At Thursday evening's "Digital Cabaret," technology transformed music and dance. This event featured students and faculty from the Cultural Computing Lab, School of Music, and Department of Dance performing original works that incorporated the latest in sensor technology and human-computer interfaces. Part demonstration and part concert, the works applied tracking and magnetic sensing technology to synthesize and process sound and video. Held at the Studio Theater in the Krannert Center for Performing Arts, attendees witnessed the culmination of semester long projects undertaken as part of the department's

new Cultural Computing program. <http://www.cs.uiuc.edu/outreach/cclab.php>

Richard Wirt, vice president, senior fellow and general manager of Intel Corporation's Software and Solutions Group, delivered the event's keynote address. Wirt, whose group maintains the company's laboratory in Champaign, has been with Intel since 1981. His keynote addressed symbiosis in university/ industrial relations and focused on the changing face of the world market place for information technologies.

A "Reverse" Job Fair gave companies the opportunity to become familiar with the knowledge and achievements of DCS students in concrete terms, rather than the traditional job fair.

"Employers were able to move from booth to booth to view students' research projects," said Deborah Israel, the conference coordinator. "It provided potential employers with substantive access to our students, and allowed our students to make important contacts in industry and learn more about industrial applications of technologies within their area of interest."

The core of the conference featured a four-track lecture series, with individual tracks focused on business intelligence, performance, software engineering, and pervasive computing, presenting cogent roadmaps covering promising technologies, and exploring the associated implications for University collaboration and recruiting.

For participants interested in business intelligence, one track explored emerging techniques for managing business data to better inform decisions and improve business operations. Specific topics included information integration and data mining, with speakers including Phil Bernstein, a senior researcher at Microsoft Corporation.

The performance track focused on the design of systems that maximize cost performance while consuming fewer resources. Specific areas of discussion included the modern era of high performance computing (HPC) and continuous program optimization, with speakers including IBM's Calin Cascaval and Thom Dunning, executive director of the National Center for Supercomputing Applications. The HPC panel also included Henry Potts, vice president and general manager for system design at Mentor Graphics, Luiz DeRose, senior principal engineer at Cray, Inc, Emmet Kilgariff from NVIDIA, and Apple Computers' Blaine Garst.

The utility track explored tools and methods that promise to advance efforts to design sturdier, more functional soft-

ware. A discussion of hot topics in embedded systems featured panelists Gary Cristiano, corporate vice president of engineering at Motorola, Ford's Shuh-Yuan Liou, and Gary Hafen, corporate fellow at Lockheed Martin. The Formal Methods and Software Validation panel focused on the promising new advances, benefits, and challenges in applying mathematically based models to

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rectness and trustworthiness of software systems.

The fourth track, ubiquity, explored ways to satisfy users in a transparent yet dependable manner. Film artist and alumnus Ron Brinkmann from Apple Computer spoke in a "Beyond 3-D" panel. Brinkmann has supervised work on major motion pictures such as *Speed*, *James and the Giant Peach*, and *Contact*, in addition to authoring a seminal visual effects books including, *The Art and Science of Digital Compositing*. In a discussion regarding the future of mobile systems, panelists such as Tapani Ryhanen, head of Multimedia Devices Research at Nokia Research Center in Helsinki, Steve Bunch, vice president of the Technical Staff of Personal Communications Sector of Motorola, and Marion Lineberry, senior member of the technical staff at Texas Instruments explored the potential growth avenues and future uses of voice and data communications by an increasingly mobile work force.

The conference also featured a "Computing Habitat" programming competition sponsored by Intel. The competition challenged teams of any size and composition to develop applications that build upon the "smart" infrastructure embodied by the Siebel Center. In the end, nine projects were judged by a team made up of corporate visitors, alumni, faculty, students, and a member of the department's Technical Services Group. First Prize of \$2500 went to a project entitled Find@Siebel. This project was developed entirely by students and included contributions from Luke Rajlich, Sizhao Yang, Andres Tack, Matt Alden, Ho-Mui Wong, Joel Poloney, Matt Geske, and Thomas Felker.

The project enables users to use touch screen information panels, 19 of which are scattered throughout the building, to get a graphical representation of the best route from one point in the building to another. The project also displays a picture of the destination location to give the user a visual impression of the destination, if one is available.

A Second Prize of \$1500, went to Tony Kaap who did a similar project entitled Automatic Maps. A Judges Prize of \$1000, was awarded to Matthew Loar for his project entitled Siebel Radar. This project uses the buildings motion sensors to collect real-time data on the location of Siebel inhabitants, compiling the data in a graphical format much like Doppler radar and superimposing it on a map of Siebel. The output, continuously looping through floor by floor, targets the video wall and other large displays housed in the Siebel Center. All projects were brilliant testaments to the skills and ingenuity of the CS student body and plans are in place to integrate each of them into the Siebel Center's living laboratory environment.

"The goal of the conference was for industry to gain a better idea of how to leverage a relationship with the university to make their computing technology more productive and profitable," Israel said. "We want them to be able to make the best use of our students, faculty and resources." ❧

The second annual Illinois Department of Computer Science Industrial Affiliates Conference

Will be held April 26-28, 2006

featuring

Keynote Speaker

Dan Ling, Director of Microsoft Research

Women in Computer Science Awards Banquet
Keynote Speaker

Pat House, Co-founder Siebel Systems
and

A reverse job fair, student demos, EOH projects, panel discussions, a digital cabaret, an open Executive Advisory Council meeting on industrial relations, industrial awards, and much more...

**For more information contact Deborah Israel at:
disrael@uiuc.edu**

UNIVERSITY OF ILLINOIS TO PROVIDE ONLINE COMPUTER SCIENCE COURSES TO SAMSUNG

The University of Illinois at Urbana-Champaign has signed an agreement with Samsung SDS Co., Ltd., Seoul, Korea, to provide online graduate courses through the university's Department of Computer Science (DCS). According to university officials, this agreement provides the basis for a significant ongoing relationship between the university and Samsung.

"DCS has developed online courses that can be delivered in connection with its Master of Computer Science (MCS) degree program or on a non-degree basis," explained Mehdi Harandi, associate head and director of graduate programs for the computer science department. The agreement provides Samsung employees access to online courses with additional local support.

"This is the same program as we offer to individuals and companies anywhere around the world," Harandi stated. "We have developed some pricing incentives for multiple registrations, and Samsung will be helping with program promotion and administration internally. Through this relationship, we may also be able to develop additional online courses and consider alternate delivery methods."

The Illinois Internet Computer Science Program offers the department's Master of Computer Science degree as well as specializations and single courses.

"What separates this program from the many "diploma mills" you hear about is that the quality of education our online students receive is the same as those on-campus," he stated. "Our goal is to provide online students with as much of the on-campus experience as possible, while offering a flexible, convenient option for busy professionals who want to advance their careers through education."

Online students enrolled in engineering and computer science programs are held to the same standards as on-campus students. On-campus lectures are captured and streamed over the Internet, and the online students are required to participate in class projects, turn in the same homework, and complete the same exams as on-campus students. They have access to the same teaching assistants and help resources as on-campus students.

"Our online computer science program is constantly evolving in response to the dynamics of the information technology field," Harandi said. "The certificate in computer security, for example, was introduced this year to meet the growing demand for advanced education in this critical area."

Students wishing to apply for the online master's degree must have graduated from an accredited institution with a mini-

imum of a university-equivalent bachelor's degree. Admission is competitive and is based on academic performance and the potential for excellence in the program. The degree requirements can be completed in as few as 12 months, as a full-time student, or longer as a part-time student. Since its inception in 1998, 114 students have successfully completed the master's degree program. Hundreds more have earned specialization and single-course certificates.

The non-degree option allows students to audit individual computer science courses or take them for credit. Non-degree credit courses may be applied to a master's degree program in the future. According to Harandi, the certificate program provides a means of obtaining in-depth knowledge in a sub-area of computer science such as information systems, networking, software engineering, system software, and computer security.

"Part of the mission of the College of Engineering is to provide educational programs on a continuing basis to practicing engineers," explained Laura Miller, director of Online Engineering Programs in the Office of Continuing Engineering Education (OCEE). "The top-tier education available from the College of Engineering is now available to students located anywhere in the world. A degree earned in our online program is the exact same degree that is awarded on-campus."

Samsung Electronics Co., Ltd. is a global leader in semiconductor, telecommunication, digital media, and digital convergence technologies with 2004 parent company sales of \$55.2 billion and net income of \$10.3 billion. Employing approximately 123,000 people in 93 offices in 48 countries, the company consists of five main business units: Digital Appliance Business, Digital Media Business, LCD Business, Semiconductor Business and Telecommunication Network Business. Recognized as one of the fastest growing brands, Samsung Electronics is the world's largest producer of color monitors, color TVs, memory chips and TFT-LCDs. (www.samsung.com)

For further information, contact: Mehdi Harandi, associate head and director of graduate programs for the Department of Computer Science, 217/333-6952, harandi@uiuc.edu.

Department of Computer Science alumni Jonathan Stark and Brian Swetland, College of ACES alumna Wendy Van Wazer, and Electrical Engineering alumnus Rick Kacprowicz were on the ride of their lives...autonomously.



The Defense Advanced Research Projects Agency (DARPA) invited Team Underdawg to attend the Grand Challenge 2005 National Qualification Event (NQE) held September 28 to October 6, 2005, at the California Speedway, Fontana, California. Team Underdawg was composed of individual software engineers, hardware engineers, designers, and mechanics in the San Francisco Bay area. Several team members met while attending the University of Illinois at Urbana-Champaign. The team was excited to be competing in its first Grand Challenge event. More information is available at <http://www.teamunderdawg.com>

DARPA Grand Challenge 2005 was a field test of robotic ground vehicles for the purpose of advancing autonomous vehicle technology. All vehicles were developed without Government funding. More information is available at <http://www.darpa.mil/GrandChallenge>.

DARPA selected Team Underdawg and two other teams to participate in the NQE after evaluating nine teams at site visits during the week of August 15. Team Underdawg, Princeton University, and Austin Robot Technology joined the 40 previously selected semifinalist teams to compete in the NQE. The NQE consisted of a 2-mile course and teams were challenged by terrain that included obstacles, steep hills, narrow cattle gates, and roads where there was a steep vertical wall on one side and a steep vertical drop on the other.

The NQE further narrowed the field to just 20 teams that participated in the final Grand Challenge event held October 8, 2005. For the final event, the vehicles were required to travel approximately 150 miles over rugged desert roads using only onboard sensors and navigation equipment to find and follow the route and avoid obstacles.

Team Underdawg worked hard to further refine its tools, technology, and vehicle in preparation for the NQE. Team leader Jonathan Stark was thrilled to take his team and their vehicle to the California Speedway. "A lot of late nights and early mornings have gone into this project, but it was an amazing thrill," Stark said.

Team Underdawg's sponsors include Android, Inc., a Silicon Valley software startup; Matt Christiano; Digital Turbulence, Inc.; The Ellis Family; Mike McCool; Stark Consulting; Thales Navigation; and Videre Designs.

DARPA awarded \$2 million to the team from Stanford whose autonomous vehicle successfully completes the 2005 route the fastest within a 10-hour period. ☞



Engineering in Residence Program

Brings Students Face to Face with Alumni Leaders of Industry

A UIUC Computer Science alumnus whose company aided in the successful landing of the Mars Exploration Rover on Mars will kick off the CS department's 2005-2006 [Engineering in Residence](#) (EiR) Program in late October.

Jerry Fiddler, founder of [Wind River Systems, Inc.](#), a company that specializes in embedded software and services, is the first of this year's slate of alumni taking part in the program.

The program, which began last year, takes place throughout the academic year and aims to bring alumni back to the department to stay "in residence," supporting its growth and development through interactions with students, researchers, and faculty for a day, sometimes more. Divided into 5 components, the program features: a formal seminar, private office hours for students, an informal pizza lunch, alumni participation in computer science classes related to their field, and a dinner for the alumni with faculty and researchers.

[Tammy Nicastro](#), the department's associate director of development, said the program is a great opportunity for students. It allows students to ask any questions they may have about a specific field or about jump-starting their career in computer science in a more comfortable environment, she added.

"It allows alumni to have a big brother/big sister relationship with our current students, Nicastro said. "The alumni of this

Department have made some very significant contributions to industry and one of the values of being a student in this Department is being able to tap our accomplished pool of alumni and to learn from their successes. It is also very important for our students to be exposed to the many employment opportunities that exist for CS graduates and to understand just how marketable they are with a degree from UIUC. Our alumni demonstrate this to our students"

Through the formal seminar, alumni have the opportunity to speak to students about their field of expertise. The program offers numerous opportunities for more personal interaction as well. Private office hours for students to meet one-on-one with the EiRs, and an informal pizza lunch in the Siebel Center, where students have the opportunity to ask questions about careers in computer science, facilitate person-to-person interactions. This year the program also plans to encourage alumni participation in classes.

Fiddler, who specializes in embedded systems, shared his insight into the emerging area of cultural computing, which studies the intersection of technology art, music, and the humanities. He participated as a guest lecturer in the cultural computing class taught by Professor [Guy Garnett](#).

In November, alumnus Max Levchin, founder of PayPal, also participated in the program. While on campus, Max interacted with over 70 students and faculty. Many students took advantage of the opportunity to get advice from one of the most successful computer science entrepreneurs of our time. According to students, having the opportunity to interact with Max in a casual



Jerry Fiddler, far right, speaks with students from Guy Garnett's, second from right, Cultural Computing Class.

setting was a distinct experience unlike any other they have experienced on campus.


Max also spoke about his new company, Slide, which is setting out to help people organize and share the digital media that is important to them.

Also in November, alumnus Scott Corley, founder and President of Red Mercury Games, came to campus for the program. Scott is a veteran and leader of the video game industry. He spoke to over 200 freshman about the things you should know before you leave for the real world. He also spoke to a group over lunch about the transformations he has experienced in the industry and how the cycle of developing a video game works. Before he left he spent several hours meeting with faculty and students one on one to share his experiences and provide feedback on what students need to know to work in the gaming industry.

Ross Erlebacher, who has worked for Beloit, [Accenture](#) and [AT&T Bell Labs](#), was one of two alumni who took part in the program last year. Alumnus Chirantan "CJ" Desai also took part in the 2004-2005 EiR season.

"In a heartbeat," Erlebacher said, in response to whether he would participate in the program again. Erlebacher said the program is beneficial to both alumni and students.

"The goal of (the program) is to open student's eyes to all the different things you can do with your degree," said Erlebacher. "It's a unique treat to be able share experiences

and ideas with computer science students in a relaxed atmosphere." 



Scott Corley as guest lecturer in CS 100



Max Levchin answers questions about his experiences at PayPal and his aspirations for his new company, Slide, during the informal lunch.



Max Levchin meets with undergraduate and graduate students during office hours...that extended until the wee hours of the night/morning.

The Importance of Staying Connected to the Department, the University, and Each Other

By Tammy Nicastro, Associate Director of Development and Alumni Relations

Since August of 2004, I have met with hundreds of brilliant alumni from our department. Each meeting has been unique and extremely worthwhile. I never know exactly where the conversation will lead but my meetings almost always result in follow up activity that somehow benefits the department. These meetings have taken me down so many diverse paths both literally and figuratively that I am beginning to appreciate the ubiquity of computer science.

Like many people, I am motivated by results and progress. So it has been deeply rewarding to witness our department head, Marc Snir and our associate head, Mehdi Harandi take your feedback from these meetings and begin to make changes based on this information. There is one message that has been heard loud and clear, you believe that new graduates need to have a broader set of skills that include understanding the real world applications of computer science in a global marketplace, project management, and the profit cycle of a proposed software solution. Both Marc and Mehdi are working to provide more opportunities for our students to strengthen those skill sets while at the same time protecting the theoretical education that you all remember so fondly.

There are many different outcomes from my meetings but connecting them all is the mission to get you, our alumni reconnected to each other, the department, and the university. There is considerable value for this institution and we hope for you when you engage in a dynamic relationship with your alma mater, our current students and your fellow alumni.

There is a real sense of urgency now more than ever before to look to our alumni for answers and for support. This department needs its alumni to help us forecast what the changing needs of industry will be so we can better prepare our students and guide our research. We also need the financial support of our alumni as the department makes the transition from receiving the majority of our operating budget from the state to only receiving about 20% from the state. If we are to compete for the top undergraduate and graduate students and faculty, we will have to increase the number of scholarships, fellowships, professorships, and chairs that this department can offer. In order to maintain the same academic programs that were made available to you through state funding, we will have to increase our annual fund at a dramatic rate. This is the reality of public higher education.

With some rather lofty goals in hand, it is paramount to the success of this alumni relations and development program that we understand the effectiveness of the department's efforts to engage our alumni. To date, we have the lowest alumni participation rate in an annual fund of any department in the college (although it is improving rapidly) and we have roughly only 10% of our alumni's email addresses. Perhaps we have not sent the message out at a high enough frequency explaining why it is important to us that we have the ability to communicate with you. Or perhaps we have not created enough value for you to take the time to keep in touch with us. The reasons we would like to communicate with you range from wanting you to know about an alumni event in your area to asking for your help in creating promotional materials for the department that showcase our alumni's careers. Here is one example: we recently needed to gather data on how many of our PhD alumni were holding faculty positions or had been honored with certain awards. It would have saved the department considerable resources if we could have sent an email to those alumni with PhD's asking for an update on their employment status. Or even better, if every alumnus or alumna contacted the department to update us whenever they changed jobs, we'd be in alumni relations nirvana.

So, I am asking for your input not just today but on an ongoing basis. What could we be doing differently that might aid in our efforts to increase alumni engagement with this department? How soon should we address the importance of staying connected to the department? Is the day someone accepts their admittance too early? What would it take for us to have 100% of our alumni's email addresses and alumni participation in our annual fund?

Ultimately, we want you to feel a life long connection to this department. We want you to feel that together we can do greater things than we can apart. And lastly, we want you to feel the fulfillment that comes from being a part of something that is far reaching and promises to enable progress. I'll look forward to hearing from you and to meeting many of you in 2006. Please send your feedback to alumni@cs.uiuc.edu



Alumni Event Creates Opportunity for Chicago Area Alumni to Learn, Volunteer, and Be a Part of the Solution

Over refreshments and hors d'oeuvres, 35 concerned [UIUC](#) CS alumni tackled the problem of decreasing enrollments of women in computer science. At a reception held in Chicago on September 8, concerned alums met with representatives of the department to learn more about the problem and how they can help.



"I've had many discussions with alumni about how we can work together to bring more women into the department," said [Tammy Nicastro](#), associate director of development for Computer Science and organizer of the reception.

The enrollment of women has been steadily declining since 1984, when women made up about 40 percent of our undergraduate population. Currently less than ten percent are women.

"There is a real desire among our alumni to get involved at a grass roots level to help solve this problem," Nicastro said. "It seemed logical to hold an event that would develop opportunities for concerned UIUC CS graduates to help us generate interest in computer science among female high school students."

Brooke Herman is a 2002 graduate of the department and currently an employee of [Crowe Chizek and Company LLC](#), an accounting and consulting firm. Con-

cerned by what she learned from Nicastro about the declining representation of women in the department, she convinced her company to host the reception.

The event featured a lecture by Professor [Sam Kamin](#), the department's director of undergraduate programs, in which he described and quantified the recruitment and retention issues facing both the department and the nation. He also discussed what might be done to improve enrollment rates. One potential solution, he said, is making girls more aware of the satisfying and challenging work available in the field before they reach college.

In an effort to raise such awareness, Kamin said, the department has initiated an outreach program in conjunction with the [Women in Computer Science](#) (WCS) student organization. Together they created the [ChicTech](#) program, a traveling road show for girls who attend Illinois high schools. Treating girls to pizza luncheons, members of the ChicTech team voluntarily travel to high schools across the state, explaining and demystifying the field of computer science. They give girls a glimpse of life as a student in CS and explore the exciting and challenging career options open to graduates. Based on an interactive PowerPoint production containing problem-solving games that require logical reasoning and mathematics skills, the presentation confronts stereotypes of the male-dominated field, debunking myths, citing success stories and sharing personal experiences. It is designed to resonate with the younger girls, sparking their interest and moving them toward further exploration.



Alumna Brooke Herman talks with Eva, daughter of alumna Tonya Berger-Wolf

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Debra and Ira Cohen Graduate Fellowship to attract excellent graduate students in bioinformatics

Fellowships are the most effective way to recruit the future leaders in computer science. In order to be competitive as a top computer science department we must be able to offer the most talented graduate students the opportunity to attend graduate school without the burden of working or incurring student loans. Debra and Ira Cohen are helping the Department realize the recruiting power in graduate fellowships. Last academic year, the Department had 7 endowments for graduate fellowships funded by alumni or friends of the department. These endowments were able to fund 16 graduate students. Through Ira's involvement with the Department's Executive Advisory Council, the Cohen's became aware of the initiative the Department is taking to increase the number graduate fellowships that we can offer incoming and returning students.

This fall, the Department added an 8th endowed graduate fellowship with the addition of the Debra and Ira Cohen Graduate Fellowship in Computer Science. Our goal is to offer 13 new fellowships over the next 3 years so that we can competitively recruit the world's most promising graduate students in the same way that our peer departments are recruiting.

Ira holds a BS in computer science (1981) from the University of Illinois at Urbana-Champaign. Upon graduation, Ira worked for a brief time in consulting before he started his company, Advanced Systems Concepts (ASC). Now, 23 years old, ASC is a provider of software tools for IBM midrange systems. Their data access, operations and programmer tools have won numerous awards and are used at thousands of sites worldwide.

The Cohen's generosity has been an integral part of the development of the Department. In 1995 they endowed the Sara and Louis Cohen Graduate Scholarship for minority undergraduate students in computer science that honors Ira's grandparents. Then in 1996 they established an endowed Scholarship for female undergraduate students in computer science and honors Debra's parents. Both scholarships are awarded based on merit. "This fellowship truly was just a continuation of our commitment to the Department." Debra said. "We had already established two undergraduate scholarships and over the years we've been able to see how the scholarships have helped the students succeed in their respective educational fields."



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At the beginning of 2005 the Cohen's decided they wanted to do something else for the Department that would make a substantial impact on the educational opportunities for students and at the same time further the Department's research efforts. A graduate fellowship was the perfect fit. Because of the size of the Cohen's gift, \$250,000 the Department was able to take advantage of a phenomenal program offered through the Provost's office. The Provost's office will match the income from any gift designated for a graduate fellowship as long as the fellowship meets certain requirements. In essence, this doubles the income from a \$250,000 endowment. For this academic year, the Department will have roughly \$25,000 from this gift to award a graduate student. The student will be able to use this money as a stipend to cover living expenses. Another benefit to the Department and the student is a tuition waiver that will accompany this fellowship.

"Last year at the Annual Foundation meeting we attended a session on 'The Critical Role of Fellowships in Graduate Education,' recalled Debra. "Both of our interests were peaked when we found out that the Provost had agreed to match funds earmarked for fellowships. We also liked the fact that we would be able to pick the department where the fellowship would be established. We began conversations with Tammy Nicastro, Associate Director of Development and Professor Marc Snir and just recently the Debra and Ira Cohen Fellowship in Computer Science was established."

The final step in making the Cohen's gift a reality was deciding on the criteria for awarding the fellowship. Debra has had a strong relationship with the American Cancer Society over the years as a board member. Most recently she has become very involved in their program that funds high school students' participating in summer research at various Illinois universities. Debra realizes how

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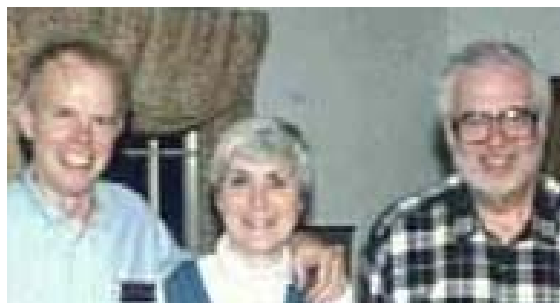
Department of Computer Science Announces

Endowment of Saylor Professorship

The Department of Computer Science at the University of Illinois at Urbana-Champaign has announced the establishment of the Paul and Cindy Saylor Professorship in Computer Science. The new Professorship was endowed through a generous gift from Stanford University Professor Gene H. Golub, an alumnus of the University and long-time supporter of the Department. The gift was bestowed in honor of Golub's long-standing friendship with Professor Emeritus Paul Saylor and his wife Cindy.

"Professor Golub's gift is important to the department in a number of ways," said Department Head and Faiman/Muroga Professor Marc Snir. "In addition to providing apt recognition for an esteemed educator and mentor such as Professor Saylor, it will also be used in perpetuity to attract and retain top scholars for our department and thereby help provide a first-rate education for generations of students to come. The endowment will be invested so that its income can be relied on regardless of the economic or legislative climate."

Professor Golub established the Saylor Professorship with a donation of \$500,000, the majority of which was through a transfer of Google stock. Professor Golub obtained the stock when Google bought a start-up company in which he had previously received stock as a gift from a grateful former student whom he had helped in developing an algorithm for relevancy search. Thus, Professor Golub's earlier generosity with his time and ideas enabled his subsequent financial generosity in promoting academic excellence through this new endowment, which is targeted to grow to \$1,000,000 in the coming years. Professor Golub was born on February 29, 1932, in Chicago, where he attended the public school system. He attended the University of Illinois at Urbana-Champaign, where he received his B.S. in 1953, his M.A. in 1954, and his Ph.D. in 1959. After an NSF Fellowship at the University of Cambridge and a brief position in industry, Golub joined the faculty of Stanford University in 1962. At Stanford he has served as Chair of the Department of Computer Science 1981-1984, Director of the Scientific Computing and Computational Mathematics Program 1988-1998, and Fletcher Jones Professor since 1991.



Golub is noted for his highly influential research in numerical analysis, especially numerical linear algebra. His book *Matrix Computations*, co-authored with Charles Van Loan, is considered the definitive work on this subject. Golub served as President of the Society for Industrial and Applied Mathematics (SIAM) and was founding editor of both the *SIAM Journal on Scientific and Statistical Computing* and the *SIAM Journal on Matrix Analysis and Applications*. He has received numerous international awards and honorary degrees, including an honorary Doctor of Science from the University of Illinois, and is a member of both the National Academy of Science and the National Academy of Engineering.

"All of the achievements I've realized in my career," said Golub, "can be traced back to my experience at Illinois and the wonderful, supportive group of people who brought me into the field. Paul and Cindy Saylor were an important part of this group. Paul has dedicated himself to being a good professor and Cindy is running for sainthood. I'm very happy to be able to give back to Illinois now with a gift honoring the Saylor."

Paul Saylor was born in March, 1939, in Dallas, Texas. An avid student of mathematics, Saylor received his bachelor's degree from Stanford University in 1961, his masters from the University of Texas at Austin in 1963, and his Ph.D. from Rice University in 1968. Upon joining the Digital Computing Laboratory at Illinois in 1967, Saylor became interested in the great capacity of computers to solve important problems in science and engineering. Accordingly, during his career on the faculty at Illinois, Saylor established collaborative relationships and frequent visits with several national laboratories, including Lawrence Livermore, Los Alamos, Lawrence Berkeley, and Oak Ridge.

Saylor's research interests have focused on high performance computing and the solution of large linear and nonlinear systems, with applications in astrophysics, electromagnetics, and groundwater flow. He was Principal Investigator for the NASA Earth and Space Grand Challenge on Simulating the Merger of Binary Neutron Stars and was a co-PI with the Center for Simulation of Advanced Rockets at UIUC. In recent years he has spent a year as a program manager at the National Science Foundation and an extended visit at the Center for Computation and Technology at Louisiana State University. Saylor is currently Professor Emeritus at Illinois.

See Saylor on page 45

Ceremony and Celebration *in Padua and Campbell Investitures*

On November 1, two computer science professors received one of the highest campus honors. Professor Roy Campbell and Professor David Padua were invested as named professors in a ceremony that took place at the Siebel Center. Professor Campbell was invested as the Sohaib and Sara Abbasi Professor and Professor Padua was invested as the Donald B. and Elizabeth M. Willett Professor, the first of both in the department. The investiture was followed by a reception and a dinner for the speakers, recipients, and their guests at the Champaign Country Club.

The investiture and reception drew approximately 175 people to honor Padua and Campbell. Speaking about the impact that Padua's work has had on the computer science field was his PhD advisor and Intel Fellow, Professor David Kuck who also happens to be a Donald B. and Elizabeth M. Willett Professorship recipient.

Professor Campbell was called to the platform to accept the Abbasi Professorship by his PhD advisor, Professor Brian Randall, a member of the faculty at the School of Computing Science in Newcastle upon Tyne, England. Department Head, [Marc Snir](#), served as the master of ceremonies and kept the event running on schedule. Ilesanmi Adesida, the Interim Dean of the College of Engineering, invested Padua and Campbell. They each received gold medallions symbolizing the ideals they exhibited to earn their respective professorships.

The general purpose of professorships is to acknowledge and reward outstanding research, but honorees must also strike a unique balance between expertise in teaching and in exemplary research accomplishments.

The Willett Professorship was endowed, specifically, to honor outstanding professors from anywhere within the College of Engineering while the Abbasi Professorship is available only to computer scientists. "It's a recognition of my work, the work of my advising professors and the work of my colleagues and students," Professor Padua said. "I'm absolutely pleased with it."

Professor Campbell agrees that the recognition can be applied to many, including the over 30 Ph.D. candidates he has advised. "It reflects well upon my students," Campbell said. " They contributed to recognition, and they deserve to receive recognition as well."

The Sohaib and Sara Abbasi Professorship was given to the department by alumnus Sohaib Abbasi, who was present at the event. Mr. Abbasi also took the podium to share a few remarks with attendees before he and his wife Sara were presented with a Shadowbox commemorating the event. Abbasi graduated with honors from the University, earning degrees in computer science. He was the president and CEO of Informatica, a leading provider in data integration software after 20 years at the Oracle Corporation. He was important in the company's jump from a 30-person startup making \$4 million in revenue to a company employing over 42,000 worldwide with revenues of \$9 billion.

The Sohaib and Sara Abbasi Professorship was established by the couple to enable the Department of Computer Science to maintain its stature as one of the nation's premiere departments and allow an opportunity to learn from a well-known computer scientist and educator. "By having their names attached the professorship position, it will make sure the world remembers the contributions the Abbasis have made to research in general," Professor Campbell said. "These honors are a way to acknowledge the contributions alumni have made to the institution."

In addition to being a full time faculty member, the recipient of the Abbasi Professorship, Professor Roy Campbell, is the Director of the National Security Agency designated University of Illinois Center of Academic Excellence in Information Assurance Education and the Director of the Systems Software Research Group. He has been named an IEEE Fellow and received the Delta Sigma Omicron Distinguished Teaching Award in 2004.

The Donald Biggar Willett Professorship is awarded in memory of a man who left the UI a few credits short from receiving a degree in civil engineering to join his family's Chicago-based coal business as a partner. According to his wife Elizabeth, her late husband admired the College of Engineering for its thriftiness and honesty.

Professor Padua came to the University of Illinois for graduate studies in 1974-he spent 4 years away immediately after receiving his Ph.D., but has been at the University ever since then. His work on automatic program transformation for multi-threading produced several influential parallelizing compiler techniques and parallel programming constructs. He also was one of the first to study automatic optimization algorithms and debugging tools for parallel programs; topics of great importance for emerging multicore systems. Professor Padua chairs the steering committee of the SIGPLAN Symposium on Principles and Practice of Parallel Programming. He is also an IEEE Fellow and the recipient of the College of Engineering Xerox Award for Faculty Research. ☞

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Debra realizes how important bioinformatics will be to finding a cure for cancer. When the Department of Computer Science announced last year that we would begin a graduate program in bioinformatics, this seemed like a natural fit for the Cohen Fellowship.

Because Debra's involvement with the American Cancer Society has played a role in the establishment of this gift, we asked her how she became involved with this organization. Debra replied with *why* she became involved. "I can give you two very good reasons-my mother and father. My father died from lung cancer 16 years ago and my mother 12 years ago from pancreatic cancer. Prior to my father dying, I knew that cancer existed but never had to experience the affects of the deadly disease first hand. Both my husband and I have subsequently lost far too many family members and friends to this non-discriminating, devastating disease."

The first student to be awarded the Debra and Ira Cohen Graduate Fellowship in Computer Science is James Lin. He comes to our Department from the University of California at Berkeley where he earned his BS in computer science. In the last 18 months, he has been involved in research on computational protein analysis and on human-computer interaction. As an intern at Guidant, he added to Pfizer's "Protein Family Annotation Alignment Tool (PFAAT), a software system for classification and analysis of proteins. He wants to continue his research in bio-medical informatics with an emphasis on the application of "machine learning" techniques to bio-medical problems. His reference letters put him among the very best graduates from Berkeley. ☞

Alumni event Continued from page 41

According to [Cinda Heeren](#), the department's assistant director of diversity programs, ChicTech visits have addressed not only the recruiting problem; they've also had an impact on retention by investing WCS members at a personal level in the quest to improve diversity. Since ChicTech visits were established, Heeren reported, the retention numbers within the department have doubled that of the national average.

None-the-less female CS majors are so scarce and the ChicTech time commitment is so large - generally involving a full day of missed classes to travel to Chicago-area schools - that the WCS volunteers can not scale the program up sufficiently to cover anything but a tiny fraction of the state's high schools. The message is being heard by far too few girls.

Enter the alumni. To date, eight attendees to the reception have signed on as ChicTech volunteers and agreed to lead their own high school visit in the Chicago-land area. They will select a school, convenient for them to visit, and deliver the ChicTech presentation independently. The department will provide administrative support, advertising, food, and supplies for the presentation.

"The alumni don't necessarily know the people who work within the high schools that they pass on the way to work everyday, so we will set up the presentations," Heeren said. The alumni will deliver the message.

The ChicTech presentation provides a framework for that delivery but Kamin and Heeren are eager to see alumni volunteers fill it with their own experiences and style, putting a personal spin on their presentations. By describing their own experiences in the workplace, alumni have the potential to be singularly effective in conveying the message that computer science is a great major for women who are "curious, creative, clever, and communicative," Heeren said. Alumni holding positions in industries as different Motorola and Sears will underscore the wide range of job opportunities available to CS graduates.

"The variety of alumni present at the Crowe Chizek reception was encouraging," said Heeren. The interest was not limited to women in the audience-many men signed on as ChicTech volunteers.

"By encouraging alumni to facilitate the program directly," Nicastro added, "the department is tapping into a great resource." ☞

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Making the rules

Computer science departments traditionally tend to collaborate with technology companies, but, according to Snir, the landscape is changing. "IT users are becoming as important as IT companies," he says.

Solutions to the challenges inherent in embedded systems are of utmost concern to information technology users like Lockheed Martin. "Lui has synthesized a methodology that provides many of the properties we need: temporal correctness, efficient use of resources, failure immunity." Whether it's navigation, fire control, or decision aids, his work provides a "sound, orderly way of developing these systems," Preston says. ☞

The Annual Fund: You Do the Math

By Tammy Nicastro, Associate Director of Development and Alumni Relations

The annual fund which is comprised of individual gifts of less than \$10,000, has always played a role in the educational experience of our students and our ability to run the department. Last year we reported to you that our annual fund could use some help in both the participation and the contribution rates. We've seen considerable progress in the way of increased participation by alumni and an increase in dollars given. At the end of this past fiscal year (June 2005), we saw a significant increase of 51% over the previous year's giving. We also saw an increase in participation of 20%. These trends are very encouraging and show us that you are responding to our changing needs.

Just as we have some rather lofty goals for an increase in our endowed gifts, we have the same aspirations for our annual fund. There are more than 8,000 alumni of this department. Imagine if 4,000 alumni each made a \$100 contribution each year. You can play around with this question and change the number of alumni who will contribute and the amount they will give, but no matter how you do the math, there is power in numbers and we have them.

When I think about the annual fund, the first word that comes to mind is POWER. Our annual fund is unrestricted which makes it very significant for our department. Unrestricted support can lead to unrestricted experiences for our students and our faculty. In an ideal world, we should never have to tell a student that their idea is great but we just can't afford to see it through. Please keep in mind, we're not talking about making things as easy and luxurious as possible for the students, just making sure they have the basics so they can move forward with their ideas.

When I spent time with alumnus Jonathan Stark, team leader for Team Underdawg, at the DARPA Grand Challenge national qualifying event (see story on page 35), it was never more obvious to me just how much you can accomplish with the basics. While I was hanging out in the garage getting the grand tour of their modest Jeep Cherokee purchased from craigslist for \$500 and all its equipment, I couldn't help but notice the stark (no pun intended) contrast to the other teams who came with fleets of brand new cars, matching outfits, and gleaming equipment. With just the basics, Team Underdawg was able to accomplish great things and in the process exercise many of the skills they learned in the ACM office or working on EOH projects.

Now that we have the most sentient, advanced, and functional facility of any computer science program in the country, it's time to build an unrestricted fund which will parallel the power in our building. The Siebel Center is having its own very positive effect on our students' ability to learn and our faculty's ability to teach and do research, but there are still gaps in other areas which need to be closed. We should not have to tell a faculty member that we can't afford to buy more tracking devices for his students' cultural computing projects even though the current equipment breaks frequently and doesn't meet the needs of the number of students wishing to participate. When money comes in the way of providing the basic needs of instruction, it's a call to action. Where we used to rely on state budgets or federal grants, we have to now look to other sources. The state budget is supporting less than 20% of the university's operating costs and federal grants are becoming increasingly more competitive or in some cases non-existent when you're talking about research that doesn't fit into an established category.

So, once again we are asking you, our alumni and friends to partner with us as we promise our students and faculty that we will provide the resources as long as they provide the ideas and hard work. Our promise to you if you choose to make a contribution to our annual fund, is to keep you connected to the progress that you are enabling to happen. We will share with you the stories of accomplishment that we expect to emerge as each academic year begins and ends.

Please know that no matter how large or small your contribution may be, it will become a part of a greater whole. It's when we combine hundreds of thousands of dollars from smaller gifts that we realize the power of our annual fund. We ask that you do one of two things between now and June of 2006: 1. make a contribution to our annual fund (visit our online giving page at <http://www.cs.uiuc.edu/alumni/giving.php>), or 2. send us a note at alumni@cs.uiuc.edu and tell us why you aren't making a contribution to the annual fund and what we need to do differently to make you want to make a contribution.

How is the annual fund used?

- Student travel costs
- Awards banquet
- To support student organizations such as: ACM, !BANG, WCS, and GSO
- Scholarships
- Fellowships
- Alumni Events
- The Engineer in Residence Program (publicity and food for students)

Saylor continued from page 41

After a successful career in nursing, Cindy Saylor is currently a volunteer in the effort to restore New Orleans in the aftermath of Hurricane Katrina.

The department expects to announce the first holder of the distinguished Paul and Cindy Saylor Professorship in Computer Science in the next academic year.

Alumnus Len Kawell's Pepper Pad Puts Internet Media Into Consumers' Hands

By Frank Krolicki

The increasing popularity of compact mobile phones, iPods and PDAs suggests that when it comes to consumers and technology, size matters. Len Kawell, a 1977 graduate from the Department of Computer Science at the University of Illinois, noticed this trend and created the Pepper Pad, a device that combines the convenience and cool factor of these compact devices with the usability of a PC. Kawell founded Pepper Computer in 2002, and the Pepper Pad was launched in May 2005. Since then, he has focused on providing consumers with a portable yet functional, easy to use device that can hold large amounts of digital media and provide instant wireless Internet access.

"I saw that everyone was using PDAs and cell phones," Kawell said. "But I thought there ought to be something in-between those kinds of devices and PCs, and that's how the idea started."

Kawell set out to design a device that had the accessibility of a PC, but was also compact enough for people to use on their coffee tables and kitchen counters. With a small team, he built the necessary hardware and software, and developed the 2.3-pound Pepper Pad with a set of key objectives in mind. "One of the keys was for people to be able to carry a large amount of digital media around," he said. "With the popularity of the iPod, it's become clear that people find that very important." The Pepper Pad's 20 GB disk drive allows users to download and access a library of music, videos and photos.

Kawell said another important aspect when designing the Pepper Pad was that consumers be able to view information on the screen in full fidelity. Unlike a PDA or mobile phone, the Pepper Pad has a high resolution, resistive touch LCD screen. This provides the experience of using a larger, more stationary device. He also said building the Pad to be rugged and sturdy was an important factor in making the device appeal to consumers. "We have made it pretty drop resistant and protective devices so that it's made to survive falls and spills," Kawell said. "People want to be able to carry it around wherever they go in something other than a corporate briefcase, so it has to be able to survive things like crumbs and sand."

Timing was an important factor in the success of the product, Kawell said. The initial stages of its development coincided with the increasing popularity of Wi-Fi Internet, which freed people from having to sit behind a desk to get online. Also, the company was able to get involved with the Mozilla project in order to secure Mozilla as the product's Web browser.

Some of the basic ideas behind the modern technology used in devices such as the Pepper Pad began as early as the mid-1970s, when Kawell and two of his friends and classmates, Ray Ozzie and Tim Halvorsen, worked on developing the Notes networking program, the first commercial groupware product. Kawell recalled how his experiences in the then-small computer science department served as a launching pad for his entire career, which includes time at Iris Associates, Digital Equipment Corp. and Glassbook, Inc., a leading developer of PDF-based e-book reading software, of which he was co-founder. "My time at the U of I in CERL (Computer-Based Education Research Lab) working on the Plato system was very important," he said. "That's where I met Ray and Tim, and a lot of the ideas we have expanded on since then came from there."

Kawell said consumers have responded to the Pepper Pad with enthusiasm, mainly because the device does not compromise accessibility for size. He also noted that the Pad has attracted a devoted group of hackers, who enjoy writing their own programs for the device.

Though it is a relatively new product, the Pepper Pad has already undergone improvements, Kawell said. Pepper Computer is working on a new version of the Pad called Pepper Pad Plus, which has a bigger battery, newer generation of Wi-Fi and 30 GB of storage space. In addition, the company has made simple upgrades, such as additional colors. "If you position a product as something that can sit on a living room coffee table, consumers will want to make sure it blends in with the décor," Kawell said.

Currently, consumers can purchase the Pepper Pad through retailers such as Best Buy and Amazon, but he said the product could soon be available through broadband providers, as well. Kawell said it was important for the Pepper Pad to remain easy and entertaining to use, while fully functional. "It's a fun product, whether you're an ordinary consumer or a computer geek," he said.

Professor Sha Honored with Donald B. Gillies Endowed Chair

The eminent career of [Lui Raymond Sha](#), professor of computer science, is being honored with the announcement of his receipt of a Donald B. Gillies Chair in Computer Science. A ceremony, to be held March 31, 2006, will mark his investiture as the Gillies Chair.

Professor Sha, a pioneer in the establishment of an engineering process for the practice of real-time computing based on analytic methods, is one of the nation's best and most respected researchers in Embedded Systems. He earned his undergraduate degree from the McGill University in Canada in 1978 and his Ph.D. from Carnegie Mellon University in 1985. He has distinguished himself as one of the University's most outstanding educators and has served on the Doctoral Dissertation committee of some 20 Computer Science Ph.D. candidates in the last five years.

Sha's research concerns the design and integration of robust real time embedded systems using a mixture of new and extant components. He has published more than 100 articles in the area, and the significance of his work has been recognized by institutions such as the National Academy of Science, the National Research Council, and the US Department of Defense. His research is approved by the FAA for flight control, supported by nearly all the open standards and most commercially available operating systems, middleware and tools for real time computing, and integrated into many national high technology programs including: the GPS upgrade, the Mars Pathfinder, and the International Space Station. Sha is an IEEE fellow, a member of the Executive Committee of the IEEE Real Time Systems Conference, and Associate editor of the International Journal of Real-Time Systems,



Professor Lui Sha

He currently works on technologies for the integration and development of robust real time systems while serving as the Director of the National Center for Systems Integration Technology at the University of Illinois.

"Professor Gillies was an outstanding mathematician and computer scientist, whose accomplishments helped establish our department a leading institution," said Professor Sha. "To be a Gillies Professor is a great honor and a great challenge to me."

The Donald B. Gillies Chair in Computer Science honors the late Professor Gillies (1928-1975), who was a member of the faculty in the Department of Computer Science at the University of Illinois at Urbana-Champaign from 1956 -1922. Gillies earned his undergraduate degree from the University of Toronto in Canada in 1949 and his Ph.D. from Princeton University in 1953. At Princeton, Gillies worked as a research assistant to John Von Neumann, a pioneer of the modern digital computer. Professor Gillies was an inspira-



Donald B. Gillies

tion to his students. Long before the personal computer made "hands-on" computer experience commonplace, he recognized the need for students to have this opportunity and implemented several systems to provide it. Throughout his work and teaching, Gillies stressed the importance of the ethical use of computing machines in contemporary society. He was dedicated to the honest uses of technology, environmentally concerned, a man of wit, vigor, and understanding, Gillies challenged and stimulated those who knew him.

"Professor Gillies demonstrated tremendous enthusiasm for everything related to computers and a willingness to lead us, his students, into his world," said the Chair's donor, Lawrence (Larry) White. "He acted like sharing his breadth of knowledge was a delight. Even though I've forgotten everything that was on the tests, I've never forgotten what it means to be a good teacher."

White, an alumnus of the department, established the Donald B. Gillies Chair in Computer Science with a gift of \$2 million. "My gift to UIUC was my first major gift," he said. "It is my opportunity to give something back."

Larry grew up in a family where helping others was a way of life. His parents were missionaries to Liberia, who returned to the United States when Larry was ready to enter school. He attended public schools in Naperville IL and was active in the Boy Scouts of America, ultimately becoming an Eagle Scout.

He launched his programming career almost as soon as he got to college. While working on his Bache-



Lawrence (Larry) White

lors and Masters degrees in CS, White spent four years as a student programmer on UIUC's PLATO project.

"I learned early," he said, "that a software error could cause 1000 people to lose their work."

He graduated with a master's degrees in computer science in 1976 after having earned his bachelor's degree in math and computer science from the department the previous year. After graduation, Larry stayed on at UIUC, working for four years as a development manager at NCSA. He began work at Microsoft as a Development manager in the 1990s. "The monetary rewards for working at Microsoft were more than anyone could have anticipated," he said.

In sharing these rewards, White chose to enable the department, in perpetuity, to more effectively recruit and retain preeminent researchers, such as Lui Sha.

"The University of Illinois provided an environment in which I thrived. Few places in the country could match our computing and research facilities," said White, "and even fewer had professors of the caliber we had. My education would not have been possible without the efforts of the thousands of people and the thousands of gifts that came before."

March 31 will celebrate the beginning of a new legacy, illustrating the significance of such gifts, when Professor Sha is honored as the inaugural recipient the Gillies Endowed Chair.☞

Alumnus Ray Ozzie is Named One of Three Chief Technology Officers at Microsoft

On April 8, 2005, Microsoft completed its acquisition of Groove Networks, Inc., and as part of the transaction, Ray Ozzie (BS 1979, Computer Science), who founded Groove Networks in 1997, became a chief technical officer at Microsoft. Headquartered in Beverly, Massachusetts, Groove Networks offers virtual office software that allows teams of people to work together over the network as if they were in the same room. Reporting directly to Microsoft Chairman and Chief Software Architect Bill Gates, Ozzie will help shape corporate-wide communication and collaboration offerings as well as associated platform infrastructure.

Previously, Ozzie was a founder and president of Iris Associates, where he created and led the development of Lotus Notes, the defining groupware product used by more than 100 million people worldwide. Prior to Iris, Ozzie was instrumental in the development of Lotus Symphony and Software Arts' TK!Solver and VisiCalc, and did early distributed operating systems development at Data General Corp.

He earned a bachelor's degree in computer science and has been honored as a distinguished alumnus of the University of Illinois Urbana-Champaign, where he was first exposed to the nature and significance of collaborative systems and computer-supported cooperative work while working on the university's seminal PLATO project. This work significantly influenced his perspective on collaborative systems and the projects he has undertaken throughout his career.

"My passion for using technology to augment relationships began in the mid-1970s when I worked on PLATO (Programmed Logic for Automated Teaching Operations) as an undergraduate at the University of Illinois," Ozzie stated. "At the time, PLATO consisted of about 1,000 terminals connected to a central mainframe. Programmers started to use the system not only to build courseware, but also to create a variety of tools for human interaction, such as those we now think of as e-mail, instant messaging and chat rooms, online discussions and interactive gaming. In the course of my projects, I established relationships with people I never actually met face-to-face. Since then, in many ways, I've spent most of my life trying to build on those first experiences I had with PLATO."

Honored as one of seven "Windows Pioneers" by Microsoft, Ray was named "Person of the Year" in 1995 by PC Magazine. He was inducted into the Computer Museum Industry Hall of Fame and the InfoWorld Hall of Fame, and in November 2000, he received the Institute for Electrical and Electronics Engineers (IEEE) Computer Society's W. Wallace McDowell Award. He has served as a member of the National Research Council's Computer Science and Telecommunications Board, and was a member of the NRC committee that produced the landmark CRISIS report on the societal impact of cryptography, a computer security technology. Ozzie is a member of the National Academy of Engineering, and a World Economic Forum member and governor for IT and telecommunications. He was honored as World Economic Forum Technology Pioneer in 2001.☞

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