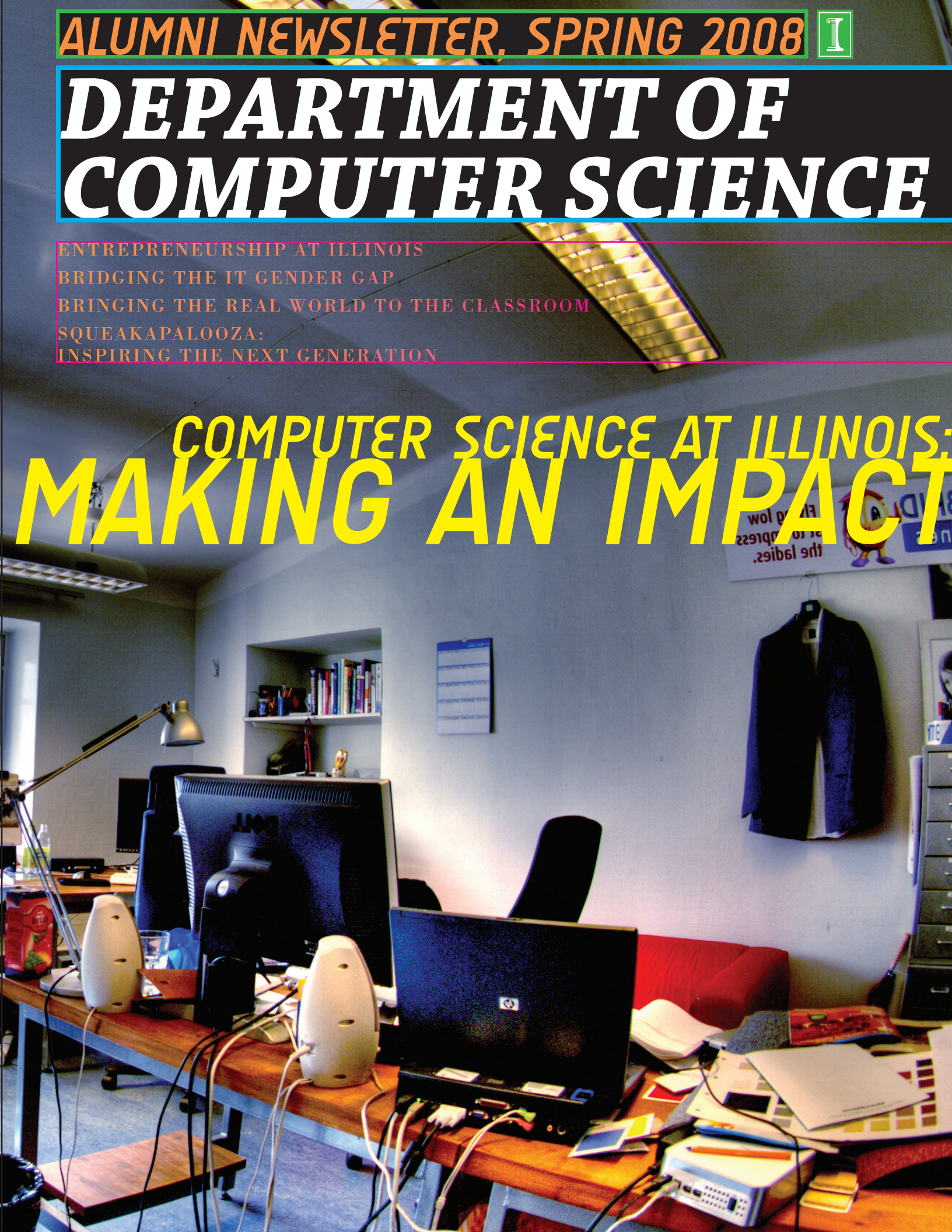
ALUMNI NEWSLETTER, SPRING 2008

DEPARTMENT OF COMPUTER SCIENCE

COMPUTER SCIENCE AT ILLINOIS:

MAKING AN IMPACT



EAC

Executive Advisory Council

MUKUL CHAWLA; *NEW YORK, NEW YORK*

IRA COHEN; *WHEELING, ILLINOIS*

JAMES COMMONS; *GLENVIEW, ILLINOIS*

BILL DUNN; *CHICAGO, ILLINOIS*

JOHN ENTENMANN; *SAN MATEO, CALIFORNIA*

ROSS ERLEBACHER; *HIGHLAND PARK, ILLINOIS*

JERRY FIDDLER; *BERKELEY, CALIFORNIA*

JOHN FOX; *NAPERVILLE, ILLINOIS*

KUMAR GOSWAMI; *SUNNYVALE, CALIFORNIA*

HOWIE HOLLANDER; *SYRACUSE, NEW YORK*

NOREEN ILES; *ALGONQUIN, ILLINOIS*

NAYEEM ISLAM; *PALO ALTO, CALIFORNIA*

TODD KIMBLE; *WESTERN SPRINGS, ILLINOIS*

TIM KRAUSKOPF; *DOWNERS GROVE, ILLINOIS*

MARC MARTINEZ; *OAK PARK, ILLINOIS*

MARY MCDOWELL; *GREENWICH, CONNECTICUT*

ZACH MIDED; *SAN FRANCISCO, CALIFORNIA*

EISUKE MUROGA, *SAN FRANCISCO, CALIFORNIA*

DAN PETERSON; *MOUNTAIN VIEW, CALIFORNIA*

ED REINGOLD; *EVANSTON, ILLINOIS*

CRAIG ROWE; *NEW YORK, NEW YORK*

THOMAS SIEBEL; *WOODSIDE, CALIFORNIA*

RICHARD SCHELL; *SAN FRANCISCO, CALIFORNIA*

PETER TANNENWALD; *CHICAGO, ILLINOIS*

TIM YARDLEY; *CHAMPAIGN, ILLINOIS*

c0n7ribu73rs

contributors

DEPARTMENT HEAD
PROFESSOR MICHAEL HEATH
FULTON WATSON COPP CHAIR
217 333-3373; HEAD@CS.UIUC.EDU

ASSOCIATE HEAD
PROFESSOR MEHDI HARANDI
217 333-6952; HARANDI@UIUC.EDU

DIRECTOR OF UNDERGRADUATE PROGRAMS
PROFESSOR LENNY PITT
217 333-7505; PITT@UIUC.EDU

COORDINATOR OF GRADUATE ADMISSION & ADVANCEMENT
PROFESSOR STEVE LAVALLE
217 265-6313; LAVALLE@UIUC.EDU

DIRECTOR OF DEVELOPMENT
SAFIYA NOBLE
217 265-6823; SNOBLE@UIUC.EDU

ASSOCIATE DIRECTOR FOR PUBLIC ENGAGEMENT
KAREN HYMAN
217 244-4496; KKHYMAN@UIUC.EDU

ASSOCIATE DIRECTOR FOR COMMUNICATIONS
JENNIFER LAMONTAGNE
217 333-4049; JSANDONE@UIUC.EDU

EDITOR
JENNIFER LAMONTAGNE

DESIGNER
KELLY CREE

WRITERS
CARLY NEEDHAM
MATTHEW SPARTZ
TINA TALARICO
BRAD PETERSEN, ELECTRICAL & COMPUTER ENGINEERING
RHIANNON CLIFTON, TECHNOLOGY ENTREPRENEUR CENTER

COVER PHOTOGRAPH
VILLE MIETTINEN

:D3P4R7M3

MICHAEL HEATH
INTERIM HEAD
FULTON WATSON COPP CHAIR
217.333.3373; HEATH@UIUC.EDU

3N7H3AD

Computer Science at Illinois has always helped shape the future of the computing industry through the research, innovations, and other contributions of our faculty, students, and alumni. Our graduates are often found in key positions in a wide range of companies, where the solid educational foundation they gained at Illinois enables them to make a difference, whether in creating change or adapting to it. As the industry continues to grow and broaden its reach, our department is placing a renewed emphasis on finding new and innovative ways to prepare our students to enter the information technology workforce and make a decisive impact.

New interactions with corporate partners are providing new opportunities for our students to bridge the gap between the classroom and the real world. These new interactions tightly integrate the expectations and demands of the marketplace with the deep foundational knowledge for which our graduates are known.

Reconnecting our alumni with our students through on campus events like our Engineers in Residence and Distinguished Entrepreneur series provides our students with insights into what it means to be a computing professional in today's world and the limitless possibilities for those with the imagination to go for it. These connections illuminate new paths and demonstrate the significance of computer science to all aspects of modern society and the world economy.

As interim department head, my goals for the department are to improve the student experience though enhanced interactions with our faculty, alumni, and corporate partners; raise the national level of visibility for our excellent educational programs, students, alumni, and research; pave the way for more extensive industry interactions; and realize the department's potential to be a cornerstone for the future of the university in an increasingly technological world.

Since this is my first letter to you as interim department head, perhaps a few words of introduction are in order. I joined the department in 1991, so by now I am one of the "old timers" in a very young department, even though it seems I joined only yesterday. Prior to coming to Illinois, I had been at Oak Ridge National Laboratory for several years after completing my PhD in computer science at Stanford University. My research interests are in scientific computing, parallel computing, and especially in the combination of the two. Since 1996, I have served as director of the university's Computational Science and Engineering Program, an interdisciplinary program spanning sixteen departments, and since 1997 I have also been director of the Center for Simulation of Advanced Rockets (yes, that makes me a "rocket scientist"). Hopefully, my considerable administrative experience will stand me in good stead in leading the department during this very exciting time of transition. I look forward to getting to know many more of you during the months ahead, and I welcome your ideas concerning the department at any time.

RECONNECTING OUR ALUMNI WITH OUR STUDENTS THROUGH ON CAMPUS EVENTS LIKE OUR ENGINEERS IN RESIDENCE AND DISTINGUISHED ENTREPRENEUR SERIES PROVIDES OUR STUDENTS WITH INSIGHTS INTO WHAT IT MEANS TO BE A COMPUTING PROFESSIONAL IN TODAY'S WORLD AND THE LIMITLESS POSSIBILITIES FOR THOSE WITH THE IMAGINATION TO GO FOR IT.

:D3V310PM3N7

SAFIYA NOBLE

DIRECTOR OF ADVANCEMENT
AND ALUMNI RELATIONS

217.265.6823; SNOBLE@UIUC.EDU

ALUMNI OF THE DEPARTMENT OF COMPUTER SCIENCE ARE LIKELY TO BE AMONG THE MOST HEAVILY SOUGHT-AFTER EMPLOYEES AND NEW ENTREPRENEURS IN THE NEXT DECADE, TO WHICH THIS ISSUE OF OUR ALUMNI MAGAZINE IS DEDICATED.

It's a pleasure to join the Department of Computer Science at Illinois this Fall as the new Director of Advancement. Working in partnership with our interim department head, Mike Heath, will be a tremendous opportunity. We hope to build upon the great strides in development made by our former Department Head Marc Snir and my predecessor, Tammy Nicastro. After three fantastic years of growth and transformation of the alumni relations and fundraising efforts in CS, a new opportunity became available for Tammy, who was asked by the Chancellor and the President of the Foundation to lead a new initiative on the West Coast. Considerable research helped Illinois determine that the second most important market for institutional advancement, outside of Chicago, is the Silicon Valley. Tammy will open this Bay Area office and work toward strengthening alumni relations and resource development for the University. We know she will be missed, but it is her goal to work closely with us to increase the visibility of Illinois' history of contributions to the economy in Silicon Valley and bring resources back to the University, so that the tradition of excellence continues. We hope that many of you will seize this opportunity to be a part of new partnerships and re-connect with us, whether you are in Illinois, California, across the U.S. or abroad.

You may also know that after serving the Department for six years as head, Marc Snir has taken on a new responsibility as Director of the Illinois Informatics Initiative, www.informatics.uiuc.edu. The Illinois Informatics Initiative will play a key role in keeping Illinois on the bleeding edge of technology. It also allows us to share information and keep our faculty and students on the forefront of knowledge creation as we leverage informatics in social, medical, and economically transformative uses of technology. You can stay in touch with Professor Snir and many of our faculty, students and alumni through our social networking site, "Always Illinois" at www.alwaysillinois.org.

You should also know that in June of 2007, Illinois launched its *Brilliant Futures* fundraising campaign, anchored by the generous gift from Thomas and Stacey Siebel of $100 million dollars. Tom and Stacey's gift is designated for use across the campus and will create more opportunities to engage both undergrads and graduate students in world-class research. These kinds of opportunities continue to make Illinois a truly special place. And while our future at Illinois is bright, our ambitious goal to be the premier Computer Science Department in the world is predicated upon you, our alumni, who are making great strides with your work and innovation. Your CS Annual Fund gifts to support fellowships, scholarships, professorships, and programming are the key to keeping us competitive with private universities, and are critical to helping us attract the best and brightest faculty and students to this program. Equally, your contributions of time and energy are moving us closer to realizing the vision of providing the best computer science education available.

Certainly, the market is responding with great rewards to many of our alumni. Predictions by a recent Harris Online Poll declare a bright job market for science and technology occupations. The work of our CS alumni remains prevalent in the headlines of 2007, and the Siebel Center halls are a buzz with companies clamoring to work with our students and faculty. We have a lot to be proud of, and know we can do even more. In the first few weeks of the semester, alumni have found their way back to Champaign-Urbana and are spending time mentoring new students, or participating in our Engineer in Residence program to share information and learning from the field. We are grateful for these gifts, and invite each of you to come back for a visit to campus.

Alumni of the department of computer science are likely to be among the most heavily sought-after employees and new entrepreneurs in the next decade, to which this issue of our alumni magazine is dedicated. Increases in salaries will bring higher expectations for qualified computer scientists and engineers that are the proficient in CS. But true rewards will be found among those with interpersonal communication skills, project management and leadership abilities that complement their Illinois' education. These demands for new skills, new knowledge and new applications of a world-class CS education place increasing strain on our resources and the Department. We hope you will stay connected, or re-connect with Illinois, and engage in creating solutions and opportunities for our students and faculty.

Contributing to Illinois and the Computer Science Department is only a click away at www.brilliantfutures.uiuc.edu

It's an exciting time at Illinois. I invite you to reach out to me and share your thoughts on ways you can remain a part of our brilliant future.

:PUB1IC3N

KAREN HYMAN
ASSOSCIATE DIRECTOR
FOR PUBLIC ENGAGEMENT
217.244.4496; KKHYMAN@UIUC.EDU

STUDENTS ARE BEST-SERVED BY CORPORATE SUPPORT AND ENGAGEMENTS THAT BUILD THEIR SKILLS FOR THE JOB MARKET AND MAKE ILLINOIS STUDENTS COMPETITIVE IN THE MARKETPLACE.

G4G3M3N7

It is a pleasure to enter my second year as Associate Director for Public Engagement and to work towards creating brilliant futures for our students and faculty. Intellectually adept, innovative, entrepreneurial, and keen to make a difference in the world, our students are a force that makes the Department of Computer Science a focal point for companies nationally and worldwide. It is indeed a great privilege to act as the gatekeeper for corporate and public engagement with our students and faculty. Together with my colleagues in development, and the professional staff in our Academic Office, we look forward to developing programs and student experiences that will enrich their education and provide a foundation for success in life and in work.

Students are best-served by corporate support and engagements that build their skills for the job market and make Illinois students competitive in the marketplace. Our halls and classrooms are alive with the dynamic programs that build these skills and make our students desirable recruits: competitions testing their programming skills; simulations that duplicate marketplace conditions; peer-to-peer presentations on internship experiences; formal lectures and informal conversations that open students' eyes to work in the "real world." We remain grateful for the resources alumni provide, through their volunteer efforts and financial support, that help to strengthen the student experience and provide necessary resources in these challenging times. And, we look forward to working more closely with you to learn how to build programs that will meet the needs of our students as future employees, entrepreneurs, and leaders in the IT field.

We may not be civil engineers, but I am often struck by how much of our work involves building firm and steady bridges between companies and our students. With an exciting reformation occurring of our Corporate Affiliate Program, we look forward to building a terrific bridge to better connect companies to our student organizations: ACM, Women in Computer Science, Latino/a Computer Science Club, !BANG and CS Graduate Student Organization. With a strong spirit of collegiality amongst our new advancement team, we are aiming to provide consummate service to our corporate partners, and our students, with programs that build a high return on investment for a growing roster of corporations, across the country and internationally. These partners cut across vast segments of the economy: companies in traditional IT areas and software development; but also financial services, insurance, aeronautics, healthcare, consulting, and entertainment.

My focus on public engagement means that a key part of my job is to create partnerships between our Department and some of the major non-profits in Illinois and national research labs. Bringing the strengths of our Department's research faculty to bear on some of the critical social and public health issues of our day – by creating alliances between the University and social service organizations; and supporting recruiting efforts of the national labs – is critical to fulfilling our mission as a public university, to serve the citizens of the State and the public good. I'll look forward to reporting more on some exciting new initiatives in future communications.

My capacity to serve our students and to build meaningful programs has been much enhanced by conversations with you, our alumni and friends. Please feel free to contact me, to share your thoughts and suggestions or to engage your company with students and faculty in the department.

10.11

74b13 Of C0n73n75

STUDENTS

PhD Students Study Computer Science Retention Practices

Tanya Crenshaw and Erin Wolf Chambers, University of Illinois Computer Science PhD students, are studying the reasons computer science does not attract a more diverse, dynamic group of people in a paper entitled "A Case Study of Retention Practices at the University of Illinois at Urbana-Champaign."

The paper will appear at the SIGCSE 2008, the ACM conference on computer science education. Crenshaw and Chambers, along with a few other researchers, conducted a survey of 130 undergraduate and graduate students for the paper. They hope to find the best ways to recruit and retain more students to computer science.

Students Win Computing Research Association Honors

Two undergraduate students were honored with Computing Research Association Outstanding Undergraduate Awards. Lars Erickson was chosen as a finalist, and Ekaterina Gonina received an honorable mention award. Both seniors were selected for the high quality and innovative research they are pursuing as undergraduate students.

Erickson is conducting research with Prof. Steve LaValle on localization techniques for robots with extremely low sensing capabilities. He conducts his research using Roomba robots. Gonina's work in parallel programming with Prof. Kale has focused on implementing a parallel version of Prim's algorithm for minimum spanning tree for dense graph. She and Prof. Kale have explored innovative ideas that liberate researchers from the textbook limitation of serialization (that only one vertex can be added at a time).

CS Students Help Power Illinois Solar Decathlon Victories

A group of University of Illinois Computer Science students helped propel their team of solar house builders to two first place finishes at this year's Solar Decathalon in Washington D.C. The "Elementhouse" earned first place in Market Viability and Comfort Zone.

The solar house cost about $600,000. The competition pitted 20 college and university teams against each other "to design, build, and operate the most attractive, effective, and energy-efficient solar-powered house," according to the contest's description. The houses were presented on the Nation Mall in Washington, D.C., from Oct. 12-20.

CS Programming Team Heads to World Finals

A team of computer science students at the University of Illinois at Urbana-Champaign have qualified for the world finals of the ACM International Collegiate Programming Competition for the fifth time in six years. Ninety teams from around the world advance to the finals which will be held April 6-8, 2008, in Alberta, Canada, hosted by the University of Alberta.

Jacob Lee, a senior in CS and a member this year and last year's qualifying teams, said this year's team is young, and in a rebuilding phase.

"Last year's team had a lot more experience," Lee said. "We'll need to train a lot more before the world finals."

Two CS Students Win Yahoo! Key Technical Challenge Awards

Wanmin Wu and Tao Cheng, CS PhD students, received the Yahoo! Inaugural Key Technical Challenge grant which recognizes research contributions in important and challenging areas and aids in funding the advancement of their projects. Each winner will receive $5,000 of unrestricted funds for the support of their research activities.

Wanmin is working in Tele-Immersion research. Tele-Immersion uses 3D multicamera setups to compile and stream 3D images over a network. Tao has been working on a project called Web Indexing and Search for Data Mining that allows users to specify Web searches like Google and come up with a more specific list of possible answers.

2 CS PhDs Win Yahoo! Fellowships

2 CS PhD students have won Yahoo! Fellowships. The fellowship program was created to recognize outstanding graduate student researchers with exceptional potential to make significant contributions and become thought leaders in their research fields.

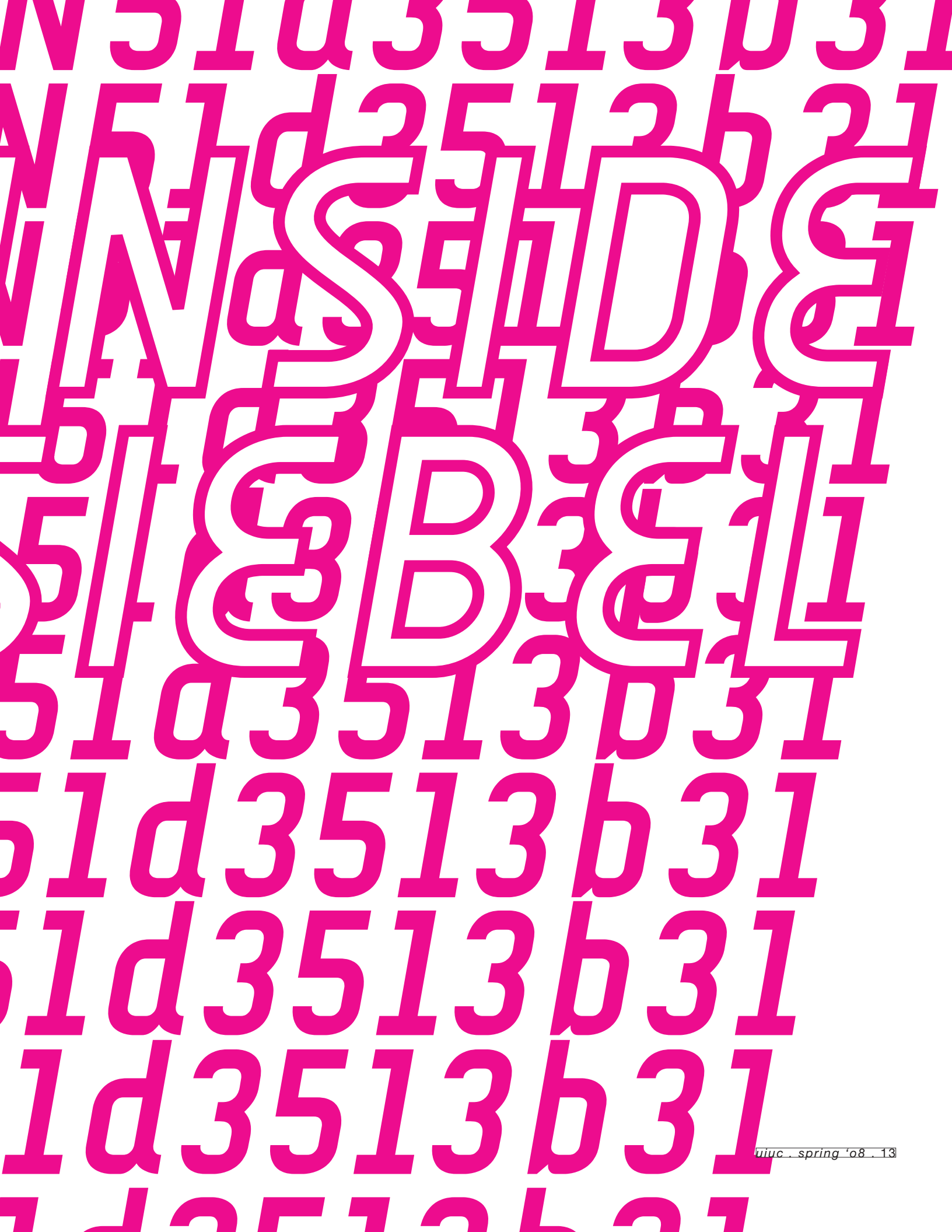
Qiaozhu Mei, 1 of 5 Yahoo Fellows selected in 2007 focuses his research on how contextual and text data mining expands the concepts of traditional web search to discover useful patterns and knowledge from text information like web pages, blog entries, and scientific literature. His techniques have application not only in search result summarization, but also in product opinion extraction and analysis, business intelligence, and interdisciplinary research topic discovery.

Xuanhui Wang, 1 of 4 Yahoo! Fellows selected in 2008, is currently pursuing advances in exploratory web search, with emphasis on an approach that uses navigation or browsing to help guide searchers to the information they seek. He is also investigating search log mining methods to improve the utility of general web search.

Both are researchers in Prof. Cheng Zhai's lab

CS Student Wins Yahoo! Hack Day with Digital Slide Rule

Greg Schechter won first place in the Yahoo! University Hack Day for his creation of a slide rule widget. Schechter qualified for the competition at the Hack Day held at the university, and the national competition was held at the Yahoo! headquarters in California on March 30, 2007. He beat out students from Stanford, Carnegie-Mellon, and MIT. The widget is currently available online and has been downloaded over 14,000 times.


51d3513b31
51d3513b31
51d3513b31
51d3513b31
51d3513b31
51d3513b31
51d3513b31
51d3513b31

FACULTY & RESEARCH

LLVM in the Real World

Prof. Vikram Adve has developed a complier to take advantage of the complete life cycle of a process – compile-time, link-time, install-time, load-time, run-time, and even idle-time – with his open-source Low Level Virtual Machine, or LLVM.

Major companies, such as Apple, Adobe, Aerospace, Cray, Ageia, and NASA, have adopted the LLVM in their production systems to perform a variety of tasks. LLVM is capable of supporting both sophisticated cross-module inter-procedural optimization and very fast run-time optimization and code generation. These capabilities make LLVM well-suited for developers looking to create new mid-level language-independent analyses and optimizations of all sorts, including those that require extensive inter-procedural analysis.

Novel Parallel Computing Architectures Focus of 2 New Projects

Architecture inefficiencies and the complexity of programming for parallel systems threaten to stand in the way of the continued adoption of parallel environments. Two teams of computer science researchers, both led by Professor Josep Torrellas, aim to change that, with new research programs designed to improve the performance of parallel architectures and to find new architectures to simplify programming for parallel environments

Typically, a chip cannot operate any faster than its slowest transistor. Torrellas and his team are researching how to deal with parameter variation in semiconductors on a variety of fronts - architecture design, CAD techniques, and software. The team sees promise in an approach where part of the chip's power budget is shifted from the fastest transistors to the slowest ones, enabling the latter to increase their speed.

CS Researchers Lead Major Trust Initiatives

Several computer science professors are leading new projects at the University of Illinois Information Trust Institute (ITI). The new projects are funded by the U.S. National Science Foundation Cyber Trust program. The NSF Cyber Trust program has very low acceptance rates, and grants are highly sought after.

CS researchers will be working on projects addressing a variety of technical problems involved in making information systems trustworthy and secure.

Prof. Carl Gunter will lead two projects. One, with ECE Prof. Nikita Borisov as co-investigator, will work to improve the security of network control systems for buildings, such as those used to control lighting, heating, and building access; a second award, with Dr. Himanshu Khurana (NCSA) and CS Prof. Manoj Prabhakaran, will develop new architectures and strategies for attribute-based security and messaging. Prof. Marianne Winslett will design archival data storage systems that have built-in, high-performance, low-cost security features to ensure automatic compliance with recent government regulations on records retention, such as the Sarbanes-Oxley Act. Prof. Jose Meseguer will work to enhance end-to-end protocol security through modeling of attackers and verification methods. Prof. Vikram Adve, along with Profs. Roy Campbell and Samuel King, will pursue ways to improve system security with a compiler-based virtual machine for operating system kernels.

The Information Trust Institute is a multi-disciplinary cross-campus research unit housed in the College of Engineering at Illinois. www.iti.uiuc.edu

University of Illinois Named an OpenSPARC Center of Excellence

The University of Illinois has been named an OpenSPARC Center of Excellence by Sun Microsystems, Inc. The Center represents a collaboration between the University of Illinois departments of computer science and electrical and computer engineering and Sun in support of OpenSPARC, a global community that fosters the creation of tools and derivative chip designs based on Sun's UltraSPARC T1 processor.

As part of the new Center of Excellence, Illinois researchers will be advancing the OpenSPARC movement through research in two primary areas: support for reliable processor hardware, and compilation for large numbers of threads.

Prof. Zilles Research Selected as Industry-relevant "Top Pick"

One of 10 papers to be included in the special issue of the IEEE Micro publication, entitled "Micro's Top Picks from Computer Architecture Conferences," is written by University of Illinois at Urbana-Champaign Professor Craig Zilles. His research deals with hardware support for improving compiler optimization.

Zilles's research demonstrates the viability of an approach that uses hardware rollback to facilitate speculative optimization. The hardware support permits the program to checkpoint its state, execute one version of code, and then decide to revert to the program's state at the checkpoint and execute a different version of the code. The benefit of this approach is that it enables the compiler to optimize the code for the common case, prevent infrequently or never executed program paths from constraining code optimization.

3 Faculty Members Win NSF CAREER Award Honors

Three CS faculty members were selected as NSF CAREER award winners in 2007. Professors Anil Hirani, Brian Bailey, and Karrie Karahalios all received the prestigious awards. Professor Anil Hirani was awarded for his research to further the field of discrete exterior calculus. Prof. Hirani hopes to provide new theoretical foundations that will enable those using discrete exterior calculus equations to better preserve the structure of the original physical equation, resulting in more accurate and stable simulations.

Professor Brian Bailey's award will support his ongoing research on collaborative multi-display environments (CMDEs). His framework will allow users to quickly share off-the-shelf applications between personal devices and large displays, perform simultaneous input with those applications, and mediate which applications can be shared and when.

Professor Karrie Karahalios' award will support her work in Human-Computer Interaction. With this award, Prof. Karahalios will extend her research into the use of technologies to foster and advance human communications and interactions by studying the impact of speech visualization tools and techniques among children diagnosed with an autism spectrum disorder.

William Gropp, Julia Hockenmaier Join Computer Science Faculty

We are pleased to welcome Professor William Gropp to the department. Professor Gropp will become the first Paul and Cynthia Saylor Professor of Computer Science.

Gropp had a major role in the creation of the Message Passing Interface (MPI) standard and is co-author of one of the most influential MPI-implementations to date (MPICH). MPI is the standard interface for interprocessor communication for virtually all large-scale parallel computers today. Gropp also co-authored, with CS professor Marc Snir and others, the definitive text on MPI, MPI: The Complete Reference, volume 2. He was selected as an ACM Fellow in 2006 for his contributions to message passing protocols.

We are also pleased to welcome Julia Hockenmaier to the faculty. Julia's main area of research is natural language processing, or computational linguistics. She addresses the question of how computers can identify the grammatical structure of sentences, a necessary step towards building systems that understand natural language. Her secondary area of research is computational biology, where she works on predicting the three-dimensional structure of proteins and modeling the process by which proteins fold into these structures.

HONORS

TWO CS PROFESSORS NAMED IEEE FELLOWS

PROFS. NAHRSTEDT & HOU HONORED FOR "EXTRAORDINARY RECORDS OF ACCOMPLISHMENT"

Two computer science faculty members have been selected as IEEE Fellows for the class of 2008. Professor Klara Nahrstedt was honored for her for contributions to end-to-end quality of service management of multimedia systems, and the late Professor Jennifer Hou was honored for her contributions to protocol design and analysis of wireless communications networks.

The grade of Fellow recognizes unusual distinction in the profession and is conferred by the IEEE Board of Directors upon those with an extraordinary record of accomplishments in any of the IEEE fields of interest. The accomplishments that are honored have contributed importantly to the advancement or application of engineering, science and technology, bringing the realization of significant value to society.

"This well warranted recognition of two of our senior faculty members by the one of the most prestigious professional societies in our field affirms the consistent record of excellence they have exhibited in their research, as well as the great respect they command among their peers," said Michael Heath, interim head of department and Fulton Watson Copp Chair in computer science.

Klara Nahrstedt: Quality of Service in Multi-Media Environments

Professor Nahrstedt's research interests are in services and protocols for provision of end-to-end quality of services within distributed multimedia systems. Her research group works on time-variant QoS management, QoS routing, multimedia middleware, peer-to-peer networks, multimedia services for smart rooms, pervasive computing, soft-real-time operating systems, adaptive cross-layer design of resource management for multimedia mobile systems, multimedia security, understanding tradeoffs between QoS and quality of protection in first responder systems, and HDTV distribution protocols.

"When I came to Illinois, I felt I had only just begun to touch the problem of QoS. I really wanted to explore all of the individual puzzles in the end-to-end QoS chain of IP-based wired and wireless networks, general purpose operating systems, application, session, transport and routing protocols – truly looking at how QoS works with underlying support structures, versus how it can be done without."

Nahrstedt considers herself very fortunate to have had an excellent group of students over the years who have been willing to take on big challenges across a spectrum of QoS issues.

"In that sense, my dream has come true," remarked Nahrstedt.

"We've been able to really understand the set of puzzles underlying and supporting QoS for certain set of multimedia applications. However, new end-to-end QoS challenges are appearing as new applications arise such as large scale tele-immersive environments, large scale distributed interactive games, interactive Digital Television that need new QoS results in terms of considering heterogeneous devices, their scale, and their integrated usability for diverse group of users over diverse networks." Hence, Nahrstedt is interested in pursuing topics related to QoS and scalability. "We are experiencing a boom in multimedia sensory information accessible to everybody such as 2D and 3D camera arrays, microphone arrays, HDTV 3D displays that can deliver experience never seen and heard of before except in expensive studios," says Nahrstedt.

"How do you organize that information so it can be delivered to remote places? In some ways, it's revisiting what's already been done to address QoS, but on a much larger scale."

Her recent work is also focused on another big puzzle in the end-to-end Quality of Service goal: how to best provide QoS in connection with security and quality of protection. "The current perception is that security is antithetical to performance," says Nahrstedt, the Ralph M. & Catherine V. Fisher professor of computer science. "Why does this have to be? Security must happen for many of these new applications, so how can we make security and performance work together?"

Jennifer Hou: Networked Systems

The late Professor Hou's research interests in networked systems ranged from issues of Quality of Service in wireless networks to enabling software infrastructure for assisted living. She pursued topics in both the theoretical protocol design and deployment aspects of wireless sensor networks. As part of her research work, she and her team developed and released an extensible, reusable, component-based compositional network simulation and emulation package called J-Sim, widely used by the research community.

"[Jennifer's J-Sim work] was an astonishing undertaking. The scale of the project would have daunted other researchers. But it was the kind of work that needed to be done if we were to get to the next level of network simulator," remarked ECE professor PR Kumar.

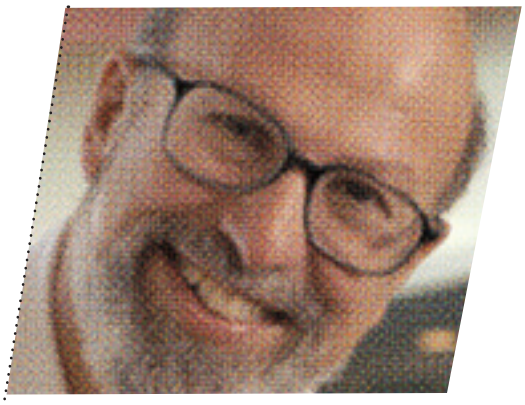
Hou was equally well-regarded for her work on practical applications of her study, such as the J-Sim package and her recent work on sensor networks for assisted living, as for her strong theoretical investigations.

"She and her students have conducted some strong and deep theoretical studies of network design," said Kumar. "This work supplements her practical work. You might expect a researcher to excel in on area or another, but Jennifer was excellent on both fronts."

Hou once described her research goals as "to, on the one hand, understand how network components and systems interact/coordinate with one another (via theoretically grounded measurement, modeling, and simulation techniques) in the cyber physical space and study how they perform under a wide variety of circumstances, and on the other hand, to design/refine new/existing network and systems techniques to optimize their interaction subject to environmental effects."

2008

CS PROFESSOR DAVID PADUA NAMED ACM FELLOW



2008 ACM Fellow David Padua

2008 IEEE Fellow Jennifer Hou

3 IEEE Fellow Klara Nahrstedt

Professor David Padua has been named an ACM Fellow by the Association for Computing Machinery. ACM recognized 38 Fellows this year.

"These (2007 ACM Fellows) are the inventors of technology that impacts our society in profound and tangible ways every day," said ACM President Stuart Feldman. "They have pushed the boundaries of their respective computing disciplines to create remarkable achievements that have the potential to make our world more accessible, more secure, and more advanced."

"David's many research accomplishments have been intellectually deep and technologically influential, and it is entirely fitting that he has been selected to join the elite group of ACM Fellows," said Michael Heath, interim head of department and Fulton Watson Copp Chair in computer science. "We are delighted that David continues to bring such distinction to himself and to the department."

Padua was honored for his contributions to compiler support for parallel computing. Starting with his PhD research at the University of Illinois, Padua's main interest has been the study of autoparallelization, that is, compiler techniques to translate programs written in sequential languages into efficient parallel programs.

Throughout the years, his research has also involved related areas, including run-time program analysis, debugging parallel programs by race detection, machine organization, parallel algorithms, and auto-tuning strategies. His work on race detection using trace analysis and autotuned libraries has been particularly influential.

"There have been many significant advances, but so far the problem of translation (from conventional languages to parallel systems) has not been satisfactorily solved," said Padua.

Autoparallelization is of increasing importance as the industry shifts to multi-core architectures. According to Padua, the industry is wrestling with this issue now as parallelism migrates from supercomputers to the desktop. New programs will become increasingly expensive to develop, because to benefit from advances in technology, they must make efficient use of numerous processors. Achieving this will take tremendous human effort, he says. For Padua, the best hope lies in the use of compiler techniques that make machine characteristics, including parallelism, transparent to the programmer.

Padua's search for solutions extends beyond the realm of compiler technologies, however. He and his research group are also now looking towards ways to better inform compilers about the purpose of the source program.

He describes the focus of his recent work as "how do we make the task of the compiler easier, while not making life difficult for the programmer". He sees promise in an approach that will result in a higher level programming environment – one that will teach the compiler about the program operators and give the programmer a higher level of insight into how the program will behave in parallel.

"Many are skeptical. This is certainly a difficult problem, but it can be solved. Efficient, machine-independent programming is possible," said Padua.

$74R71N6 $414R13$

The 2006-2007 Engineering Employment Summary shows that Computer Science majors at the University of Illinois at Urbana-Champaign come out on top.

The starting salary for recent Illinois graduates with a bachelor's degree in CS ranges from $30,000 to $92,500, with an average of $63,080. This is over $10,000 more than the National Association of Colleges and Employers average, according to the report.

"Obviously I was pleased, but not necessarily surprised (to hear the statistics)," said Michael Heath, interim head of the department. "I think it's partially due to our traditional level of success." Heath said industry prizes the students and the education they receive at Illinois, and companies are willing to invest in its students. They show the initiative, drive, energy and desire to succeed, he said.

But some students realize this data simply makes official what some considered common knowledge.

"Everyone I know who has gone to get a job has made more money than anyone else," said Dennis Griffith, a junior majoring in Mathematics and Computer Science and ACM member. Joe Re, also a junior in Mathematics and Computer Science and ACM member, described why he thinks CS majors are highly valued. He recalled presentations at The Engineering Expo detailing how the government needs people who can design systems to find patterns in data, for example. This can be applied in anything from detecting money laundering to tracking terrorist activity, he said.

"You can have a very big impact," Re said, "which is why you may get paid higher."

One thing that can make an Illinois CS degree more lucrative in the job market is this impact. The more talented a person is the easier they can accomplish tasks quicker than another person, or even a team of people, Re said. Instead of outsourcing jobs over seas for a team of people, companies want one good computer scientist who can do the work.

Both CS majors feel overwhelmingly that their education at Illinois will set them up for success. Not just in the classroom, but with the application they get working on projects in ACM, Griffith said. It also helps them keep in touch with alumni for networking job prospects.

But just because students receive a diploma from Illinois doesn't mean they should expect money and success to fall in their laps.

"That kind of thinking can be a mistake," Heath said.

Some people use the skills learned in earning a degree in CS to work strictly in the discipline. But many times people take those skills and will need to apply them to other disciplines, such as business or engineering, he said, adding that students need "analytical thinking and problem solving combined with good communication skills."

"By all means learn the technical, but don't expect that to suffice." ■

Matt Spartz

2006-2007

ILLINOIS ENGINEERING EMPLOYMENT SUMMARY

SALARY ACCEPTANCE BY MAJOR - BACHELORS

	range	average	nat'l avg.
AEROSPACE ENGINEERING	$24,960 - $64,480	$49,283	$52,131
AGRICULTURAL & BIOLOGICAL ENGINEERING			$49,779
BIOENGINEERING			$55,283
CHEMICAL & BIMOLECULAR ENGINEERING	$48,500 - $73,000	$61,839	$59,707
CIVIL & ENVIRONMENTAL ENGINEERING	$41,200 - $60,500	$51,295	$47,750
COMPUTER ENGINEERING	$40,000 - $78,000	$57,902	$55,946
COMPUTER SCIENCE	**$30,000 - $92,500**	**$63,080**	**$52,177**
ELECTRICAL ENGINEERING	$50,000 - $92,000	$60,931	$54,915
ENGINEERING MECHANICS	$55,200 - $69,000	$62,100	
GENERAL ENGINEERING (SYSTEMS & TECHNOLOGY)	$41,600 - $65,000	$53,358	$55,309
INDUSTRIAL ENGINEERING	$54,000 - $56,000	$54,847	$54,911
MATERIALS SCIENCE & ENGINEERING	$54,000 - $71,000	$60,331	$55,230
MECHANICAL ENGINEERING	$36,000 - $73,000	$54,953	$54,695
NUCLEAR ENGINEERING			$57,674

SALARY ACCEPTANCE BY DISCIPLINE

MASTERS	range	average	nat'l avg.
AEROSPACE ENGINEERING	$50,004 - $76,180	$61,781	$66,418
CIVIL & ENVIRONMENTAL ENGINEERING	$50,000 - $59,980	$54,242	$49,331
COMPUTER SCIENCE	**$54,000 - $99,024**	**$84,074**	**$67,767**
ELECTRICAL ENGINEERING	$66,150 - $85,000	$70,383	$66,690
MATERIALS SCIENCE & ENGINEERING	$62,500 - $75,000	$69,375	
MECHANICAL ENGINEERING	**$56,940 - $75,000**	**$66,109**	**$63,259**

PHD	range	average	nat'l avg.
COMPUTER SCIENCE	**$63,000 - $95,000**	**$84,333**	**$79,333**
MATERIALS SCIENCE & ENGINEERING	$85,000 - $91,100	$87,400	

BASE SALARY SUMMARY

	bachelors	masters	phd
RANGE	$24,960 - $92,500	$50,000 - $99,024	$50,000 - $100,000
AVERAGE	$57,683	$65,988	$81,956

CS Students Kick-Start Their Own Companies in Unique Internship

While many computer science students spent the summer months working for established companies, three teams of computer science students spent the summer working to establish companies of their own.

As part of the new iVentures10 program through IllinoisVENTURES, University of Illinois computer science and engineering students were given the unique opportunity to develop their entrepreneurial attitudes by developing and creating their own software or web based service to show to prospective investors and customers.

Teams participating in the program received direction and resources to move their idea and company forward. The 10 week internship provided the teams with funding and resources to create prototype software or web-based applications. The program also provided the students with a foundation in the skills necessary to start a company, develop valuation and capitalization structure, plan a product or service launch, and attract investors.

At the conclusion of the iVentures10 program, each team presented their company and product idea to a panel of investors to attract additional capital to continue their venture.

The iVentures program provides invaluable experience in entrepreneurship. “We are used to doing this type of programming in the classroom but now we can be exposed to the real world,” says Hyung-Sul Kim, member of the OhThere! team.

OhThere!, a product developed to foster social interaction through places, was created by Sung Hyun Kim, Kwan-Young Chung, and Hyung-Sul Kim. The service will allow users a unique way to save and share real places and locations as easily as they can with web-sites. OhThere! will blend traditional social bookmarking, with social networking and mobile technology to make it easy for members to “bookmark” their favorite locations. These locations can then be viewed and shared from any device around the world.

Team members Sung Hyun Kim and Hyung-Sul Kim are focusing on the programming and technical aspects of the project while Kwan-Young Chung dedicates his time to the design.

The intense development effort required to build their prototype in 10 weeks requires significant dedication from the group. “We sometimes work 12 hours a day 7 days a week,” remarks Sung Hyun Kim.

iBud, developed by graduate students in Computer Science Feida Zhu, Liping Chen, and Jingyi Jin, is a social community based on travel in Web 2.0 style aimed at the Chinese market. The idea of iBud was created due to the large shift in the market geared at travel and the three friends were set on creating their own product before they even heard about the iVentures internship.

“Even without a sponsor we would do it [iBud] anyway, but then [Feida] saw the iVentures advertisement on the video wall [in the Siebel Center] and we knew it was just for us,” says Chen.

The iBud website has many different functions, one of which, the comments section, will be of great help to consumers. Site visitors and users have the ability to review comments about restaurants, museums, or even the travel destination itself from experts and people who have tastes similar to themselves before they go visit. It will also be a place to store everything about your trip, like pictures, in a complete, coherent way that others can view. “The website should be everything you need before, during, and after your trip,” says Zhu

Eventually, with the backing of an investor, the three hope to expand their idea from just travel to a relevant part of everyday social life and include many languages, making it accessible around the world.

Snap and Buy was created by Nicolas Loeff, Ali Farhadi, and Alexander Sorokin to help advertisers direct advertisements to individual customers. While shopping, customers will have the opportunity to do a price check for competitor's prices and coupons within seconds with the technology this group is creating. Using their cell phone, customers take a picture of the bar code and send it to the Snap and Buy website. Within seconds they receive a message back with any coupons available for that product or if a competing store has a lower price. For advertisers, the product represents an opportunity for highly targeted and timely promotions and advertising.

All three international graduate students are working hard and using their field of expertise to tailor their product to every individual user. “It’s pleasant to see something you learn working in real life,” says Farhadi.

The group plans on continuing the project after the 10 week iVentures internship is over if the feedback coming in from the investors and companies is promising. “We believe there is a good chance,” assured Nicolas Loeff. ■

Tina Talarico

U of I Named to Top 25 "Best Schools for Entrepreneurs" by Fortune Small Business Magazine

Fortune Small Business magazine has named the University of Illinois at Urbana-Champaign to its list of the top 25 schools for entrepreneurs. Citing its technology entrepreneurship and management programs, rich double-major offerings, and record of entrepreneurial achievements, Fortune Small Business counted the U of I among the top programs for undergraduates, double-majors, and executives seeking to get a leg up in the start-up world.

Computer Science students are no small part of the reason that the U of I tops the ranks. Alumni Jawed Karim and Steve Chen of YouTube renown and Max Levchin of PayPal and Slide.com are just a few examples of Illinois computer science alumni whose start-ups have influenced an entire industry. Proclaims Fortune Small Business:

"In this college community, entrepreneurship is a town-and-gown affair. Illinois has innovative centers to aid both students and area entrepreneurs. The Hoeft Technology & Management Program at Urbana gives the top undergraduate students from the business and engineering schools the training to comfortably inhabit both worlds. The University Business Developers, a student-run group, provides "workout partners" for student entrepreneurs. Like the friend that keeps you going to the gym for a workout, the entrepreneur buddy helps students stick with a difficult regime. It doubled the amount of cross-disciplinary entrepreneurship courses to more than 75, spanning 32 departments. To learn how to integrate business principles into other areas of studies, faculty members go through a year of training in entrepreneurship education. Last year, graduate and undergraduate students launched 28 ventures, including a record label and a tech start-up built around a communication tool for disabled people." ■

Matt Spartz

ENTREPRENEURIAL RESOURCES @ ILLINOIS

THE TECHNOLOGY ENTREPRENEUR CENTER (TEC) courses and co-curricular activities expose students to the complex concepts inherent in the simultaneous processes of technology innovation and market adoption. The TEC hosts outreach activities for students and alumni, such as the Illini-TEC forums, in several major cities. The TEC also hosts the annual Cozad business plan competition, as well as the Lemelson-Illinois Student Prize for Innovation. Although part of the College of Engineering, the center is interdisciplinary, having affiliated faculty members from several departments and colleges.

AN ACM SPECIAL INTEREST GROUP (SIG), University Business Developers UBD is the student-run business development and entrepreneurial group at the U of I. UBD serves several groups of people, including startups, technical students, and student entrepreneurs.

THE HOEFT TECHNOLOGY & MANAGEMENT PROGRAM at the University of Illinois bridges the gap between traditional engineering and business education by offering a unique curriculum to a select group of highly qualified undergraduates drawn from the Teams of business and engineering students work together to develop comprehensive solutions to real world problems. There is an emphasis on experiential learning and the inclusion of hands-on elements in each of the courses in the program.

THE ACADEMY FOR ENTREPRENEURIAL LEADERSHIP offers entrepreneurial programs, services, and resources to faculty, students, and community members on U of I campus. The Academy's mission is to encourage entrepreneurial awareness and initiatives across all disciplines of the University of Illinois. The Academy sponsors events for faculty, students, and staff throughout the year, including workshops, public discussions, business plan competitions, symposia, professional FastTrac courses, and lectures.

en7rPrnr5#P

Illinois Among Nations Top Programs in Entrepreneurship Education

The University of Illinois at Urbana-Champaign was ranked 16th among undergraduate programs and 21st among graduate programs in the fifth annual ranking of the nation's top entrepreneurship educational programs. The rankings are the result of a survey of over 900 schools just released by Entrepreneur magazine and The Princeton Review.

"I could not be more pleased with these new rankings," says Chancellor Richard Herman. "The model of entrepreneurship education is changing rapidly, and Illinois is leading the way." Entrepreneurship education has received increasing attention at the University of Illinois since the university expanded its core missions to include economic development in 1999. Unlike most of the other ranked institutions, the Urbana-Champaign campus boasts two centers of entrepreneurship education with discrete emphases.

The Technology Entrepreneur Center (TEC) was established in the College of Engineering in 1999 to build a curriculum in entrepreneurship and other related programs and support available to the college's students and faculty. And the College of Business houses the Academy for Entrepreneurial Leadership, created in 2003 with a $4.5 million grant from the Kauffman Foundation in Kansas City.

Professor Andrew Singer, entrepreneur and director of the Technology Entrepreneur Center, likened the new recognition to the University of Illinois' other programs.

"At TEC we emphasize technology entrepreneurship for students and faculty in engineering and other sciences, which gives Illinois a unique entrepreneurship footprint. Engineering education at the University of Illinois has always produced visionaries, innovators and entrepreneurs," he said. "So it's appropriate that our programs in these areas should begin to garner the national attention that our other academic units enjoy."

Dr. Tony Mendes, executive director for the Academy for Entrepreneurial Leadership, emphasized the academy's cross-campus mission, its support for entrepreneurship course development, research and co-curricular programs, and its impact.

"We know that a high percentage of our students will go on to become entrepreneurs or will be required to be 'entrepreneurial' in their careers." Mendes said. "Faculty teaching entrepreneurship in multiple disciplines here offer courses unlike those taught on any campus in the U.S. I believe that is one of the reasons we are being recognized as one of the nation's best."

Entrepreneur magazine's criteria for evaluation included academics and requirements, students and faculty, and outside-the-classroom support and experiences. The results of the survey, along with the analysis, appeared in the November 2007 issue of Entrepreneur.

Rhiannon Clifton,
Technology Entrepreneur Center

When it comes to getting a job after graduation one thing resonates from almost every alum – it’s who you know. Whether it’s getting a job through networking at a career fair, or getting an internship through a friend in ACM, who you know can be the biggest factor overall.

Both the computer science department and the College of Engineering provide students with many opportunities and programs to help them prepare for the future job market. Some focus on developing a student’s technical skills, while others teach students how to work in teams with a real business model. All of these programs create opportunities for students to make networking connections that will help them land a job after graduation.

Possibly the best way to meet people currently working in computer science and on relevant projects is through the student chapter of the Association for Computing Machinery (ACM). This provides any student, faculty or staff an opportunity to work with others interested in all things computers.

Some students will tell you they got an internship because someone in ACM gave them information about the opportunity. But many times members get internships because someone else in ACM had it before.

This was how James Commons, a 2007 graduate now working at Deloitte Consulting, had the success in job and internship hunting.

R3C3N7 41UMN1 Recent Alumni

ON THE HUNT: Recent Alumni Describe their Search for the Perfect Job

"I got pretty much all my internships, and my first job, through students who've had internships (at those places) before," he said.

"The biggest thing, really, for me is the people that I met on campus," Commons said. "The big one is through the student groups that are available."

Commons was also involved with the Office for Technical Consulting Resources (OTCR), a student run group that has students work with companies on "business strategy, market research, process evaluation, and technology integration". It was through OTCR that Commons discovered that a consulting career was right for him.

But just because you know someone doesn't mean you get to just show up one day and start working. This is where the College of Engineering's Engineering Career Services office (ECS) steps in. They connect students and employers through an online job listing and resume database, and through job fairs they organize throughout the year.

Commons said ECS helped him out the most in his freshman and sophomore years, in "the initial stages of contacting employers."

CS alumnus Kyle Wilkinson said the job fairs and interviews that ECS brought to campus were the most helpful. He was also the co-chair for ACM's Reflections | Projections conference and job fair, allowing him to meet more closely with the guest speakers coming to campus. This year's Reflections | Projections Job Fair hosted companies such as Intel, VMWARE, Yahoo!, Morgan Stanley, Microsoft and Google. Companies at the fair are looking for interns as well as full time employees.

The department's Corporate Affiliates Program not only brings companies to campus to share employment opportunities, but provides interactive programming that gives students an in-depth look at working environments in different industries and companies. Students participate in a weeklong Corporate Days events with visiting partners. These events range from lectures and information session to immersive gaming and programming competitions. Through this students learn the day-to-day working life and the culture that drives each corporate partner. They also have a chance to explore what careers in different IT organizations are like – from financial services or Fortune 500 companies, to traditional IT giants and smaller start-ups.

Wilkinson discovered the path that was right for him through trial and on-the-job immersion. He had an internship with an insurance company after his sophomore year and with Microsoft after his junior year. But after getting a taste of the corporate lifestyle he realized something:

"I don't have a mortgage, I don't have a wife," Wilkinson said. "So I decided it was time to take a risk."

That "risk," as he hesitates to call it, was to work for a start-up company called Pelago, founded by CS alumnus Jeff Holden. "Risky in that you don't have job security, you don't have benefits," Wilkinson said. But it's given him the opportunity to improve his skills.

"(It's) lucrative in the fact that I can learn a lot more," he said.

Computer science students can now get an opportunity to experience life in the entrepreneurial fast lane before leaving school, with an internship program sponsored by IllinoisVENTURES, LLC. The iVentures10 project provides students with funding, office space, and executive guidance to enable the students to prototype and launch their product or web service idea. At the end of the 10 week program, students pitch their ideas and products to investors in the hopes of attracting additional funding and continuing their venture. Last year, 3 teams of CS students participated, (See article, page 20)

But some students never want to leave school. Luis Ceze, who earned his PhD in 2007, is currently an Assistant Professor at the University of Washington. He said the faculty and ECS were very helpful in showing him the right steps to follow in the academic career search.

"The academic job hunt is a little different than the industrial job hunt," Ceze said. "Usually for PhD level jobs, both at the research level and academic level, you have to give talks about your research." The faculty help set up practice lectures for him and other students to attend.

"It's very important that you do practice talks and get it smooth before you have to do it," he said.

Even for Ceze, networking was key. The faculty helped him set up interviews through people they knew in the field.

Commons of Deloitte emphasized networking, however it's done, above anything else.

"It really comes down to the people that you know," he said, "and the experiences you have that can differentiate yourself.

"The Computer Science department was great for providing the foundation ... Student groups like ACM and OTCR took it to the next level." ■

Matt Spartz

SQUEAKA

On Tuesday, May 1, 2007, room 1404 of the Siebel Center was abuzz as kids, parents, and local teachers all geared up for a night fondly coined Squeakapalooza. The Computer Science Department and College of Education Office for Math, Science, and Technology Education (MSTE) co-hosted the event to display Squeak, a free media-authoring tool, to the Champaign-Urbana community.

"Squeak can do presentations, it can do programming, it can do just drawing if that's what you want to do, so it's a powerful authoring environment," says MSTE Director George Reese.

Squeak has captured the attention and hearts of many kids, parents, and educators in the local community and worldwide.

"Squeak is like a virtual sandbox with a limitless supply of resources and tools," says computer science major Jordan Timmermann.

The software allows people of all ages to imagine any object, illustrate it to their liking, and then set the drawing to motion using its animation tools. Each movement of the object depends on the user's commands, intrinsically serving as an introduction to many mathematical and programming concepts.

"Oh, this means you can make anything with this!" exclaimed the very first child to use Squeak according to its creator, Alan Kay, after the 10-year-old child transformed his drawing of a car into an animated fish on a whim.

Squeakapalooza was open to the public with a special invitation to students from local grade schools, Dr. Howard and Urbana Middle School, where Computer Science Professor Lenny Pitt and MSTE's Kathleen Harness have been working to teach Squeak to local teachers and youth.

Pitt says the night gave the students the opportunity to come out with their families to see their Squeak projects displayed on the big screen of room 1404 Siebel.

"Squeak represents an environment where it is easy for children to learn many powerful ideas in math, science, computing, and other arts, via their own artistic constructions," says Squeak creator, Alan Kay.

The second part of the evening was a show and tell of Squeak and its capabilities intended to encourage local educators to make use of this free teaching tool.

"For adults, Squeak represents real alternatives to the many prevailing poorly done norms that children are subjected to with little success," says Kay.

For Dr. Howard enrichment teacher and member of MSTE's SqueakCMI team, Kathleen Harness, it was Squeak's accessibility to people of all ages, backgrounds, and skill levels that immediately drew her to the program. Harness is responsible for first introducing Squeak to the Champaign-Urbana community after seeing it at a Supercomputing Conference in Phoenix, Ariz. in 2003.

"It is not a tool they can outgrow; I feel we can confidently show even a 4 year old how to do something in Squeak and can see ahead to projects that have been done in high school physics that use Squeak, so we know we're not introducing them to a toy or to something that will limit them," Harness says.

Teachers and students alike stand by the benefits of the program. Fernanda Mendes, a sophomore in computer science, volunteered at Squeakapalooza because she says she loves seeing the kids' initial reactions to Squeak, but she also believes in its mission as an alternative teaching tool.

PALOOZA

"It's important for teachers to learn Squeak because it's programming; it's logic, which teaches you to think in a whole different way," Mendes says.

Not only is the Squeak free, it has the ability to interest, entertain, and educate users of all ages.

"It's really actually fun, and I can still see myself learning," says Harness.

Squeakapalooza was one small continuation of a larger Squeak-oriented outreach effort that the computer science department has been conducting all year.

CS Professor Lenny Pitt offered a credited seminar this year where college students learned Squeak and then took to the streets visiting area elementary and middle schools: Carrie Busey, Dr. Howard, and Kenwood Elementary Schools, and Urbana Middle School, to teach Squeak to kids as young as first grade.

"It was amazing to see what first graders could create using Squeak," says Katie Hartnett, a recent Chemical Engineering graduate, who participated in the course.

"I think the major goal of Squeak is to be accessible to everyone. I have seen first-graders and computer science professors alike use Squeak with great success," Hartnett says.

"I saw this class as an opportunity to get our students involved in service and at the same time push Squeak to parents and kids," says Pitt.

Jordan Timmermann, who also took Professor Lenny Pitt's Squeak outreach course this spring, saw kids completely unfamiliar with computer programming get genuinely excited while playing with Squeak. He says neither his grade school nor his high school offered any interesting computer courses.

"I think that's a shame, and I wanted to participate in a program that I had always wished would have been available for me," Timmerman says.

At the end of the semester, Professor Pitt and his students continued their goal to engage the community by offering free drop-in Squeak lessons at Siebel on Friday afternoons. By the second week, there were already as many as 40 kids with parents peering over their shoulders attending.

"Our Friday Squeak sessions attract a wide range of people from elementary school kids to elementary school teachers," Mendes says.

According to Pitt these efforts go beyond the basic goal of getting the word out about Squeak. "I'm going to make a push on service learning again because I think it's important to open up the university to the community," Pitt says.

For those out there who haven't yet seen Squeak Pitt says, "Go see it; go download it-there's this really delightful toy that's free and available for all computer platforms that's empowering and allows for creative expression," says Pitt.

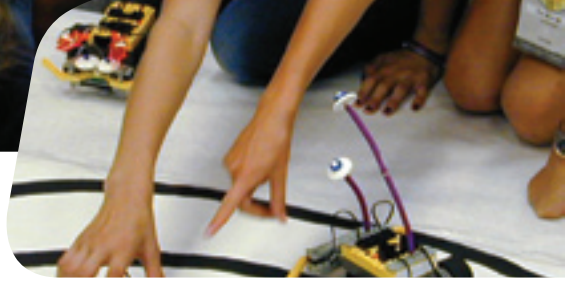
To download Squeak for free visit: www.squeakland.org

For more information about Squeak in Champaign-Urbana visit: www.squeakcmi.org ■

Carly Needham

OUTREACH

Computer Science Encourages Girls To BRIDGE GENDER GAP



"G.A.M.E.S. opens a lot of doors for you, like it teaches you, and it prepares you for the rest of your life," said Sinfonie Rosales, a local 8th-grader and veteran G.A.M.E.S camper.

Rosales is now in her second year at the University of Illinois College of Engineering's G.A.M.E.S. (Girls Adventures in Math, Engineering, and Science) camp, an annual weeklong event that gives talented middle and high school-aged girls the opportunity to explore these technical fields. Last year, Rosales attended the Structures camp, but this year she's in the midst of a week in the Computer Science world. Next year, she hopes to explore the third option, the Bioengineering and Chemical Engineering camp, currently in its very first year.

G.A.M.E.S. challenges the girls to unique field-related lessons, games, and competitions. This year the Structures camp tested the girls' abilities to build boats able to successfully float and carry weight across water. Meantime, the Computer Science camp invited its campers to create outer space-themed projects using the media-authoring tool, Squeak. Girls in the Bioengineering and Chemical Engineering camp were faced with creating a polio vaccine for people in the Dominican Republic, while tackling all the accompanying technical, ethical, and environmental issues.

The camp strives to encourage these girls to pursue their interests in the typically male-dominated fields of math, engineering, and science all amidst a staff comprised almost entirely of women in these fields and majors.

"I think it's important to have girl role models who are in these fields, so if it's something they want to do then they can see someone who's in it already that they can aspire to be," said Christine Gonzales, G.A.M.E.S. counselor and recent Mathematics graduate.

The camp also staffs a diverse group of girls in an effort to break some of the myths and common preconceptions associated with technical fields according to Minosca Alcantara, director of the G.A.M.E.S. camp.

"We're trying to get rid of the stereotype that you have to be nerdy to do math, science, or engineering, or that you have to be on your computer all the time," said Fernanda Mendes, G.A.M.E.S. Coordinator and sophomore in computer science.

Mendes said she's currently one of about 15 girls in a class of 200 computer science majors, numbers reflecting the startling gender gap prevalent in many technical fields- a gap perhaps most severe in computer science. According to the National Science Foundation, women received only about 28 percent of the computer science bachelor's degrees in 2003.

"It's one of those things where girls aren't really pushed into these fields and its kind of not the 'cool' thing to be doing while you're in junior high at this age-liking these subjects," said Gonzales.

Alcantara believes the G.A.M.E.S. camp helps the girls to embrace their interests from an earlier age. "They all of a sudden look around and say, 'Hey, I'm not a nerd. This is pretty cool.'" She said the girls gain confidence in their abilities as they see large groups of girls their age all sharing a similar interest in science and math.

Jacqueline Jachymiak, G.A.M.E.S. counselor and Mathematics major, said that building this confidence is one of the main goals of the camp. She said they work to teach the girls to be proud, not shy, about their intelligence and to remain excited to use what they're learning throughout their lives.

Since its start in 1998, interest has been steadily increasing in the G.A.M.E.S. camp with a total of 198 girls in attendance this year and overflow waiting lists for every camp. Structures enrolled the most with 96 girls, next was Computer Science with 71 campers, and finally the newly added Bioengineering division with 30.

Attracting more women to the field isn't just for the sake of balancing numbers. Increasing women's enrollment in technical majors could break the stigma plaguing the few existing women in the field.

"If we have more girls it seems like we can make the boys understand that we are capable of being in this major because right now there aren't many, so a lot of them think that we're not smart enough," Mendes said.

The G.A.M.E.S. camp seeks to instill a sense of confidence in the girls while opening them up to some options they may not have considered.

Tanya Crenshaw, Computer Science Ph.D student and G.A.M.E.S. counselor said, "Women belong in computer science, and not every woman has to do it, but at least to know that they have that opportunity is very valuable, I think."

ou7R34c#

G.A.M.E.S. has been a continued success, with girls' best interests at its heart. "This is just one way that we get them involved to see there are other career options, besides just what they see," said Jachymiak.

But the computer science department outreach efforts don't stop there. According to the American Association of University Women, "Computer science is the only field in which women's participation has actually decreased over time," and the computer science department has taken notice offering several important outreach programs to confront this alarming trend. Like G.A.M.E.S., Games4Girls and ChicTech (TAC), both seek a similar end: opening the computing door to young women, who might otherwise face discouragement, fear, or just a lack of awareness of the field.

ChicTech and Games4Girls

are two of the other outreach programs that really work hand-in-hand both in mission and operation. These initiatives' goal is two-fold: recruitment and retention according to CS Professor Sam Kamin.

ChicTech is comprised of volunteers from the Women in Computer Science student organization who travel across the state to raise awareness and generate interest in computer science among high school-aged women.

"We're trying to harness our existing women in CS both here and at partner institutions, and they go drum up interest in CS to high school girls," said CS Professor and Director of Undergraduate programs Lenny Pitt.

Their presentation addresses all the stereotypes and myths while citing the various career options and opportunities such a major affords.

"There are so many different areas that CS interacts with, so whatever your passion is, you could probably combine computer science with it," said Pitt.

At the end of this program, the college CS women also extend an invitation to the high schoolers to come take part in the Technical Ambassadors competition (TAC), where the younger girls compete on teams to create a winning technical project to serve the non-for-profit organization of their choice. Their creations range from games, to web-sites, to learning tools.

While participating in this competition, these high school girls serve as the judging panel for the Games4Girls competition by playing the computer game submissions created by college girls from all across the nation. These innovative, original computer games are judged based on their level of appeal, playability, and fun as determined by the TAC high schoolers recruited by the women of ChicTech.

"For the college girls, Games4Girls sort of builds morale to have them participate in something that is fun and really produces something that real people actually use, and for high school girls, it's just seeing what college CS women can do," said Kamin.

This year, ChicTech was able to recruit 63 high school participants for the Technical Ambassadors Competition on April 21-22. The first place winners hailed from Hindsdale Central High School winning with their website design for the Free Education Program intended to improve cross-cultural relations. The website is viewable at:http://www.hinsdale86.org/staff/jlopykin/home.htm.

Games4Girls received nine submissions from colleges across the country, but the winner proved to be a team from the University of Southern California whose game "Etoile" captured the attention of the high school judges above the rest. The game contained extraordinary graphics and featured a girl and her pet cat as its main characters. To play this winning game visit: www.uiuc.edu/goto/Games4Girls.

"I think that it is really a great danger that girls are missing out on a great opportunity," Kamin said. The goal behind these outreach programs is to help girls realize they do have a very real place in the computer science world.

"If you want to do it (CS) then you have the ability to choose it, so if you want to be a doctor, that's cool. If you want to be a computer scientist, then that's cool, too," Tanya Crenshaw, computer science Ph.D student, said.

■

Carly Needham

RECRUITING AT ILLINOIS

How One Company Makes Its Play for CS Students

Illinois computer science students are in high demand for full time positions or summer internships. To facilitate connections between students and the companies looking to hire them, the Siebel Center plays host to a variety of corporate recruiting events throughout the year.

Companies set up shop at Siebel Center and conduct events ranging from traditional information sessions and resume drops to team competitions and programming games. Events are designed to give students an idea of what it's like to work for the company, or work in their industry. Students get a chance to see how their interests and style might apply to a variety of fields and corporate cultures in a relaxed setting.

Here's a glimpse at how one company, Microsoft, made its pitch to students during an event this fall:

Tables lined the walls with huge plasma screen televisions displaying eight different products that students who get hired at Microsoft may end up working on. There was complimentary food, and a raffle for various Microsoft products.

Erin Bucholz, Microsoft recruiter, said she had a wish list of products she wanted to bring to students, products they may not immediately think of working with when they think Microsoft.

"We really try to educate students who may be potential employees," Bucholz said. "There is a various array of products that we're working on that we hire students out of college to work on."

Members of different teams presented their projects, such as the tablet PC team, the Windows Live team, and the internet connectivity team. The connectivity team demonstrated how to get internet access on a laptop using the service through a cell phone.

Vinay Venkatachalapathy, a software development engineer in testing, plugged a USB cord from his phone to his laptop and was able to connect to the internet through the phone. But before working with this software, Venkatachalapathy worked on the graphics team.

"One of the coolest parts of my job is I get to work in different departments," he said, adding that changing teams is quite easy. "We want the students to work for us, to get students excited about the different types of products they are going to work on."

After a demonstration of the Windows Live software, which allows users to integrate everything from a space page to free online storage, Pat Murphy, a senior in computer science, said the relaxed atmosphere of the event made it easy to learn about what Microsoft had to offer.

"I like the open set up," Murphy said, adding that it's an opportunity to just walk around to whatever peaks your interest.

"It's great being able to see what they're actually working on behind the scenes," he said. "And it gives you an opportunity to get internships."

Each team was encouraging students to drop off resumes to Bucholz and to ask about career opportunities.

While canvassing the free table of cookies, pie, vegetables, and soda, Roney Castro, an exchange student in electrical and computer engineering from Brazil, said his university has similar events, but this one was much more effective.

"You have more time to speak to people," he said. "They have more space to show their stuff.... that's why I think it's a better approach."

JOBS

DSSI

At the University of Illinois Department of Computer Science, a new program is not only researching the technologies needed to extract information from varied sources of information, but preparing future leaders in the field to make breakthrough contributions as well.

The research center for Multimodal Information Access and Synthesis, otherwise known as MIAS, is focused on researching technologies for extracting and tracking interesting events, entities and relations from multimodal information sources. The group is also researching the use of this technology to support content driven search, as well as finding ways to use such information in formulating a hypothesis based off the data gathered and analyzed.

"In a large number of disciplines – Scientific, Engineering, Social Sciences and the Humanities, not to mention national defense – a large share of the budget and a considerable intellectual effort are invested around the realization that understanding such complex systems requires data, and more and more, unstructured data," said Dan Roth, director of MIAS and professor of computer science.

"Our center could have a huge impact on one of the key challenges facing Computer Science and the computing industry today -- how to deal with the huge amount of unstructured data, how to locate, organize, access and analyze unstructured data."

The MIAS Center also hopes to develop diverse human resources for the scientific research, educational, and governmental workforce communities through education and outreach.

To further support this mission, MIAS has launched a unique 8-week educational program designed to prepare undergraduate and graduate students entering the information science field. At the Data Sciences Summer Institute (DSSI) students from across the country are learning the theoretical fundamentals and practical skills needed to advance the field and impact the study of information science.

DSSI is aimed at those interested in the five technical fields of information science, including machine learning, databases and information integration, natural language processing and information extraction, computer vision, and information retrieval and web information access.

The program entwines mathematical foundations, applications, and research over an eight-week period. It combines an intensive course on mathematical foundations of information science, a series of guest lectures, immersive tutorials from leading scientists in the field, and a publishable group research project giving the students hands-on, practical experience in their field.

"This program is really going to allow me to find out what I want to do and contribute to this area of study," says Diana Napolitano, a graduate student focusing on Natural Language Processing from the State University of New York at Stonybrook.

For Kansas State University graduate student Vikas Bahirwani, the opportunity to work with renowned faculty and gain new perspectives on his field of study are what attracted him to the program.

"The University of Illinois is on top [in Computer Science], and this program will give you an edge when you go back to work on your own thesis."

U of I student Jeremy Grozavescu, a junior in mathematics, agrees. "I really wanted to get to know the other faculty involved with research here and be able to make connections with them," says Grozavescu.

Professors contributing to the DSSI program include Kevin Chang, ChengXiang Zhai, David Forsyth, and Jiawei Han of the University of Illinois, along with Bill Hsu of Kansas State University and Qi Tian of the University of Texas at San Antonio.

MIAS

The skills these students are learning and techniques they will be researching will one day make it easier to solve the problem of finding data dispersed through multiple sources of information, in a quicker timeframe and with greater ease. From web searches that integrate text and image results, to search engines that learn from and respond to the querying patterns of the user, the possibilities are endless.

"Can we each have our own personal search engine," asks DSSI Director Cinda Heeren.

"If I type in 'robot', can it know I mean toy robots? Can it know to instead return information about robots in manufacturing when someone from the manufacturing industry types in 'robot'?"

Heeren has no doubt that the students in the program will be making a major impact on the field, solving these questions and more.

"The students who are in the program amaze me," says Heeren. "They are able to immediately come up with energetic applications of the principles we're discussing."

For more information about MIAS or the Data Sciences Summer Institute, visit: http://www.mias.uiuc.edu. ■

Tina Talarico

NVIDIA and Illinois bring parallel processing to the classroom

Computer science and computer engineering students got a special education last semester as part of a pioneering new class taught by David Kirk, chief scientist at graphics-processing industry leader NVIDIA, and ECE Professor Wen-mei Hwu. Students in the class learned how parallel processing works and how to write programs that take advantage of it—an important skill, as parallel processors are becoming standard equipment in most computers.

"We want to help students tap into the massive computing power of these processors to allow them to do work that was too computationally expensive to do before," Hwu says. "We also want to help them design future massively parallel processors and programming tools."

"We want to make sure that our students are the ones that take advantage of these opportunities to revolutionize their own fields with these new capabilities," says Hwu

But using parallel processing also means a different approach for the programmer.

"It's a different way of thinking to, in your mind, lay out a problem into thousands of pieces rather than laying out a problem simply as a recipe sequence of a single path," Kirk explained.

That's where ECE 498: Programming Massively Parallel Processors comes in. This unique class teaches students to understand how parallel processing works and how to write programs that take advantage of the increased processing power. Although parallel processing is not a new concept, the availability of chips made by companies like NVIDIA is making the technology ubiquitous.

"Historically, people talk about Moore's Law…microprocessors getting faster every year…" Kirk said. "You could write a program and, a year and a half later, you'd get a new processor and your program runs twice as fast, and it's just free. It's automatic. But a few years ago, the free lunch ended. Technology reached a point where we can't just make processors faster, we have to add more of them. So this is a big change."

This change represents a problem for everyone because most universities are not teaching students how to use parallel processors.

"Traditionally, computer science and computer engineering education has not really addressed parallel processing as an important part of programming. It's a graduate course and it's an elective. It's not required for graduation," Kirk said. "Going forward with multi-core processors and highly parallel GPUs [graphics processing units], everybody needs to know how to program massively parallel processors because it's all there is. There won't be any single core processors any more."

"Applications that are developed for this technology have potentially a very large footprint," Kirk said. "If we train people in this skill, there can be these machines at every university in the world, at every research lab in world and, in fact, on every desktop. It could be pervasive."

For students, the end of each semester in ECE 498 will include a group project and an opportunity to display what they've learned.

"The students will propose and execute a project in groups of three or four people. They will pick some significant and interesting task that has interest for them and refactor it and recompose it to expose the parallelism," Kirk said. "They'll write massively parallel programs that execute their task, and they can run it on the NVIDIA GeForce 8800. And hopefully they can demonstrate the large amount of speed-up from running it on a single CPU."

NVIDIA Corporation (Nasdaq: NVDA) is the worldwide leader in programmable graphics processor technologies. The company creates innovative, industrychanging products for computing, consumer electronics, and mobile devices. Its customers include PC, game console, and cell phone makers.

Brad Petersen,
Electrical & Computer Engineering

Bringing the Real World to the Classroom

OUTREACH

Whether or not graduating seniors in computer science have had an internship, the department is now ensuring that they get at least some real-world problem solving experience before leaving Urbana. Starting this year every CS student is required to take either Senior Thesis, CS 499, or Senior Design, CS 492/493.

Senior Design is a year-long "Capstone" course aimed at providing students a way to put their classroom knowledge to the test, said Mike Woodley, capstone projects coordinator. Woodley said a majority of the project's focus is learning how to work with a corporate partner on a real team.

This teaches students how to "(solve) a bigger problem instead of getting specifications and doing exactly what you're told," he said.

"In general we don't help them with technical stuff," Woodley said. "They come to obstacles and we help them get around those."

The projects begin with corporate sponsors. These are both local and national companies that want to elicit the help of Illinois computer science students to solve real problems. The projects are underwritten by corporate sponsorship and funding. Some of the companies currently working with students are locally based Volition, the City of Champaign, and the Illinois State Geological Society. Also partnered are Rockwell-Collins and State Farm.

The department defines the projects in the summer, and in the fall, students seek out the corporate liaisons for the projects they want to work on. These projects will take close to 1,000 hours of work and go from September through April.

"Clients need to put in a little time to guide students on how they want the project to go," Woodley said, "so (students) can figure out how to solve it, who's going to test it."

When the students finalize the project they are going to work on and its goals, it is up to them to figure out how to accomplish those goals. They also have to develop working demos during the first semester and a time line for the rest of the year.

One of the biggest challenges students face is making a time line to complete the projects because the class is much longer and includes a lot more work than a usual class.

"It seems like they have a long time," Woodley said. "You can give them the lecture ... but they don't realize that they have to do it now."

But Senior Design is a symbiotic relationship; the corporate partners can benefit just as much as the students.

CS alumnus Brandon Whatley is the liaison for students working with State Farm, and he believes the projects are advantageous for everyone involved.

Not only is he working on the corporate side, he also took Senior Design as a student.

"The experience you get from working as a team, defining roles and activities, performing analysis, establishing realistic time lines, and satisfying the requirements of your business partners can give you a real competitive edge," Whatley said in an e-mail interview.

He also sees Senior Design as a way for the corporate partner to improve their organization by recruiting some of the best and brightest students.

"In addition to providing the students with an educational experience and a first hand look into State Farm, we benefit from the fresh perspectives and ideas that find their way into their final product," Whatley said. "It is our hope that this experience will encourage them to consider State Farm as a potential career choice and possibly share their unique perspective with other students. Should they come to work with us then we realize the full impact of our investment."

Alex Mineer is a CS alumnus who took Senior Design and who is now a software developer for GE Healthcare. For his project he worked with Jon Gunderson at the Illinois Center for Information Technology Accessibility developing software to make computers more accessible for handicapped individuals.

He volunteered to be the project leader to get even more real world experience.

"It definitely helped me get a job being able to talk about experiences as a small group leader," he said.

Although the group didn't get to accomplish as much as they wanted to, Mineer classifies the project as a success.

"We ended up getting people from all over the world trying out our Web site," he said.

Not only did his project receive notoriety, but the development programs he used in the class are the same that he uses at work for GE Healthcare.

"Overall my experience was very positive," he said. "I would personally recommend it to others."

If your company would like to sponseor a senior design project, contact Karen Hyman at kkhyman@uiuc.edu or 217.244.4496 ■

Matt Spartz

SENIOR DESIGN IS A SYMBIOTIC RELATIONSHIP; THE CORPORATE PARTNERS CAN BENEFIT JUST AS MUCH AS THE STUDENTS.

PhD THESES

May 2007

Ganesh Bikshandi
Parallel Programming With Hierarchically Tiled Arrays

Azadeh Farzan
Static and Dynamic Formal Analysis of Concurrent Systems and Languages: A Semantics-Based Approach

Smruti Sarangi
Techniques to Mitigate the Effects of Congenital Faults in Processors

Zhen Zhang
Large Scale Information Integration on the Web: Finding, Understanding and Querying Web Databases

Xiaoxin Yin
Scalable Mining and Link Analysis Across Multiple Database Relations

Sebastian Magda
Image-Based Reconstruction and Modeling of Geometry With Complex Reflectance in Non-Diffusive Media

Changhao Jiang
Automatic Software Performance Optimization on Modern Architectures

Mingliang Wei
Software and Hardware Support for Data Intensive Computing

Arkady Epshteyn
Combining Prior Knowledge and Data: Beyond the Bayesian Framework

Scott Kircher
Approximating, Editing, and Processing Free-Form Motion

Xinlai Ni
Dynamic Modeling with Implicit Surfaces and Polygonal Meshes

Dan Cranston
Coloring and Labeling Problems on Graphs

David Alber
Efficient Steup Algorithms for Parallel Algebraic Multigrid

Kaustubh Joshi
Stochastic-Model-Driven Adaptation and Recovery in Distributed Systems

October 2007

Rodrigo Braz
Lifted First-Order Probabilistic Inference

Luis Ceze
Bulk Operation and Data Coloring for Multiprocessor Programmability

Po-Hao Chang
Customizing Web Applications Through Adaptable Components and Reconfigurable Distribution

Lei Cheng
Novel Cad Techniques for New Challenges in Deep Sub-Micron VLSI Design

Marcelo D'Amorim
Efficient Explicit - State Model Checking for Programs with Dynamically Allocated Data

Hui Fang
An Axiomatic Approach to Information Retrieval

Jia Guo
Exploiting Locality and Parallelism with Hierarchically Tiled Arrays

Chengdu Huang
A Scalable Self-Diagnosing Content Distribution Service with Bounded Latency

Won Jeon
Optimization Strategies for Qos-Sensitive Vod Service Delivery in Cooperative Environments

Gregory Koenig
Efficient Execution of Tightly-Coupled Parallel Applications in Grid Computing Environments

Viraj Kumar
Conformance Testing and Error Explanation for Software Models

Chengkai Li
Enabling Data Retrieval: By Ranking and Beyond

Jin Liang
Building and Managing Large Scale Distributed Services

Chao Liu
Statistical Debugging and Automated Failure Triage

Liqian Luo
Envirosuite: An Environmentally-Immersive Programming Framework for Wireless Sensor Networks

Robert McCann
Efficient Data Integration: Automation, Collaboration and Relaxation

Hanna Neradt
Null-Space Methods for Numerical Solutions of Differential Equations

Jason Okane
A Theory for Comparing Robot Systems

Cigdem Sengul
Communication-Centric Energy Conservation for Multi-Hop Wireless Networks

Xuehua Shen
User-Centered Adaptive Information Retrieval

Rishi Sinha
Indexing Scientific Data

Karin Strauss
Cache Coherence in Embedded-Ring Multiprocessors

Samarth Swarup
Artificial Language Evolution on a Dynamical Interaction

James Tuck
Efficient Support for Speculative Tasking

Shun Wang
Krylov Subspace Methods for Topology Optimization on Adaptive Meshes

Dong Xin
Integrating Olap and Ranking: The Ranking-Cube Methodology

Zhenyu Yang
Multi-Stream Management for Supporting Multi-Party 3D Tele-Immersive Environments

Yuan Zhou
Interactive Visualization of Large Higher-Order Tetrahedral Data

Qingbo Zhu
Performance Aware Energy Efficient Storage Systems

December 2007

Ke Chen
Algorithms on Clustering, Orienteering and Conflict-Free Coloring

Daniel Dig
Automated Upgrading of Component-Based Applications

Shen Dong
Quadrilateral Remeshing and Efficient Surface Parameterization

Chao Huang
Supporting Multi-Paradigm Parallel Programming on an Adaptive Run-Time System

Mario Medina
A Self-Tuning Disk Striping System of Parallel Input/Output

Tao Tao
Improve KL-Divergence Language Models in Information Retrieval Using Corpus Local Structures

Qing Wu
Feature-Based Texture Synthesis and Hierarchical Tensor Approximation

IN MEMORY

Gene Golub

Illinois alumnus and Stanford University Professor Gene Golub, one of the world's leading numerical analysts for the past forty years, passed away on November 16, a victim of acute myeloid leukemia. Golub received all three of his degrees from Illinois, taking his PhD in 1959 under Professor Abraham Taub. Golub's influence on both the theory and practice of scientific computing was profound, both through his vast range of technical research contributions and his professional leadership of the entire scientific computing community nationally and internationally.

Golub had served on the Stanford faculty since 1962, including a term as Chair of the Computer Science Department 1981-1984 and Director of the Scientific Computing and Computational Mathematics Program, 1988-1998. He served as President of SIAM 1985-1987 and was founding editor of both SIAM Journal on Scientific Computing and SIAM Journal on Matrix Analysis and Applications. His founding of NA-Net and NA-Digest helped unify the worldwide numerical analysis community.

He was also legendary for his encouragement and mentoring of young researchers just becoming established in the field. He established the Franz Hohn and J.P. Nash Scholarship in the department of computer science. The scholarship is given in recognition of outstanding scholarship and promise in applied mathematics, computational science, or scientific computing. Another example of his generosity was his endowment of the Paul and Cynthia Saylor Professorship in Computer Science at Illinois, in honor of his longstanding friendship with the Saylors.

Golub's many honors included membership in both the National Academy of Sciences and the National Academy of Engineering, numerous honorary degrees, and having his collected papers published by Oxford University Press. Among the nearly thirty PhD students Golub produced is Professor Michael Heath, currently Interim Head of the Department of Computer Science at Illinois. The Golub Tree provides a small glimpse of his lasting influence on the field by way of his direct mentorship.

Gene will be sorely missed by the worldwide numerical analysis community and by the Illinois computing community, which owes him an enormous debt of gratitude both for his many seminal research contributions and his generous and inspiring leadership. ■

Sergio Servetto

University of Illinois computer science alumnus Sergio Servetto died July 24 in a private plane accident. He was 39.

Servetto was born in Argentina on Jan. 18, 1968. He received a Licenciatura en Informatica from the Universidad Nacional de La Plata, Argentina, in 1992 and the M.Sc. in electrical engineering and Ph.D. in computer science from the University of Illinois at Urbana-Champaign (UIUC) in 1996 and 1999, respectively. He worked as a programmer for IBM in Buenos Aires from 1991 to 1994, then returned to the University of Illinois as a graduate research assistant until 1999. From 1999 to 2001, he worked at the Ecole Polytechnique Federale de Lausanne, Switzerland. Servetto joined the Cornell faculty in the fall of 2001 as assistant professor of electrical and computer engineering.

His research overlapped the fields of computer science and applied mathematics, and centered around networks of small sensors that communicate wirelessly. His work combined theories of communication, typically a topic in electrical engineering, with theories of networking, typically pursued in computer science. "All of my educational and outreach activities ... are designed around the general goal of providing a solid theoretical basis to our students in networking and communications," he once wrote.

During his studies at the University of Illinois, Servetto was the recipient of the 1998 Ray Ozzie Fellowship, given to "outstanding graduate students in computer science," and of the 1999 David J. Kuck Outstanding Thesis Award for the best doctoral dissertation of the year. He was the recipient of a 2003 National Science Foundation CAREER Award, which provides funding to outstanding young investigators. He was a member of the editorial board of Foundations and Trends in Networking, and was one of the guest editors for a special issue of the IEEE Journal on Selected Areas in Communications, on the topic of Fundamental Performance Limits of Wireless Sensor Networks.

He was in the process of writing a book, tentatively entitled "Digital Communications over Packet-Switched Networks," and had been working for over two years on a major paper which he hoped would resolve what is known as the multi-terminal rate distortion problem, which concerns the assembling of signals from multiple sources that contain overlapping information and are sent to a common destination at different rates and with different amounts of distortion. Colleagues describe the work as an original approach to a problem of some 30 years' standing and plan to submit finished portions of it for publication in Servetto's name.

Servetto is survived by his wife, Viviana Sitz, and two young sons, Alejandro and Luciano. ■

Professor Jennifer Hou

University of Illinois computer science professor and IEEE Fellow Jennifer Hou passed away December 2.

Jennifer joined the computer science faculty in 2001. She was a principal researcher in networked systems and served as the director of the Illinois Network Design and Experimentation (INDEX) research group.

Her research interests in networked systems ranged from issues of Quality of Service in wireless networks to enabling software infrastructure for assisted living. She pursued topics in both the theoretical protocol design and deployment aspects of wireless sensor networks. As part of her research work, she and her team developed and released an extensible, reusable, component-based compositional network simulation and emulation package called J-Sim, widely used by the research community.

Jennifer once described her research goals as "to, on the one hand, understand how network components and systems interact/coordinate with one another (via theoretically grounded measurement, modeling, and simulation techniques) in the cyber physical space and study how they perform under a wide variety of circumstances, and on the other hand, to design/refine new/existing network and systems techniques to optimize their interaction subject to environmental effects."

In addition to her many research accomplishments, Jennifer will also be remembered as a devoted educator. Her students remember her as a patient and supportive advisor who always put her students first. Former student Chunyun Hu recalls that "through the years, Jennifer has been a great advisor to me and the group. I got encouragement, honest judgment of the work, and patience to observe my research progress, and Jennifer never let the group worry about the research funding. She always led me and pushed me go deeper to understand things from a more fundamental, theoretical viewpoint."

"Jennifer was a vibrant presence in our department, both as a researcher and an educator," said Michael Heath, interim department head and Fulton Watson Copp Chair in computer science. "She was a dedicated mentor to her students and was civic minded in focusing her research for the public benefit. She will be greatly missed by her many colleagues, students, and friends."

Professor Sylvian Ray

University of Illinois computer science professor emeritus Sylvian Ray passed away on December 12, 2007. He was actively involved in research into artificial intelligence topics. ■

Ray's primary research focus was on signal interpretation, particularly those of biomedical origin. His research into the subject used a variety of techniques, such as system rule-based techniques and connectionist (neural network) methods. His group developed a system which accepts the multichannel signals originating from a sleeping human subject and produces a diagnosis including a number of abnormal conditions. Ray was the author of the text Data Acquisition & Digital Signal Processing.

Ray's research interests have always been known for their diversity. The recent research work of Ray and his students has spanned language evolution and convergence issues, cumulative learning, a new approach measuring task relatedness using a Kolmogorov complexity based Transfer Learning method, and development of a self-aiming camera built to perform audio-visual sensor fusion in the manner of the deep superior colliculus (DSC) region of the brain.

"Sylvian was an amazing guy," said computer science professor Gerald DeJong. "He knew about oscilloscopes and soldering guns as well as neural networks."

In his early career, Ray was involved in hardware related research. He was a primary researcher on the ILLIAC III system, a fine-grained SIMD pattern recognition computer built by the University of Illinois in 1966.

"Sylvian Ray's long and distinguished career spanned almost the entire digital computer era. From his pioneering work on the hardware design of the early ILLIAC machines to his most recent research on neural networks, which continued beyond his retirement, Sylvian was a dynamic presence in our department who will be missed by his many friends and colleagues," said Michael Heath, interim head of department and Fulton Watson Copp Chair in computer science.

Ray is remembered by his graduate students and former students as a kind, patient, and generous mentor. He was the recipient of several awards for his mentorship and advising during his tenure.

"He was always positive," said former PhD student Kiran Lakkaraju. "He was always supportive of our efforts and our efforts to tackle new issues that were challenging. He knew so much from so many different areas, from the rudiments of signal processing to more cognitive and social aspects of artificial intelligence."

Former student PhD Samarth Swarup said, "His wisdom and kindness will remain an inspiration to me. He has shaped my own interests, given me a broad curiosity, and taught me (and many others) to do research." ■

Memorial Funds

Memorial funds in CS have been established in the names of Gene Golub, Jennifer Hou, and Sylvian Ray.

Contact

Safiya Noble (snoble@cs.uiuc.edu) for information on making a contribution.

Ways to Contribute

Now, more than ever, we depend on the alumni and friends of the Department of Computer Science. In order to continue to flourish as one of the top computer science departments in the country, we depend on the generosity of our alumni and friends. Your gifts, large or small, monetary or gifts of your time, enable us to uphold our distinguished past, maintain excellent educational and research opportunities for our current students and faculty, and cultivate our outreach to future generations.

Return to Campus: Give a gift of your time by returning to campus to share your career experiences with our students.

> Give a lecture, seminar, or technical talk
> Host an Engineer in Residence session

CONTACT
SAFIYA NOBLE
217-265-6823; SNOBLE@UIUC.EDU

Serve as a Mentor: Give the gift of experience to students bridging the gap between the classroom and the workplace, or between high school and university.

> Mentor incoming freshmen students from your area and help guide them through their first years as a CS student
> Sponsor a Senior Design project and provide valuable real world experiences to seniors preparing to enter the industry.

CONTACT
KAREN HYMAN
217-244-4496; KKHYMAN@UIUC.EDU

Support Student Programs: Your contributions to the CS Annual Fund or a designated fund support student activities, scholarships, and programs to provide current students with a richer experience.

> Give online at www.cs.uiuc.edu/giving/

CONTACT
SAFIYA NOBLE
217-265-6823; SNOBLE@UIUC.EDU

Reach Out to Future Generations: Give a gift to future generations of computer science students by participating in an outreach program.

> Visit a local high school through our ChicTech program
> Sponsor a Technical Ambassadors Challenge project through ChicTech

CONTACT
SONYA HARRIS
217-244-4493; LHARRIS2@UIUC.EDU

GVBK

giving back to the department of computer science

Always Illinois

Always Illinois is a free virtual community exclusively for Illinois alumni, students, faculty, and staff. Renew and maintain lifelong friendships with the Illinois family in a secure, private community.

- Connect with alumni in a specific region or city
- Use your Engineering alumni network to find a job or fill a vacancy
- Start groups to stay in touch with your on-campus clubs/activities
- Create a group for your professional areas of specialization
- Keep up with news about events and activities for alumni and students
- Join groups of alumni and/or students with common interests
- Connect with current students and faculty to keep up with what's happening in and around Siebel Center

Always Illinois Challenge

Help current CS students get a head start on entering the industry. Log on to Always Illinois and share your must-read trade publications, blogs, and technology journals in the Computer Science Alumni group.

A Virtual Community for Illinois Alumni

EXPLORE WWW.ALWAYSILLINOIS.ORG TO REGISTER OR LEARN MORE.

ROWE FAMILY Scholarship

Promotes International Competitiveness

For alumni Jim (BA Political Science, '88) and Craig Rowe (BS Computer Science, '90, BA Economics, '90), supporting the University of Illinois was an easy choice. Jim and his wife Cindy (BS, Microbiology, '88) met at the university, while Craig and his wife Ulku (MS, Computer Science, '97) both attended the U of I at different times. Add in an Illinois alumni tradition that stretches back three more generations – including a great grandmother who was one of the pioneering female U of I students – and it's clear that Illinois is part of the Rowe family history.

"Given that four generations of our family have attended the U of I, it is very likely that we will be supporting the university as part of the tuition for our kids," the Rowe's said. "But, we didn't want to wait until they attend the university – which may never happen – or through our estate to set a good example of charity for the next generation."

The Rowe Family scholarship fund provides support for incoming computer science freshmen. The Rowe's wanted funding to be available to exceptional students who needed assistance, regardless of cutbacks in other charitable or governmental programs.

"We didn't want students who got accepted among international competitors to miss the opportunity due to lack of financial resources."

International competitiveness is an ideal to which the Rowe's are committed. They chose to support the computer science department because of their belief that excellence in science is a critical component in competing on a global scale. And the computer science program is not only one of the top programs in the country, but holds prestige internationally as well. Ulku Rowe was a Fulbright Scholar from Turkey in the CS graduate program.

But, they are careful to point out, the University offers more than just a top computer science program.

"As technology becomes increasingly pervasive and accessible, subject matter expertise in another area will be important in order to make the most of the technology. The U of I has the other classes and curricula necessary to do this," they remarked.

The scholarship fund was established in honor of Jim and Craig's grandparents, Hubert W. and Bonnie Scott Baker. The brothers wanted to recognize the important contributions of their maternal grandparents to their success and happiness.

"They were critical to our upbringing, always demonstrating respect for family, hard work, and education," they said. "They enabled us to achieve things they never knew about, but were influential in us achieving."

:prf1sNgvn

Profiles In Giving

$100 million

Thomas M. Siebel Gift

The University of Illinois announced a record $100 million gift commitment from alumnus Thomas M. Siebel during the kick-off of the largest fundraising effort in the 140-year history of the University.

The gift commitment from Siebel is an estate provision combined with outright support of science and engineering on the Urbana-Champaign campus. The Thomas M. Siebel Fund for Excellence will emphasize collaborative work that addresses major problems and opportunities facing humankind in this century, including the convergence of the computational and life sciences and breakthrough developments in energy and human health.

Siebel has expressed particular interest in alternative energy to reduce dependence of carbon-producing fuels, the application of information technology to bioengineering, and stem cell research.

The Siebel Fund may support research for faculty and students, symposia, endowed professorships or chairs, graduate fellowships, and public policy development and programs designed to apply research pertaining to the fields of inquiry the fund supports. The Siebel Fund will also support collaborative and research and program efforts between the U of I and other academic institutions, businesses or governmental entities.

"Illinois is a miraculous place. It's a humbling moment to play a role going forward. But there's a lot of work to be done in the next few decades: technology, bioengineering, energy, and gerontology. To be second-to-none, to be world class, we need even more resources in place by 2010. It's our chance to participate in the future of this great institution. It is simply the right thing to do," said Siebel.

"We seek unsurpassed excellence among public research universities in this nation. Quite simply put, no other goal is worthy of our history," said Chancellor Richard Herman. "Tom Siebel and his wife Stacey have provided a gift of passion in accord with the idea that public universities, especially this, the state's flagship institution, should help resolve the great issues facing society. Improving human health, providing new sources of energy and increasing cross cultural understanding are all a part of our role in society and our path to the vaunted position we seek. The Siebel's' gift sets high aspirations for us and a high water mark for individual gifts; and it occurs at an exquisite time—the beginning of our Brilliant Futures campaign. "

Contributors: UI Foundation and the Office of the Chancellor

NONPROFIT
U.S. POSTAGE
PAID
PERMIT #75
CHAMPAIGN, IL

DEPARTMENT OF COMPUTER SCIENCE
Thomas M. Siebel Center for Computer Science
201 N Goodwin Ave,
Urbana, IL 61801-2302.