



Research grants increase sharply 1997-2002

Research continues to flourish in the department. The range of topics has broadened as new faculty have been hired in areas such as computer graphics and information systems while other areas that have recently suffered due to retirements are being infused with new blood. In 2002, a dozen faculty received grants of more than \$200,000 and three received one million or more in funding.

Steven LaValle, Jeff Erickson and John Hart's 3D visibility research will help robots navigate through cluttered spaces or make possible visualizations of complicated molecular structures that undergo conformational and viewpoint changes. Daniel Reed will assess the use of game systems, with graphics capabilities equivalent to high-end supercomputers, for parallel computing and scientific visualization. Sarita Adve, Robin Kravets, Klara Nahrstedt and Doug Jones (ECE) are using a hardware/software collaborative approach to multimedia applications for mobile devices

incorporating adaptivity in all layers of the system to enable quick responses to dynamic changes.

Research awards have risen dramatically within the department in recent years. In 1997, \$4.4 million in grants were awarded and by 2002 \$12.4 million in grants were received. The highest one-year total was \$22.5 million in 2001. Faculty submitted 81 proposals this year with 38 being funded for a 47% success rate.

In 2002, the National Science Foundation was the largest granter with \$6.1 million, followed by Office of Naval Research with \$4.1 and DARPA with \$1.4 million. Other funding sources included: Motorola, NCSA and the State of Illinois.

Numbers are expected to continue to climb as the new faculty, hired during the last two years, begin to contribute. These numbers do not account for faculty whose grants are administered by other units such as the Beckman Institute or research projects transferred from other institutions with the new senior hires.

continued on p. 6.

Israel named alumni coordinator



Deb Israel

Deborah (Deb) Israel was named the coordinator of alumni relations and development for the Department of Computer Science. Her years of experience in industry, the university and the department will be a valuable resource for this position.

"I am delighted to assume my new role with CS students and alumni and

eager to contribute to the growth of this pre-eminent department," said Deb Israel. "Judy Tolliver established an outstanding foundation that I look forward to building on as the department becomes even larger and

more influential. To realize the tremendous opportunities that the Siebel Center affords the department, I plan to focus on supporting the vision for this challenging enterprise."

Most recently she was coordinator of research programs for Prof. Daniel Reed for four years and before that was a research editor for NCSA. Industry experience included work at SubLOGIC Corporation as a promotions coordinator, Computer Teaching Corporation as director of communication, and McGraw-Hill as a science and engineering representative.

"Deb has been several years with the department, and is very familiar with our students and faculty. Her enthusiasm and dedication will no doubtably reinvigorate the critical relations with our alumni. We welcome Deb in her new job and wish her success," said department head Marc Snir.

Alumni News

In this Issue

Alumni

Classnotes	4
Alumni coordinator	1
Executive Advisory Council	5

Department

Ethics and professionalism	8
Faculty notes	7
Industrial gifts	12
Networking lab	12
Real-Time research lab	14-15
Research grants	1, 6-7
Siebel update	10-11
Student notes	9

Other news

CS summer camp	13
----------------	----

Alumni News is published twice a year. All ideas expressed in the *Alumni News* are those of the authors or editors and do not necessarily reflect the official position of the alumni or the Department of Computer Science.

Editor: Kathleen Zanotti

Send address changes or submissions to:

Editor, Alumni News
Dept. of Computer Science
1304 West Springfield Avenue
Urbana, IL 61801

Email: alumni@cs.uiuc.edu

Fax: (217) 333-3501

www.cs.uiuc.edu



Printed on recycled paper with soy ink.

The University of Illinois is an equal opportunity and affirmative action institution.

2002 Distinguished Lecturers

Archived lectures are available at:
www.cs.uiuc.edu/dls.

- 9.16.02** Surajit Chaudhuri, Microsoft Research, Self-Tuning Database Systems: The AutoAdmin Experience
- 9.30.02** Vijay V. Vazirani, Georgia Institute of Technology, Primal-Dual Algorithms and Market Equilibria
- 10.14.02** James R. Goodman, University of Wisconsin, Multiprocessors, Cache Coherence, and Synchronization
- 10.21.02** David Kirk, NVidia, Graphics Architectures: Evolving Faster than Moore's Law?
- 10.28.02** Radia Perlman, Sun Microsystems, How to Build an Insecure System out of Perfectly Good Cryptography
- 10.30.02** David A. Patterson, University of California, Berkeley, Recovery Oriented Computing, Robert Mueller-Thuns Lecture
- 11.11.02** John Canny, University of California, Berkeley, Human-Centered Computing,
- 12.02.02** Monica S. Lam, Stanford University, Converting Cycles into RASS (Reliability, Availability, Serviceability, Security), Donald B. Gillies Memorial Lecture
- 12.9.02** Lixia Zhang, University of California, Los Angeles, Challenges in Tackling Large-Scale Networks, CRA-W Distinguished Lecture
- 1.27.02** Anthony Ephremides, University of Maryland, Energy Efficiency in Wireless Networking
- 2.10.02** Thomas Anderson, University of Washington, Considerations for Robust Internet Protocols
- 2.17.02** Daniel E. Koditschek, University of Michigan, Programming Machines that Work



Safe crossings

New crosswalk

Crossing Springfield Avenue between Granger Library and DCL has become much easier and safer these days with the addition of a \$25,000 crosswalk.

No more waiting for a driver to feel pity; no more squeals of tires as a bold/crazy individual steps off the curb.

As a pedestrian passes between a set of posts with infrared sensors, solar-powered lights begin to flash, warning traffic to stop. A sign in the center of the street informs drivers that pedestrians have the right-of-way.

The crosswalk is the first of its kind on campus and serves as a test for other busy sections of campus that have no nearby traffic lights.

From the corner office . . .



Marc Snir

I would like to use this column to describe efforts we are making to improve department interactions with two most important constituencies: our undergraduates and our alumni.

Since coming to the CS department, I have been concerned with the high undergraduate student to faculty ratio. It has peaked at over 30:1 and has resulted in

large classes and limited opportunities for student-faculty interactions. Over the next few years we plan to reduce this ratio to 20:1, a more manageable but still suboptimal ratio; this, through a significant increase in faculty and a slight decrease in the undergraduate population. Last fall, we raised our acceptance threshold for freshmen and as a consequence our freshman class has the highest qualifications of any department on campus. The number of accepted freshmen declined by approximately 20%.

We are working on a significant overhaul of our undergraduate curriculum. The changes are intended to ensure the acquisition of knowledge in key technical areas such as networking and databases, and vital practical skills in software development and teamwork. The details of the proposed curriculum are posted on our web site and your comments are most welcome. Some of these changes include:

- A new sophomore-level system course (CS 241) will provide a gateway to an expanded choice of junior- and senior-level courses in distributed systems, networking and information systems.
- A programming studio course (CS 242) will focus on the art of programming and on the practical skills that lead to elegance in programming.
- We shall require each student to participate in a team senior project or write a senior thesis.

We also plan to experiment with new ways of using IT in support of education, as we move to Siebel Center. The last newsletter described the e-Fuzion project developed by two undergraduate students. This software facilitates electronic interactions in class between students and their lecturer and TAs. We expect to deploy such technologies more broadly in our new building. My goal is to establish an environment where students' contributions to our education and collaborative infrastructure become commonplace, and where technology is used to enhance student-student and student-faculty exchanges.

Of course, technology is not an end-all solution. We have started a variety of initiatives to improve the connection between undergraduate students and the faculty and department. The Computer Science Student Advisory Council involves students in departmental decisions that affect them. The "power lunch" program provides opportunities for students and faculty to interface in an informal setting (www.acm.uiuc.edu/powerlunch/). A stronger emphasis on undergraduate projects and research will also lead to closer links. I also expect that the new building design (which includes an espresso bar!) will promote more informal contact between students and faculty.

As an aside, let me briefly address the impact that the current economic situation is having on the university. The State of Illinois projects a significant deficit for the next fiscal year – around \$5B. At the time I write this column, plans for coping with this deficit have not yet been made public. One can expect that the state university system will bear its share of the expense reductions to help balance the budget. Illinois is not unique in this situation: most US states, hence most state university systems, face significant budget challenges in the coming years. At the same time, many private universities have been hit by a significant decrease in the value of their endowments due to the slide in the stock markets. Thus, one can expect a few rough years for higher education. The challenge for the university leadership will be to continue expansion and maintain excellence in key areas, while reining in expenses overall.

Interactions between the department and its alumni will be facilitated by the recently (re)established Department of Computer Science Executive Advisory Council (EAC). The current members of the EAC are: Ira Cohen, Ron Cytron, John Entenmann, Kumar Goswami, Tim Krauskopf, Doug MacGregor, Mary McDowell, Ed Reingold, Tom Siebel and Rick Schell. We plan our first meeting in April. EAC members will normally rotate every three years, provide advice on department policies and be involved in various activities in support of the department. See page 5 for more details.

Relations with alumni are more important than ever, as we strive to continue our fast evolution through these challenging times. Therefore I am very happy to have a new energetic alumni coordinator, Deborah Israel. Please contact either of us with any suggestions you have on ways to improve the interaction between our department and its alumni. With your help and that of the EAC, I am confident that we shall meet the challenges ahead and enhance excellence of our department.

— *Marc Snir*

Classnotes

2000s

Anthony Czupryna, BS 00, was married to UI alum Britt Wilms last June. He is a computer programmer at Orbitz online travel agency. They are living in Chicago, Ill.

1990s

Si Park, BS 98, is Senior Embedded Software Engineer with Lockheed Martin Aeronautics in Fort Worth, Tx. Previously he had been a software engineer at Object Computing, Inc. in St. Louis, Mo.

Anupam Sharma, BS 97, received his MS and JD from Stanford University and is currently working at Investor Growth Capital, a venture capital firm in Palo, Alto, Calif.

Joseph Saltiel, BS 96, married UI alum Michelle Hieggelke in May. He also received his MS in ECE in 1998 and his JD in 2001 from Urbana. He is an attorney with Jenner and Block in Chicago, Ill.

Subrata Mitra, PhD 94, was named as General Manager of the India Development Center by Tavant Technologies, Inc. He was founder and VP of engineering for Firewhite, Inc. which was acquired by Ubiquio Corp. Previously he had been at IBM's T. J. Watson and Santa Teresa Labs, where he was an architect for their OOAD tool, called Dynamic Designer. He is the author of 8 patents. Tavant is a provider of software products and solutions for businesses to manage multi-level distribution channels.

John Slagel, BS 93, was married last February to Deborah Wilderman. He is a computer programmer with Volition, Inc. in Savoy, Ill.

1980s

Bill Sherman, BS ECE 86 and MS 89, and **Alan Craig**, MS Teaching of CS 85, have written a book, "Understanding Virtual Reality: Interface, Application, and Design". The book deals with applications of VR and includes a history of information presentation.

Steve Chien, BS 85, MS 87 and PhD 91, was on campus to give seminar entitled "Move Over Hal Autonomous Spacecraft in the New Millennium". He is at the Jet Propulsion Lab as Principal Computer Scientist.

John Klein, BS 85, was ordained a Roman Catholic priest on June 1 at St. Raymond in Joliet, Ill. He had worked as a systems analyst, manager and sales before entering the seminary five years ago. He is an associate pastor at Visitation Catholic Church in Elmhurst, Ill.

1970s

Monty Denneau, MS 78, PhD Math 78, received the 2002 Seymour Cray Award for sustained contributions that have advanced and shaped the frontiers of high-performance computers as well as led to widely used industry products. He is at the T. J. Watson Research Center.

Sohaib Abbasi, BS 78 and MS 80, and his wife Sara were honored by the University of Illinois Foundation for their contributions to the department. The Abbasis have donated \$1.7 million to the department to create a professorship and a fellowship.

Richard Schell, MS 77 and PhD 79, was named CTO for NetIQ Corp. He will also serve as general manager of the Performance and Availability Management business unit and will

lead the development of the unit's vision and business plan. He has held executive leadership positions in a number of companies including Intel, Netscape and Sun Microsystems. NetIQ is a provider of systems and security management, and web analytics solutions.

Linda Petzold, AB 74 and PhD 78, was on campus to give a CSAR noon seminar on "Adaptive Numerical Methods for Sensitivity Analysis of Differential-Algebraic Equations and Partial Differential Equations". She is a professor at the University of California at Santa Barbara in the departments of computer science and mechanical and environmental engineering.

1960s

Daniel Dobberpuhl, BS 67 in ECE, was chosen for the 2003 IEEE Solid-State Circuits Technical Field Award for "pioneering the design of high-speed and low-power microprocessors." He is vice president and general manager for Broadband Processor Business Unit at Broadcom in San Jose, Calif. He is a DEC Technical Fellow and authored the classic, *The Design and Analysis of VLSI Circuits*.



Sara and Sohaib Abbasi with first fellowship holder, Mumtaz Ahman

Executive Advisory Council Announced

At the top of department head Marc Snir's to do list has been the establishment of an Executive Advisory Council. His goal for the council, which has not been active for several years, is to provide a forum for real involvement of alumni in shaping the department's future.

"With the rapid changes taking place in industry and the new skill sets required of our graduates, it is essential that we have an advisory council that will help us focus on the trends ahead and for our students to remain competitive. Siebel Center will provide needed space for the expansion of classrooms, instructional labs and faculty. These changes will in turn foster new technologies, courses and research areas. I hope we shall be able to take advantage of their unique contributions for the tasks ahead," said Marc Snir.

We are pleased to announce that our distinguished council will include:

- Ira R. Cohen (BS 81), Vice President, Advanced Systems Concepts, Inc.
- Ron K. Cytron (MS 82, PhD 84), Associate Professor, Washington University
- John K. Entenmann (BS 84), Vice President, Oracle
- Kumar Goswami (MS 88, PhD 93), President and CTO, Kovair, Inc.
- Timothy K. Krauskopf (MS 87), Vice President and General Manager, Motorola
- Douglas B. MacGregor (MS 80), The MacGregor Institute
- Mary McDowell (BS 86), Senior Vice President, Compaq-Hewlett Packard
- Edward Reingold, Head, Department of Computer Science, Illinois Institute of Technology

· Richard M. Schell (MS 77, PhD 79), CTO and Director of Engineering, NetIQ

· Thomas M. Siebel (MS 85), CEO and Chairman, Siebel Systems, Inc.

The group will inform department about+ long-term directions in research and education, Siebel Center – establishing it as a vibrant living laboratory and collaborative community, industry-department interactions and new ways to bridge the gap between the "silicon prairie" and the "silicon valley," student placement in industry, women and minority recruiting, and funding models and fund raising.

The initial meeting will be held April 11.

Alums party at IBM



(From left) Calin Cascaval PhD 00, Robert Montoye MS 81 and PhD 84, Jose Moreira, PhD 95 ECE talk with Prof. David Padua

IBM hosted an alumni reception held last fall at the T. J. Watson Research Center. The event included CS, physics, and ECE alums within IBM and the surrounding area. Department head Marc Snir welcomed alums and gave a brief department update to the group. Professors Roy Campbell, David Padua and Jiawei Han gave presentations on their research earlier in the day during the IBM Technology Forum.

Other news

In early October, the National Academy of Television Arts and Sciences presented Emmy Awards to **Donald L. Bitzer** BS 55, MS 56, and PhD 55, **H. Gene Slottow**, PhD 64; and **Robert H. Willson**, BS 59, MS 61 and PhD 66, for the invention and development of the plasma display panel. Bitzer and Willson were on hand in New York to accept the award. UI representatives accepted the award posthumously for Slottow and later presented it to his widow Irene in a ceremony at her home.

Spring Alumni reception in Chicago

Chicago area alumni can mark their calendars for an alumni reception to be held this spring. Meet Deb Israel, the new alumni coordinator, current students and faculty, while renewing old ties, and meeting some new CS alums. This is a joint event held with the Department of Electrical and Computer Engineering. For more information, see our alumni web site.

April 22, 5 - 7 pm
Chicago Marriott at
Oakbrook

“The large increase in research funding is all the more remarkable given the large number of new faculty members: more than half of the department members have joined the department in the last six years. One would expect newcomers to be less ‘productive’ in obtaining research funding,” said department head Marc Snir. “However, the potential handicap of lack of experience or exposure has been more than compensated by the quality and dynamism of this new generation.”

Looking at grant dollars spent in a year there is a telling accumulative effect. In 2001 total expenditures were \$6.6 million, nearly doubling for 2002 to \$11 million. Most of the money awarded is earmarked for people-related costs, such as research assistants, and not for equipment purchases.

Spending is most noticeable in the increased number of research assistants. During 1997 there were 88 half-time positions. In 2002 the

number sky rocketed to 150 and in 2003 increased to 166. Space within the building is at a premium and everyone looks to Siebel Center anxiously.

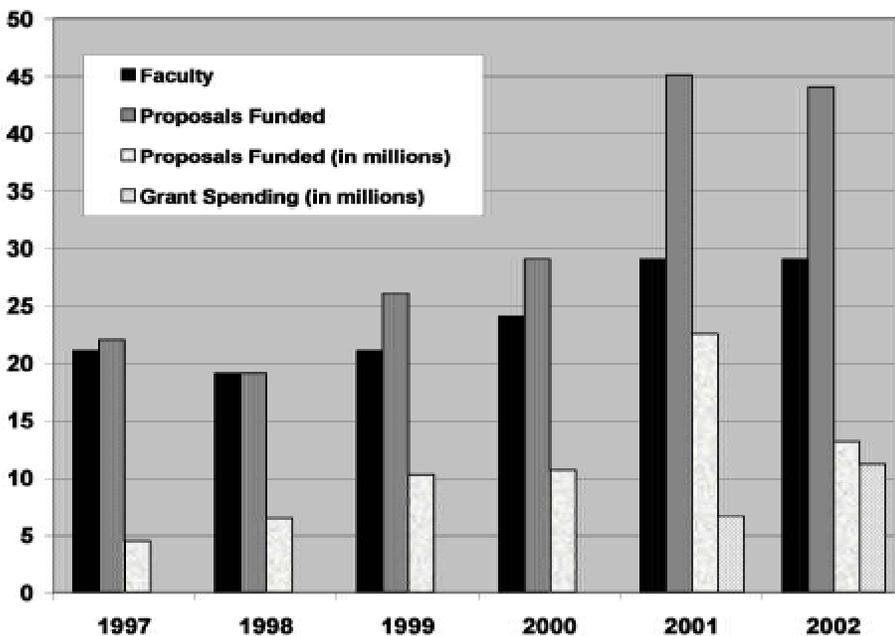
“I believe that the quantitative increase in research funding in our department is accompanied by an important qualitative change. An increased fraction of our funding results from broader research projects that involve multiple faculty members in the department, faculty members from other departments and collaborators from other universities. There is a significant amount of cross-fertilization that happens when people from different disciplines and different units collaborate; such collaborations break established discipline boundaries and generate new ideas,” said Snir. “The shift toward broader cross-disciplinary research reflects on the evolution in computer science research and on the ability of our department to change as the discipline changes.”

Major grants for 2002

- Sarita Adve with Klara Nahrstedt, Robin Kravets and Doug Jones (ECE), A Hardware-Software Collaboration Approach for Multimedia Applications, NSF ITR, \$1,000,000.
- Sarita Adve, Using Simultaneous Multithreaded Processors for Soft Real-Time Applications, NSF, \$300,000.
- Jiawei Han, Mining Sequential Patterns and Structural Patterns, Scalability, Flexibility, Extensibility, and Applicability, NSF \$165,000.
- Jennifer Hou with Lui Sha and P.R. Kumar (ECE), Data Centric Sensor Networks, NSF, \$540,000.
- Laxmikant Kale with Marianne Winslett, Advanced Parallel Computing Techniques with Applications to Computational Cosmology, NSF ITR, \$1,000,000.
- Steven LaValle, with Jeff Erickson and John Hart, Making 3D Visibility Practical, NSF, \$499,623.
- Steven LaValle, Multiple Robot Sensor-Based Pursuit Strategies, ONR, \$308,080.
- José Meseguer with Gul Agha, A Logical Framework for Adaptive Systems Interoperability, ONR MURI, \$2,905,800.
- José Meseguer, Composable Formal Models for High-Assurance Fault Tolerant Networks, SRI, \$400,000.
- Daniel Reed, Intelligent High-Performance Computing on Toys, NSF ITR, \$400,000.
- Lui Sha, Defect Tolerant System Integration and Evolution, ONR, \$757,248.
- Lui Sha with Vikram Adve and Mark Spong (GEngr), Flexible and Survivable Embedded Systems, NSF, \$300,000.
- Robert Skeel, Numerical Methods for Molecular Dynamics, NSF, \$212,200.

NSF CAREER grants on page 7.

Funded Departmental Research 1997-2002



Faculty notes



Gul Agha

Gul Agha was elected to the European Academy of Sciences. Some 520 members have been elected in recognition of their contributions to science. The academy is a multi-national body that promotes science and technology, scientific cooperation and creates centers for research.



Jiawei Han

Jiawei Han received the IBM Faculty Partnership Award, which recognizes and fosters creative research work. He also received a Microsoft Research Grant. His research interests include database systems; data mining; and data warehousing.



John Hart

John Hart co-authored the book *Real Time Shading* that came out this past July from AK Peters, with co-authors are Marc Olano, Wolfgang Heidrich and Michael McCool. The book describes how to unleash the newly available programmable features available in recent PC graphics cards. He also was a contributing author of the third edition of *Texturing and Modeling: A Procedural Approach*, published in December. This has become a bible of special effects in the computer graphics industry, and the third edition expands the tools previously used for movie special effects to real-time use for video games.



Laxmikant Kale

Laxmikant Kale and his research group returned to campus as winners of two awards from this year's supercomputing conference, SC2002. Kale and co-authors James C. Phillips, Gengbin Zheng and Sameer Kumar, won a Gordon Bell Award for special accomplishment for their paper NAMD: Biomolecular Simulation on Thousands of Processors. The team achieved unprecedented scaling of NAMD using Charm++, a code that simulates the behavior of large biomolecules and biomolecular systems, atom-by-atom. NAMD is the result of an interdisciplinary collaboration between Kale, computer science Prof. **Robert D. Skeel** and physics Prof. Klaus J. Schulten at the theoretical biophysics group of Beckman Institute. Charm++, developed by Kale and co-workers, simplifies parallel programming and provides automatic load balancing, which was crucial to the performance of NAMD.

The best research poster award was given to Kale and research students Sameer Kumar, Jayant DeSouza, Mani Potnuru and Sindhura Bandhakavi for their Faucets: Efficient Resource Allocation on the Computational Grid.



Jean Ponce

Jean Ponce, was elected an IEEE Fellow for his contributions to geometric shape representation in computer vision. He also recently became co-editor of the *International Journal of Computer Vision*.

NSF CAREER grants

National Science Foundation CAREER grants were awarded to three faculty members in 2002. The five-year grants are given to outstanding and promising young scientists and engineers.



Kevin Chang

Kevin Chang, MetaQuerier: Dynamic Ad-Hoc Information Integration across the Internet. His research objective is to provide seamless and transparent access to queryable databases on the "deep" Web; places where current crawlers cannot effectively query databases. He was awarded \$300,078.



Sariel Har-Peled

Sariel Har-Peled, Approximation Algorithms for Geometric Computing. His research focuses on approximation algorithms in computational geometry. He was awarded \$320,000.



Yizhou Yu

Yizhou Yu, Efficient and Realistic Spatial/Temporal Appearance Details. His research focuses on developing novel and powerful modeling and representation schemes that advance the state of the art in computer graphics and related areas; especially in the areas of 3D and temporal appearance modeling and synthesis. His award was \$325,000.

Ethics and professionalism in computing

"I found a security weakness on my school's network. I want to publish my findings on my web page. Some of my friends say that this is ethically wrong while others have said that this is no problem under the First Amendment. I am not sure what I should do."

Students are learning to think through problems similar to the above in a new course, CS 210 Ethics and Professionalism in Computing, being taught for the first time this semester. The course helps students develop their moral reasoning skills through case studies, current events and examples students bring into the classroom from experience. Ethics, like computer science, has developed its own set of questions. This course teaches students a methodology to obtain the answers.

"I worked as a network administrator one summer, and the biggest issue that surprised me was how passwords were handled. The senior administrator had memorized everybody's password at this firm, and a good portion of the users had the passwords written down in their office."

CS student



Students Lee Hyer, Mike O'Conner, Mani Partheesh, Jason Moore and Willam Gabriel test their ethical reasoning skills with with Dilbert board game.

Marsha Woodbury, MS 91 in journalism and PhD 95 in computer-aided instruction, developed this course to fill an area not usually covered in department classes. Presently CS210 is an elective but will become a requirement for students entering in fall, 2003.

Students discuss ethical practices in areas such as decision making and professionalism, cyber etiquette, computer crimes, copyright, privacy, e-commerce and social issues.

A high proportion of classroom time is comprised of student presentations and discussion, giving them many opportunities to express themselves and defend their decisions.

Most of the students are being introduced for the first time to the Software Engineering Code of Ethics and Professional Practice and the ACM Code of Ethics and Professional Conduct.

The course book, "Computer & Information Ethics," has been an ongoing project for Woodbury. Her interest in professional ethics led her to become national chair of the Computer Professionals for Social Responsibility organization and to deliver a number of papers at international conferences. Woodbury's collection of case studies, examples, quotes and resource lists are absorbing to read and ponder.

Woodbury finds the board game, "Dilbert Ethics Challenge" created by Lockheed Martin and Scott Adams, to be a good device to encourage student interactions. Players are presented with problems drawn from case studies that cover timely issues such as honesty, trust, responsibility and integrity. After the group decides on a course of action, points are awarded for how ethical their response is and their character moves around the board.

During his final presentation on ethics of privacy and cryptography, Mike O'Connor used as his case study the commercialization of PGP and the problems that developed for Phil Zimmermann in the process. O'Connor took the initiative to contact Zimmermann and interview him by phone.

"It is easier for our students now to grapple with these sticky situations in the relative safety of the classroom where they can develop their reasoning skills. It becomes more difficult to reason through a problem in a real situation without some practice," noted Woodbury.

New Curriculum

The proposed curriculum for the computer science majors is now available. We would like to hear your input on the revised changes which can be found on our home page.

ACM R/P02 conference a success

ACM's eighth annual Reflections/Projections conference was held on campus in October. Around 300 students, who were mainly from the Midwest but came from places as far away as North Dakota and Pennsylvania, participated the three-day event. They attended the ever popular job fair, a variety of talks, panel discussions and workshops. The event was capped by the final showdown in MechMania, a competition held on Sunday afternoon.



ACMer Nasko Oskov prepares for workshop

sensing gloves. They demonstrated how computer visualization has changed the design process. Craig is a research programmer and Sherman is a senior research programmer for NCSA.

This year's speakers included Carsten Haitzler from Enlightenment who spoke on the future of Linux, Alexey Pajitnov from Microsoft who spoke about the problems involved with designing and selling games, and a panel discussing the future of open source software with Marcus Brinkman from GNU HURD, Haizler and Debian founder Ian Murdock.

This year's MechMania programming competition theme centered on military strategy. Teams of three were given 17 hours to write and debug their programs for a search and destroy mission that would be fought out in the virtual arena. The winner of the competition was F4N3RF3W from Southern Illinois University in Carbondale. Second place went to Dirty Bits from North Dakota State University and DDT from Pennsylvania State University came in third.

The keynote address was delivered by CS grads Alan Craig, BS Ed 83 and MS 85, and Bill Sherman, BS ECE 86 and MS 89, entitled "Visualization and Virtual Reality." They discussed virtual reality, its applications, and how it has evolved over the years. They brought several pieces of simulator equipment including headsets and motion



Alexey Pajitnov and ACMer Mary Pacold

CRA research award



Wojciech Jarosz

Senior Wojciech Jarosz received an honorable mention in the 2003 CRA Outstanding Undergraduate Award program. The award recognizes undergraduate students who show outstanding research potential in an area of computing research.

He submitted two research projects: Implicit Surface Modeler and High Dynamic

Range Image Editing. Jarosz worked on these projects with Prof. John Hart in the graphics research group.

The software for the modeler can sample and interactively model complex implicit surfaces. "The surfaces are previewed in real-time by constraining a particle system to lie on the zero-set of the implicit function," said Jarosz. "The result is a collection of floating disks which represent the shape and structure of the implicit surface. These surfaces can be modified by using 'control' particles to push and pull the surface into the desired shape, providing a much more intuitive method than working with the mathematical representation of the surfaces."

The HDRIE was one of SIGGraph's EOH projects that involved creating a free, open-source, image editor. "It worked on floating point precision images, as opposed to standard 24 bit images. The extra precision adds a great deal of flexibility to the digital imaging process, and is essential when trying to simulate physically correct lighting phenomena," said Jarosz. The project won 3rd place for Original Undergraduate Research last year at EOH.

Jarosch is also quite involved with the Sounds and Visions group and many of his animations can be downloaded from their web site (see below).

Sounds and Visions opens ACM conference



Bouncy Bouncy by Wojciech Jarosz

Sounds and Visions, a joint effort by ACM's special interest groups SIGMusic and SIGGraph, kicked off the conference Friday night with their multimedia extravaganza event. The pieces can be viewed in a mpg format from the ACM web site:

www.acm.uiuc.edu/siggraph/s&v/. Also available are the 2001 pieces which won S&V first place in the Just for Fun category at EOH 2001.

Siebel Center

Roaming the halls of Siebel Center feels like being part of a time-lapse. The eastern section is still very open. The southern section, skeletal with some dry wall for cover. The western section is most complete; its walls warming with color.

Some 200 workers can be found inside, outside and on top of this 225,000 square foot structure during the day; two companies are running double shifts. The copper roofing panels as thick as a penny gleam as they are set into place but have developed the patina of years of exposure within a day or two. Workers remove the snow and set the U.S. flag further down the peak before working on the next section.

In the basement, the mechanicals are ready to come online. The room-sized main air duct snakes along the western wall, huge water pipes disappear to the floors above, an apartment house of fans with their front doors warning visitors to keep out.

On the floors above, piles of tile in greens and beiges wait to be applied to the bathroom walls, metal arms along the tops of the corridors wait for the miles of computer wiring to be strung, and offices wait for people

to make them home.

Final selections of furnishings, upholstery, tack boards are being made to give the spaces warmth, texture, personality, and to blend with the theme of woods, slate and metal.

The technology for Siebel Center is currently being finalized. The next newsletter will have more details.

The department will still maintain a presence in DCL. CS will keep the two main lecture halls, first-floor instructional labs and office space for 9-10 teaching assistants.

The move is scheduled for fall.

artechology

Siebel Center is already filling with technology but the structure is also an ideal art venue for continuously changing, synchronized plasma and laser displays, art-for-contemplation and interactive artworks. An environment in which art intersects technology.

Imagine the possibilities. The ground floor includes walls of plasma panels for rotating art exhibitions or information on our history, students or current research. The north-facing glass "monumental" staircase provides an open space for floating displays and culminates with the third-floor glass ceiling which could utilize lighted displays and laser art. Commons areas include space for informal presentations or those focused on specific research. The lower-level atrium offers a forum for student presentations. Digital information panels and glass display cases for historical artifacts will be spread throughout the building.

The goal is to create a living matrix of art, design and digital technology that integrates with the daily life of the department. A collaboration has begun with art and design faculty and the Krannert Art Museum to define the process, design art and information elements and involve students from both areas in this process.

The committee encourages comments and suggestions from the alumni community.

Committee members: Barb Armstrong, Roy Campbell, Sheila Clark, Deb Israel Dave Raila, John Hart, Marc Snir and Kathleen Zanotti. Art department consultants Kevin Hamilton, Robb Springfield and Tim Van Laar.

Our history

We are gathering information, memories, photos, documents and bits and pieces of our history. If you have something to contribute, please contact us.

Quick Facts

Offices

84	faculty, emeritus, instructors
1200	undergraduates
540	graduates (total)
271	research assistants
120	teaching assistants
13	visitors
42	professional and support staff
31	research programmers
11	computer support staff

Spaces

4	32-seat classrooms
5	46-seat classrooms
1	210-seat auditorium
7	instructional labs
14	conference/seminar rooms
16	commons areas
2	lounges with kitchen
1	espresso bar
17	research labs

Beyond the web cam



*Moving in/out?
research assistants' office*



*Looking up through the
"monumental" staircase*



Southwest entrance



Room with view



ACM conference room



Research lab



*Raised flooring in
research labs and classrooms*



210-seat auditorium and espresso cafe (upper left)



Hallway-sized air duct



Electric thruway

Visit our web site for more photos.

Industry helps department through donations

Networking curriculum updated with generous Intel gift

The area of networking has exploded with demands for sophisticated services, protocols and routing functions. Next generation network infrastructures require enhanced services and management systems with integrated support for areas such as QoS, secure networking, distributed object systems, mobile and wireless networking and advanced architectures. Intel Corp. donated twenty workstations and a server featuring Internet Exchange Architecture (IXA) that is being used to revise the current networking curriculum and create several new courses. The curriculum update will integrate theory and new research results in networking, and provide students with exposure to applied design, implementation and management projects. These systems mark the start of a state-of-the-art networking laboratory that will be part of Siebel Center when it opens later this year.

Within the department, research in the Active Space infrastructure, ubiquitous computing, HDTV streaming, QoS provisioning and MIST security research underlines the enormous potential of this area for innovation and new technology.

With a recent equipment grant from Intel, revision of the networking curriculum is underway. The enhanced curriculum will integrate theory and new research results, and provide students with exposure to hands-on design, implementation and management projects.

In addition to the current networking courses, several new courses will be offered. A 200-level undergraduate course will cover fundamental concepts in the areas of operating systems, computer architecture and networking. A 300-level course will be designed to teach students design, implementation and evaluation techniques of computer network protocols at the operating system kernel level. A set of 400-level courses will be designed in specific networking areas such as advanced computer networks and network security.

The laboratory consists of a front-end PC server/workstations for student access (local and remote) to the laboratory. These production systems will support basic development, programming course work and access to the back-end experimental systems. The back-end will consist of protected, specialized PC hardware specifically designed to support network experiments and additional hardware components to support advanced experimentation. The front-end will manage and mediate all access to the back-end systems, and provide a convenient integrated environment that will allow rapid experimentation and reconfiguration.

The new IXA network lab will be located in Siebel Center and will provide configurable software and hardware components based on an enhanced Compoer model.

“Our students will benefit enormously from the new IXA

lab. Not only will they be using cutting-edge equipment but it will provide them with a comprehensive development environment to design, implement, debug and evaluate new protocols, services and network infrastructures – a tremendous opportunity to learn,” said Prof. Roy Campbell.



New Intel machines demonstrated by David Raila, sr. research programmer

Other recent gifts

Intel Corporation gifted the department with equipment valued at over \$450,000 this past year. Equipment included workstations for the new IXA networking lab and Linux lab.

A Linux lab has been on our students' and department's wish lists for quite some time. Their wishes have become a reality with Intel's gift of 35 Dell Precision 340 workstations. More faculty are using the Linux systems in their research and software development. Many upper-level classes use faculty-developed software for machine problems, which historically had been developed primarily on Solaris but now Linux has become more common.

Intel also donated approximately 60 8-port and 12-port Fast Ethernet switches that have been put to a variety of uses. The 100Mb/s ports have replaced the older 10Mv/s ports in the department's primary network and ACM's networking. The equipment will also be used for senior project groups. Three load balancing switches will probably be used for student projects.

Hewlett-Packard donated a i2000 one-way and four two-way workstations, and a RX4610 Server worth \$156,672.

CS summer camps a success

The department was alive with a younger than usual crowd this past summer. Two College of Engineering programs gave students a taste of science and engineering in each of these week-long programs.

GAMES

Eighteen middle school girls came to campus to attend computer science camp that was offered for the first time by the college's Women in Engineering program. GAMES began in 1998 to give girls a chance to explore many areas of math, science and engineering in a fun and pleasant environment.

The very enthusiastic group of girls learned the rudiments of programming, web design and other topics



GAMES robot competition

in computer science, science and engineering. Numerous hands-on activities were designed to explore basic principals of computer science and to make concepts easier to grasp.

Culminating the week was the programming competition. Throughout the week, teams of two were given blocks of time to design and build their robot, write code to run it, design strategies for the competition and of course name their creation. The Lego robots were equipped with a microcomputer, 2 motors, 2 touch sensors, a light sensor and an infrared transmitter.

Prof. Lenny Pitt employed fun activities for the campers that explored basic ideas of programming that could be used for their robot project. They also learned Logo to create games programs. Marsha Woodbury taught campers either basic web design using standard tools, or HTML and style sheets to set up their personal pages.

The program was not all work; there were a variety of social activities, team building, a virtual reality experience in the CAVE and faculty presentations. Camp counselors and team leaders were university women in computer science, science and engineering.

The final competition was amazing. Campers' faces filled with anticipation, worry and excitement. They cradled their bots, and were concerned as to how they would perform. The time had come; all their hard work

would be put to the test. The round robin competition ensued with three robots facing off in the arena; trying to bump their opponents three times while avoiding being hit and going out of bounds. At the end, all were winners.

The annual camp is open to all middle school girls. For more information, see: www.wie.uiuc.edu/games/cs.htm.

WYSE

All the students had to do was sit totally still for 18 seconds to get their picture taken. Sound like something people did during the early days of photography? In this case, each student was posing for a 3D portrait. Forty enthusiastic high school students visited the department one morning as part of the College of Engineering's World Youth in Science and Engineering program. Students came from a dozen states including Texas, California, Florida, Maryland and Rhode Island. Approximately a third were females and 14% were minority students.

For their portrait, each student sat on a platform while the capturing unit circumnavigated their head taking in measurements of the head with all its ridges and planes and recording the color information. In black and white, the images look like a classic bust from a museum, but the color images looked more like computer-generated characters. Senior research programmer David Raila showed the group how the images can then be "printed" using a stereolithography as a very accurate 3D sculpture.

A tour of the ACM office was the next stop where they spoke to current president Vilas Dhar. The final stop was the Active Spaces lab for a tour of a prototype room containing state-of-the-art equipment, including a HDTV satellite program and a wall-size display screening "Star Wars." Graduate students Manuel Roman, Chris Hess and Jalal Al-Muhtadi introduced them to ubiquitous computing and current research in the areas of multimedia, security, networking and distributed systems.

Students, with their eyes aglow, were in animated conversations as to what they could do with all these "toys." They received a cd with a 3D image of each student and the software to display them on their home computer. For more information see: www.engr.uiuc.edu/wyse/.



Group views 3D portrait

Using simplicity to control complexity



Lui Sha

“A software system built upon the principle of ‘using simplicity to control complexity’ can provide what you want and guarantee what you need.”

Neil Armstrong’s first step on the moon July 20, 1969 brought cheers from all corners of the world; a realization of dreams for space enthusiasts and the start of new dreams to aspiring astronauts.

When the news reached China, the impact of this event on the young Lui Sha was momentous; he too dreamed that one day he would obtain a higher education and contribute to the exploration of space. He grew up during the Cultural Revolution and after high school was sent to a remote rubber plantation for nearly 8 years. During this time his love for science and technology never diminished. After overcoming many obstacles a part of his dream came true, he received his PhD from Carnegie Mellon University in 1985.

While working for the Software Engineering Institute at CMU, he led

the development of generalized rate monotonic scheduling (RMS) theory, provides a comprehensive solution to many real-time computing problems. Aaron Cohen, former Deputy Administrator of NASA, noted in 1992 that RMS allowed the Space Station Freedom to successfully schedule and set priorities for tasks. This was not the case at first for the Mars Pathfinder mission (see side bar below).

The 1991 Software Technology Strategy report by the Department of Defense called his work, “A major payoff, ... system designers can use this theory to predict whether task deadlines will be met long before the costly implementation phase of a project begins. It also eases the process of making modifications to application software.”

Prof. Lui Sha came to the department in 1998 and became part of the Real-Time Systems Laboratory with Prof. Jane Liu, who has since retired. Sha became an IEEE Fellow in 1998 for research that transformed real-time computing practice from an ad hoc process to an engineering process based on analytic methods. Today, every open real-time computing standard provides needed primitives to support the use of this theory.

Sha now dreams of creating a new generation of robust real-time software systems.

“What happens to your steering when you are speeding on the highway but the engine suddenly stalls,” asked Sha. “No problem, you can still safely steer your car without power. The power steering in modern vehicles illustrates a guiding principle of reliability engineering: complex and less reliable components should be used in an architecture, where their failure will not jeopardize the essential services provided by the simple and reliable components.” Sha calls this principle “using simplicity to control complexity.” It is the guiding principle of his Simplex architecture, which supports the dependable upgrade of real-time control software.

“High complexity is the root cause of software faults and failures; and the complexity of software systems is driven by useful but non-essential features,” said Sha, “What we really need from a system or life in general is quite modest but what we want, that is very large. If you build a system according to what you need, the system is simple and reliable. But you will not be happy with it because you want a lot more.

Mars Pathfinder

Days after the Pathfinder spacecraft successfully landed on Mars in 1997, it began encountering total system resets that resulted in data loss. It was later determined that the problem was due to a priority inversion which was first described by Lui Sha, along with his CMU colleagues John Lehoczky and Raj Rajkumar.

Michael Jones, at an IEEE Real-Time Systems Symposium, reported that after hearing the full story behind the successful rescue of the Mars Pathfinder, Sha and his colleagues received a standing ovation. “When was the last time you saw a room of people cheer a group of computer science theorists for their significant practical contribution to advancing human knowledge?-) It was quite a moment,” commented Jones.

A software system built upon the principle of 'using simplicity to control complexity' can provide what you want and guarantee what you need."

Simplex includes software architecture, real-time middleware services and supporting tools to allow the safe insertion of new technology or upgrading of existing technology in high-assurance real-time systems. In aerospace software applications, fault tolerance is useful in cases where new functionality has been partially tested but is necessary for the success of the mission.

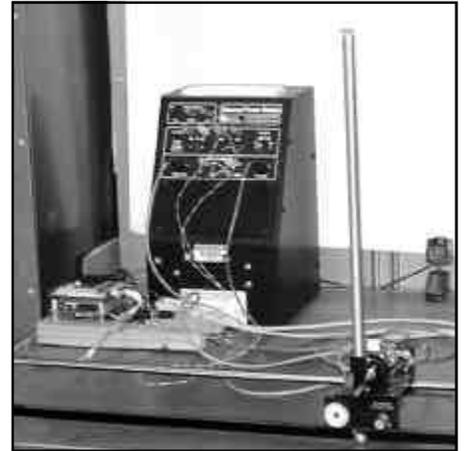
In the spring 2002, the International Space Station became operational; Sha received an unexpected email from the station's software architect David Preuett commending him for successfully convincing IBM to use RMS principles for the space station software ten years before.

Closer to the ground the Joint Strike Fighter, one of the largest DOD programs, uses INSERT which is an

extension of Simplex architecture developed for advanced avionics applications. The Navy has also expressed interest in transitioning this new software technology for its Surface Combatant for the 21st Century (SC21), the Next Generation Carrier (CV(X)) and other naval systems.

Broader applications for his research may begin to take place. This January Larry Bernstein, retired senior vice president of Bell Lab, organized a meeting of telecommunication executives and senior engineers to explore potential applications of this technology.

Looking back over his career, Sha noted that he was never the smartest one in the class and he had interruptions in his course of studies. He attributes most of his success to the ability to choose the right problems. He advises his students to read his very popular web site article *Elements of Research*. "To excel in research, we must sharpen our skills in positioning R&D strategically, identifying and



To see how Simplex works, visit the Real-Time Systems Laboratory web site, www-rtsl.cs.uiuc.edu/drii/, and see if you can create an error to unbalance the pendulum.

formulating high impact problems and communicating ideas and results effectively," said Sha.

To read more about his research, visit his Web site at www-rtsl.cs.uiuc.edu/. An overview of this work was a featured article in IEEE Software July-August 2002.

Yes, I want to help computer science!

\$1,000 \$500 \$100 Other _____

The gift is: unrestricted student scholarships Innovation Fund Other _____

I am enclosing my employer's matching gift form. Company name _____
will match my gift with \$ _____

I authorize the U of I Foundation to collect my gift in the amount above through:

Visa MasterCard Amex Discover

Card no. _____ Expiration date _____ Signature _____

Name _____

Home address _____

City _____ State _____ Zip _____



10/02



12/02



3/03

Live Web cam and timelapse construction
video at: www.cs.uiuc.edu



DEPARTMENT OF
COMPUTER SCIENCE

University of Illinois
at Urbana-Champaign
1304 West Springfield Avenue
Urbana, IL 61801