

Alumni News

Fall 1998

Vol. 2, No. 1

Computer Science Alumni Association • A Constituent Group of the University of Illinois Alumni Association

Hohn and Nash Award given for first time Endowment established by Gene Golub

Colleagues, family, and friends gathered on March 3 to celebrate the lives and work of Professors Franz Hohn and J. P. Nash and to award the first Hohn and Nash awards, established by alumnus Gene Golub in their honor.

Golub endowed the Franz Hohn and J. P. Nash Award as a tribute to these former Illinois professors and to promote scholarship in the field of applied mathematics, computational science, and scientific computing. Hohn and Nash were both pioneers in the field of applied and computational mathematics and dedicated to the teaching profession. Together they greatly influenced Gene Golub, himself a professor at Stanford University.

Franz Hohn, PhD'40, joined the UIUC mathematics faculty in 1948 and remained there until his death in 1977. He specialized in applied mathematics and automata theory and was the



Franz Hohn



Jack Nash



Hohn and Nash award winners Karla Miller, Aaron Hartman, and Darrin Doud pose with Gene Golub, wearing the bow tie.

author of a widely used textbook on elementary matrix algebra. John Purcell Nash, PhD'40 from Rice Institute, helped develop ILLIAC I and was a professor of applied mathematics at UIUC from 1950–57. After his career at Illinois, he became VP of Lockheed Missile Space Corp. He died in 1972.

Golub, BS'53, AM'54, PhD'52, is the Fletcher Jones Professor of Computer Science at Stanford, where he has been a faculty member since 1962. He is famed for his many brilliant innovations in the field of numerical algorithms and is especially noted for developing algorithms for solving linear systems with special structure, for computing eigenvalues of sequences of matrices, and estimating functions of matrices. His work is known both for its elegance and its wide usage. His deep knowledge of the field, combined with his own

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MCS degree online: First time is in India

by Michael Faiman, professor

Spring 1998 saw the department's first venture into the emerging phenomenon of distance learning with the opening of an off-campus version of the MCS degree program in New Delhi. The program is administered in conjunction with the Quantum Institute, a private New Delhi corporation with which the department has signed a contract. At present nine students are enrolled, and that number is expected to increase significantly for the coming fall.

All course work, instruction, assignments, and grading are carried out by UIUC CS faculty members and graduate assistants. Quantum provides the local infrastructure in the form of lecture rooms, labs, and local consulting

staff. Students admitted to the program have the same status as domestic extramural students enrolled in a degree program and must meet normal departmental standards to graduate.

For the first two semesters, teaching materials have been a mixture of the old and the new, while the department ramps up to the necessary hardware and software to make the program completely Internet-driven. Standard videotapes have been used to record lectures being given in Urbana—the same lectures taken by on-campus students—while all other materials have been transmitted over the Internet. Starting in the fall, the program will be 100% digital, with lectures delivered by streaming

Editor: Judy Tolliver

Computer Science Alumni News is published twice a year. Deadlines for submissions: March 1 for the spring issue, October 1 for the winter issue. Your input is needed and welcomed!

All ideas expressed in the *CS Alumni News* are those of the authors or editor and do not necessarily reflect the official position of the alumni or the Department of Computer Science.

Correspondence concerning the *CS Alumni News* should be sent c/o the editor, Department of Computer Science, 1304 West Springfield Avenue, Urbana, IL 61801, or to alumni@cs.uiuc.edu.

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Tom Siebel panelist at final Higgerson Forum

The final installment of the College of Engineering's Higgerson Forum series was held on April 9, and computer science alumnus Tom Siebel, MS'85, was one of the four panelists. The other panelists, all College of Engineering alumni, were Charles Berkel, founder of Berkel and Company Contractors; Bernard Cherry, president of Oxbow Energy and Minerals Group; and Shahid Khan, president of Flex-N-Gate.

This was the fourth in a series of discussions exploring entrepreneurship through engineering. The inaugural forum explored markets. The second, in which Ray Ozzie, BS'79, participated, focused on invention and product development. The third looked at funding start-up, growth, and expansion. This time critical human-resource issues related to starting a business were explored.

Tom Siebel is founder, chairman, and CEO of Siebel Systems, the fastest growing application software company in history. Based in San Mateo, Calif., Siebel Systems is a leading provider of enterprise-class



Tom Siebel talks about what motivates people at Siebel Systems.

Thompson-McClellan

sales, marketing, and customer service information systems. With its acquisition of Scopus Technology last March, it is also the largest. In addition to his MS in CS, Siebel also holds a BA in history and an MBA, all from UIUC.

Clarke given Presidential Award

Arthur C. Clarke, author of *2001: A Space Odyssey*, was named a recipient of the UI Presidential Award and Medallion last spring for his literary and scientific achievements and for the unique relationship he created with UIUC when he named Urbana the birthplace of HAL. HAL's birthday was the impetus for Cyberfest, a celebration of computers and technology held on campus in March 1997. Clarke's participation in and support of Cyberfest "helped create an unforgettable experience for those who attended the event," said Chancellor Michael Aiken. Clarke chose Urbana as HAL's birthplace because George McVittie, his mentor at King's College in London, left England in 1952 to become chair of the astronomy department at UIUC.

MCS, continued

video over the Internet.

The department has agreed on a set of courses to get the Quantum program started. Core courses are operating systems, combinatorial algorithms, and computer architecture. Database systems, multimedia, and computer networks are also being offered. Advanced courses are design of database management systems, advanced operating systems, and object-oriented programming and design. Other courses will be added to this list in time.

Digital musings

As I write this column on my laptop while onboard a plane returning to Champaign-Urbana, I can only reflect on how computing has transformed our lives. From my student days, I remember the blank looks as I struggled to explain my chosen profession to my friends and family. It's amazing what a difference a few years makes! I am especially proud of the way the department's alumni, students, and faculty have helped lead this digital revolution.

As a capstone to an outstanding academic career, our own Karla Miller received the Computing Research Association's (CRA) Outstanding Female Undergraduate Award, both for her outstanding classroom academics and for her undergraduate research. In the same competition, Kevin Vlack received honorable mention for the CRA Outstanding Male Undergraduate Award. With nominees from all of the country's best computer science departments, the success of our department's students reflects the highest standards of excellence.

We are equally pleased that four outstanding teachers and researchers have joined our faculty, effective this fall. Lui Sha, joins us as a full professor. Hailing from Carnegie-Mellon University, Dr. Sha led an internationally known research program in real-time systems. Similarly, H. V. Jagadish joins us as a full professor from AT&T Research, where he led the corporate database research program. David Kriegman, a gifted researcher in artificial intelligence, joins us as an associate professor from Yale University. Finally, Jeff Erickson joins our theory faculty as an assistant professor, following receipt of his degree from UC-Berkeley and a postdoctoral appointment at Duke. I am sure you will be hearing great things about all four of these new faculty members. I hope you will join me in welcoming them to the Illinois family.

In the spirit of family, we also say farewell to retiring professors Duncan Lawrie, George Friedman, and C. L. (Dave) Liu. All three helped build the department in its infancy and have been among its leading lights ever since. In addition to his many contributions to high-performance computing, Duncan served the department



Dan Reed, department head

with distinction as its head. George was for many years the smiling face seen by our undergraduates in his role as director of undergraduate programs. Finally, Dave is one of the giants of theoretical computer science, but always with time for anyone who dropped by his office. They will all be long remembered and sorely missed.

As always, we would love to hear from you—tell us about your recent accomplishments. Similarly, we are trying to make events within the department more accessible to you. Beginning this fall, we will be transmitting all of our distinguished lectures via streaming video. Moreover, to give remote students an opportunity to interact with our faculty, we will begin digital delivery of our professional master's degree (the MCS). Look for details on these and other events at our updated WWW site (www.cs.uiuc.edu).

Keep inventing the digital future!

—Dan
July 24, 1998

Come visit our new Web pages! <http://www.cs.uiuc.edu>

After several fits and starts, the CS department has a new look. In the proverbial small world, our designers have CS connections. Initial Web design was done by Elizabeth Yen, who is married to CS alum Eric Mann, BS'94, an engineer at Intel. Graphic designer was Paul Koziarz, cousin of CS alum Louis Koziarz, BS'91, a pinball programmer at Williams/Bally-Midway.

Farewell to our outgoing faculty members

Several longtime faculty members are moving on to the next phases of their lives as they retire after many years of service to the department and the University of Illinois. And several younger faculty members are moving on to pursue their careers elsewhere. We wish them the very best. We are also excited to welcome several new faculty members to the department.



Dave Liu



Duncan Lawrie



George Friedman

On February 4 **Dave Liu** was inaugurated as president of the National Tsing Hua University in Hsinchu, Taiwan. Besides his administrative duties, he also teaches an undergraduate course and continues his research in the area of CAD of VLSI circuits. Well known as an exceptional educator, Liu has been highly praised by his students and peers. He is a fellow of the IEEE, fellow of the ACM, honorary member of the Golden Key National Honor Society, and a Guggenheim fellow. He has won the Karl V. Karlstrom Outstanding Educator Award from ACM, Meritorious Service Certificate from the IEEE Computer Society, Taylor L. Booth Education Award from the IEEE Computer Society, and Education Medal from the IEEE. Liu has won the College of Engineering's most prestigious honors, including the Everitt Award for Teaching Excellence and the Tau Beta Pi Daniel C. Drucker Eminent Faculty Award.

Liu had been with the computer science department since 1972 and, before leaving the university, was serving a three-year term as associate provost, focusing on educational technology, undergraduate advising, and education. "Biologically, I grew up in China," he said. "Academically, to a great extent, I grew up in the United States. I am going home, but I'm also leaving home."

Duncan Lawrie retired in June. Lawrie has been with the department since 1974 and served as its head from 1990-95. Lawrie has contributed to the design of several large computers including the ILLIAC IV, in which he designed and implemented the machine's first high-level

language, and the Burroughs Scientific Processor, in which he specialized in the array memory system. He was an architect of Cedar, a prototype large-scale, shared-memory multiprocessor, and directed its systems software development. He has published extensively on the subject of design and evaluation of computer architecture, especially in the areas of networks for tightly coupled multiprocessors, virtual memory performance, and the use of mass file storage devices. He is a fellow of the IEEE and a member of the ACM.

Lawrie said, "I came to Illinois in 1966 to get a Masters degree. I did that, and it is time to move on. I find there are many things I still want to do that I cannot do and remain an active, 80-hour-a-week faculty member. I hope to continue some of my research within the university and finish up some students.

"I feel privileged to have been associated with one of the best computer science departments in the world, and over the years I have known and worked with some truly outstanding people, both inside and outside the university. I hope that my departure from the university will not end those relationships but will strengthen them."

H. George Friedman, Jr. will retire in December 1998. He has been with the department since 1965 and has served as director of undergraduate programs since 1985. He plans to remain active in the computer science department and will continue to live in Champaign-Urbana. He says he might even teach a course from time to time or serve as an advisor to some students in the

department. But he intends to devote time to writing a book on Champaign-Urbana streetcars (anyone who has visited his office will have noticed his interest in streetcars). And he says that there's a family genealogy that needs more work. "You haven't gotten rid of me yet!"

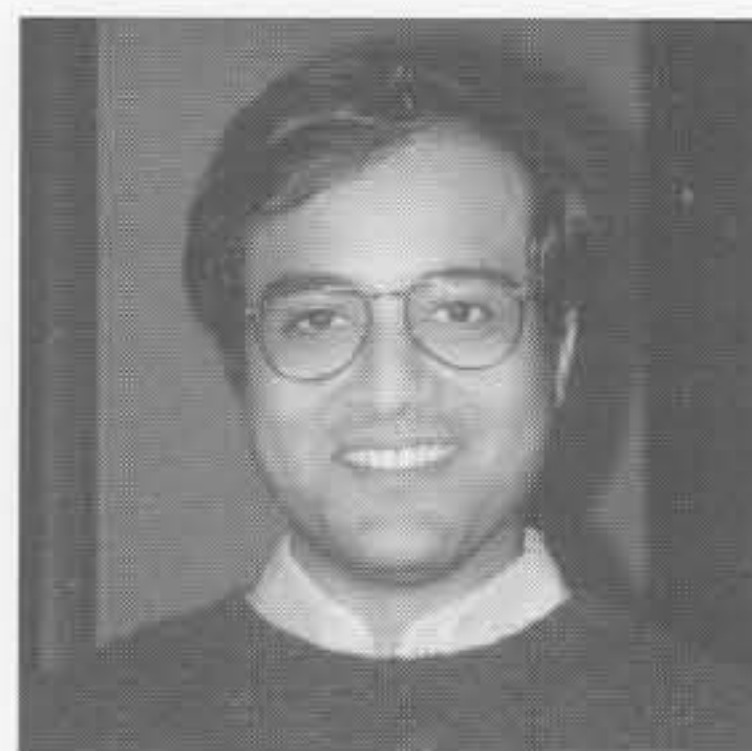


Andrew Chien

Andrew A. Chien is the inaugural holder of the Science Applications International Chaired Professorship at the University of California at San Diego. He plans to continue his research in object systems, high-performance networking, and computer architecture. Chien's summer departure comes after

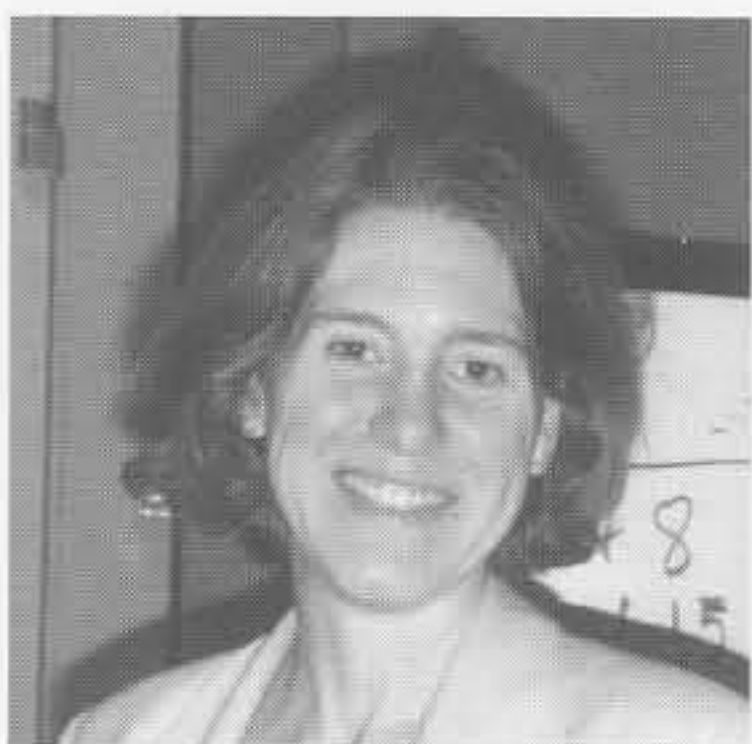
eight years on the CS faculty and on the heels of recent high-visibility successes such as the 192-processor Windows NT Supercluster demonstrated in April with NCSA and the contribution of his Illinois Fast Messages project to the recently announced Intel/Compaq/Microsoft Virtual Interface Architecture cluster interconnect standard.

In parting, Chien said, "I have thrived on the environment at Illinois, but was offered an opportunity simply too good to pass up. I never anticipated that I would return to the university in 1990, so who knows what the future may bring!"



Sharad Mehrotra

Sharad Mehrotra started a faculty position at University of California-Irvine in August 1998. His research area is databases. "The past (almost) four years at Illinois has been a wonderful experience both professionally as well as personally for me. I will always cherish my stay here," he said.



Caroline Hayes

Since spring, **Caroline Hayes** has been associate professor of mechanical engineering at the University of Minnesota, where she continues her research on intelligent decision support tools for assisting in complex engineering tasks.

Hohn and Nash, continued from p. 1



Thompson-McClellan

Karla Miller and Aaron Hartman talk with Professor Paul Saylor and guest Steven Lee, PhD'93.

contributions, led to his writing the widely used book *Matrix Computations*, co-authored by Charles Van Loan. He is a member of both the National Academy of Engineering and the National Academy of Sciences, and is a Fellow of the AAAS. At UIUC, Golub was

awarded an honorary degree in 1991 and the College of Engineering's Distinguished Alumni Award in 1984.

Golub intended that the Hohn and Nash Award go to students in both the computer science and mathematics departments. Three exceptional students received awards. Darrin Doud, graduate student in mathematics, does research in algebraic and computational number theory. Karla Miller was a senior in computer science with an interest in applications of computation to medical imaging. Aaron M. Hartman was a senior in computer science with a mathematics minor and a strong interest in numerical analysis.

The ceremony was held in the Grainger Engineering Library after a dinner hosted by CS department head Dan Reed and Math department chair Phillippe Tondeur. Some of the guests shared their remembrances of Professors Hohn and Nash during the dinner, and earlier that afternoon, Golub presented a talk in Altgeld Hall on cyclic reduction.

The Department of Computer Science gratefully acknowledges the kindness and generosity of Professor Golub, the Hohn and Nash families, and their friends and colleagues, many of whom were present at the ceremony. Some of them have since contributed to this fund. You can support the Hohn and Nash Award with your contribution by filling out the form on the back of this newsletter.



Thompson-McClellan

Dorothy Nash talks with Gene Golub while son John Nash looks on.

CS undergrads win CRA honors

Two CS students were winners in the Computing Research Association's 1997-1998 CRA Outstanding Undergraduate Awards competition, sponsored this year by Microsoft. The awards are presented in two categories: Outstanding Female Undergraduate and Outstanding Male Undergraduate. Karla Miller won the Outstanding Female award, and Kevin Vlack was one of eight who received Honorable Mention.

Karla Miller, BS'98, was a senior when she was nominated by the department for her research in medical imaging. Miller worked in the Magnetic Resonance Imaging Research Group at the UC-San Diego Medical Center on a biophysical model for the changes in blood flow, blood volume, and blood oxygenation in the brain during activation. The model takes physiological parameters and predicts temporal patterns of the measured MR signal; Miller's research focused on the inverse calculation. At Illinois, she worked in the Beckman Institute on automation of electron crystallography, using adaptive pattern techniques to predict high-resolution image quality based on crystal features. Miller received a Spyglass Scholarship and the Hohn and Nash Award. She starts graduate school this fall at Stanford University.

Kevin Vlack was nominated as a sophomore for his research in the CAVE™ (NCSA's virtual environment) and for assembling an international seminar about the cultural and historical perspective of human-computer interaction via videoconference with Japan. At NCSA, he is working on near-optimal decomposition of nonconvex polyhedra into convex partitions to later be used in an efficient collision detection system for deformable objects. This system can then be used for developing applications for testing the psychological factors of the immediate surrounds in a dynamic virtual environment.



Karla Miller

Rhonda Anderson

Department awards

More than 100 people attended this year's department awards and recognition banquet, held in the Grainger Engineering Library on April 23, 1998. Department head Dan Reed and Professor Marianne Winslett, awards committee chair, hosted the evening. Listed below are the award winners. Two awards were given this year for the first time: the Ray Ozzie Fellowship and the William and Ruth Witt Scholarship.

Alumnus Ray Ozzie, BS'79, and creator of Lotus Notes, established the department's first endowed fellowship for graduate students in computer science. The fellowship was awarded to **Sergio Servetto**, a doctoral student advised by Professor Klara Nahrstedt. Servetto's research is in the area of analysis, design, and implementation of visual communication systems, with a strong emphasis on wavelet-based approaches. He has spent several summers as an intern at AT&T Labs. Before coming to Illinois, where he completed his MS in ECE in 1996, he was a staff member at IBM Argentina, his native country.

The William and Ruth Witt Scholarship was established by Debra Jo Cohen, wife of CS alumnus Ira Cohen, BS'81, and named for her parents William and Ruth Witt. With this scholarship, the Cohens hope to encourage more women to pursue careers in computer science. The recipient was undergraduate **Jill Magsam**.

Also of special note is Christopher Seguin's Campus Award for Excellence in Undergraduate Teaching, which is given to only six teaching assistants on the entire campus.

Congratulations to these exceptional scholars!

C. W. GEAR AWARDS

Graduate Student — Thomas Kwan
Junior Faculty — Sharad Mehrotra
Undergraduate (ENG) — Sebastian Magda
Undergraduate (LAS) — Ilya L. Korzhenevich

DUNCAN H. LAWRIE AWARD

Michael J. Eakes, Christina M. Schumacher

JOHN R. PASTA AWARDS

Stephen O. Markus (ENG), Indra K. Rosadi (LAS)

W. J. POPPELBAUM MEMORIAL AWARD

Venkata S. Krishnan

JAMES N. SNYDER AWARDS

Matthew J. Bricton (ENG), Gregory C. Harfst (LAS),
Jason Y-W. Sheu (ICCP Award)

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DUNN SYSTEMS SCHOLARSHIP
Evans Chang

FRANZ HOHN
AND J. P. NASH AWARD
Aaron M. Hartman, Karla L. Miller

SPYGLASS SCHOLARSHIP
Viktoriya Basina, Priti Ghai, An T-N. Le, Kathleen L.
Ower, Rochelle Relova, Noura Sharabash, Patricia A.
Sullivan

DANIEL L. SLOTNICK AWARD
Jason E. Luther, Sherwin C. Tam

EVERITT AWARD FOR TEACHING EXCELLENCE
Michael T. Heath

XEROX AWARD FOR FACULTY RESEARCH, ASSISTANT PROFESSOR
Klara Nahrstedt

XEROX AWARD FOR FACULTY RESEARCH, ASSOCIATE PROFESSOR
Jean Ponce

LUCKMAN DISTINGUISHED UNDERGRADUATE TEACHING AWARD
Christopher A. Seguin

BRONZE TABLET
David N. Biscan, Mark R. Gates, Daniel G. Sachs, Russel
E. Simmons

GTE FELLOWSHIP — Tae-Eun Kim
INTERSTATE ELECTRONICS FELLOWSHIP — Ali Dasdan
NSF GRADUATE FELLOWSHIP — Tanya Berger-Wolf
CROWE-CHIZEK SCHOLARSHIP — Snehal C. Patel
JOHN DEERE SCHOLARSHIP — Russell H. Bader, Jason E.
Luther, Jill Magsam

HUSSEMAN SCHOLARSHIP — Stephen O. Markus
MAVIS MEMORIAL FUND — Mark C. Astley, Anthony-Trung
Nguyen, Michael Oretga-Binderberger

MICROSOFT JUNIOR — Jose L. Rojas
WORDLINK SCHOLARSHIP — Jeffrey J. Wall

Come back to Champaign?

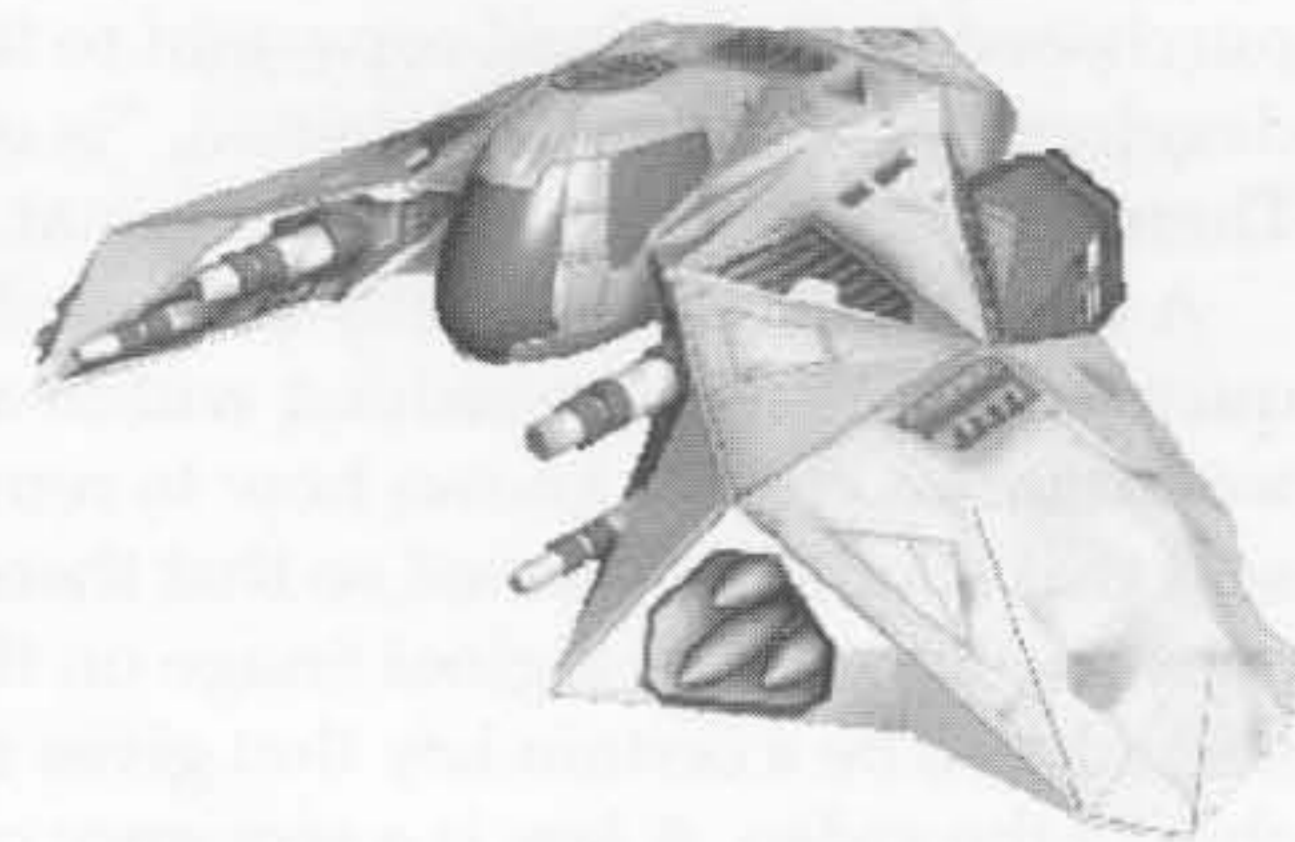
It may be flat, but the housing is affordable, the air is clear and the commute is short.

Now there are job opportunities you probably never dreamed of.

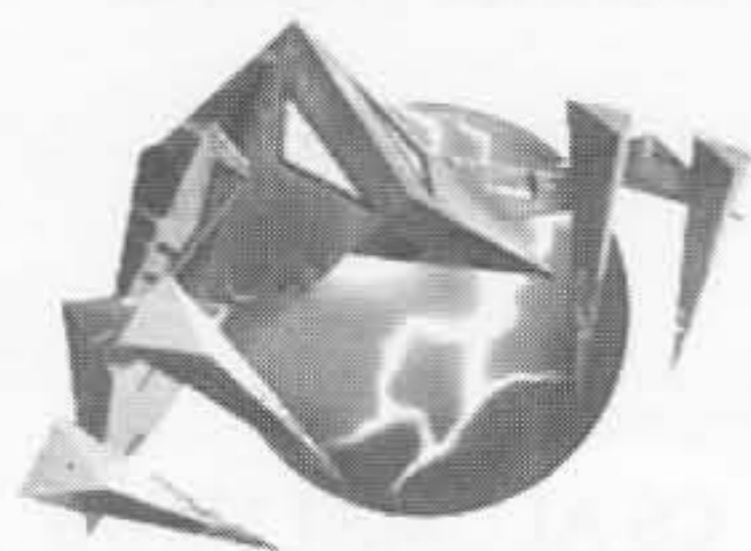
Volition is an award winning developer of PC and console games, and we're hiring.

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Nahrstedt and Qiao develop novel watermarking process

Professor Klara Nahrstedt and graduate student Lintian Qiao have developed a novel watermark construction method to ensure multimedia security and copyright protection. Unlike other watermarking protocols, Nahrstedt's incorporates part of the original video image into the watermark itself. This process is the first to address not only the original owner's rights but also the rights of legitimate customers. Nahrstedt's protocol has potentially huge commercial application, especially among DVD producers and Web-related product providers, because multimedia security and copyright protection will become increasingly important as multimedia systems in distributed environments grow. "The ideal watermark," said Nahrstedt, "should be invisible, create minimal distortion, survive regular multimedia operations, and be extremely difficult to remove."



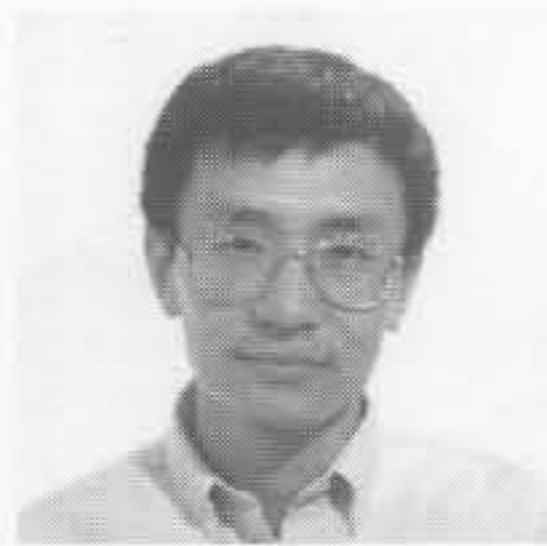
Klara Nahrstedt

Currently, original owners of video information (MPEG or uncompressed) have complete control over the watermarking procedure, and customers cannot prove legitimate ownership of the watermarked video. Nahrstedt and Qiao's construction algorithm combines a standard encryption function with part of the original video image. A customer's unique identification is encoded into the owner's watermark at the point of purchase so that a unique watermark is created for each purchase.

The big problem with watermarking is how to make it noninvertible. A noninvertible procedure allows the owner of video information to prove to a judge that the video truly belongs to them—that they created the video, purchased it, or attained copyright to it. "What we developed," Nahrstedt explained, "is one approach. There are others that we are looking at, too."

A watermark is essentially an invisible digital sequence of 1s and 0s embedded within a video. Only the watermark's creator knows how to remove it. Nahrstedt said that should be created so that there is a certain dependency on the original image on the video. There should also be a certain key that gives a person ownership of the video. A key is a sequence of bits used by an algorithm to create a code for encrypting data. For instance, a key could use 50 bytes of a known, unique number like pi. The owner can show a judge that they have the key. Because they are the only one who has this key, no one else could have created that information.

How does this new noninvertible watermarking scheme work? First the watermark must be produced by



Lintian Qiao

both the original owner and the customer together. A standard encryption algorithm, like DES (Data Encryption Standard) is applied, with the customer's unique key, to an image from the video. This is the watermark. The key comes from the customer, and the video image comes from the original owner. A procedure is applied to produce the watermarked video that can be made available to the public. You can verify to a judge that you are the original owner of a watermarked video by presenting your video and key, applying decryption, and according to your procedure, producing something very close to the original video.

The protocol for the customer's right that Nahrstedt and Qiao developed takes this scheme on step further by requiring one key from the original owner and one from the customer. Using a combination of these two keys, plus the original video, a third trusted party (TTP) can verify legitimate ownership among customers. "The only way for this protocol to succeed commercially," said Qiao, "is for people to adopt the idea of a third trusted party to act as the judge. Currently, TTPs are only involved in key distribution rather than in the watermarking process itself."

Nahrstedt's next goal is to study one-way functions. Using these functions, a video will become damaged when an improper attempt is made to remove the watermark. This would be a truly noninvertible process. "We feel that creation of the watermark and putting the watermark into the video must be treated as one process. It is a very interesting issue," she said. "When you put something on paper, there is a chemical reaction. We understand how to put material into another material so that it is not removable without damage. In the digital domain, on the other hand, it's different. You are working with pixels, and the operations we do with pixels are addition and subtraction. They are all invertible. It is a very hard problem."

Nahrstedt and Qiao's work will appear in the *Journal of Visual Communication and Image Representation* later this year. Qiao, who earned his PhD this summer, works at Lucent Technologies in Naperville, Ill. He earned his BS at Beijing University, his MS at Marquette University, and spent three years doing database work for TASC, in Chicago, before coming to UIUC.

For more information, see <http://cairo.cs.uiuc.edu/papers.html>.

Josep Torrellas ready to exploit new chips



Josep Torrellas

Professor Josep Torrellas is breaking new ground in designing the next generation of hardware that will exploit new processor and memory technologies. His goal is simple: to design a high-performance supercomputer from commodity microprocessors and components that will

blow away traditional supercomputers in terms of performance, speed, reliability, power (heat dissipation), and cost. Whether this design will be realized in a real machine will depend on the new generation of chips. The name of this project is I-ACOMA (Illinois Aggressive Cache Only Memory Architecture).

We asked Professor Torrellas about his work. Here is what he said:

What we're working on

We are basically trying to go on to the next generation of hardware by exploiting aggressive compiler and hardware technologies. The main goal is to exploit the new processor and memory technologies, especially integration within processor and memory—the stuff that you can put on a chip so that you can build scalable machines or scalable multiprocessors. For example: building scalable multiprocessors out of chips that contain processor and memory or out of chips that contain multiple processors. As more and more stuff is put on a chip, this affects the way we'll build multiprocessors in the next five years or so.

What has happened is that current machines have n processors on a chip, and the memory is outside. What we are seeing is that you can put more and more on a special chip, for example more functional units like the [Intel] Merced chip. You have very many functional units and it can be very powerful, or you can have lots of caches—more storage. Now if you have an order of magnitude more transistors—say a billion transistors, which will happen in five to ten years—then you can have the whole memory on the chip. Potentially you can have a workstation with one chip only, and that chip has both processor and memory. Another idea is to put multiple processors on a chip, so what happens now is instead of having a very powerful processor, you put

several processors on a chip. So I'm looking at the technology side.

On top of this, I'm looking at techniques to exploit this architecture. For example, you can use a lot of speculation. That is, because you have so many transistors, why not try to do work that you don't know to be useful or not? So you do the work, and it may not be useful. But it's okay, you throw it away because you've done it in parallel with other things. So I take a program, for example, that is sequential. It's supposed to run on a very fast uniprocessor. And now I have a multiple processors on a chip. So I'm going to take to it separate threads of execution from the sequential program, give it to several processors, and say: Execute. Now at the same time, I'm checking to see if there's going to be a problem, a dependence. And if there is a problem, then I'll kill all the threads, and then restart it. This is called speculation. You speculate parallelism. This is the idea, and it's just starting. People are talking about doing speculation within a chip. I'm also looking at doing this across a huge machine, with many chips.

Another emphasis of my work is to look at commercial workloads—databases. These are very common workloads that will be very useful for large-scale machines. It is possible in the future to have one to five percent of the workload being scientific and most of the other ones commercial—databases, data warehouses, and so on. So it's very important to make a contribution in this area.

Where we are

None of this stuff currently exists. There is no machine yet. We are going to design and eventually build one of these new machines. We'll integrate processor and memory and use a scalable microprocessor design. The name of the machine is I-ACOMA (Illinois Aggressive Cache Only Memory Architecture multiprocessor). The plan is to build, perhaps in collaboration with IBM, a small prototype, 16-node machine to prove some of our ideas.

I'm not the first one to approach processors in memory, but I have a design to integrate processors in memory so you can do scalable multiprocessing in a shared-memory environment. We can build this machine using very cheap components, hopefully off-the-shelf. If, in the next five years or so, manufacturers build off-the-shelf chips of this type, we want to figure out how one would exploit these chips to build scalable machines. So suppose that Intel manufactures this chip that has processor and memory, and they use it in single-proces-

continued on page 14

Supercomputing legend Steve Chen



Sequent

Steve Chen

Steve Chen, PhD'75, is a pioneer in the design and development of large-scale, parallel supercomputing systems. From Burroughs to Cray Research to his own companies, SSI and Chen Systems, Chen is recognized the world over as an industry leader and visionary.

Steve Chen was the principal architect of the most influential high-performance computer ever made: the Cray X-MP. Renowned as a supercomputing giant, it's no surprise to many of us that Chen earned his PhD in one of the cradles of supercomputing might, the University of Illinois.

Chen spent most of his life in Taiwan, where he earned a BS in electrical engineering from National Taiwan University in 1966. After graduation, he remained as a teaching assistant and spent a great deal of time with the school's mainframes computers, an IBM 350/320, Control Data Cyber series machine, and IBM 1620. He spent hours as a teaching

assistant helping students debug their programs, which were written in assembler. "Learn as we go. Teach as we go. Debug as we learn," recalled Chen. By interpreting the binary code, he started to learn how the machine's logic worked. "I really got to understand how computers worked in a basic way," he said, "before learning the higher level applications, like FORTRAN and COBOL, and how they were compiled. I liked the computers. Then I learned how to use them. Then I wanted to understand them."

Chen left Taiwan to attend graduate school at Villanova University in Philadelphia. There he bought computer books and maintenance manuals from an IBM sales office and reverse-engineered a software model of a computer. Chen spent several months, with the help of his wife, typing up his software on punch cards—ten boxes of them! He found he could insert the cards into either his own emulator or into the actual machine he was emulating and come up with the same result. Then he followed his desire to design a *real* machine.

After earning his MS in 1972, Chen came to Illinois to work with Professor Dave Kuck and graduate student Duncan Lawrie, who were championing the new concept of parallelism in the ILLIAC IV project. The ILLIAC IV was an array processor that

contained four quadrants of 64 processing elements each. The quadrants could be configured to work synchronously under a single control unit or as four independent processors.

"In those days," recalled Professor Duncan Lawrie, "we were mostly thinking about things like compiler generators and languages with semantics for parallel processing. Chen was one of the first to think about automatic detection of parallelism so that users wouldn't have to worry about thinking parallel. It turned out to be a lot harder than any of us thought, but he made some very significant contributions to the field. And of course, along the way, he evidently learned a few things about high-performance architecture."

Professor Kuck assigned Chen a project to explore software techniques that would enable FORTRAN programs to run using this parallel concept. The supercomputer industry was in its infancy, and several Illinois alums were working in the area of uniprocessor supercomputers, like Ken Miura, MS'72, PhD'73, at Fujitsu and Toshiro Kunihiro, MS'59, at NEC.

"I believe Chen was the programmer of the first version of Paraphrase, Kuck's compiler system," recalled Professor David Padua, "and he contributed with many interesting compiler ideas. For example, I think it was he who developed the techniques we use today for loop interchanging."

When Chen graduated, he set out to develop a commercial parallel system. "I was very focused," he recalled. "I never thought of anything else. I joined Burroughs Corporation in 1975, got a prototype built, developed a vector compiler and hardware for the control unit, and got my feet in the water for real development." Chen's prototype was the Burroughs Scientific Processor (BSP), a supercomputer with an array architecture that could compete with the newly developed Cray-1. But the finished product never got out the door. Chen left Burroughs in 1978 to develop a high-speed scientific array processor for Floating Point Systems, Inc.

After a year at Floating Point Systems,

Chen joined Cray Research as its chief designer, where he led the development of the world's most commercially successful parallel vector supercomputers, the Cray X-MP, and its successor the Cray Y-MP. Chen began by making some architectural changes to the Cray-1, which was introduced in 1971. In the Cray X-MP (Chen said that the "X" stood for "extraordinary"), Chen introduced shared-memory multiprocessing to vector supercomputing. The machine contained two pipelined processors compatible with the Cray-1 and shared memory. The X-MP series was expanded to include 1- and 4-processor machines. The X-MP4 was the first supercomputer installed at the National Center for Supercomputing Applications (NCSA) at Illinois (summer 1985).

The first of the Y-MP series, Cray's new multiprocessor vector supercomputer introduced in 1988, contained 1 processor, followed by 8, and then 16. All these machines shared essentially the same architecture, and the majority were designed by Chen and his team. Cray Research enjoyed tremendous growth from 1982-86 as its customer base expanded beyond government laboratories to commercial applications. This was the "heroic age" of the supercomputing industry. Sales blossomed from \$50 million to \$500 million as other U.S. supercomputing companies like Thinking Machines, Kendall Square Research, nCUBE, and MasPar proliferated. It wasn't until the personal computer revolution in the 1980s that the commercial supercomputing industry began to fade.

Chen spun off from Cray to start Supercomputer Systems, Inc. (SSI). This was a mutually agreeable arrangement for the two companies; it was simply too much for one company to support both the Cray series (now at Cray-3) and the Y-MP series. Partnered with IBM, SSI drew in some large corporate customers, like Boeing, Du Pont, and Ford. SSI built the world's most powerful, highly parallel supercomputer of its time, the SS-1.

In the 1990s, the supercomputing market had completely changed. "The cold war was over," Chen explained. "The commercial world was so competitive, and companies couldn't afford the machines. Meanwhile,

microprocessors became more powerful. It was the beginning of commodity technology instead of proprietary technology. There was the move to vertically integrate everything. We were in a new age. Supercomputers were too expensive. They were not only hard to build, but they took a long time to build."

"Everything we used in the 1980s," Chen said, "we pushed to the extreme limit. It's very expensive to sustain this. You can only have so much volume with microprocessors, so we are building alternatives. In general, a lot of the ideas are similar, but they are applied in different places. For example, before, every five years you had to redesign the floating point micro division. Now the building blocks are bigger. You use processors instead of gates."

In 1993, Chen founded SuperComputer International (SCI) which was later renamed Chen Systems. The company developed Intel-based, 8-processor mid-range open enterprise servers (CS-1000) based on commodity component technologies. In 1996, the company was acquired by Sequent Computer Systems. Chen was most recently Sequent's Executive Vice President and Chief Technical Officer. He left the company this summer, and we await to see what he does next.

Like many others in the field, Chen believes that future supercomputers, if they are to be commercially viable, must be based on Intel, commodity-based building blocks. They must be able to tackle both business and scientific problems so that multiple users can use the same machine. Therefore, the machine must be sharable, partitionable, integratable, as well as cost effective and highly available. Chen predicts that these machines will revolutionize the IT and platform industries. "The next wave will be in system technology," he said. "The endgame is commoditized, supercomputing knowledge—making it available to businesses and communities for things like videoconferencing, entertainment, shopping, and so on. You can see us merging into a new era of massive, deployable software."

Chen is a member of the National Academy of Engineering and the American Academy of Arts and Sciences. He lives with his wife and their two youngest children in Oregon. Their two older children are grown.

For a
timeline
of major
developments in
supercomputing,
see [http://
www.par.univie.ac.at/
literature/
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Brian Totty: Software adventurer extraordinaire



Brian Totty

Brian Totty, MS'92, PhD'94, has the distinction of being employee #1 at Inktomi, an exciting young company applying supercomputing technology to the Internet.

Brian Totty has a simple credo — “He who dies with the most stories to tell wins.” Here’s one tale, of Totty’s Westward Expansion from Massachusetts, to Illinois, to California, where he helped found Inktomi, one of 1998’s hottest Internet technology companies.

From a young age, Totty knew he had an entrepreneurial bent. “I dreamed of having the opportunity to work with a small group of spunky, ambitious, talented people who would laugh a lot and make amazing things happen.” In high

school, at the peak of the Atari video game generation, Totty built and sold a game called “Rush Hour,” starring a protagonist named Businessman Bob, and his misadventures scrambling across busy city streets crisscrossed with bulldozers, taxicabs, logging trucks, and Titan rockets. Totty describes it as “Frogger, but with a oddball hero and a bit more blood.”

And while studying computer science at MIT, Totty worked as a software engineer at Mark of the Unicorn, a startup software company in Cambridge made famous for music sequencing and desktop publishing software. At MIT, Totty worked under Professor Bill Dally and wrote the operating system for the J-Machine massively-parallel multiprocessor, for which he won the MIT undergraduate Computer Systems thesis prize.

Totty joined the University of Illinois graduate computer science program to work with Professor Dan Reed. He was familiar with Reed’s *Multicomputer Networks* book from undergraduate research at MIT.

“I really wanted to go to grad school for the ‘grad school experience,’ not for a diploma, not to get a better job or a better title. I wanted to be able to pursue a diverse education, but at the same time focus on making stuff happen,” he explained. Illinois was a school that afforded him some opportunity to do that. While he did his computer research in parallel processing and networking, he spent five years studying French and Arabic, helped direct the newly formed Habitat for Humanity volunteer

organization, and invested most of his graduate stipend into rebuilding his Triumph Spitfire sports car.

Totty finished his thesis on resource management for distributed memory parallel processors and received his PhD in 1994 (MS in 1992). From there, he went to Silicon Graphics as a roving scientist. “I spent almost three years there,” he said, “doing a bunch of random things—evangelist, research, performance visualization, technical marketing, systems design, clustered supercomputing product development, 3D graphics, performance studies.”

Totty thinks of himself as more of a creative type than a technical type, but in writing software, he was able to blend both these talents. “Software is good stuff,” he said. “It’s a pretty unique media, where you can sit down at a keyboard with next to nothing, push electrons around in some magical way, and be left with software that people find valuable. And maybe it even has some soul, some character. I really love that you can start literally with nothing and shape it into something really special to people. That’s the creative part of it.”

Totty made the difficult decision in February 1996 to leave SGI and take a gamble on the adventure of a lifetime, to join a few colleagues from MIT and Cal Berkeley and start Inktomi.

The goal of Inktomi is to take supercomputing technology and apply it to emerging Internet applications. Totty explains, “Today’s Internet is basic plumbing — dumb data pipes that blindly move bits from place to place. But the Internet of the near future will have processing engines built right into the plumbing, and these ‘smarter networks’ will provide applications and network services that you can ‘plug into’ to do really cool things with Internet content. This gets really exciting with the widescale deployment of television set-top boxes, cable modems, satellites, and mobile multimedia technologies. Inktomi builds this software. And because the content and usage demand is growing exponentially, high-performance parallel computing is well suited.”

Inktomi started with eight people in a small office in Berkeley, across from the Berkeley BART subway station. Their first product was HotBot, a scalable cluster-parallel Internet search engine licensed to *Wired* magazine. "The initial HotBot was three Sun workstations propped up on a cardboard box in a phone closet." Inktomi's search engines now fill up large data centers, a testimony to the growth of the Internet and Inktomi's scalable architecture. Inktomi's search technology has won numerous accolades, including the Editor's Choice Award from *PC Magazine*. Inktomi's search engine has been recognized by CNET, *SmartMoney*, and *Network World*, as the best on the Web. Inktomi is the underlying search engine for Yahoo!, the Web's largest navigational guide.

"But, the goal was never to be a search engine company," Totty said emphatically. "The dream was always about embedding new services into the fabric of the Internet. A search engine is just one example of a multimedia content service. Inktomi's document caching and replication technology is another. And things just get more exciting from here."

Two years later, Inktomi has about 150 employees. Its IPO this June garnered the *Wall Street Journal* headline "Inktomi IPO Sparks Another Internet Frenzy: ...Startup Soars to \$738 Million in Market Value."

Totty is Director of Engineering. Not much has changed since the IPO, he said. "The work we have to do is mostly the same, there's just more of it. There's a huge pile of things to get done. In terms of growing a company, I thought you'd just get technical people, design a product well, and you're done. But there are so many aspects, and you have to run as fast as you can to solve issues as they come up."

Today, Totty is hard at work with a scalable network caching program called Traffic Server. It's a steroidal Web server that sits in the middle of a network that keeps copies of popular Web pages, greatly increasing network efficiency. Already, corporate giants such as America Online, the largest Internet service provider in the world, and @Home Network, the huge broadband cable media provider, are using Traffic Server. "The Internet is growing at a huge rate, on a scale completely unheard of," said Totty. "We've got to find ways to handle the sheer number of documents, bits per second, features, and so

on. This is not a simple problem—it crosses many disciplines and many axes."

"I do miss a bunch of things from grad school," Totty admitted. "I was working pretty hard there most of the time, doing one lunatic thing or another, but I have warm memories." And Totty still has a little of the professorial bug in him, so he teaches computer networking classes for UC-Santa Cruz. "I like the creative aspect of teaching, building a course, sharing it with people." And he does it well—he was voted best instructor in his department last year. He also has a contract with O'Reilly and Associates to write a book on Internet protocols, though he hasn't made as much headway as he'd like with all the Inktomi responsibilities. "I'm at that phase of book writing known technically as the 'breach of contract phase,'" he joked.

"The big agenda," he said, "is to take next year and get the company solid, get the Traffic Server finished, fill in the loose holes we're making as we're growing, and try and keep the soul and spirit of the company together, so we're not just any other company. I do sometimes think about taking a break. I wouldn't mind sailing around the world for example, or picking up an unhealthy weightlifting obsession or something. Or maybe disappearing to a island where they drink tropical drinks all day, and just sleep a lot. But right now, this is the adventure of a lifetime, and there's a lot left to be done".

Totty looks to SGI and to Apple, where he did a research internship, for his inspiration for keeping a company's individuality and creative spirit. He also looks to an uncommon hero, Muppet creator Jim Henson. "Now here's a guy who started with nothing, had an idea, built a set of concepts, teaching, programs, and media that had positive impact on millions of people. This guy took a risk, gathered like-minded adventurers, and built something special, growing a successful business venture while at the same time educating generations of children."

Other Illinois alumni who work at Inktomi include John Plevyak, PhD'96, Ed Baumann, BS Math/CS'83, and George Velamparampil, MS'98.

The name Inktomi derives from Native American Lakota folklore. Inktomi (or Iktomi) is a mischievous character that often takes the form of a spider. He is known for his ability to outwit larger adversaries through wit and cunning. He is also known as a character who wanders the world for knowledge and brings culture back to the people.

<http://www.inktomi.com>

Torrellas, continued from p. 9

sor workstations. How would you use this same chip to build a supercomputer, and build it with as little extra hardware and with as many off-the-shelf components as possible?

Where we're going

In the next three to five years, you'll see chips coming out with multiple processors. How can we exploit these chips in a larger scale environment? The first thing is to figure out how we exploit even one of these chips, by itself.

Most of the applications these days are single processor executables. What you want is to have compiler support to extract all these threads and run them speculatively. But what if you have a multiprocessor built out of these chips? You need to exploit the parallelism somehow. In other words, you have multiple processors on a chip and multiple chips. How will you exploit this environment?

The key is integration. Putting more and more transistors on a chip allows you to have higher performance because you don't have to spend time communicating so much. Imagine that you have all your memory close to the data. When you bring all the data that you need to this memory, it's going to be much faster. So that's one thing. The second is power. By having all this integration—all the transistors on the chip—you don't have to waste power sending signals across chips. The third is price. The cost is very low. Instead of buying a machine with many chips, you could buy just one chip. For the next five to ten years, there's a road map that is very aggressive in terms of how many transistors can fit on a chip. Following Moore's law, we're still ten years off. You can still put humongous amounts of stuff on a chip.

Another advantage is temperature (power dissipation).

You have more reliability with one chip, but as you put more and more stuff on it, there's always the problem of testing. It's very complicated to test, and people spend a lot of time doing it. In fact, I'd say that most of the people who graduate from here and go into hardware will be testing. Companies have armies of people testing chips.

So my idea of a supercomputer of the future will be a system that uses chips—hopefully off-the-shelf commodity chips—that will integrate lots of things inside. And this system will be easier to program than current supercomputers.

Thank you to our donors

The following people have made financial gifts supporting the work of the Department of Computer Science during the period from May 1, 1997, to April 30, 1998. Their quiet generosity each year makes a difference in the field of computer science. Those people designated by an * are members of the Presidents Council and have fulfilled a \$15,000 commitment directed to the Department of Computer Science. On behalf of the department, we renew our pledge to use these gifts wisely. And on behalf of our current and future students, we thank these donors for their support.

The funding priorities of the department continue to concentrate on support for people and programs, specifically, fellowships and scholarships for students, and professorships and chairs for faculty. We have also put your money to work by helping fund our Distinguished Lecturer Series and keeping our instructional laboratories up to date.

If you haven't yet made your tax deductible gift to the department, you may do so by completing the form on the back of this newsletter.

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Classnotes

Carl Dill, MS'69, has been chief information officer for McDonald's Corp. in Oak Brook, Ill., for 15 years. He is responsible for global systems planning, development, and operations. Before that he was with McGraw Edison Co., a manufacturing company in Elgin, and Andersen Consulting.

Dennis Goldman, BS Math/CS'69, MS'71, is the Science and Education Counsel to the National Ground Water Association. He is responsible for technical education and conferences for the 18,000 member association, headquartered in Columbus, Ohio.

Stewart A. Schuster, MS Stats'69, PhD'73, is a venture partner of Brentwood Venture Capital in Menlo Park, Calif. Before that, he was executive vice president of marketing at Sybase. Focusing on enterprise software and the Internet, he is a board member of several early-stage firms.



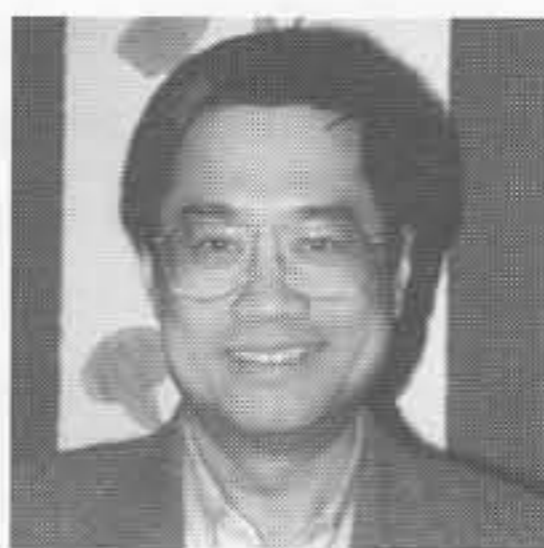
Janet Chin

Janet Chin, BS'70, MS'73, is provost of World Institute of Technology's U.S. campus in Fremont, Calif., a high-tech

graduate school geared toward working professionals in Silicon Valley. Chin is also staff to the CEO of Avant! Corp., an electronic design automation software firm.

Dick Swee, MS'70, was appointed vice president of engineering at TyLink Corp., in Norton, Mass., where he is responsible for the development of digital access products linking a variety of networking and communications equipment to high-speed communications services. Before joining TyLink, Swee has held

senior positions with UB Networks, Kendall Square Research, Charles River Data Systems, and Honeywell Information Systems.



Bernie Tse

Bernie Tse, BS'70, MS'75, PhD'75 all in EE, and his wife **Grace Tse**, BS'74, MS'76, keep busy with their two children and dividing their

time between their homes in California and Hong Kong. Bernie is founder of Wyse Technology, a maker of enterprise network computing hardware.

Richard T. Cheng, PhD'71, was named Outstanding Industrialist by the Science Museum of Virginia in March 1998. Cheng is founder and president of ECI Systems and Engineering in Virginia Beach, a company produces business and government information infrastructure and simulators for defense and law enforcement agencies.

Toshio Yasui, PhD'72, is president of Western Digital Japan. Before that, he was executive VP of Display Technology Inc., a joint venture between Toshiba and IBM-Japan. Western Digital produces information storage management and design systems and manufactures hard disk drives and I/O devices.



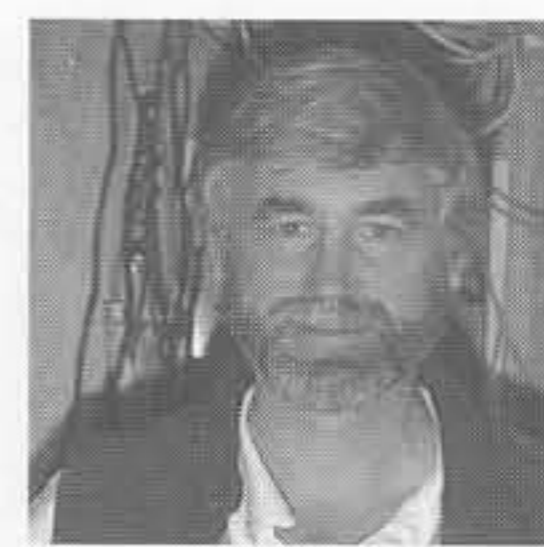
Bill van Melle

Bill van Melle, BS Math/CS '73, is on the research staff at Xerox PARC, where he works in the collaborative systems area on technologies to

support meetings and other group activities.

Lisa Kearns Richardson, BS'74, is VP and treasurer of Premark International, a multinational company that

markets products under such brand names as Tupperware, Hobart, and West Bend. Before joining Premark in 1986, she held financial management positions with Morgan Guaranty and Staley Continental.



Al Whaley

Al Whaley, BS CompE'74, PhD'84, is CTO of ITN (Internet Travel Network) in Palo Alto, a company he and his son **Dan**

Whaley, AB Rhet'90, co-founded. Dan is now VP of new business development and is credited with the concept for ITN and the development of its core reservation engine. ITN's software streamlines airline ticket reservations so that individuals and corporations can make their travel arrangements through the Web.

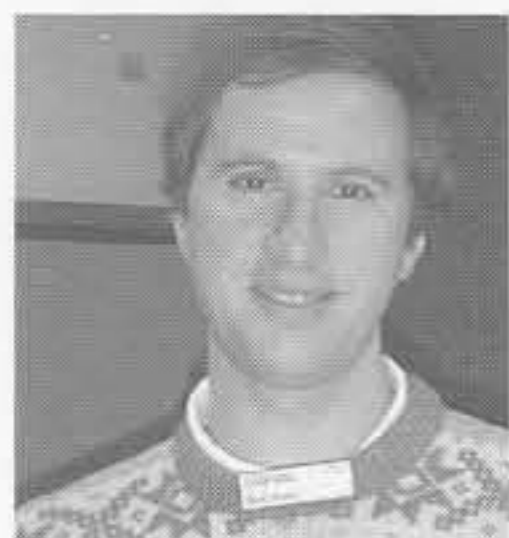
Several CS alums and friends were featured in the February 9, 1998, issue of *U.S. News & World Report* in an article about Chicago high-tech entitled "Silicon City on the lake." Department benefactor **Doug Colbeth**, who established the Spyglass Scholarship, was featured as CEO of Spyglass, Inc., a provider of software and services for Web devices. **Roger Covey**, BS'76, was also featured. He is founder of System Software Associates (SSA), the second-largest software company in Chicago after Platinum. SSA provides of enterprise-wide systems for the industrial sector. Covey resigned as chairman and CEO last April to study the Tang dynasty for an advanced degree in art history from University of Chicago. <http://www.spyglass.com>, <http://www.ssax.com>

Jackson Hu, MS'76, PhD'78, president and CEO of SiRF, joined the Board of Directors of EuPhonics, developers of digital audio and digital music synthesis technology.

SiRF is a Santa Clara, Calif., firm that provides integrated circuits and software for GPS (global positioning systems) and wireless communication applications. Before that, Hu was senior VP and general manager of S3 Inc., where he designed and managed the development of S3's 2D graphical user interface accelerator. h

Michael Borman, BS'77, general manager of the Chicago-based Midwestern region of IBM, has been promoted to a new job in New York as general manager of the division that makes the RS-6000 computer.

Anil Singhal, MCS'79, was named Entrepreneur of the Year in the Technology, Communications and Entertainment Category by Ernst & Young in November 1997 along with Narendra Popat. Singhal and Popat are co-founders of NetScout Systems, Inc., a developer of network monitoring and analysis tools based in Westford, Mass.



David Sievert

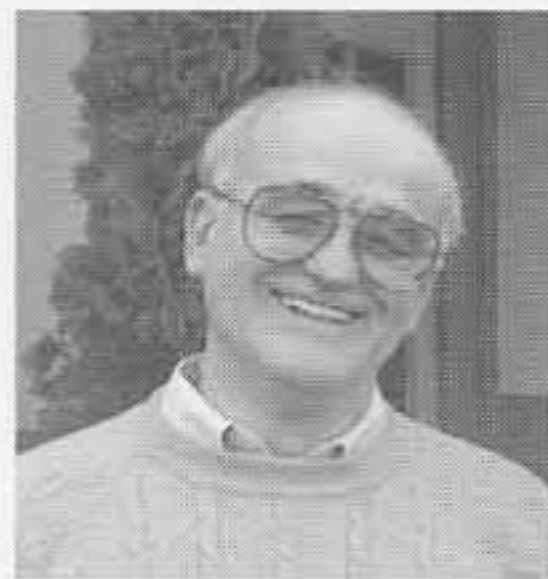
David Sievert, BS'80, MS'83, is manager of architecture and technology for enterprise business systems at Hewlett-Packard in Palo Alto. He is

working on application integration architectures in a new open collaborative team workspace at HP.

Andrew Wise, BS'83, is managing director of marketing and sales at Tuttle and Co., a Mill Valley, Calif., company that provides mortgage pipeline risk-hedging services.

James Conrad, BS'84, has written a book, with Jonathan Mills, titled *Stiquito: Advanced Experiments with a Simple and Inexpensive Robot*. **John Estell**, MS'87, PhD'91, is author of several chapters. The Stiquito robot is a vehicle for introducing students to robotics. Conrad is senior staff

engineer for Ericsson in Research Triangle Park, N.C.



Valentin Bazavan

music professor in Romania who came to Illinois as a refugee to study computer music, he switched to CS when he became interested in computers.

Steven Sol Skiena, MS'85, PhD'88, was married in August 1997 to Renee Micele Fass. Skiena is a professor and assistant chair at SUNY-Stony Brook.

Odie Williams, BS EE'85, BS'87 was married in June 1997 to Delores Sterling. He works as a project manager for Customer Development Corp. in Peoria, Ill.

Marc A. Smith, BS Math/CS'88, was admitted in January 1998 as an associate partner in Andersen Consulting, where he works in health services and insurance practices in Chicago.

Aaron Contorer, BS'90, started a club in 1997 within Microsoft called the Big Gift Club. His idea was that club members would pledge to give at least \$1,000 every time Microsoft stock went up 10 points. The company matches those gifts, which are given to various charities. In its first year, the club raised some \$430,000 for the favorite charities of its members. Contorer is a general manager of a Microsoft group that makes programming tools.

Timothy Germann, BS'91, BS'Chem'91, was married in June 1997 to Lina Shebaro. Germann earned his PhD in chemical physics

after graduating from Illinois. They live in Santa Fe, N. Mex.

Pankaj Mehra, PhD'93, is a senior software designer at Compaq Tandem Labs in Cupertino, where he is also responsible for managing university liaison and running the summer program. He is working on scalable SAN architecture, SAN-attached I/O, and advanced Windows NT clustering. Before joining Tandem, he was on the faculty of computer science and engineering at the Indian Institute of Technology, Dehli.

Arlen Shub, BS'91, was married in December 1997 to Stacy Morgolis. He works as a computer consultant in Chicago.

Navy Lt. **David A. Benson**, BS'95, is completing a six-month deployment to the Arabian Sea and Persian Gulf aboard the destroyer USS Ingersoll. His homeport is Pearl Harbor, and he has been a member of the navy since June 1988.

Earl J. Bonovich, BS'96, was married in November 1997 to Anne Estandarte, BS Geology'96. Bonovich is a consultant/manager for Metamor Technologies in Chicago.

Brian Drewes, BS'96, was married to Kimberly Hines in June 1997. He works for Sangamon County Data Processing in Springfield, Ill.

Jenette Eihusen, BS'96, was married in July 1997 to Bryan Homrighous. She works for McDonnell-Douglas in St. Louis.

Two BS'97 alums were appointed associate systems engineers at DC Systems, an information management firm in Oakbrook Terrace, Ill.: **David Pankros** and **Norman Murrin**.

In memorium

Donna Daniel, BS'84, died on August 27, 1997. Daniel was a software engineer for Motorola in Schaumburg, where she worked for the firm's cellular infrastructure group.

Robert Mueller-Thuns, MS'88, PhD'90, died on May 14, 1998, after a long struggle with Hodgkin's Lymphoma. His wife, Nikki Mirghafori Mueller-Thuns, BS'91, is finishing her PhD in computer science at UC-Berkeley. Robert was a software architect at Evolve Software in San Francisco.

Jeffrey S. Curtis, BS'94, passed away on January 6, 1998, from injuries suffered in an automobile accident. Curtis, a native of Elgin and former resident of Naperville, was working at Argonne National Laboratory, where he was the internetwork manager in the electronics and computing technologies division.

Faculty notes

Jean Ponce was promoted to full professor, effective in August 1998.

Josep Torrellas was promoted to associate professor, effective in August 1998.

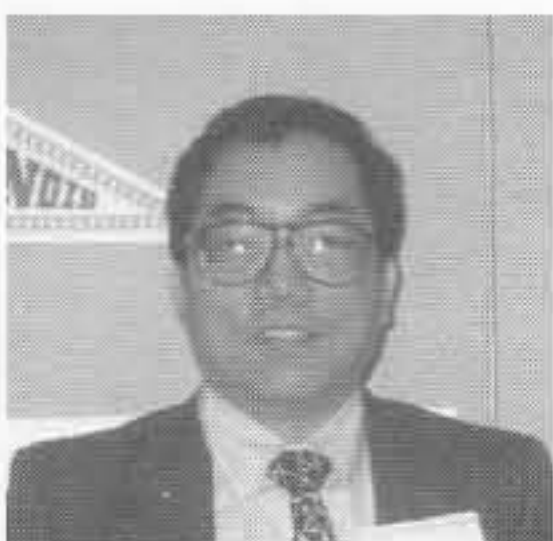
David Kriegman, associate professor, won a best paper award at the 1998 European Conference on Computer Vision in Friburg, Germany, for the paper "What Shadows Reveal about Object Structure," with Peter Belhumeur.

CS and ECE party at Sun

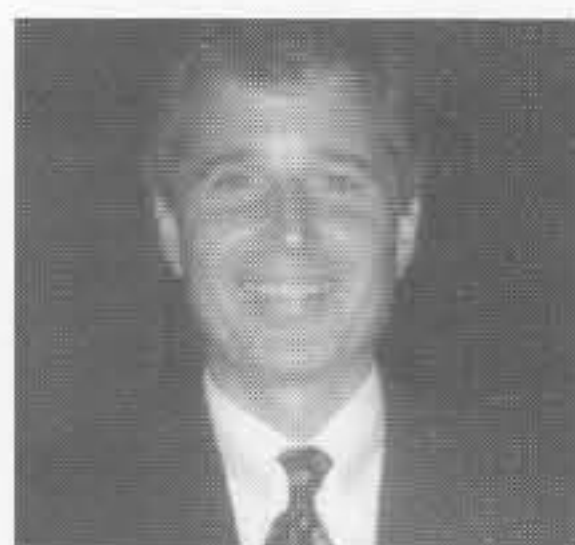


Brandon Long, BS CompE'95, MS EE'97, from Intel; Chris Trimble, BS Math/CS'95, from Pacific Data Images; and Alan Braverman, BS'96, from SGI, at the Bay Area Illini bash.

About 70 alumni turned out for an Illini Reception on January 16 held at Sun Microsystems' beautiful campus in Menlo Park, Calif. Sun executives



David Yen, MS EE'77, PhD EE'80



Mark Tolliver, BS EE'71

David Yen, MS EE'77, PhD EE'80, and Mark Tolliver, BS EE'73, turned out to welcome alumni from both the computer science and the computer and electrical engineering departments on Sun's behalf. The event was cosponsored by Sun and by the two departments. Department head Dan Reed, associate head Bill Kubitz, and alumni coordinator Judy Tolliver represented CS. ECE was represented by alumni coordinator Emma Marshall and Professor Ibrahim Hajj. Development director Carol Mahar represented the College of Engineering. Familiar and new faces gathered to catch up on depart-

ment news, share Illinois memories, and meet other friendly alums. This marked the first time that CS and ECE have held a party together in the Bay area since the 1996, and it is the second time CS has held a company-sponsored party in the Bay Area. Last year, a gathering of CS alums was held at Silicon Graphics. Because of the overlap of our two departments (many of our alums have degrees from both), we enjoy holding these receptions together. Stay tuned for the next Bay Area bash!

Get to know our student groups

ACM

Student Chapter of the Association for Computing Machinery
<http://www.acm.uiuc.edu>

CSGSO

Computer Science Graduate Student Organization
<http://www-csgso.cs.uiuc.edu>

Two great places to recruit!

Computing job market affects CS department

by William J. Kubitz, associate head

You all have read about or experienced first-hand the shortage of personnel in the computing field, and you might assume that we, confined within the staid walls of academia, remain unaffected. Nothing could be further from the truth! It is chaotic, frustrating, and fun.

Undergraduate students

Here jobs are so plentiful that students can practically choose for whom they want to work. Enrollments would get completely out of control if some action were not taken to prevent it. We have raised our admission selection level three times in an effort to bring stability at around 1,000 undergraduates. In fact, last fall we had exactly 1,000 undergraduates for a few minutes. It is our hope that we can keep it at this level and not have it rise further. Had we not done this, I think the enrollments could well be at the 2,000 level by now. While undergraduate enrollments increase, the number of faculty members is actually decreasing.

The College of Engineering published a monograph entitled *Educational Profile for Entering Freshmen, Fall Semesters 1994, 1995, 1996, 1997*. The statistical summary presents an impressive picture of our freshmen.

The average entering freshman ranked at the 90.8% level of his or her high school graduating class in 1994. The figures for subsequent years are 1995 91.8%, 1996 92.5%, and 1997 93.6%. In fall 1997, 1 in 5 ranked in the top 1%. The average ACT composite score for CS majors for fall 1997 was 29.7. Are we too selective? We don't really have a choice.

Graduate students

A high-demand job market is always hard on graduate programs. The lure of high salaries siphons off potential graduate students at the BS level, reducing the available pool of new applicants. The same lure causes PhD students to stop at the MS level or to just leave school in mid-degree. This ultimately reduces the number of PhDs and thus the pool of available faculty members in years hence.

Faculty

Recruiting faculty members has become almost as challenging as corporate hiring of undergraduates has become. This year it was about as wild as I can remember. It has now become commonplace for universities to hire at all levels, enticing people away from one university to another with lucrative offers, chaired professorships, and other perks. Even hiring at the traditional junior level has become so competitive that both salaries and start-up funds have become inflated. Good for the candidate, but bad for us!

As the recession of the early nineties gave way to the expansion of the late nineties, universities went from cutting faculty to hiring faculty—all at the same time. Couple this with the lure of start-ups and corporations siphoning off a goodly fraction of the PhD production, and you have a very competitive and tight job market.

What can you do about this for the Ol' Alma Mater?

You guessed it! Help us fund fellowships, professorships, and chairs so we can obtain and retain our great faculty. Would you or your company endow a fellowship or chair? Let us know. This is all the more important as we build the University of Illinois' CS department for the new millenium.

What should we look like for the new century? Many of our older faculty members, many who have been here since the department was established, are thinking about retirement or actually doing it! We will be undergoing the largest faculty change in recent memory during the next five years. Your help is essential in continuing the Illinois tradition of high quality, and lasting education, combined with cutting-edge research!



Rhonda Anderson

DCL when the crabapple trees are blooming

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University of Illinois at Urbana-Champaign

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