Alumni Board works to establish infrastructure

The CSAA Board met three times since its formation on September 18, 1993. At the November meeting, the Bylaws were written, rigorously debated, hashed over, rehashed, and approved. We now have what we think is a very elegant set of Bylaws. Our mission statement appears below. A "Communications" meeting was held by the board in January. This meeting was devoted to exploring ways to get the board, and eventually the membership, connected electronically. The hope is that the board can use network communcations to support more geographically dispersed and comprehensive discussions in a shorter period of time, with fewer face-to-face meetings. Once this infrastructure is in place, the board plans to attack the more general issue of alumni communications, including a CS alumni bulletin board and an electronic newsletter. Guest speakers from the UI Alumni Association and U of I Foundation welcomed our organization and briefed us on their activities. (See page 16 for an explanation of the UIAA and UIF's roles.) The most recent board meeting was in March, in which the various committees reported their activities. The next meeting will be held on May 21 in Chicago. As usual, all alumni are welcome to attend. Look forward to hearing lots more as the rolling ball picks up speed.

In addition to serving the department, board members are out to serve you, the alumni. To that end, they would like to know what you would like to see the alumni group doing. Please contact any board member about your concerns, or contact Judy Tolliver, who will forward them to the board. Meet the board members on page 12.

Ernst & Young supports CS at Illinois

Looking for computer scientists

This issue of the Computer Science Alumni News is underwritten by the firm of Ernst & Young in support of computer science education at the University of Illinois. Ernst & Young is looking for outstanding computer science graduates from the University of Illinois (see page 19). CSAA board member Marc Martinez championed the idea within Ernst & Young of both supporting the university with a newsletter underwriting and reaching a select and highly qualified audience of employment candidates.

Ernst & Young, the largest of the "Big Six" integrated professional services firms, provides audit, tax, and management consulting services to its clients. In the area of management consulting, they do strategic systems planning, implementation, and systems integration work in conjunction with major business process redesign, and innovation of business functions. Ernst & Young's consulting arm represents about 25% of its total revenues and is growing at a rate of about 20% per year. To that end, the firm needs to expand their number of computer scientists to staff their offices in some 65 metropolitan areas.

The Department of Computer Science looks forward to strengthening its ties with Ernst & Young in the future. For information on how your company can underwrite future issues of the Computer Science Alumni News, please contact Judy Tolliver at the computer science department.

The Mission of the Computer Science Alumni Association

A *dvance the standing, reputation, accomplishments, and leadership of the Department, the College of Engineering, and the University by promoting the participation of its members in university affairs.*

B *enefit the membership by providing a forum for career opportunities, professional advancement, continuing education, and any other appropriate activities for its members which the organization may establish.*

Steve Dorner's *Eudora:*
"Bringing the post office to where you live"

Steve Dorner, BS'83, has been around DCL for a long time, first as a student and then as an employee of CCSO. Now, as a telecommuter working for QUALCOMM, he's still here. His current claim to fame is Eudora, *an e-mail program that is enjoying meteroic growth.*

Steve Dorner was destined for glory in Urbana, Illinois. Born while his father was an undergraduate at Uof I, he lived as a baby in the upstairs apartment of Mrs. Albert Noyes's house on Oregon Street, where the Krannert Center now sits. Dorner still lives in Urbana where he works out of a bomb shelter at his house. His brainchild is Eudora, one of the world's hottest e-mail programs.

"When Eudora for the Mac was released at UIUC in 1990, it literally revolutionized the way Mac users on the campus network (and eventually all over the world) processed their electronic mail," says Lynn Ward, network administrator in CCSO. "Eudora afforded people the luxury of preparing outgoing messages and reading and organzing incoming messages within the familiar confines of the graphical, menu-driven Macintosh desktop. For most Mac users—even those well acquainted with UNIX e-mail software and text editors—it was time to say, 'Goodbye Elm and vi, hello Eudora.'" Eudora is now available for the PC, and it has particularly caught on among journalists and writers, like Cliff Stoll, author of The Cuckoo's Egg. In fact, Dorner has been delighted to receive e-mail messages from a surprising array of "celebrity" Eudora-users.

Dorner grew up in St. Charles, Illinois, and came to U of I to study chemistry in 1979. Tired of being cooped up in chem labs and his unfortunate penchant for spilling things, he was drawn to computer science. "Professor Sameh was the best at imparting practical knowledge. I always felt that he not only taught you the theory, but also how to apply it," Dorner recalled. "He was one of the best pure teachers I had at the university." He also feels indebted to Professor Friedman. "In his operating systems class, he really made me understand a lot of things I that had been doing without really understanding them. He gave me the tools to go on and learn more." Dorner got his BS in 1983.

After graduation, Dorner worked for the U.S. Army Construction Engineering Research Lab (USA CERL) for several years before returning to the university and working at CSO/NCSA. (CSO and the National Center for Supercomputing Applications originally formed a partnership.) "We were offering UNIX e-mail to faculty and staff, and AISS was offering PROFS," Dorner explained. Though far from perfect, PROFS was an easier to use e-mail program than anything in UNIX. Dorner and his colleagues at CSO decided to do something about this situation, discussing what an ideal mail system would be. Initially deciding that writing their own would be too monumental a task, they sought commercial solutions. What they found were more and more people using Macs and PCs with e-mail systems which were incompatible with the Internet. Coming up empty-handed, Dorner
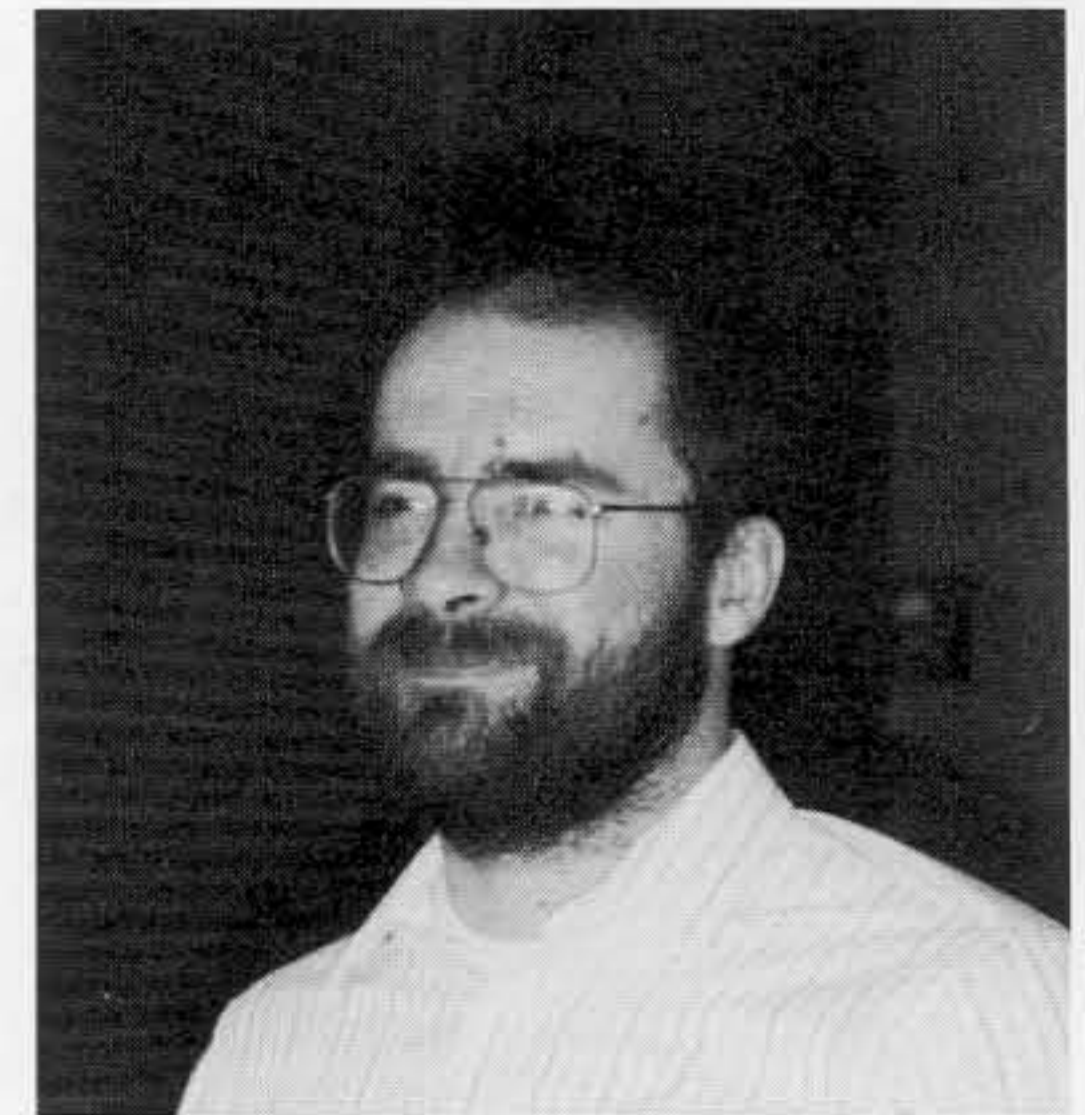
again decided to write his own. As predicted, it was indeed an extremely large undertaking, especially for one person. The first version was over 50,000 lines long. Dorner wrote it in C and patterned it after UNIX Mail. "The problem with UNIX Mail wasn't that the things it offered were bad or that it didn't have good concepts," Dorner explained. "The problem was that the commands were hard to remember and the editors cumbersome to use." Initially, he went about reimplementing the general functionality of UNIX Mail with a Mac user interface. It has since grown to offer many things unavailable on UNIX Mail.

Why is Dorner's program called Eudora? No, it is not a code name for "Door to UNIX" or the name of a long lost love. It is named after Mississippi Pulitzer-prize winning author Eudora Welty. Eudora, the program, uses the post office protocol for mail. That is, mail messages sit on the server until the user goes and gets it, just like if one were to have a box at the local post office. Dorner's program, on the other hand, brings the mail to the user's own machine, and the original slogan for the project was "Bringing the post office to where you live." This was an ironic play on the title of one of Dorner's favorite Welty stories entitled "Why I Live at the P.O."

Dorner spent the better part of a year to write the first version of Eudora. It was released in 1990 followed by another version in 1991. He worked on Eudora off and on, including writing a version for the PC, as part of his job at CSO, until late 1991, when CSO decided that Eudora was good enough and wanted Dorner working on other things.

In 1992, Dorner received an offer he couldn't refuse: a job with QUALCOMM Inc.,* which is now developing Eudora. "When a program has the kind of success that Eudora has," says Dorner, "it's a lot of fun to work on. I didn't want to abandon Eudora to

*QUALCOMM Inc. is a publically traded company dealing mostly with wireless digital communications. Its two main concerns are Omnitracs satellite communications for truckers, and CDMA (code division multiple access), a technology for digital cellular telephones. Its main office in San Diego employs about 1,200.

work on something else." Dorner also has the luxury of telecommuting to his QUALCOMM office in San Diego while enjoying life in Urbana, where he lives with birds, fish, snakes, dog, boy, girl, and wife. And he really does work in a bomb shelter, though he confesses that it was there before he bought the house.

Dorner relishes his time spent on the Internet, but he is very concerned about its future. "The real challenge of the Internet is how we're going to deal with everybody being on it. It's going to get to the point where it will be common for everybody to get e-mail and to read news. Right now, policy-making is done in a consensus way. Once you put 40 million on the Internet, this isn't going to work any more," he laments. "The Internet is full of technocrats and college students. When it becomes a multibillion dollar marketplace, will the control go out of the hands of people like me and into the hands of corporate suits?" Hopefully not.

Eudora *and how to get it*

Eudora is an e-mail application that delivers full-function interoperability between Macintoshes and PCs across TCP/IP networks. It provides complete connectivity without requiring specialized e-mail gateways and servers, and it is scalable from smaller local area networks to the largest wide area network. Eudora's use of the internationally-recognized Simple Mail Transfer Protocol (SMTP) and Post Office Protocol version 3 (POP3) standards eliminates the need for the platform-specific gateways required by many e-mail packages. Eudora is available in both Macintosh and Windows versions. For more information, send e-mail to eudora-hotline@qualcomm.com or call 800–2–Eudora.

Ed Krol Pens a Best Seller

The Whole Internet finds a vast audience

Programmer Ed Krol, BS'73, began collecting tidbits of information about the Internet to help him with his job at CSO. Little did he know that he had the seeds of a best-seller in his notes. The unexpected success of his book now has Krol burdened with the label "Internet guru."

Ed Krol, author of the best-selling book The Whole Internet, a user's guide to Internet navigation, has become something of a celebrity. The fact that the press considers him an Internet guru is something that continues to amaze Krol, who has finished writing a second edition of the book, due out this spring.

Krol is assistant director of CCSO and has been on campus ever since he was a freshman in 1969. Originally from Elmwood Park, he came to U of I to study physics. In keeping with the times, Krol changed to something more "relevant": political science. After taking CS 101 as a required course, however, Krol got back into the technical fold as a math/CS major. He was a member of the first graduating class within the CS curriculum in engineering.

Krol recalled his "most amazing class," CS 201 (now CS 221), taught by Don Gillies. The class's first task was to get a DEC PDP11 up and running so that the course could be taught on this machine. "Not only did the machine arrive late," recalled Krol, "but it arrived in a state where it wouldn't do anything. So the first thing we had to do was toggle in a teletype driver with the little switches on the front ... I learned more about machines in that class." By the end of the semester, some graduate students were able to get the card reader to work.

Krol married math/CS alumna Margaret Van Eylen (BS'74, MBA'78) when he graduated in 1973. Sticking around until her graduation, Krol attended graduate school, "mucking around with Pascal and databases," and then wrote atmospheric modeling programs for the State Water Survey. Then his wife started her MBA. So, their continually staggered academic terms led to their staying in the area. She is now at the university's AISS office working on the new on-line student registration system.

In 1974, Krol joined CSO, whose offices were and still are in DCL, and he has been there ever since. He has been involved in just about every aspect of that office, including user services, systems, programming, networking, and management. In the early days of the CSO/NCSA partnership, the original plan was for CSO to be the facilities manager of NCSA, which was essentially staffless at the time. Part of the plan, funded by NSF, called for producing a high-speed networking system to connect each of the principal investigators' workstations to each other and to the various national networks. As research on how to connect to national networks progressed, the dismal lack of documentation became glaringly apparent. "Everything was done by word of mouth," Krol recalled, "and you just had to find people who knew how to do things." Krol began to keep a journal of all the tidbits he learned during this process. And once Krol and his colleagues managed to get NCSA connected, everyone else wanted to connect, too.

For "everyone else," Krol wrote an on-line help manual, called Hitchhiker's Guide to the Internet, in 1985. By 1989, it was out of date, so he revised it. The Guide became a sort of official document RFC (Request For Comments). Around 1991, complaints abounded on the Net that the Guide was again out of date. But by that time, Krol did not relish the idea of writing it yet another time.

It was then that Krol received a message seemingly out of the blue from Mike Loukides, an editor for O'Reilly and Associates Inc., Krol's current publisher. Tim O'Reilly had read Krol's Hitchhiker's Guide, thought the time was ripe for an Internet book, and assigned Loukides to recruit Krol. A friend of Krol's, who was an historian and author, managed to calm Krol's nerves about the task he was asked to undertake, and Krol reluctantly took on the challenge. The opportunity to work with an editor and publisher

with experience with computer books was one deciding factor.

The book was written in "order of the least dynamic." Topics that had been around for a while and least likely to change during the process of writing the book were written first (*e.g.*, FTP, telnet). Things like Gopher and other tools still under development were tackled last. "It took about 8 months of grueling work to get it written," Krol recalls. In September 1992 the book, called The Whole Internet: User's Guide & Catalog, hit the bookstores and sales took off. Krol was not prepared for its instant success. The book is now in its 7th printing. In addition to computer magazines, the book has been reviewed in The Economist, U.S. News & World Report, and USA Today. Last fall, Krol appeared in a special report on CNN, and, unusual for a how-to computer book, The Whole Internet was a bestseller in Boston, Washington, and the Bay Area.

Now, Krol is even more up to his ears in "fun stuff." He took a voluntary reduction in time at CCSO so that he could devote more time to "doing nifty Internet stuff outside of work time and taking vacations." He is also in high demand as a speaker. "And I've got this reputation that I can write," Krol says, "so I keep getting hit on to write this other stuff," including book reviews and a monthly "Life on the Internet" column for Network World magazine. Amused at being considered an "expert," Krol sees himself as a latecomer to the Internet, "by about 30 years," he says, pointing out that the designers of TCP/IP are still around.

Like many others, Krol is concerned about the future of the Internet. "It's being privatized and commercialized, and that's the only way to keep it growing. However, there's no incentive to create a national network corporation. The current Internet model of doing things is counter-intuitive to anyone in business. Everything is 'free' and decentralized. Things on the Net don't necessarily have a business value. But what the country needs and what people want is a 'grown up Internet' and not a 'grown up CompuServe.'"

Krol sees important implications for collaborative efforts on the Internet. "If you read management stuff," says Krol, "a futuristic model is that you will be receiving all kinds of management information. Based on this information you have to steer your corporation, changing collaborations on the fly. With the Internet, all of a sudden you could be collaborating with one company and then another, by just changing an address."

From a personal standpoint, the Internet allows rabble rousing. "People who aren't normally activists become activists by bypassing the common power structures." Krol gave the following example: If a PTA wants a certain school policy published in its newsletter, and the principal does not, there is nothing to stop one of the members from putting the policy on the network. "And the law hasn't caught up with networking either," he continued. "Suppose the people that engineered the World Trade Center bombing had made their arrangements through e-mail, instead of a common carrier like the telephone? It's unclear whether someone could sue the Internet provider as an accomplice."

When asked what he considers are the hottest information resources on the Net today , Krol replied, "The federal government is now disseminating government information on the Net. For instance, the day after Clinton revealed his budget plan, it became available on the Internet." He also cited the SEC's Edgar database, a database of stock transactions by principals and companies, and forums like Cancernet, from the National Cancer Institute, as having the potential for tremendous impact.
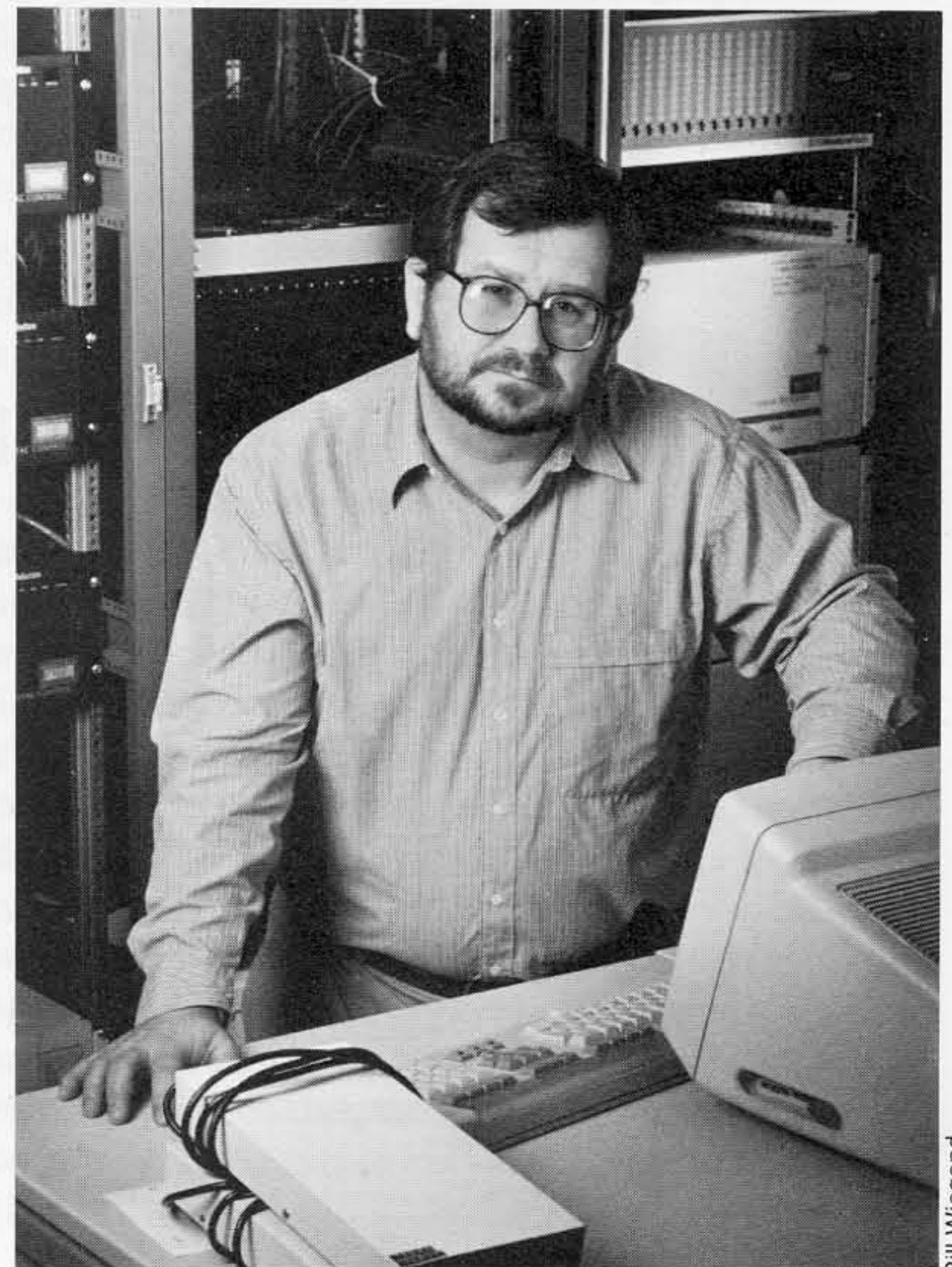
Bill Wiegand

The Whole Internet: A Brief Review
by Lynn Ward

Internet service providers and seasoned Internet users are finally recognizing the need for solid, comprehensive, and comprehensible instructions on how to find and make use of the vast and varied information archives and services available on the Internet. One of the first and best books about the Internet written specifically for the lay person is The Whole Internet User's Guide & Catalog by Ed Krol.

The Whole Internet consists of two major sections: 1) the user's guide proper, which provides historical and technical background on the Internet and instructions on how to use the major Internet applications, and 2) "The Whole Internet Catalog," a descriptive list of newsgroups, information servers, file archives, and other Internet resources organized by subject matter. The user's guide has chapters on standard Internet applications such as remote login (telnet), file transfer (FTP), electronic mail, and Network news (Usenet). In-depth coverage is given to popular applications such as Gopher, WAIS, and the World-Wide

Web. The resource catalog groups Internet resources alphabetically according to subject matter (from Aeronautics to Zymurgy), making it possible for researchers or hobbyists to zero in on the resources of particular interest, regardless of the application that drives or accesses them.

I was most impressed with the captivating style of The Whole Internet User's Guide & Catalog. Krol talks the reader through each application, often using vivid metaphors to clarify complicated technical concepts. His easy-going, congenial manner is deliberately unintimidating, often humorous, and always informative. This is not your typical dry, cookbook approach to computer documentation. Although there are instructions on what buttons to push and commands to enter, the emphasis is on conceptual understanding of the topics covered. Krol lets the reader know what each application does, why a person might want to use it, how to use it, what its current limitations are, and what potential it holds for the future.

THE WHOLE
INTERNET

USER'S GUIDE & CATALOG

ED KROL
O'REILLY & ASSOCIATES, INC.

The Whole Internet User's Guide & Catalog can be purchased at your favorite bookstore. The second edition is due out this spring.

Lynn Ward is a research programmer in the Network Administrator Support group at CCSO. This review is excerpted and revised from an article which appeared in the November 1992 issue of UIUCnet.

Department has its own home page on *Mosaic*

Mosaic is now known as "The Killer App" for the Internet. Indeed, the use of this ambitious application has continued to explode since we last reported here. And now, the Computer Science Alumni News and other U of I goodies can be found on the World-Wide Web server using Mosaic. The Computer Science Home Page is being developed by Scott Stonefield, research programmer at the department's Computer Research Lab (CRL).

Mosaic is a worldwide hypertext and multimedia system with client software for the Macintosh, Windows, and UNIX X Windows. It was written at NCSA by CS alumni Marc Andreessen (BS'93) and Eric Bina (BS'86, MS'88) and is being developed by other U of I alumni and graduate students. The program is available by anonymous FTP from ftp.ncsa.uiuc.edu.

To get to the CS department's home page in Mosaic, open "File" (top left) and then "Open URL."

Type *http://www.cs.uiuc.edu/* Then you will see a page of information about the computer science department, including a button that leads to this newsletter. You will be able to retrieve the newsletter, which is currently a PostScript file. The newsletter can be read on your screen if you are running the X version of Mosaic. Eventually, it will be screen readable on all three platforms.

Rajesh Gupta joins the faculty

Former Intel microprocessor designer pushes the CAD envelope

Rajesh Gupta is the newest faculty member in the department, having arrived on campus in January. He leaves behind an exciting job at Intel Corporation, in Santa Clara, California, where he was on the design teams for three generations of microprocessors. At Intel, he designed microprocessor devices at several different levels of abstraction, including the math coprocessor for the 80486 and the instruction processor for the Pentium. He was also greeted by some of the coldest weather that Illinois has seen in years.

Why leave such a hot career in industry? Mainly because Gupta wanted to work on more general problems in computing and not be limited, so to speak, by working on something solely to its commercial endpoint. He and his family also wanted to live in a small town to raise their two-year old son, and they found the environment at Illinois to their liking. The friendliness and openness of the department, the interest in his work expressed by the faculty, and the respect for individuality that Gupta experienced during his campus visit prior to his appointment left him with an overall good feeling about the department. These things made Illinois stand out from other institutions he considered.

The focus of Gupta's research, aided by a $50,000 equipment grant from AT&T, is to investigate and broaden the scope and quality of computer-aided design (CAD) techniques. He would like to see modern CAD address the problems faced in the design of systems used in embedded and real-time applications. Traditionally CAD techniques have been applied to improving the quality of the chip designs (faster, denser, more testable) and to shortening the design time, Gupta explains. Recent advances in microelectronics have resulted in availability of inexpensive and high-performance microprocessor devices as integrated circuits. This presents a unique opportunity for CAD tools to integrate these "predesigned" components as part of the overall synthesis solution.

Gupta expects the use of one or more of these powerful microprocessors in a system architecture to provide a quantum jump in the complexity and performance of the systems that are subject to automated synthesis and optimization techniques.

In general the selection of a suitable architecture is a difficult problem due to the diversity of applications of embedded systems. What makes Gupta's research feasible and exciting are the recent developments in semicustom VLSI, such as reprogrammable hardware. These components make it possible to experiment with "flexible architectures" that can be readily altered by using functional-level and logic-level synthesis tools. "I call this new synthesis task 'co-synthesis' due to the use of both hardware and software to achieve system personalization," says Gupta.

"Nevertheless," cautions Gupta, "one cannot overestimate the challenges facing computer-aided design for complex real-time systems. For one, the satisfaction of timing conditions for such systems, which must actively engage with the operating environment in a timely manner, remains a challeng-

Dave Liu garners IEEE and ACM top honors

Chung Laung (Dave) Liu, one of the earliest members of the department, is recognized as one of computer science's best and most prominent educators. And he has recently received two more prestigious awards to add to his long list of honors: the IEEE Education Medal and Fellowship in the Association for Computing Machinery.

Liu was selected to receive the 1994 IEEE Education Medal for his "leadership in engineering education through teaching and textbooks in mathematical foundations of computer science and system theory." Established in 1956, the medal is awarded annually by the Institute of Electrical and Electronics Engineers to recognize outstanding contributions to education. The recipient receives a gold medal, a bronze replica, a certificate, and $10,000. Liu joins an elite group which includes outstanding Illinois educators W. L. Everitt, Edward C. Jordan, and M. E. Van Valkenburg. Liu will accept this award in Denver in June. He has been a Fellow of IEEE since 1986.

Liu was inducted into the inaugural group of ACM Fellows in March in Phoenix. Fellow designation is bestowed on those members who have distinguished themselves by outstanding technical and professional achievements in the field of
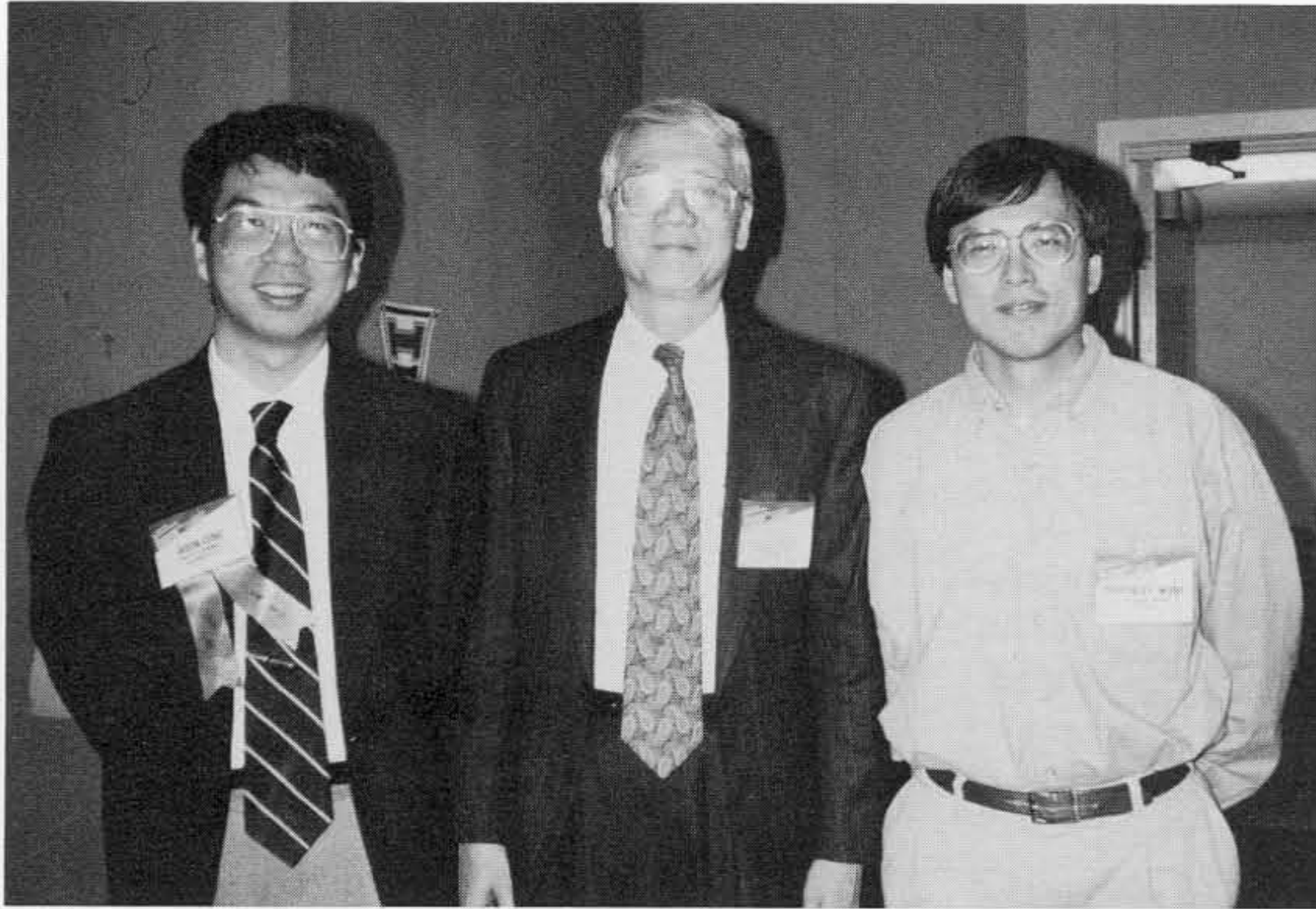
Dave Liu has devoted his entire career of over thirty years to the teaching profession. He is shown here with two of his former graduate students Jason Cong (left) and Martin Wong (right). Cong, PhD'90, is now assistant professor at UCLA, and Wong, PhD'87, is associate professor at U Texas-Austin. The picture was taken during the ICCAD'93 convention on November 9 in Santa Clara at which Liu received the Taylor L. Booth Education Award.

information theory. Emeritus Professors Charles Gear and Dave Kuck also joined him in this select group of ACM Fellows.

Among his numerous awards, outside and within the university, Liu has also won the Taylor L. Booth Education Award from the IEEE Computer Society in 1992, and the Karl V. Karlstrom Education Award from ACM in 1990. In recognition of his research, Liu won a Guggenheim Foundation Fellowship in 1987 and a Best Paper Award at the 23rd ACM/IEEE Design Automation Conference in 1986.

Dave Liu has been teaching at Illinois since 1972. Before that, he was a member of the faculty at MIT since 1962. His research interests include real-time systems, combinatorial optimization, and discrete mathematics, though his current

focus is on CAD tools for integrated circuit design.

But clearly, teaching is Liu's passion. "I think that it really is *the* reason that we are here at the university. And it's a lot of fun," he says. Though he acknowledges the difference between the two forms of teaching which take place at a university, classroom teaching and the one-to-one teaching that goes on between a professor and a graduate student, he enjoys both of them equally. "Yes, in a classroom when you have 200–300 students, you lecture, you talk to them more and they talk to me less. On the other hand, in a one-to-one discussion with my graduate students, of course, we talk back and forth. But to me, both are teaching, learning, just the same."

In response to the misconception some people outside the university have that professors have it so easy when they teach in the classroom "only several hours a week," he had this to say: " In the first place, if you teach in the classroom several hours a week, you need to spend more than several hours to prepare for that. In the second place, teaching graduate students is simply another form of teaching. Of course, it would be nice if I could spend an hour each day with every undergraduate student on an individual basis. That would have to mean a substantial reduction in our undergraduate enrollment, or we cannot afford to have the number

of professors required to do this. On the other hand for graduate students to develop as researchers, the teaching has to be done on a one-to-one basis. Because when you work with grad students in research, nobody can charter a sure course of action or discussion. If you can do this, it's not research any more. We talk, we argue, and we grope around, and hopefully we will find a way. It is my hope that throughout this process, a graduate student will learn how to become a scholar and a researcher. I say to them, 'I really cannot tell you exactly how to solve this problem in the first place. I'm not brighter or better than you are. I'm just more experienced and informed, and when you propose an idea, I will make some judgment and say, Well, I think this is a good idea, let's spend more time talking about it. Or I will say, No, I think this is not a good idea, we'll be wasting our energy.' And we make mistakes in such discussions, too, but that is how they can be influenced by me: either in a positive way—for me to show them how to do things right, or in a negative way—when they observe my mistakes, and hence they will not make the same kind of mistake."

Liu has led an interesting life since his childhood in Macao. He received his BSc degree (1956) at the National Cheng Kung University in Taiwan, his SM and EE degrees (1960), and his ScD degree (1962) at MIT. Liu has a busy travel schedule. He currently holds three collaborative research grants with colleagues in France, Singapore, and Indonesia. He is married to Professor Jane Liu, and both of them enjoy working most of the time, though Dave regularly plays ping-pong, tennis, and basketball. "Besides that," he says modestly, "I am just a regular, ordinary professor."

ing task. It is made even more difficult by the inherent disparity and variability in performance parameters for systems that use a combination of predesigned and synthesized chips. Also, verification of such systems is a vastly unexplored subject." Based on his doctoral work, which demonstrates the viability of some of his ideas over a smaller scale, Gupta is confident that the problems in this area, though formidable, can be resolved.

"We plan to develop a comprehensive system co-synthesis methodology by creating algorithms and tools to carry out rapid exploration of architectural alternatives for system implementation. A successful endeavor in system co-synthesis will have a profound impact on the way digital systems are designed for dedicated applications, from consumer electronics to telecommunications and vehicular control. It will bring the traditional 'design' areas of computer architecture and real-time systems into the fold of CAD-theoretic tools and techniques."

Gupta believes that the resulting synergy between CAD and design promises to advance the state of the art in both areas. Design will progress by the availability of tools to rapidly explore the implementation space and design automation by enlarging the scope and capability of current generation CAD tools.

After earning his BS at ITT-Kanpur, India, in 1984, Gupta joined UC-Berkeley for graduate work in semiconductor devices and circuits.

After his MS at Berkeley, he joined Intel's microprocessor division. While working, he earned his PhD in electrical engineering, which he received from Stanford in 1993. Gupta's work at Intel led him to believe that future products depended greatly on how CAD evolved, and he felt that a lot more could be done with CAD than what was being done at the time. What if, Gupta supposed, a chip was "*a* '486 chip rather than *the* '486 chip?" Why can't these "commodity chips" be used as the basic unit in a synthesis framework just like other gates and circuit blocks? Here the notion of co-synthesis took shape. Its objective was to use predesigned processors as components to maximize functionality while meeting performance criteria.

"In design technology," says Gupta, "formulating the problem is more difficult than solving it. For a contribution to be effective, it is important to solve the underlying scientific problems, rather than focus on its symptoms." And it is for these scientific problems that Gupta recognizes the importance of the human factor, pointing out emphatically that computer-aided design is not computer-generated design. "We need humans for the creative process," he says. Gupta is one such creative person that the department is happy to have on board.

Two CS professors receive Center for Advanced Study grants

Jane Liu continues her groundbreaking research in real-time systems

Jack Gladin

Jane Liu

Jane Liu was appointed an associate in the Center for Advanced Study for 1994–95. She plans to use this opportunity to continue her work on enhancing the responsiveness and dependability of real-time systems.

A real-time system is a computing and communication system in which a significant portion of the jobs have deadlines. The term job refers to a unit of work to be scheduled and executed. A job may be the computation of a control law, the transmission of an operator command, the retrieval of a file, *etc.* Its execution requires a computer, or a data link, or a file disk; all referred to as processors. The failure of a job to complete execution and produce its result by its deadline is considered to be a fatal fault. A real-time system functions correctly only in the absence of fatal faults. An example is the TCAS (Traffic Alert and Collision Avoidance System) used in commercial aircraft to alert pilots of potential collisions. The command telling the pilot to take an evasive action must not only be correct but also must be issued in time. Other examples of real-time systems include flight control and management, intelligent manufacturing, and various monitoring systems.

A major part of Liu's current research is concerned with the means of providing flexibility in scheduling and robustness of a system in the presence of transient overloads and failures. To handle this, Liu and her colleagues have proposed the imprecise-computation technique, a technique motivated by the simple observation that for many real-time applications, approximate results on a timely basis rather than exact results produced too late are preferred. "In a system based on the imprecise-computation approach," she explains, "each time-critical job, or set of related jobs, is designed and implemented in such a way that it can be decomposed logically into a mandatory part and an optional part. When the mandatory part completes, the job produces an approximate result of acceptable quality. Under normal operating conditions, the system also allows the optional part to complete, and the result of the job attains the desired quality, which is called the exact result. During overloads, however, the system may choose to leave the optional part unfinished at the expense of the quality of the result produced by the job."

During her time as an associate in the Center, Liu plans to demonstrate the feasibility of the imprecise-computation approach for fault tolerance and graceful degradation. (Fault tolerance allows for continuous operation in case of failure. For example, a fault tolerant system may use two or more computers that duplicate all processing, or may have one system stand by if the other fails. Graceful degradation is a system that, after failure of one of its components, can continue to operate at some reduced level of performance.)

Liu has been with the department since 1973. In addition to real-time systems, she is also involved in scheduling and load balancing, data bases, data communications, and distributed operating systems. She received her BS in EE from Cleveland State University (1959) and her MS and PhD in CS from MIT (1966 and 1968). Before joining the faculty at UIUC, she worked for the U.S. Department of Transportation, the Mitre Corporation, and the Radio Corporation of America. She is an active member of ACM and IEEE, and is married to Professor Dave Liu.

Jean Ponce explores new geometric modeling techniques for computer vision and robotics

In addition to his appointment as an associate in the Center for Advanced Study, Jean Ponce was designated a Beckman associate. These appointments recognize outstanding younger faculty who have made distinctive scholarly contributions to the sciences.

Ponce's primary research areas are computer vision and robotics, and he is also interested in computer graphics and geometric modeling. Computer vision and robotics is a young field with the potential to revolutionize the way we do things, at home as well as in the workplace. Holding up a small figurine of a gargoyle in his hand, Ponce outlined the many difficulties a robot would face in trying to manipuate that object. "Suppose you took a picture of this object with a video camera," he suggested. "How would the robot be able to grasp the object using the video image?" One difficult problem relates to the orientation of the object, he explained. To "know" this, the robot needs to compare the flat projection to the three-dimensional object and draw the correct conclusions about its orientation. Ponce must rely on his mathematical background to convey geometrical concepts to his robot. A second problem involves mechanical forces, including gravity, which can also be related to the geometry of lines in space. Here, his robot will use computational geometry techniques. Ponce's work lies somewhere between mathematics and computer science, but unlike most computer scientists, he uses continuous rather than discrete mathematics. And though his work is theoretical, its applications are extremely practical.

Ponce has been working on the representation of complex three-dimensional objects for the last ten years, has built several geometric modeling systems, and has developed several algorithms for three-dimensional shape recovery from a monocular image. His work in computer vision focuses on the problems of automatically constructing object models from image sequences, estimating three-dimensional pose from monocular image contours, and using viewpoint-dependent image features as indexes in large databases of models for object recognition. His robotics work focuses on the geometric and computational aspects of dextrous grasping.

The journey into the wonderful world of computers started when, as a boy, Ponce read Robert Heinlein's book, Have Spacesuit Will Travel. Originally from Marseille, Ponce received his These d'Etat in computer science from the University of Paris Orsay in 1988. He managed to fulfil his one-year mandatory military service requirement by working as a researcher at MIT in 1984. He decided to stay in the U.S., and he worked next as a researcher at Stanford until 1989. After that, his search for a "real job" led him to Illinois, which he knew of by reputation. Here he found a rich academic environment and a computer science department which was very supportive and nurturing of its faculty and students.

Ponce will spend part of his year as a Beckman associate at Cal Tech where he will have access to a host of robots of all shapes and sizes. One project happening there involves a tiny robot which will be swallowed by a pig. This robot will then tour the pig's intestines, "walking around, looking and feeling," while transmitting what it's experiencing to the human observer. It is hoped that this work will lead to the day when a


Jean Ponce

surgeon can put on a special glove and perform surgery, such as removal of a tumor, using a tiny robot inside the patient, thereby avoiding invasive surgery. Ponce hopes to become more involved in these types of projects and their practical applications.

The computer imaging techniques developed by Ponce and his colleagues can be used to interpret X-rays, CTs, and MRI images. They can also be used for robotic surgery. So in addition to industrial collaboration, Ponce is seeking collaboration with doctors and the medical community.

Ponce envisions a future wherein robots are ubiquitous, "hanging around and doing useful things in factories and in houses." Though this future is a long way from now, it is nonetheless one very similar to the futures in the minds of many a science fiction aficionado. Researchers like Ponce are making the line between fiction and reality thinner and thinner.

Meet the Board
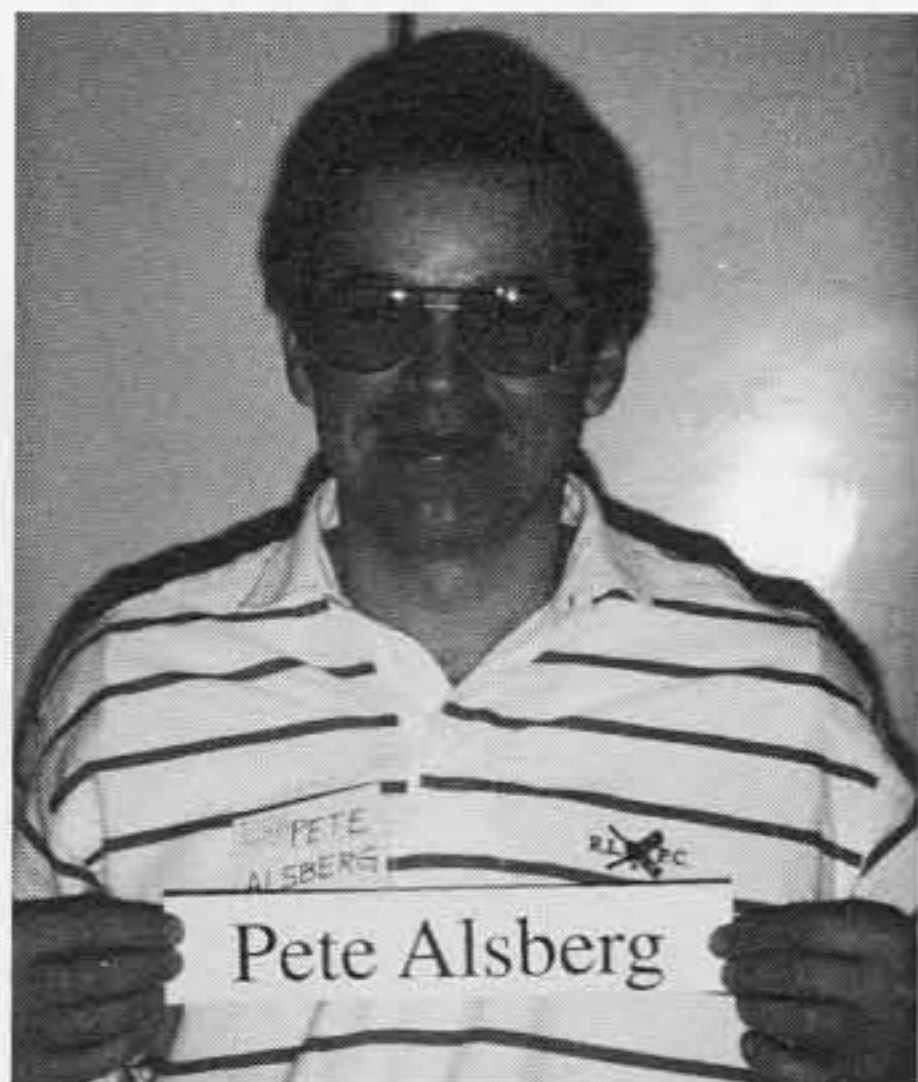
Peter A. Alsberg, PhD '70
President of Addamax Corp. in Champaign. Developer of computer security software which enables networking software and UNIX software to meet U.S. government security criteria. BS Engineering Physics '66, MS Math '68.
palsberg@aol.com

Tom Chen, PhD'72
President of Global Information Systems in Savoy, Illinois. Global designs and manufactures automated training systems for government and commercial applications.
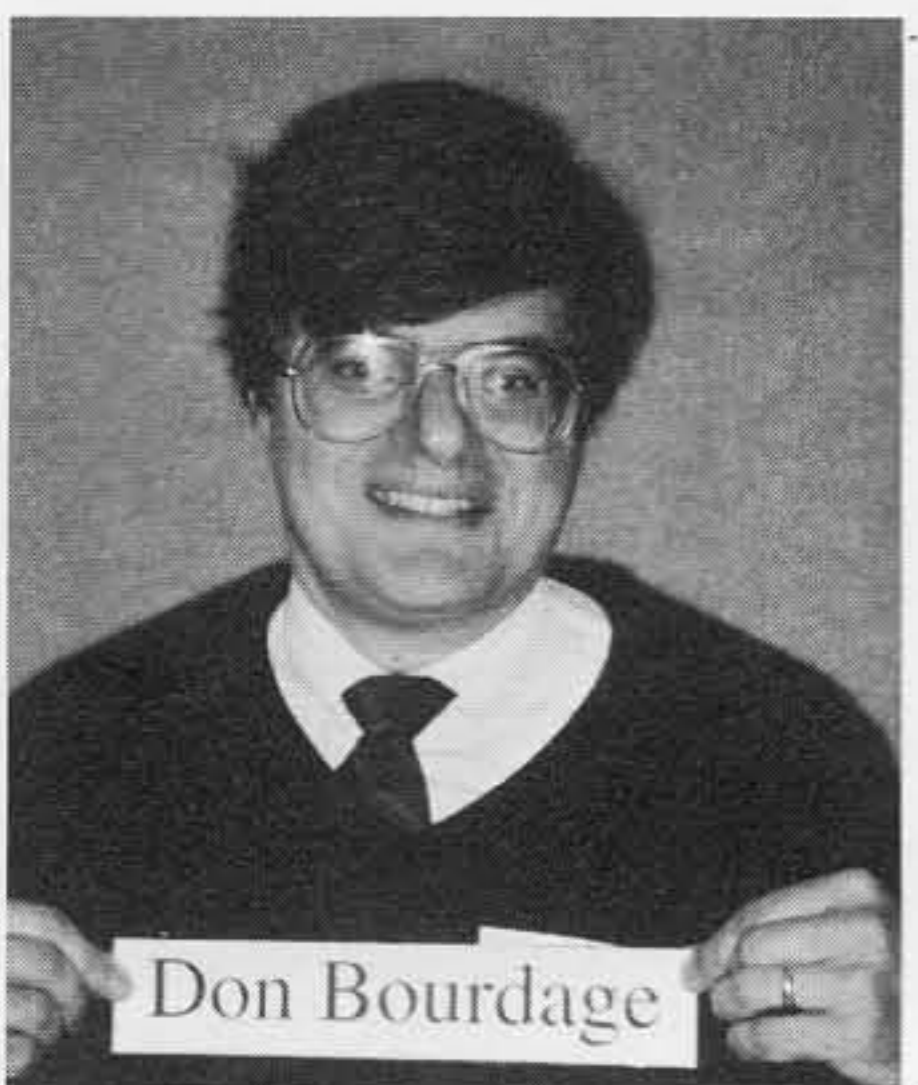
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Software product development manager and member of the technical staff at IBM in Vienna, Austria.
bourdage@vnet.ibm.com

Ira Cohen, BS'81
VP and co-founder of Advanced Systems Concepts, Inc. in Schaumburg, Illinois. ASC is a software company that develops and markets productivity software to the IBM mid-range market (AS/400).
irarcohen@aol.com
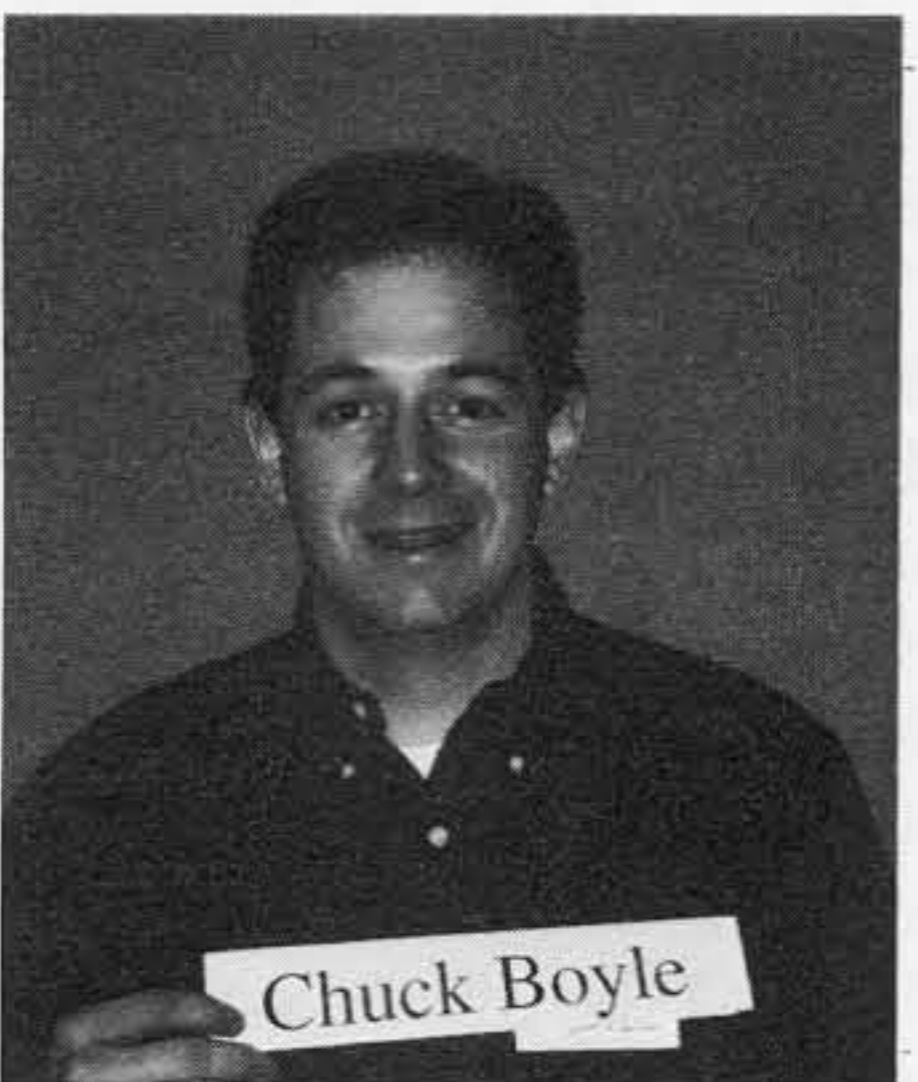
Chuck Boyle, BS'84
Senior consultant with Deloitte & Touche's management consulting group in Chicago, where he assists clients in designing and implementing information technology solutions. MBA'86.

Alan Edwards, BS'83
President and principal consultant for Alan Edwards, Inc., a consulting firm specializing in UNIX software design, development and integration as well as Graphical User Interface design.
kae@kae.com
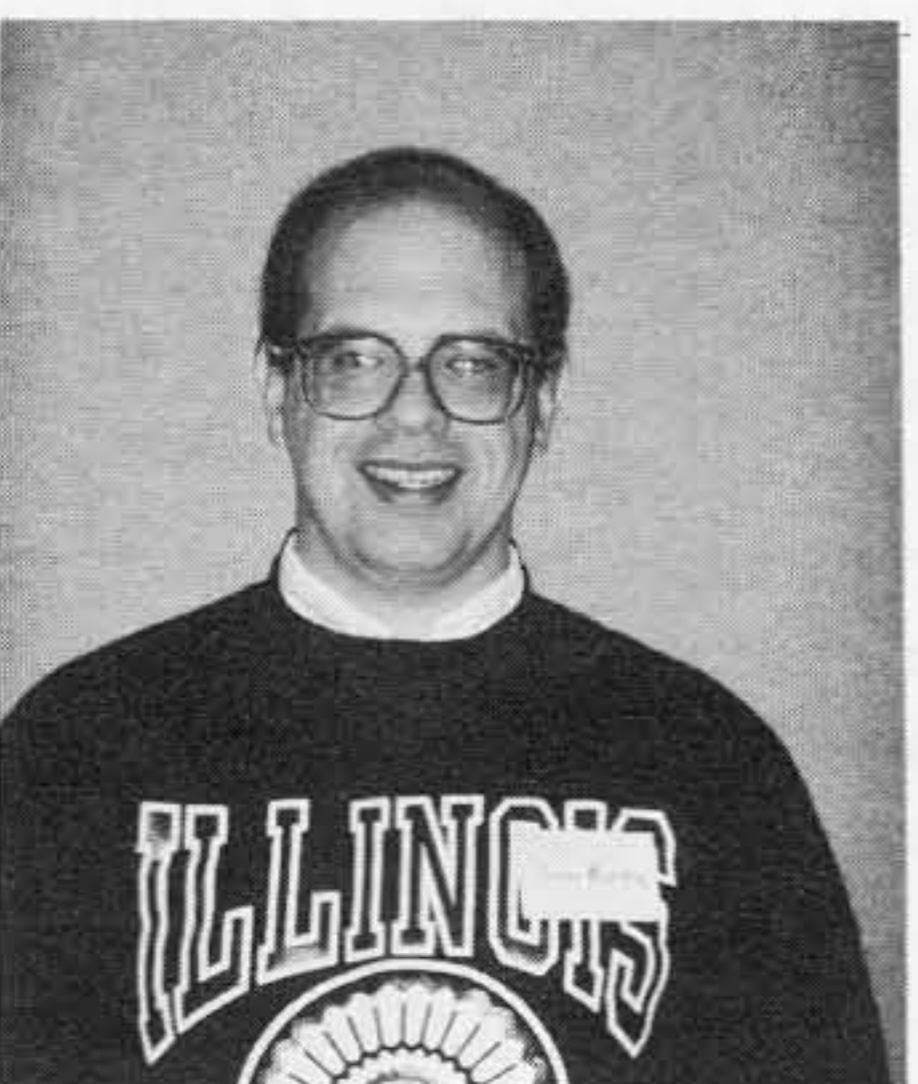
Tom Burke, MS'86
Senior associate programmer at IBM in Rochester, Minnesota. Working on adding inline assembly capability to a C++ compiler for the PowerPC chip. BS Accountancy, DePaul U '83, MS Computer Science, U Wisconsin-Madison '93.
tburke@vnet.ibm.com

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73241.3722@compuserve.com
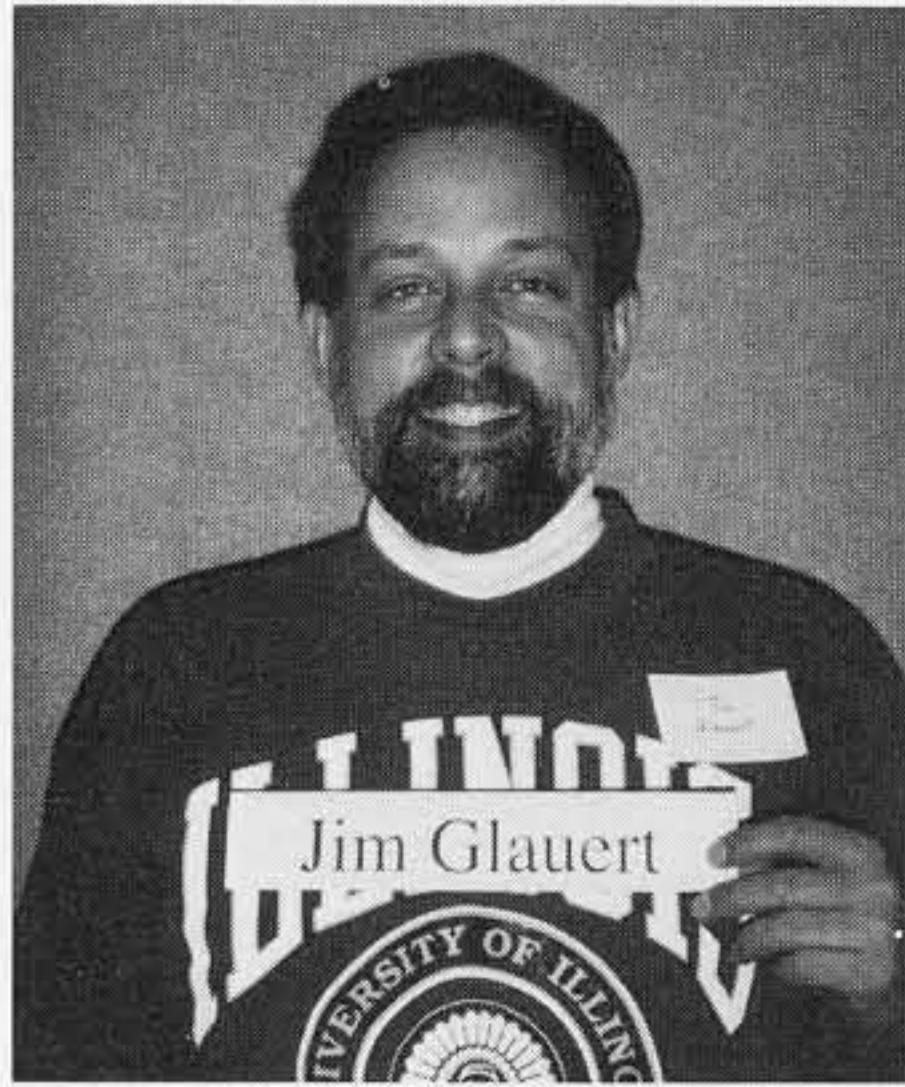
Jim Glauert, BS'77
Computer analyst at Monsanto Co. in St. Louis, where he is currently working to use expert systems to develop a "Help Desk" to handle customer questions for the corporate data center.
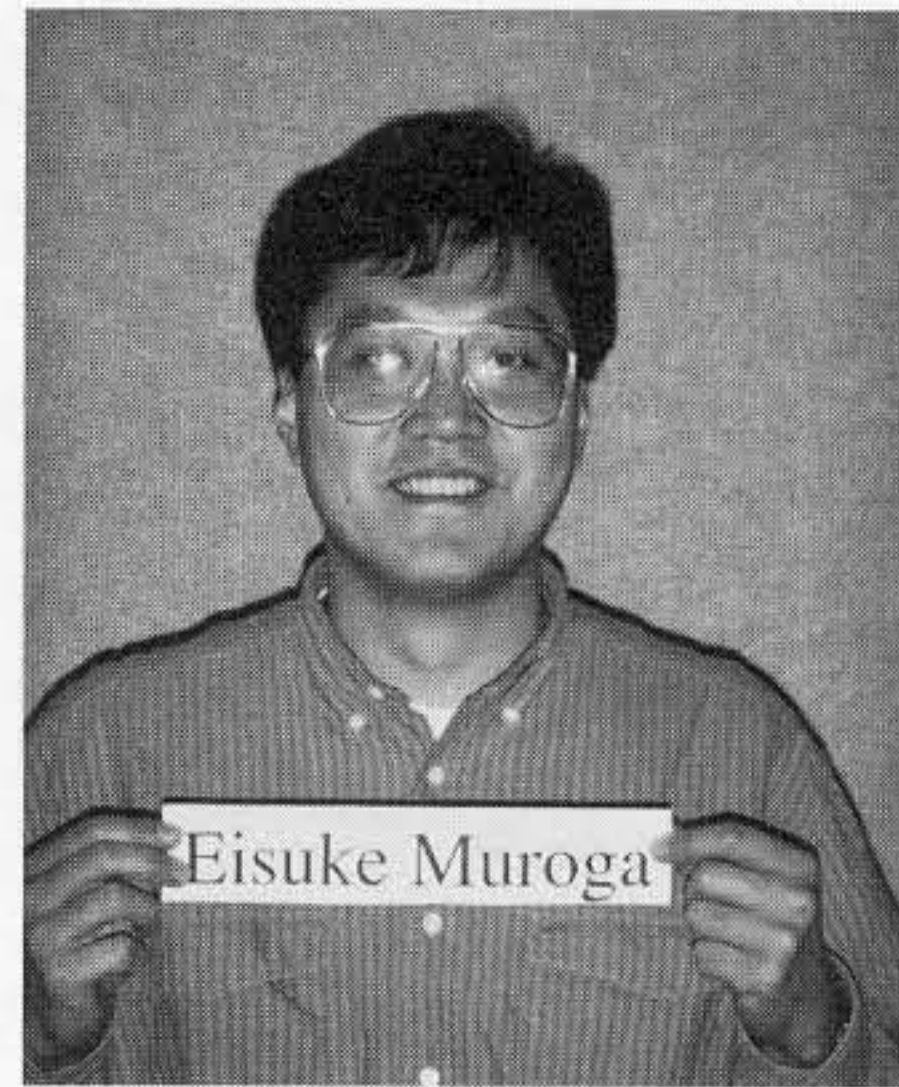
Eisuke Muroga, PhD'90
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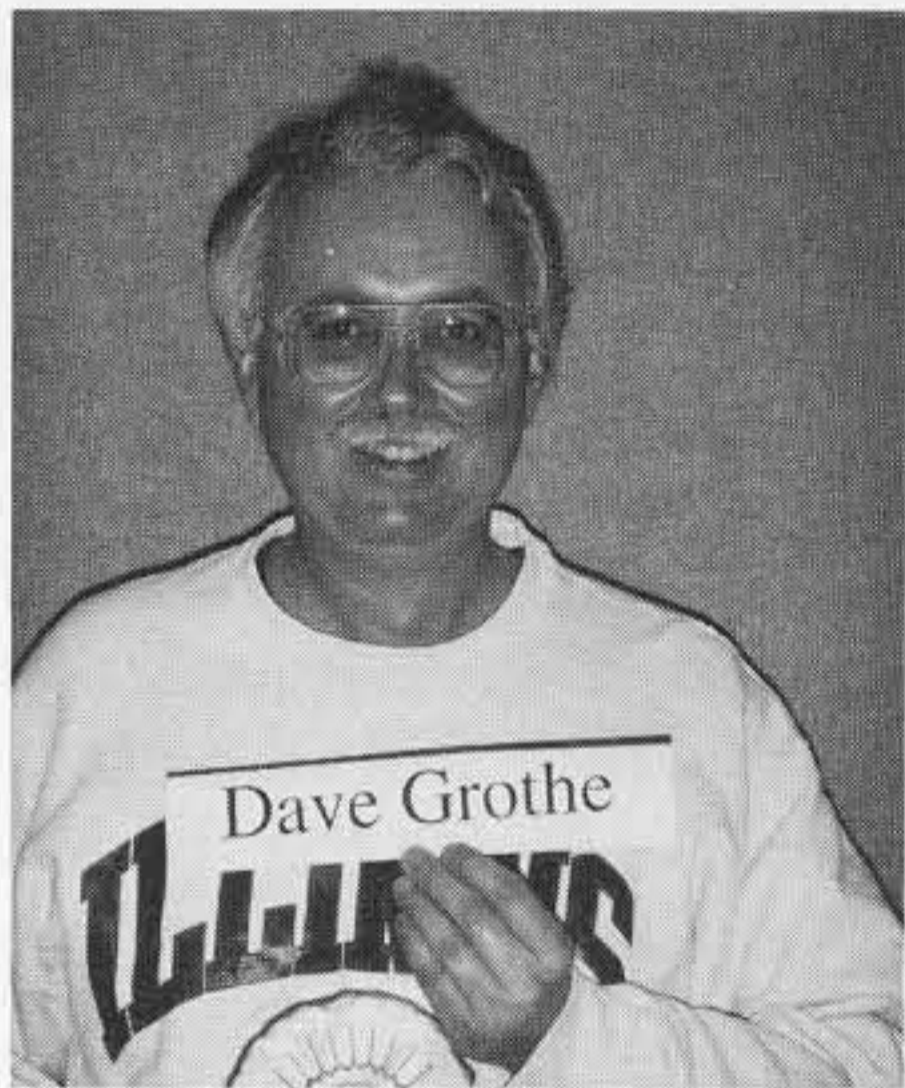
Dave Grothe, MS'69
President and founder of Gcom, in Urbana, a company that produces protocol software for high-speed data transfer. BS Math '68.

Les Murphy, BS'78
VP of Applied Research, COMPUWARE Corp. in Los Gatos, California, a provider of software and services primarily for IBM mainframes. Co-founded XA Systems, a software company which was acquired by COMPUWARE. Les appears on page 15.
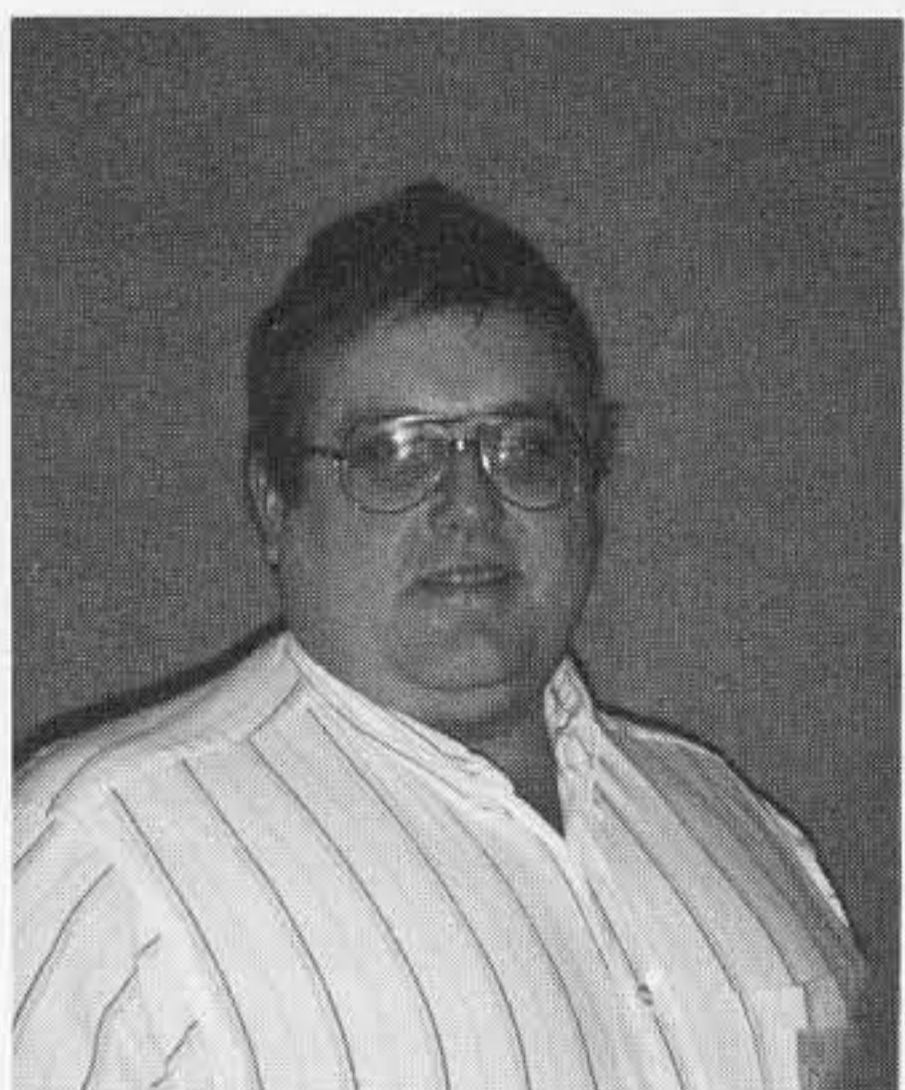
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President of Natural Intelligence, a consulting firm in Capron, Illinois. BS Psychology '80.
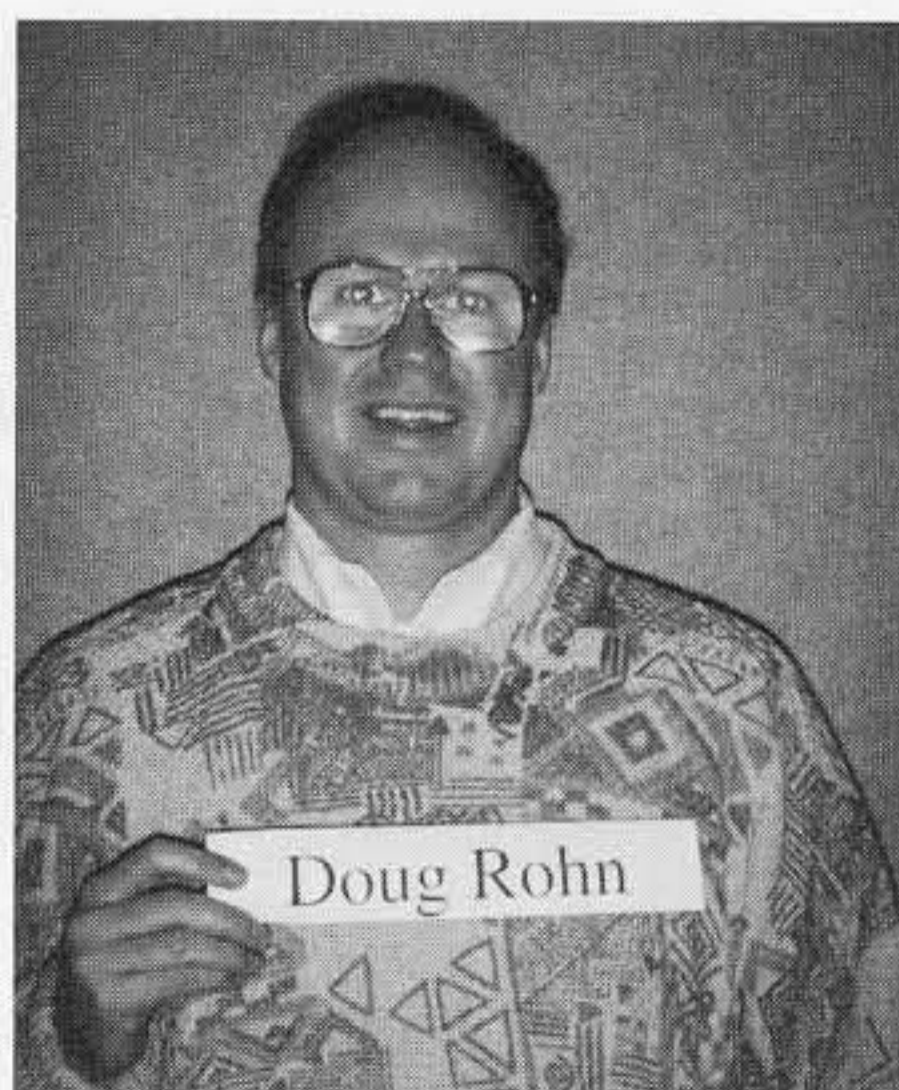
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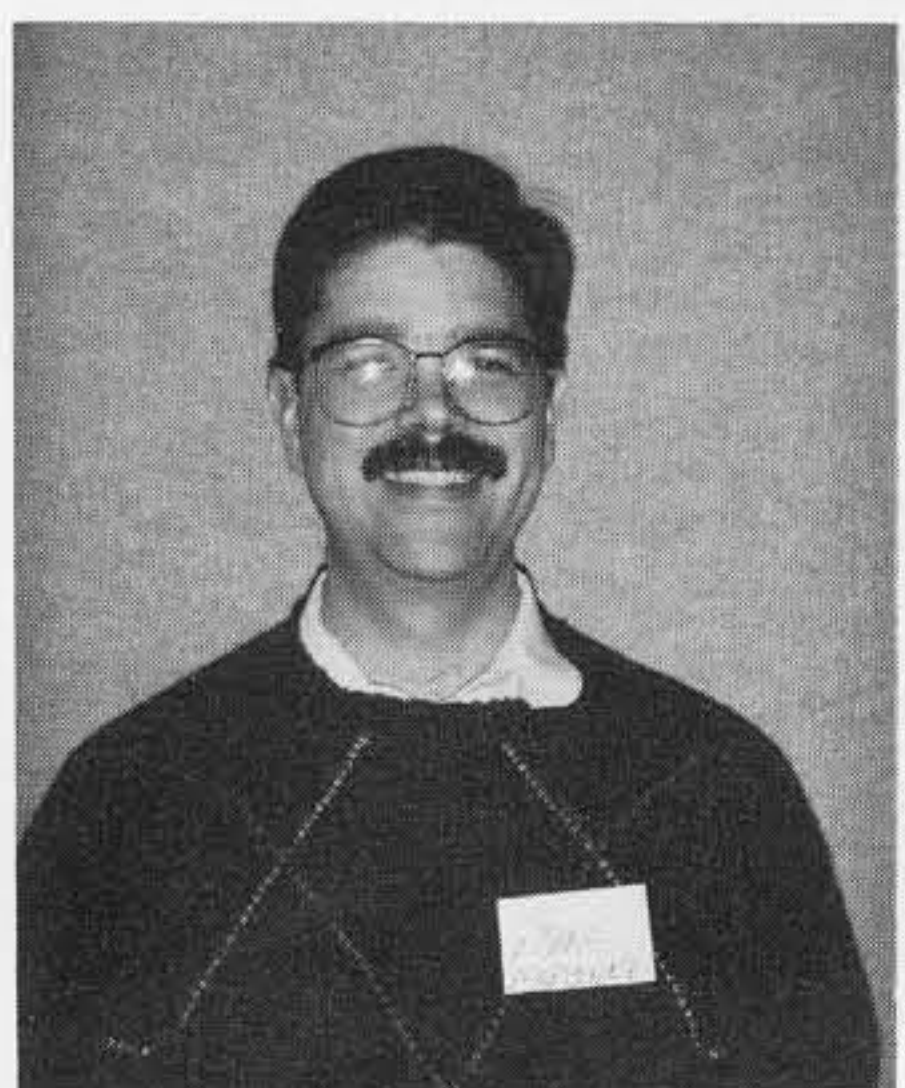
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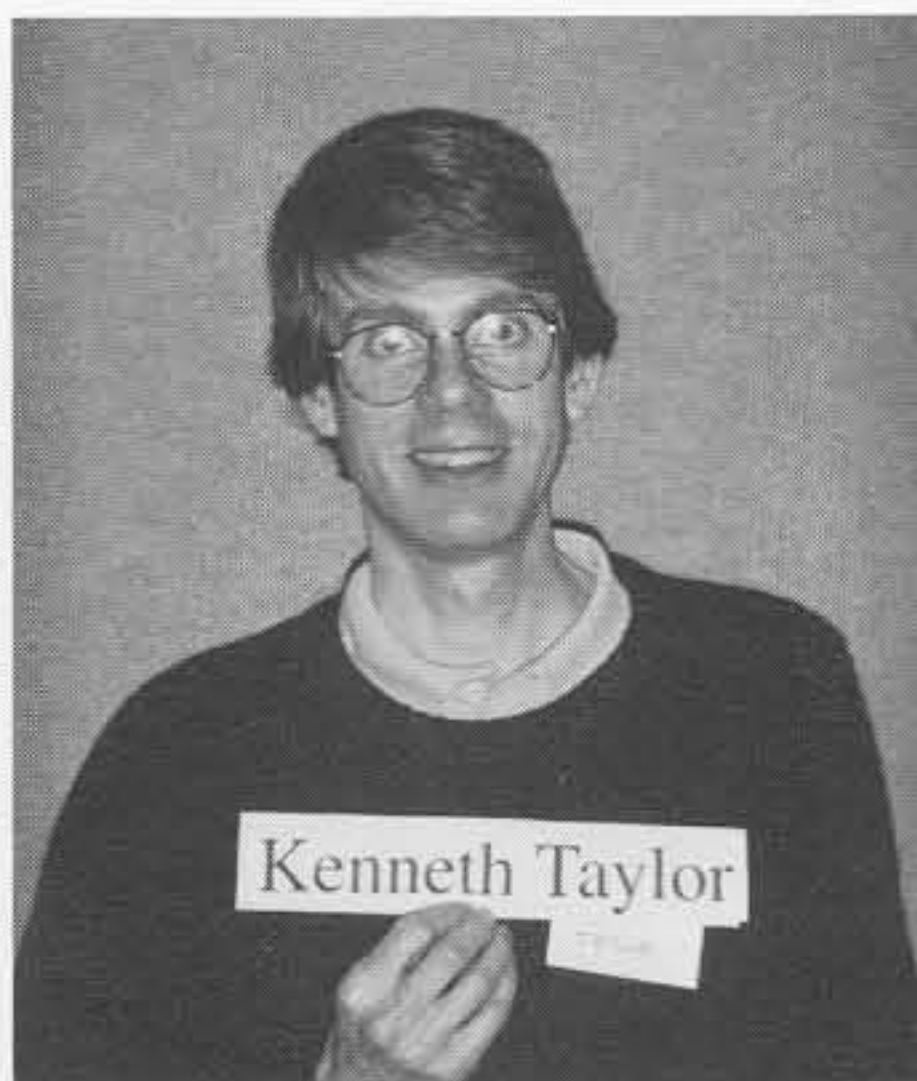
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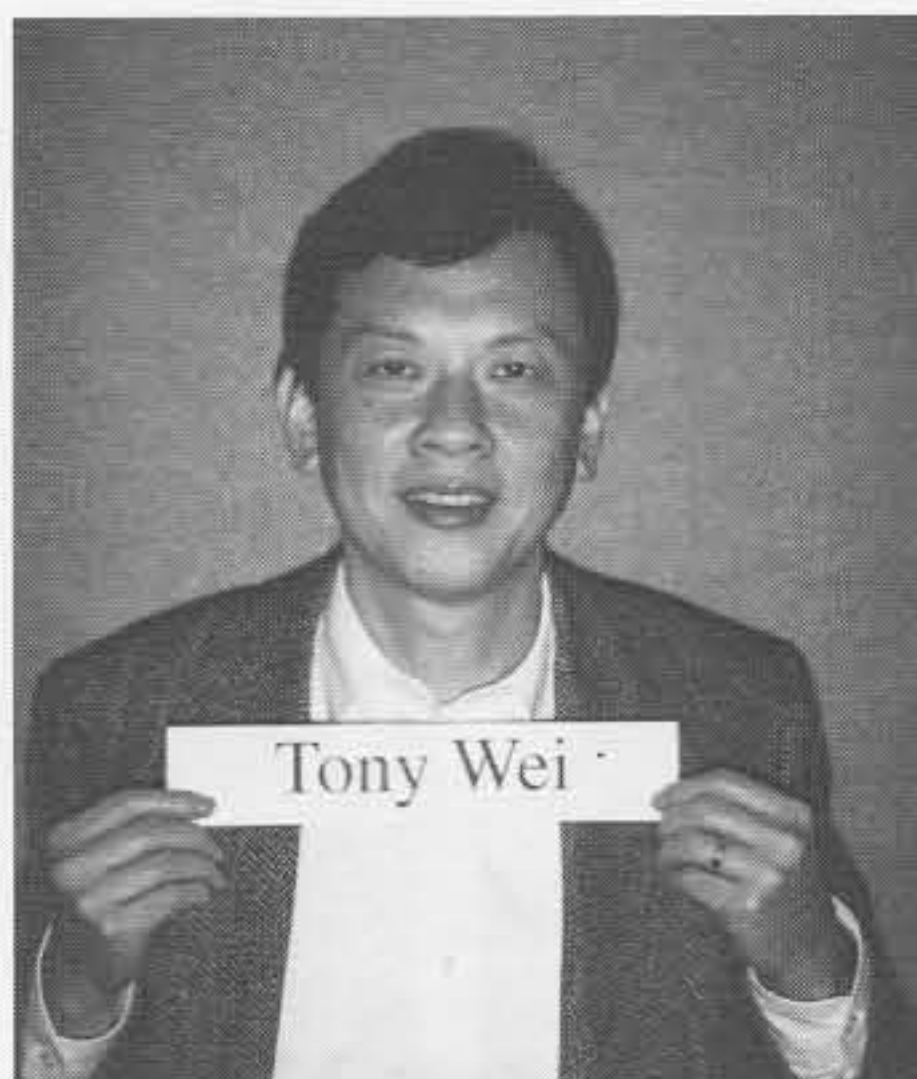
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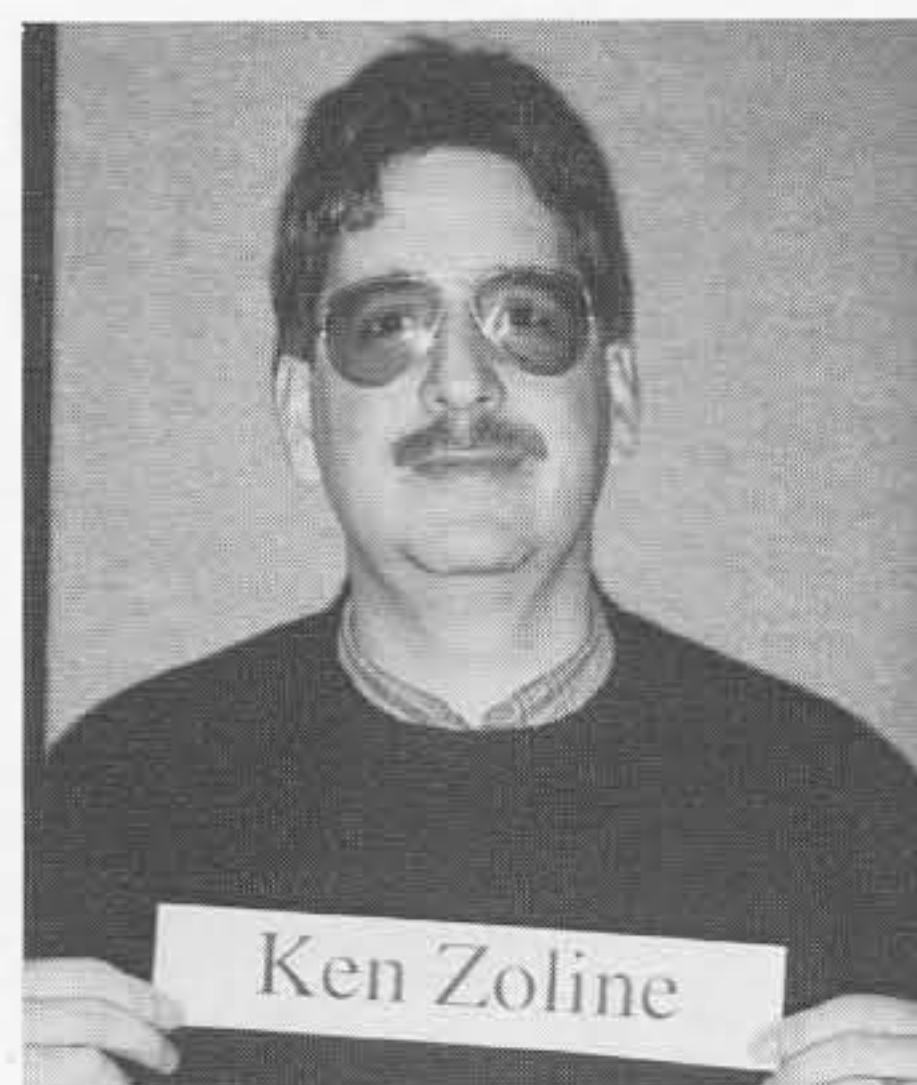
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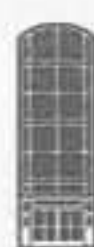
EOH'94: The best one yet

by Eric Adams

The first Engineering Open House was in 1967 when
students and faculty members from the Department of
Physics decided to gather for a day of informal demonstrations and lectures. Now, almost 20,000 people attend
EOH, held this year on February 25 and 26, on the heels
of a classic Illinois snowstorm.

Engineering Open House '94 was a great success for
the ACM@UIUC. This was a record year with ACM
entering over 10 projects for judging. Projects ranged
from a networked car battle game to an image morpher
running on ACM's supercharged RS/6000. This year's
central exhibit was a joint venture with the University of
Illinois Astronomy Club to build a Computer Aided
Telescope System (C.A.T.S.) which when given a star will
move to view that star and then track it across the night
sky.

For awards, EOH '94 was one of the top years in
history. For undergraduate research, SigArch's Apropos
Computing Engine (ACE) placed fourth. ACE is an array
of Field Programmable Gate Arrays which will allow the
user to reconfigure its hardware on the fly. In the "back
to the basics" category, SigSoft's Oscilloscope simulator
placed third. O-scope will be used by Physics 107
students who do not wish to hook up wires to see what
RLC circuits do to an input signal. Just Legos, a SigMicro
project, placed second in the same category. Just Legos
uses Lego parts to explain logic gates to grade school
students. ACM received second and third places in the
Lockmiller Award for Robotics and Artificial Intelligence.
A program which interfaces a PowerGlove with a robotic
arm, allowing easy control, placed third. The C.A.T.S.
project received second place. Projects from SigNet
included several developments using NCSA Mosaic.
SkyView is a graphical representation of the weather
anywhere in the country, and Joel's Hierarchical Subject
Index is an index to the information stored on the World-
Wide Web. A non-EOH project being worked on by
SigNet, in conjunction with CCSO, is the DNS redirector
which will balance out the load on the DNS servers
around campus. SigVR is developing a personal virtual
reality system. SigArch has a scrolling electronic sign
located outside the ACM office which will accept messages via e-mail to acmsign@uiuc.edu (see next page).

As usual ACM continues to provide workshops for the
general student community, including workshops on C,
C++, Mosaic, networking, and GL programming. ACM
is bigger and better than ever, and we plan to keep going
that way.

Eric Adams is a junior in computer engineering and is a co-op student
with Texas Instruments, in Dallas.
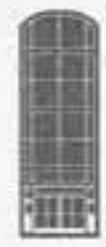
The Newly Networked Scrolling Sign

by Jonathan Stark
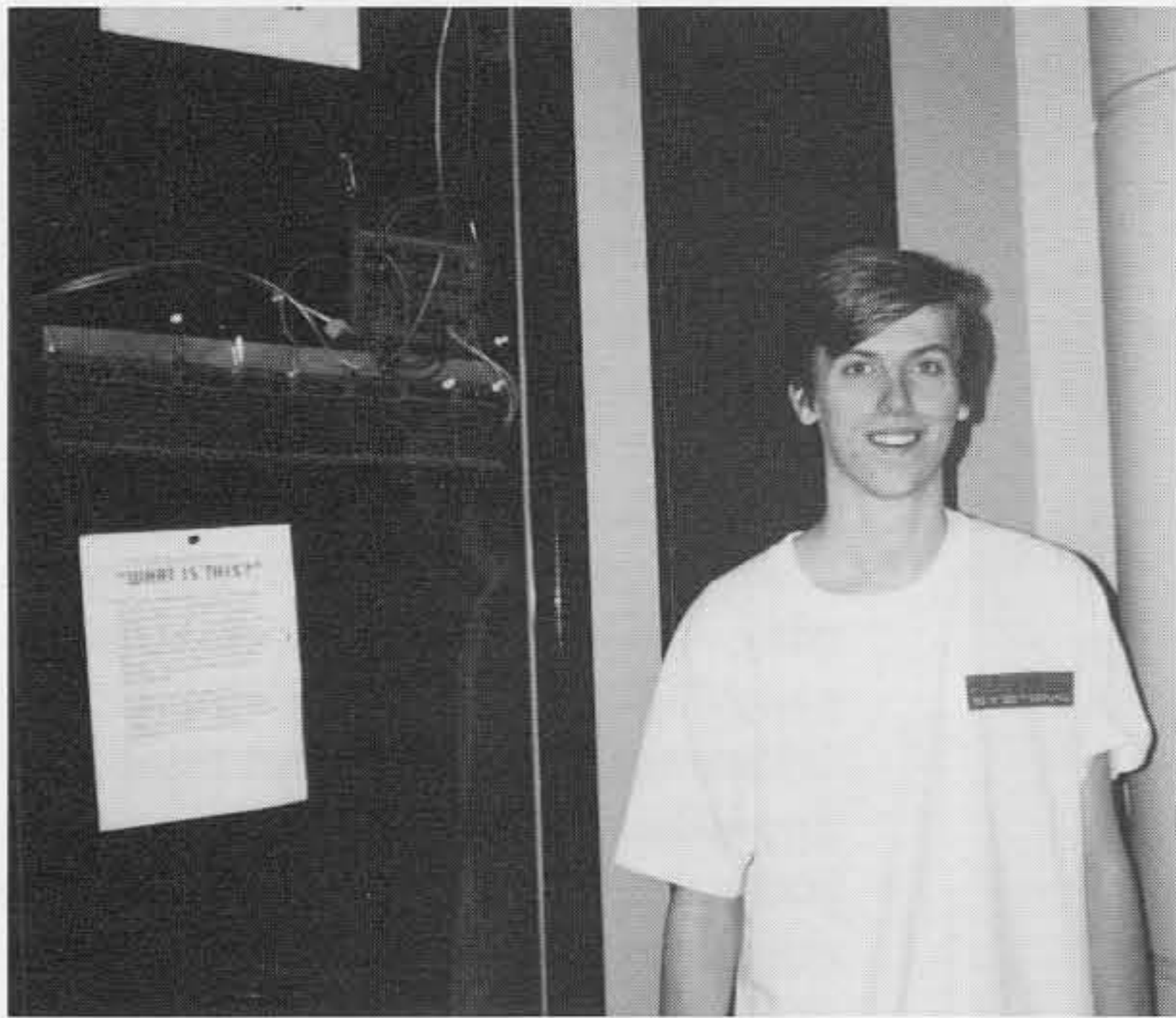
Jonathan Stark, pictured here next to the Scrolling Sign, is a junior in CS and chairman of SigArch.

If you've walked through the halls of the Digital Computer Laboratory, you may have noticed something new outside of room 1225 (the ACM office). Inside the display case that normally contains fliers about various upcoming events, you've probably noticed a mess of tangled wires and flashing lights. If you were lucky, you may have even noticed that these flashing lights were words scrolling by on the new ACM sign.

The Scrolling Sign was developed by the Special Interest Group for Computer Architecture as a tutorial project for incoming members in 1992. It was designed to teach students who were inexperienced with electronics some of the fundamentals of designing and building electrical circuits. Sometime around the end of the second semester, two ACM members had the idea of putting the sign on the Internet. With the sign on-line, people from all over the world will be able to display messages on it.

The sign was placed on the Internet in fall 1993. For information on how you can have a message displayed on the ACM sign, type *finger acmsign@cs.uiuc.edu* from any UNIX account.

Bay Area Illini Reception sparks enthusiasm

Over 100 computer science and electrical engineering graduates of Illinois gathered for an Illini Reception on November 9, 1993. The reception was held in Santa Clara, California, in conjunction with the 1993 ICCAD conference. The mood was festive as former students reunited with long lost friends and faculty over snacks and drinks.

This was our first CSAA-sponsored event, and based on its tremendous success, we plan to have more. Please let us know your ideas so that we can schedule similar receptions in areas with a likelihood of good attendance. Some possible conference venues: Interop, Comdex, and PC Expo.

We're also considering having some sort of event in conjunction with the first football game, to be played on September 1 at Soldier Field in Chicago. Homecoming is October 1. Any more ideas?

CS alumni Ron Sivertson, BS'69, Les Murphy, BS'78, and department head Duncan Lawrie, PhD'73, relax at the ICCAD'93 Illini Reception.

The Foundation, the Alumni Association: What's the difference?

Have you ever been uncertain about the difference between the UI Alumni Association and the U of I Foundation? Don't feel alone—it's happened to all of us at one time or another. The two organizations are completely distinct, but have one purpose in common—to serve the University of Illinois and its alumni. In a nutshell, you can think of the Alumni Association as the "friend-raisers" and the Foundation as the "fund-raisers."

The UIAA was established in 1873, five years after the university opened its doors as the Illinois Industrial University. Today it has almost 120,000 members, making it the largest in the country, and it maintains a database of more than 400,000 alumni. The computer science department has about 4,000 alumni, and about 40% are members of UIAA. The UIAA engages in a wide variety of activities to further the interest of both the university and its graduates, including:

- lobbying efforts;
- cultural programs and association-sponsored tours;
- social events, such as reunions and homecoming;
- its own publication, the Illinois Quarterly;
- alumni clubs worldwide;
- its own Career Center to assist job-seeking graduates;
- support for constituent alumni associations, like CSAA (a portion of UIAA membership dues goes directly to the constituent associations).

The UIF, established in 1935 by alumni leaders and university officials, is an independent non-profit membership corporation responsible for encouraging and administering private gifts made to support the university's mission. Although the UIF, like the UIAA, is a separate legal entity for the U of I, the Foundation's sole reason for existence is to further the interests of the university.

In brief, the Foundation's responsibilities include:

- encouraging, acknowledging, and administering private gifts of any amount and directing them to the program or project as specified by the donor;
- managing and executing major capital fundraising campaigns;
- serving as a financial agent for the university, borrowing funds, investing moneys, or purchasing properties when requested to do so by the University Board of Trustees;
- assisting academic units in planning and conducting annual fund campaigns, including telemarketing and direct mail appeals;
- providing an informational service on estate planning and charitable giving, as well as aiding in the establishment and administration of gifts made through deferred giving arrangements such as trusts and wills, and serving as custodian of endowment gifts.

The Foundation membership numbers 400 and is governed by a Board of Directors whose president is Gayle Pyatt '64, an attorney in the City of Chicago-Corporate Counsel's Office. Pyatt is also a member of the UIAA Board of Directors.

Department head Duncan Lawrie accepts a $20,000 unrestricted gift from Motorola , Inc., in October. Presenting the check is Dr. James Mikulski, VP of the Technical Staff, and Manager of the Systems Research Lab in Schaumburg, Illinois.

Rick Henderson

Private giving to the University of Illinois and to the U of I Foundation at fiscal year-end 1993 increased by 13.8% to $130.2 million. The increase in giving to the Foundation alone over the previous year rose by more than 33% to $52.2 million. These achievements represent new annual records in public higher educational philanthropy.

Varish Panigrahi (MS EE'70, PhD EE'73) moved over to Process Software Corp., in Framington, Massachusetts, to head their engineering operation. Process is engaged in TCP/IP network solutions for VMS, NetWare and Windows NT markets. panigrahi@process.com

Toshio Yasui (PhD'72) is VP for Display Technologies Inc. (DTI), a company set up by IBM and Toshiba, located next door to a Toshiba chip factory in Himeji, Japan. DTI is working on three technological fronts: more capacious memory chips, "flash" memory" (chips that remember data after the power is turned off), and liquid crystal displays (LCDs) in color.

William E. Skowera (BS Math/CS'78) just returned from a year and a half in England where he set up the European office for his company, Silvon Software. The company was founded in 1987 by Bill and three others, including **Marty Acks** (BS'79). Bill and his wife, **Sandy (Claeson) Skowera** (BS Math/CS'78), live in Wheaton, Illinois, and have three children.

Douglas MacGregor (MS'80) was recently hired as VP of desktop personal computers for Dell Computer Corp. He was division VP of Data General Corp. where he headed the Aviion line of UNIX computers. Before DG, he founded Solbourne Computer Inc. which makes Sun-compatible workstations. Prior to that, he designed Motorola's 68010 and 68020 microprocessors. He received his PhD from Kyoto University.

Songchun Moon (PhD'85) is Associate professor and head of the Computer Science and Engineering Division at the Korea Advanced Institute of Science and Technology (KAIST). He was recently re-elected to the Board of Directors of the multinational European Association of Microprocessing and Microprogramming, EUROMICRO. moon@sicom.kaist.ac.kr

Laura Mohlenkamp (BS'90) and Rodney Anderson (BS Finance'90) tied the knot last June and live in Iowa City where she works for Discover Card Services and he owns Panchero's Restaurant.

Curtis Weitek

Tom Macke (BS'78, MS'80) is pictured here at –45°C in front of an igloo he built in February on Resolute Bay, Northwest Territories. Why Resolute? "Because it's as far north as you can get with commercial jet service." But why the north, in winter? "The north in winter is always an adventure. You never know exactly what's going to happen." Any computing going on up there? "None what so ever. They're not on the Net; they're not wired; it's hopeless." Each February, the Canadian Defense Forces hold survival school near the town of Resolute. "In case they have a blizzard during the school and the candidates cannot built their own igloos," Tom explains, "they can at least get to stay in the ones we built so they can get an idea of what it's like to be stuck on the ice for a week." And he volunteered to do this for nothing? "I was bored." Six igloos were built by one Inuit, who put the blocks in the igloos, two guys from the Canadian Defense Forces, who cut the blocks, and Macke. "I did all the unskilled labor, which means I carried 600 40-lb ice blocks from the trenches we cut to Tony the Inuit, who put them in the igloos." When not partaking of such adventures (this was his third Arctic expedition), Macke can be found working on RNA structure sequence relationships. After graduating from Illinois, Macke worked with Emeritis Professor David Kuck on the Kuck Source-to-Source Fortran Vectorizer. He is now working toward his PhD in chemistry at the Scripps Research Institute in San Diego. His research involves developing computer languages which can be used to describe RNA and DNA structures. macke@scripps.edu

Computer Analysts have the best jobs

"What's better than being a doctor or an engineer?" asks Money magazine in its March 1994 issue. "Becoming a computer analyst!" According to Money's latest ranking of 100 jobs, computer systems analysts, "the indispensable people who install, customize and supervise computer operations at offices and factories across the nation," have the best jobs in America. This is up from number 31 last year. Rounding out the top five are physician, physical therapist, electrical engineer, and civil engineer. Computer programmer was 13th, the same as last year. Last year's number one was biologist.

Why a computer analyst? The article cites three major reasons: opportunity for growth, salary, and low stress. The outlook for career advancement and job security also rate high. Indeed, the Bureau of Labor Statistics predicts a 110% increase between now and the year 1005 in the demand for computer analysts; from today's 455,000 systems analysis jobs to 501,000.

CS grads command high salaries

Though extremely skewed by low feedback, we are nonetheless encouraged by the salaries reported by our recent graduates to the Engineering Placement Office. Our December BS graduates did very well in the job market this year. Though only 5 of 15 reported their monthly salary, the average was the highest in the College of Engineering, $3,518. One graduate reported a $5,417 monthly salary! Only six of the 59 MS graduates reported their salaries, and the average was $4,320 per month, again the highest in the college. Eleven of the 36 PhDs who graduated since October 1992 reported an average salary of $4,878 (industry) and $4,227 (university).

New Engineering Library open and wired

The new engineering library opened its doors on March 15, replacing the antiquated library which has been in Engineering Hall since the 1890s. The Grainger Engineering Library Information Center is supported by an $18.7-million gift from David Grainger in honor of his father, W. W. Grainger, a 1919 alumnus. The five-story library is 90,000 square feet and provides access to 450 remote and local on-line databases containing over 75 million references. It will store the entire engineering collection and accommodate the 6,500 new volumes added each year. It boasts electronic and on-site dial-in computers, telephone access, electronic mail, the campus network system, and 120 computer terminals for information retrieval services and academic use. The library is conveniently located directly across Springfield Avenue from DCL (where the woodshop was) and will serve as the northern terminus of a new Engineering Quad.

CSO, CCSO, ADP, AISS: What are these now?

CCSO is the Computing and Communications Services Office. It was formerly CSO, Computing Services Office. Among other things, it is the office that manages the UIUC campus telephone and academic computing systems. AISS is the Administrative Information Systems and Services Office. It was formerly ADP, Administrative Data Processing office. AISS manages university-wide business computing (e.g., payroll and grade reports).

MOVING?

Be sure to send name and address changes to:
UI Alumni Association Records
227 Illini Union, 1401 W. Green St.
Urbana, IL 61801.
Or call 217–333–1471.

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"The University of Illinois at Urbana-Champaign is a giant among academic institutions, ranking among the world's great universities," according to the lastest edition of the Fiske Guide, which gives UIUC a five-star rating for academics.

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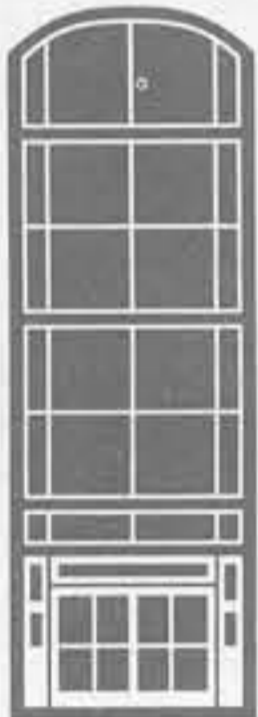   employer's Matching Gift form.

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