Banks of the Boneyard

the journal of the association for computing machinery university of illinois student chapter

EOH '95

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Fourteen Years of ACM Innovation at EOH

by Eric Adams

Welcome to Engineering Open House '95! We at the Association for Computing Machinery have produced this special issue to describe each of our EOH projects and to tell you a little about ourselves.

ACM is one of the largest engineering student organizations here at the U of I and is among the largest and most active student ACM chapters in the country. With an active membership of around 200, ACM is a powerhouse in the Engineering College. ACM provides a way for students with project ideas to find both the funding and the technical ability needed to succeed. For events such as EOH, ACM has the resources to go above and beyond for years of student innovation to come.

ACM's participation in Engineering Open House started in 1981 when undergraduate Mark Tebbe transferred from the Electrical and Computer Engineering department to Computer Science, and decided to enter a project for EOH. The CS Department did not have an undergraduate student organization at the time, so ACM was rejuvenated. The project presented by Mark, Larry Zirbez, Patty Harris and Patti Roberts that year, *The Computer—The Cornerstone*, received a second place plaque.

The current ACM EOH event has grown from the one project entered in 1981 to over fifteen projects located in three buildings in 1995. Last year ACM brought home lots of hardware, winning 5 awards in three categories. Projects this year span from our *Personal Low-cost Virtual Reality System* to a unique type of video display that contains parts that spin at close to 2000 RPM. Projects produced by ACM members can be seen in the Atrium of the Digital Computer Laboratory, in 3514 Beckman Institute, and on the first floor of Engineering Hall.

This year, Engineering Open House celebrates its 75th anniversary here at the U of I. EOH grew out of open houses hosted by the physics and electrical engineering departments in 1906, and the first official college wide open house took place in 1920. EOH benefits students by providing a way for them to demonstrate their talents directly to corporate representatives. Further, students and faculty from other campus units get to see what happens North of Green. High school students and parents of current students come by the thousands to get in on the action.

This year's EOH represents thousands of man-hours of work and many sleepless nights. Participating students are from many departments, ranging from CS and ECE to biology and sociology. Some projects this year have been in the works for more than three years.

See the back two pages for an overview and locations of the fifteen ACM-sponsored exhibits you can see at EOH this year. Some of the projects are summarized in more detail throughout this issue of the *Banks*. If you have additional questions, please feel free to ask around at an exhibit or at the ACM office (1225 DCL). We'll be more than happy to explain things to you or point you to the right place to go for more information. Enjoy and learn!

ACM General Meeting

Speaker: Mike Kulas from **Parallax Software**

Creators of "Descent"

March 9
5:00pm
1320 DCL

What's New with ACM's World Wide Web Server

http://www.acm.uiuc.edu

by Jay Kreibich

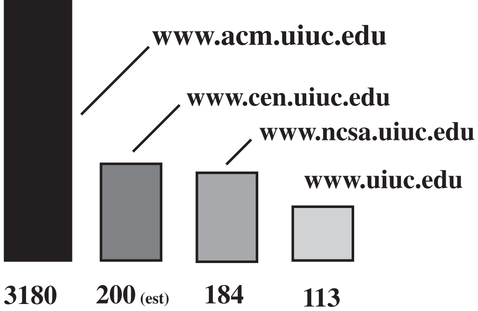
If you have never taken the time to stop by `www.acm.uiuc.edu` while out net surfing, it is definitely worth the effort. ACM's World Wide Web server is home to all kinds of online information about what's going on with ACM@UIUC, from social events to project descriptions to SIG meeting times. It is the easiest and fastest way to check up on what's going on around the group.

Also of interest to many people on the net is "Rob's Multimedia Lab," an archive of images, sounds, and movie clips sponsored by ACM. One can easily spend hours looking through all there is to be seen.

ACM's Web server has the distinction of being the most active WWW server on the U of I campus—on average `www.acm` pushes over 3.1 gigabytes of outgoing network traffic across the wire every day, or roughly the equivalent of 615,000 sheets of typed text. This makes `www.acm` responsible for over 15% of all outgoing off-campus network traffic.

As you can imagine, it takes a very powerful machine to move around that amount of data. Currently `www.acm` is running off `sleepless.acm.uiuc.edu`, an IBM RS/6000 POWERstation 360. The machine manages, but just barely. There are plans to expand the services that ACM provides with the Web server, and RML is always getting bigger and attracting more and more people. The only solution we can see to our problem is to get a machine to act as a WWW server and nothing else. This would allow us to use sleepless for code development again, as it was originally intended. Acquiring a new machine is a costly endeavor, however, and ACM is looking for corporate sponsorship of our WWW server.

Next time you're out hanging-ten on the net, be sure to stop by ACM's home page for a look. Don't forget to take a peek at RML also. All this fun can be yours at the URL `http://www.acm.uiuc.edu/`. If you have questions or comments, please direct them to `webmaster@www.acm.uiuc.edu`.



Average megabytes of data served per day for January 1995

The ACM EOH Exhibits at Beckman

by Eric Adams

For the first time ever, the National Center for Supercomputing Applications and the Beckman Institute will open their doors to ACM projects at Engineering Open House. Here's the scoop:

- **Mosaic and the Internet:** A number of Silicon Graphics (SGI) workstations will be available on Friday in the Renaissance Experimental Laboratory (3414 Beckman Institute), on which the public can use NCSA Mosaic to explore the Internet. Several of the developers of NCSA Mosaic are members of ACM at UIUC.

- **Math student projects:** In 3514 Beckman Institute (the National Center for Supercomputing Application's Numerical Laboratory), high-end SGI workstations will be available on which visitors can try out applications developed by students in Math 198 and Math 428. Many past and present ACM members have created projects which will be demonstrated during your visit.

- **CAVE tours:** CAVE tours will leave every half hour from a table in the east atrium of DCL. CAVE stands for *CAVE Autonomous Virtual Environment*. The CAVE at Beckman is among four publicly funded CAVEs in the country, and it has been developed for scientific visualization of everything from thunderstorms to complex mathematical figures. The CAVE is driven by a Silicon Graphics Onyx Graphics Supercomputer containing three Reality Engine II graphics boards. These three graphics boards drive projectors that display on 10' by 10' walls. Users of the CAVE wear Crystal Eyes LCD shutter glasses allowing a 3D view. Please note that access to the Beckman Institute will be limited to CAVE tours *only* on Saturday. You must have obtained a ticket to go on a tour through the CAVE. There is a limit of 8 people per tour.

- **IlliPuzzle:** Last Fall Eric Adams adapted code from Glen Chappel and Prof. George Francis to form IlliPuzzle. IlliPuzzle models a 3D decomposition of a cube into 12 interlocking pieces. In the CAVE, reassembling this puzzle becomes a challenge to the navigator's dexterity with the wand input device. IlliPuzzle has two modes—a *world* command mode and a *piece* command mode. While in the *world* command mode the user can rotate and translate with respect to the pieces. While in *piece* mode the user can then rotate and translate individual pieces around the space of the CAVE. In either mode one can select the piece that will be active during *piece* mode.

- **Sierpinski Pyramid:** This spring David Morgan created an IlliView application which allows the user to fly through a 3D Sierpinski pyramid in the CAVE. A Sierpinski pyramid is constructed by recursively removing tetrahedral parts from a tetrahedron. Participants at this exhibit can walk through a rendering of this pyramid and rotate it to any orientation.

Spotlight
on the Illinet-Web Interface

by Luke Nosek

The Illinet Web Interface is a project that will allow the library cataloging system used by schools in Illinois to be accessed through HTML forms over the World Wide Web, instead of through the cryptic `lcs` and `fbr` systems and the MILO interface.

The Illinet Web Interface consists of two programs: a Common Gateway Interface (CGI) script called `iwi`, written in Perl, which accepts network connections from a forms compliant browser; and a daemon called `iwid`, written in Expect, which manages the connections and interactions with the `lcs/fbr` interface.

`Iwid` opens a telnet connection to the `lcs/fbr` server, and waits for requests coming from `iwi`. If a request is detected, it first checks to see if this is a request for a search in progress (e.g. "go back" or "narrow search"), and if it is, it connects the `iwi` script to the appropriate telnet connection. If it doesn't exist, it creates one, and performs the search from scratch. In this manner, the system allows the user to use the usual browser navigational methods (forward/back/hotlist).

If it proves fast, reliable, and effective enough, the department of Administrative Information Systems and Services, which runs the current Illinet system, is considering making IWI the standard interface to the Illinois library system, until the new database, which comes with a graphical front end, is put in place.

SigNet

by Jay Kreibich

SigNet is the Special Interest Group for Computer Networks. Our discussions and projects revolve around both programming new network utilities, and new and creative uses of existing network systems.

This year at EOH we are showing our two major programming projects, the DNS Redirector, and the MUMBLE project (Multiple User Multicast Basic Language Exchange). The MUMBLE project started out as an exploration into multicast networking. Most multicast applications are for audio or video conferencing. Since we wanted to spend our time working on efficient networking code instead of compression algorithms we decided that a simple text based system would best suit our purpose. MUMBLE provides an easy to use conferencing system that allows an arbitrary number of users to link into a conversation. No servers are needed because the multicast networks transparently make sure your computer gets only the conversations you have requested, making much more efficient use of network bandwidth then present systems.

The DNS Redirector is a more long-term project SigNet has been working on for almost a year. DNS stands for "Domain Name Service" and is the protocol computers use to translate a computer's name, such as `sleepless.acm.uiuc.edu`, into 128.174.38.215, its network IP address. CCSO maintains multiple DNS servers for the campus, but many of the backup machines stay relatively idle, while the main server is forced to deal with a majority of the load. This is a very bad allocation of resources. The goal of the DNS redirector was to create a central server that would take all incoming DNS requests and then fan them out to all the available DNS servers. This would allow a more distributed load between the DNS servers, and has the added protection that if a DNS server goes down, our system can react and start redirecting requests to other servers much more quickly and efficiently then a normal host system. Development has slowed due to incompatibilities with non-standard hardware, but there are hopes to refine the server and integrate fully into UIUCnet.

SigNet holds weekly meetings on Wednesdays at 7pm in 1102 DCL. For more information please mail `signet@uiuc.edu` or visit our WWW page at `http://www.acm.uiuc.edu/signet/`.

The Banks of the Boneyard

The **Banks of the Boneyard** is a student publication of the Association for Computing Machinery and does not necessarily represent, in whole or in part, the views of the University of Illinois, its faculty or students, the Department of Computer Science, or the International Association for Computing Machinery.

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Escape from CU: The westward flight of two alums

From Netspace to Netscape: Jon Mittelhauser

So many things have happened since May of last year that it seems inconceivable that Jon Mittelhauser graduated from the University of Illinois and left to join Netscape Communications Corporation, an Internet software company in Mountain View, CA, only ten months ago.

Jon received his B.S. in computer science in 1992 and his M.S. last May, both from UIUC. In addition to his achievements with Netscape, he is well known for his work with Chris Wilson (see the interview to the right) on the original NCSA Mosaic web browser for Microsoft Windows. Jon is also an ACM alumnus, of course. He was an active member of SigMicro and SigGraph, and he spent a year on the executive board. He was responsible for several projects that appeared at EOH '92 and EOH '93, including the graphics-intensive networked dogfighting game called Netspace. The *Banks* managed to catch Jon as he blinked:

***BANKS:** What are your job title and primary job responsibilities at Netscape?*
JM: Depends upon the day of the week... I am one of the founding engineers of Netscape Communications and one of the primary developers of the 1.0 version of Netscape Navigator (my primary responsibility was the Microsoft Windows version). At the moment, I'm working in the marketing group as product manager for the Netscape Navigator. I spend a lot of my time developing product plans and coordinating communication between the different groups.

***BANKS** How does your current locale compare to Champaign, IL?*
JM: This has to be the best possible area in the country. The weather is always perfect. I am less than an hour from San Francisco, a couple of hours from skiing, and a couple of hours from great beaches.

***BANKS** So have you had any free time to actually do some of these things?*
JM: Of course not! But, hopefully, sometime I'll be able to...

***BANKS** How many hours do you put in at Netscape, anyway?*
JM: At the beginning, I was working 100-120 hours per week. That was reduced to 80-100 hours per week as we became established and as my body caught up with me. But keep in mind that almost all of those hours are fun so they fly by. There is nothing like doing what you enjoy with people you enjoy to make long hours seem like no time at all.

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From Maestro to AirMosaic: Chris Wilson

So many things have happened since April of last year that it seems inconceivable that Chris Wilson left NCSA and Illinois, got married, moved to Seattle, and joined SPRY, Inc., the network software company, only eleven months ago.

Chris received his B.S. in computer science from UIUC in 1992. In addition to his achievements with Spry, he is well known for his work with Jon Mittelhauser (see the interview to the left) on the original NCSA Mosaic web browser for Microsoft Windows. Chris is also an ACM alumnus, of course. He was social chair for a year, SigGraph vice-chair for two years, SigMusic chair for a year, and the founder of SigVR. He was responsible for several projects that appeared at various EOH's, including the SigVR helmet, the Maestro VR music program, the Fractal Muse project, and much of Netspace. The *Banks* managed to catch up with Chris for a few questions:

***BANKS**: What are your job title and primary job responsibilities at Spry?*
CW: My job title varies (depending on who you ask) between World Wide Web Technology Lead, Senior Software Engineer, and Software Developer. In general, I head up the team working on the AirMosaic browser and other World Wide Web projects for SPRY.

***BANKS:** How does your current locale compare to Champaign, IL?*
CW: The climate is different (milder in summer and winter, and no snow). Employment opportunities are better than Champaign just because it's a lot bigger, but there are some good opportunities in (or around) Champaign also.

***BANKS**: What was the one thing you liked most about UIUC? Least?*
CW: Most, the opportunities to explore things that interested me. There were a lot of things going on, computer-related and otherwise. Least, having to do work for classes that didn't interest me.

***BANKS**: What was your favorite restaurant or bar in the CU area?*
CW: Oh, wow, there were lots. House of Hunan on Mattis is a great restaurant, but I mostly miss the Wonder Dog on Sixth Street. There'll always be a special place in my heart for Cochrane's, too, since that's where I met my wife, Jennifer.

***BANKS:** How has ACM@UIUC helped you prepare you for your work at Spry?*

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◀ 4–Jon Mittelhauser Continued

BANKS: *What was the one thing you liked most about UIUC? Least?*
JM: I liked the college atmosphere a lot, since there were so many people my age. On the other hand, I hated the fact that CU is basically a cultural wasteland. I much prefer being near a major city like San Francisco..

BANKS: *What was your favorite hangout the CU area?*
JM: It changed as I aged. In terms of bars, I went from CO's to Gully's.

BANKS: *Do you have any advice for UIUC folks seeking to be just like you?*
JM: Get involved in stuff outside of your classes. The best way to get noticed is to actually *do* something which interests somebody. If all you have on your résumé is classes, there is nothing to distinguish you from everybody else. I've seen people get jobs offers at EOH just for having a cool project.

◀ 4–Chris Wilson Continued

CW: It gave me a chance to work with a variety of people, to throw a lot of ideas around. I got a lot of programming experience working on ACM projects. It also helped me develop the skills needed to work with other people on projects, and to do so effectively.

BANKS: *Do you have any advice for UIUC folks seeking to be just like you?*
CW: Drinks lots of coffee and program 'til your eyes hurt. Worship your C++ manual. But seriously, it helps a lot to find people who want to do the same kinds of things that you want to do, and even more to find someone who is already *doing* the same kinds of things you want to do. If you want to learn to be a great programmer, find someone who *is* a great programmer, and ask them to be your mentor. It always helps to have someone else to turn to. Most of all, though, don't ever take yourself too seriously.

The Computer Science Alumni Association

by Judy Tolliver

The Computer Science Alumni Association (CSAA) is the official alumni organization of the Department of Computer Science. Its two-fold mission is 1) to advance 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, and 2) to benefit its membership by providing a forum for career opportunities, professional advancement, continuing education, and other activities for its members. And when *you* graduate, you can join some of the 4,300 CS Illini who preceded you.

The CS department is relatively young when you consider that the University opened its doors in 1867. It wasn't until 1965 that we offered the first B.S. degree in Math/CS, and 1972 that we offered a B.S. degree in CS in Engineering. In the early 1990s the department felt it was high time that we get organized and reestablish our ties with our graduates. In September 1993, twenty alumni from all over the country formed the first CSAA Board. Since then, the board has launched into a flurry of activities. If you are a CS major, you should have received the last issue of the *Alumni News*, the CSAA's newsletter. It will keep you abreast of our activities and the activities of some of our alums. (Student submissions are welcome!) Since its inception, the enthusiasm for CSAA has been overwhelming. We've held several Illini Receptions in the Bay area and would like to do more. Coming up is a Chicago-area reception in Rosemont on April 5 and a big bash at Comdex in Atlanta at the end of April.

Our most ambitious project, which we are now wrapping up, is the alumni undergraduate curriculum survey. In an effort to keep our curriculum current and relevant, one-third of our BS alumni were surveyed for their advice on how better to prepare our students for the "real world." We supplemented this with an electronic mini-questionnaire that went to current CS students and with data from our peer institutions. The results of these efforts will assist the department in deciding what and how it should teach.

We are about to begin another far-reaching program which was proposed at the last CSAA board meeting: a mentor program. The program will match CS students with alumni mentors who can provide advice on what classes to take, what awaits them when they graduate, and other useful things which will help the student make better career choices. Many alumni have expressed the desire to interact directly with students, and we see this program as destined to be a great success. We'll keep you posted.

To help fund our activities, we're selling several items: stately CS coffee mugs, festive digital corn t-shirts, and classy U of I mousepads. Future doodads include a U of I screen saver and paperweights fashioned from vacuum tubes salvaged from the Illiac days.

Student involvement is very important to the CSAA. You are all invited to attend board meetings, many of which are held on campus (posted in `uiuc.cs.announce`). You also have two student CSAA board members: Joel Jones (grad student, `jj9544@coewl.cen.uiuc.edu`) and Norbert Burger (undergrad, `nburger@uiuc.edu`). Please feel free to contact them, or Judy Tolliver, the department's alumni coordinator (`tolliver@cs.uiuc.edu`), with anything you'd like to communicate to the board.

There are many alumni out there concerned about you as you prepare to join their ranks in life beyond school. We invite you to get involved with one of the hottest alumni groups around: CSAA!

ACM General Meeting Survey '95

Answers to eight of "the easiest thirteen questions you'll ever answer."

Thirty-three of the attendees at the February ACM General Meeting filled out a survey that asked for basic information on who they are and why they come to general meetings. Here are some of the results:

•What is your year in school?

Freshman:	12%
Sophomore:	24%
Junior:	24%
Senior:	27%
Grad:	9%
Other:	3%

•State your major:

CS/engineering:	45%
Comp. Eng.:	21%
Electrical Eng.:	9%
CS/math:	12%
Other:	12%

•Are you an ACM@UIUC member?

Yes:	79%
No:	21%

•Are you an International ACM member?

Yes:	9%
No:	91%

•Why do you attend ACM general meetings? (Select all that apply.)

To hear the speakers:	97%
To hear Sig updates:	36%
To guzzle free pop:	58%
To snarf free pizza:	70%

•What's your favorite flavor of PEZ?

Red:	18%
Orange:	21%
Purple:	21%
Yellow:	6%
Other: (e.g. "transparent", "black", "what's PEZ?")	18%
No answer:	15%

•What's your favorite byte order?

Big endian:	21%
Little endian:	9%
Other: (everything from "random" to "middle endian" to "short and stubby endian")	42%
No answer:	27%

•If you could choose anyone to speak at future general meetings, who would you choose? Be creative!

The top names were Bill Gates and Charley Kline, each with 5 votes. Some of the other names mentioned were: Seymour Cray, George Lucas, Steve Jobs, Chris Roberts from Origin Systems, Reece Joyner, Marc Andreessen, Jim Clark, and the BSD daemon.

Faculty profile: Caroline Hayes

- **Taught at UIUC:** since 1991
- **Courses taught**: Intro to Artificial Intelligence (CS/ECE348), Design of Computer Problem Solvers (CS/ECE444), Cognitive Manufacturing (seminar).
- **Education**: B.S. in mathematics, M.S. in knowledge-based systems, PhD in robotics (the very first one!), all from Carnegie Mellon University.
- **Favorite food**: Thai
- **Favorite music:** "Everything from Gregorian chants to Alice in Chains", including African, world-beat, and country western.

***BANKS**: What are your primary research interests in computer science?*
CH: My primary interest is in understanding the nature of design and planning problem solving. My students and I spend a lot of time observing how human experts do these tasks in order to figure out how to attack these very difficult problems.

***BANKS**: What do you expect the next major advance in AI to be? What about the most exciting advance in your lifetime?*
CH: The next major advance in my area will be in building truly intelligent integrated manufacturing systems which combine design, planning and robotic control. Current factory robots are not yet all that smart. Some of the major advances in my life time will be in the areas of machine learning and in understanding the nature of representation.

***BANKS**: Briefly, what advice would you give to undergrads or high school students considering pursuing research in AI or robotics?*
CH: Expect to work hard!

***BANKS**: CS348 attracts students from many disciplines, including EE, psychology, and computer science. Do you find it challenging to teach such a diverse crowd? What are the benefits and drawbacks?*
CH: It is definitely challenging. However the different perspectives that people from these areas bring is vitalizing. They often have a different way of looking at computer science problems that may result in an advance that computer scientists would never have thought of. I don't really see any drawbacks to diversity.

***BANKS**: If you could be any robot in the history of robotics for one day, which would you be?*
CH: Unfortunately, most of the more glamorous robots were evil... Personally, I prefer being a human.

SigBio

by Arwin Levinson and Joey Lasky

The semester has started off quite well for SigBio. We have been meeting every week on Thursdays at 7pm in 1102 DCL. Our current project involves compiling images, links, and other Web stuff into the SigBio home page. Among other things we hope to make a sort of Web Anatomy Book. Anyone with HTML or CGI programming experience would be a welcome addition to our meetings as well as anyone else interested in biology and computers. Please direct questions or comments to the two chairs, Arwin Levinson (`alevinso@uiuc.edu`) and Joey Lasky (`jlasky@uiuc.edu`).

SigUNIX

by Luke Nosek

SigUnix has suspended operations until EOH to finish up the Illinet-Web project (see the sumary in this issue), and we will be resuming with a brainstorming bash on Wednesday, March 8. We invite everyone interested to come join us in room 1330 (away from SigNet's late-running meetings) at 8:00pm. Hopefully, we'll get many new ideas. On the table now are an advanced HTML forms workshop and a project or workshop with the `pvm` message passing library. If any of these ideas interest you, or if you have some of your own, by all means, join us at the said time and date! We'll be glad to have your input and help.

SigMicro

by Paul Watts

For EOH, SigMicro is finishing up the user interface for the Computer Aided Telescope, the joint project with SigArch. After EOH, we have many projects planned, such as a C workshop, an introduction to protected mode programming, and an Emacs tutorial.

Don't have programming experience but want to learn? Or, are you experienced and looking to polish your skills? We have projects targeted at both levels. Our BBS project is designed to give people a hands-on experience in learning to program, and our planned browser for the Virtual Reality Modeling Language (VRML) is for more seasoned programmers. Come to our meetings at 8pm on Thursdays in 1102 DCL, or mail `sigmicro@uiuc.edu`, to find out more about these projects. See you there!

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Linux User's Group

by Mark Roth

The UIUC Linux Users' Group is a forum for Linux users at UIUC. Linux a free implementation of the UNIX operating system, currently running on 386, 486, Pentium or compatible PCs.

At each LUG meeting, we announce recent happenings in the Linux community, work on current projects, and discuss matters of interest to Linux users here at UIUC. Our major project right now is the UIUC Linux Distribution. We are going to be compiling all the sources and putting together a new distribution of the complete Linux system. The distribution will be aimed at the "power user" community, and it is not meant to replace Slackware or other distributions with different goals. If you're interested in this project, feel free to get involved!

The LUG meets at 7pm on Tuesdays in room 1102 DCL. If you have any questions, feel free to mail `lug@uiuc.edu`.

SigArt

by Mike Kreger

ACM's special interest group for artificial intelligence is active once again! After months of hiding out we have become bold enough to meet at coffeehouses scattered across campus in the hopes of good discussion and project productivity. Lately we have been discussing artificial personalities such as the famous psychiatrist Eliza, and we are working on a creating a new personality with a modular knowledge database. Current meetings are being used to discuss the issues involved in such a project. If you'd like to participate, watch the postings on `uiuc.org.acm` to find out the current meeting location. We typically meet on Thursdays at 7pm. Hope to see you soon!

The Wide World of the Webbed One

Interview by Ed Burns

If you've ever used the Web to get useful things done, such as getting timetable and course information, finding out where a particular building is on campus, or gathering travel tips for destinations around the world, you've probably passed through the information domain of the Duck. Kaitlin Duck Sherwood, otherwise known as Ducky, is the "WorldWideWebfoot" responsible for a good portion of the UIUC Web content. Ducky received her B.S. in Materials Science from UIUC in 1985, and went to work for Intel in Portland, Oregon. After Intel, Ducky migrated south to Silicon Valley, where she stayed until returning to UIUC for Masters work in Spring, 1994.

***BANKS**: How did you first become involved with the Web and what was it about the Web that led you to become one of the significant forces in the UIUC Web community?*

DS: After ten years working on the West Coast, I had become a consultant in a very obscure branch of EE. It was good money, but after five years of it, the money just wasn't enough any more. I wanted to find *My Passion*. I wasn't sure what it was, but I was hoping it would be genetic algorithms, so came back to school here. Over spring break, I went back to Silicon Valley, where all my friends said, "So, you must know all about Mosaic now." After about the third one, I decided I'd better make a point of checking it out when I got back.

The first thing I put on-line was my New Zealand trip report, mostly because it was a large text document that I had easy access to. I then put the Genetic Algorithms Lab page up. Then advance enrollment rolled around. I sat there with three books—the *Timetable*, the *Courses Catalog*, and the *Programs of Study*, flipping back and forth between them, losing my place, finding it, needing to go to another book, loosing my place in the first book, *etc.* I said, **"I *know* there is a better way to do this!"**

As I had spent the bulk of my five consulting years writing scripts to translate files from one ASCII format to another, I knew I could do it, too. I pulled the information for the Engineering classes out of ph and sweet-talked the *Courses Catalog* out of the Office of Facilities, Maintenance, and Planning, and whipped up a big dumb kludgey-hack script to turn them into cross-linked HTML.

Once I had it, however, I needed a place to put it, so I made a College of Engineering page. It also took up a lot of disk space on my EWS account, so I talked to CCSO about getting some space, which they were happy to provide. Also, when I left for the summer, I turned my kludgey-hack scripts over to Mike Grady, who ripped their guts out and made nice clean scripts to HTMLify all of the university's classes. I also joined the Dean's Student Advisory Committee,

with putting campus information on-line as my special project.

I ran off to Enterprise Integration Technologies in California for the summer, where I wrote CGI scripts to allow people read/post/followup/forward Usenet news and read/send/forward email from a Web browser. It was actually kind of hairy work—I had to work around HTTP's stateless nature and do some authentication. Meanwhile I was still surfing and adding what I found to the Engineering page.

I didn't really have an assistantship lined up for the fall, but as it turned out, CCSO made me an offer I couldn't refuse: the job description of **"Go do great things"**. The rest is history, and I continue to try to meet that job description. `:-)`

***BANKS**: What are your favorite sites for (a) getting useful information on topics not at all related to computers and (b) getting useless information on topics not at all related to computers?*

DS: Yahoo's and Yahoo's. (see last month's *Banks* and `http://akebono.stanford.edu/yahoo/`) Yahoo's is by far the best general collection of links. I'm not the only one who knows that, either—they are getting more than 1.5 million accesses per day now.

***BANKS**: Could you recommend to the reader a good way to get started with using the Web?*

DS: Well, the very first link on the UIUC home page is "Help!". In there are pointers to lots of very good guides on How To Web.

***BANKS**: Some people call the Web an innovation of "Gutenberg proportions" (meaning historically comparable to the printing press). Do you agree with this assessment?*

DS: Oh, absolutely! I actually think that this is an innovation of *greater* than "Gutenberg proportions". Gutenberg and Tim Berners-Lee both caused vast improvements in the speed, ease, and affordability of both distributing and accessing information. In addition to the social upheavals that movable type caused, it made practical a lot of other things - checking accounts and junk mail, for example. However, movable type did nothing to fundamentally change the nature of books. The Web allows you a much richer communications medium than books:

For those of you who are frightened by the thought of being put out of work, don't be. The Web is extremely democratic. If the only thing you know in the whole wide world is something very mundane like, say, every scene in the Brady Bunch where a microphone was visible on-screen, hey, guess what? There is probably a large market for that. On the other hand, if you are passionate about late nineteenth-century banjo and piano duets, despite only three people being interested in that, you now have a way of reaching those three people.

Furthermore, there is an *enormous* amount of information that is not yet on-line, and somebody is going to have to put it there. The Library of Congress has something like a million *subject headings* alone, to say nothing of cataloged records. I feel like all the libraries in the world burned down, and we get to write all the books over. **This is a very exciting time to be alive!**

Pyrographics 101

by Max Levchin

One of SigGraph's EOH projects is titled "How To Amaze: What you always wanted to know about computer graphics but were afraid to ask." We will discuss some of the algorithms behind a few popular computer graphics effects and techniques, such as "plasma", "fire" and a few kinds of particle animation.

To give you, the visitor, a little taste of what we'll be offering, we present here a quick implementation a simplistic fire simulation algorithm. Be warned, however, that this is not the best or most optimized way to implement this algorithm. Come to EOH for the real thing, and don't blame ACM if your monitor blows up after you try to implement this.

Consider two two-dimensional arrays of color values, and call them A and B. We can think of these as rectangular bitmaps. We need to be able to display them on screen (on a PC, for example we would just take the contents and move them, correctly aligned to the video mode's horizontal resolution, onto the display memory at physical address 0x0A0000, or 0xA000:0x0000 for those who are still stuck in real mode programming.) It is also imperative that the color palette on your video card is set as follows: bright white —> bright red—>dark red—>gas blue, where "—>" means "smoothly becoming". How to set the color palette on a PC is beyond the scope of this article, but if you've read this far, you should know how to do that already anyway.

Now we're ready to create our beautiful fire algorithm in a very simple fashion. Initialize arrays A and B to contain all zeros. Now here is the main loop: First, fill out the bottom line of the array A with random colors of white and black. The array A never gets cleared out again. We now compute the bitmap B. For each element of B (a simple nested two-dimensional loop goes here) at indices X and Y, average A[X][Y]'s surrounding elements. Which elements to consider "surrounding" is the part you will have to decide for yourself. One choice that works well is the 8 immediately adjacent pixels. Depending on what neighborhood you pick, your fire will move up, left, right, or other directions. The value that results from this averaging should then be stored in B[X][Y]. Repeat this for every pixel in A. What you'll have in B is the next frame of your animation— you can now display it. You might consider not displaying the lowest couple of lines since they will look rather blotchy.

Now, copy the contents of B to A and repeat the main loop as many times as you'd like. Array B need not be zeroed out at any time.

This is a very basic approach to a simple fire-generating algorithm. You will have to play around with it,. perhaps by changing the values that you put into the first line or by increasing or decreasing (depending on the orientation of your palette) the value of the calculated color in B. You can also change the number of elements (pixels) you average in––I've found the 8-neighborhood to yield a good balance between speed and effectiveness.

If this description made no sense to you, come talk to us during EOH, and we will try our best to explain again it with some good examples. If it did, I hope you use this algorithm and come up with a new, better, and faster one. Either way, come talk to us, as you might be interested in some of SigGraph's projects! See you at EOH!

Luke Nosek, your membership chair at ACM, would like to "reinvent ACM membership," to steal a phrase from one of our national leaders (for better or worse.) Here are examples of what needs to be done:

- Move the membership database online to a Unix machine; combine it with the pop database and library database.
- Automate membership application with an HTML forms-based interface.
- Brainstorm ideas for encouraging (dues-paying) membership, and ways for ACM to raise funds and provide better service to its members.

To effect these and other changes, I'd like to form a membership committee which will meet as soon as possible after EOH. Email `lnosek@uiuc.edu` for details.

SIG CAS

by Ben Gross

SigCAS, the Special Interest Group for Computers and Society, will present an introductory demonstration of selected new developments in digital communications, with emphasis on their effects on social discourse, privacy, and monetary transactions. The demonstration will be designed to encourage thought and debate about the issues raised by these developments.

It is clear that several recently developed technologies and techniques in the area of digital communications, such as freely available strong cryptography, digital cash, and anonymous remailers will cause a radical shift in the nature of economic and social systems that exist on the Net and, increasingly, in everyday life.

Strong cryptography, exemplified by the RSA public key algorithm used in PGP (the Pretty Good Privacy program), provides encryption that for all practical purposes cannot be broken. Public key cryptography is considered to be a revolutionary advancement.

Digital cash (e-cash) transactions over the Net are quickly becoming readily available in a myriad of forms. These range from a simple retrofitting of credit cards to verifiable (in terms of the availability of funds) anonymous transactions.

Anonymous remailers, which may be used for one-way or double blind communication, are emerging. Some use cryptography and digital signatures to create untraceable e-mail with digital pseudonyms. This allows for the creation of consistent verifiable digital identities that cannot be forged and yet are not connectable to the "true" names of their owners. It could be the ring of Gyges allowing actions with no repercussions. However, this technology could also ensure free speech, allowing controversial opinions and private economic transactions to be aired.

SigCAS will provide a small window in which EOH attendees will be able to see both some of the possible uses and effects these technologies and techniques may have in the near future. SigCAS hopes that bringing these possibilities to light will stimulate some very exciting discussion.

SigArch

by Jonathan Stark

The Special Interest Group for Computer Architecture (SIGArch) is an organization for students who are interested in designing and building computer hardware. By offering a variety of different projects, SIGArch provides an opportunity for students of all ability levels, from beginner to “Mentor™ Wizard”, to improve their skills.

The LEGO™ Project

Almost everyone has, at one time or another, played with LEGO™ building blocks. The allure and simplicity of the little plastic blocks that every kid in the world has seen and played with make LEGO™ blocks a wonderful tool for explaining concepts to children. The LEGO™ Project is out continuing attempt to explain the workings of those mysterious little boxes that we call computers. This year we will explain how decoders, ROMs, and several gates work using LEGO™ models.

Medusa’s Hair

Our first year students learned some soldering basics this year in creating Medusa’s Hair. Started as a project for those members who had never touched a soldering iron before, the Medusa project has proven to be more than just a mess of tangled wire, blobs of solder, and little melted plastic squares that used to be chips. It is a project that has really "enlightened" us all.

The Medusa project’s 2200 hand soldered points have provided amble soldering practice for our members. Much like the scrolling sign in the display case outside the ACM Office, the 640 Light Emitting Diodes (LED’s) in the five strands of Medusa's Hair are capable of display patterns of dancing light and even text messages. The patterns and text are organized on our host computer and then displayed on Medusa’s Hair using a project from last year, the 64 Bit Input/Output Device. So why is it called Medusa’s Hair? Looking at the tangled mess of wires and tubes sprawling around the project, you're likely to drop your jaw and turn to stone in amazement as you stare at our Medusa’s Hair.

Digital Nametag

In today’s world, microprocessors have become a common and accepted part of day to day life. Embedded microprocessors control everything from recording your favorite television show while you're away to cooking your favorite frozen dinner. Our Digital Nametag, headed by Chris Burian, Julie Staraitis, and Dan Sachs, provides an slightly less common example of an application of the microprocessor in our lives.

The 315 Light Emitting Diodes (LEDs) on the front of this little badge allows us to display much more than just the name of an individual. The embedded microcontroller allows us to display simple animations and scrolling messages.

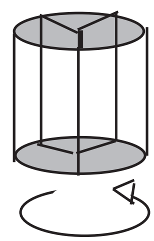
Several other projects will be on display with the Digital Nametag as a showcase of our microcontroller based projects. The ACM Glorified Refrigerator will serve you the soda of your choice via the Internet, and the PowerGlove Serial Interface will introduce you to the usage of microcontrollers in digital data acquisition. And if all of that isn't wild enough for you, make sure you see our microwave!

“The SIGArch Cylindrical Computer Display (SCCD) is quite possibly the next step in the evolution of video imaging systems on this planet”

SCCD

The SIGArch Cylindrical Computer Display (SCCD) is quite possibly the next step in the evolution of video imaging systems on this planet--at least for SIGArch it is. Headed by David Morgan and Luke Nosek, the SCCD is a versatile electronic display system that is capable of displaying color images on the surface of a spinning cylinder.

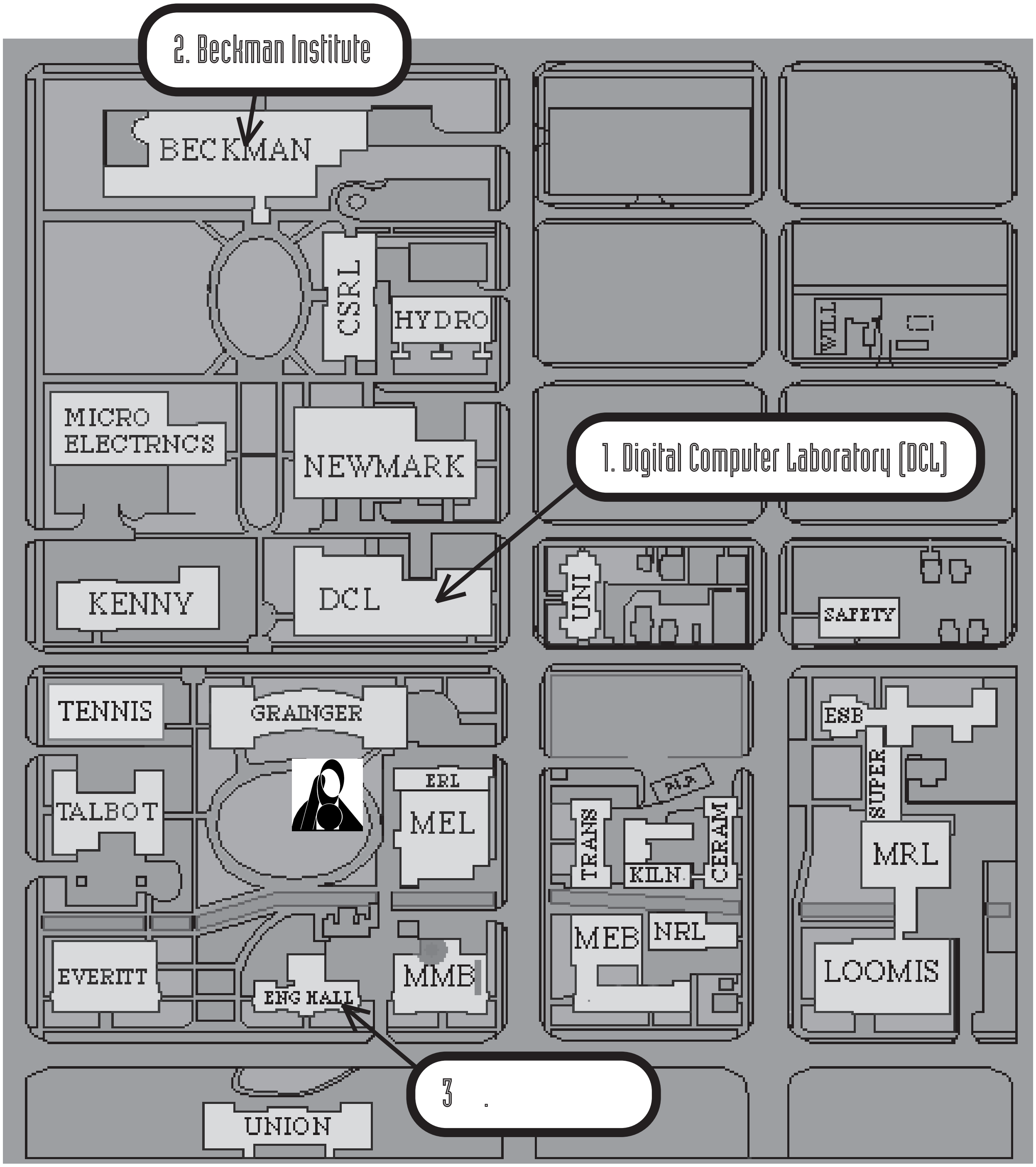
Three strips of Light Emitting Diodes (Red Green, and Blue) mounted vertically on the outside of our display allow the full color images to be displayed. As the cylinder (a fan blower) spins up to approximately 2000 RPM, a sensor monitors the position of the display with respect to the base of the fan blower. A digital phase-locked-loop (PLL) provides a count relaying information about the amount time it takes for the display to make one revolution.



The control unit, a Xilinx Field Programmable Gate Array (FPGA), divides the time reference calculated by the PLL into discrete intervals which represent each pixel around the circumference of the cylinder. By watching the counter value given back by the PLL, the control system can tell where the three strips of LEDs are as they spin, and turn them on or off depending on whether the pixel in that location is supposed to be on or off. The three strips of LEDs are spaced at approximately 120 degree offsets around the cylinder, so the controller must also calculate the delay for each individual strip, so that the three colors combine in the viewer's eye properly to create the illusion of a full color image. The colors can be dithered by adjusting the duty cycle of the individual diodes, allowing for a full range of colors.

The PLL also provides the important function of keeping the display synchronized. Small changes in the speed of the blower would result in a blurring of the displayed image, or even a temporary spinning of the image similar to the roll on a television set.

A Nerd's Eye View of ACM Exhibits at EOH



Welcome to Engineering Open House. March 3-4, 1995

Quick Guide to ACM Engineering Open House Exhibits

Presenter	Exhibit Name	Location
ACM General	Electronic Visualization	3514 Beckman (Numerical Lab)
Projects developed by students using Silicon Graphics high performance graphics hardware will be explained and demonstrated. Projects range from audio to rendered scenes to real-time interactive CAVE applications.		
ACM General	NCSA Mosaic and the Internet	3414 Beckman (Renaissance Lab)
This room has been reserved to allow visitors to explore the World Wide Web and play with the Internet in a relaxed atmosphere.		
SigArch	The LEGO Project	East Atrium, DCL
The Lego Project illustrates some of the basic workings of the “mysterious little boxes” we call computers with Lego building blocks.		
SigArch	Digital Name Tags	East Atrium, DCL
Say good-bye to those boring “Hello, my name is:” name tags and see the latest in silly electronic name tags while learning about embedded systems, microcontrollers, and their role in your day to day life!		
SigArch	Medusa's Hair	East Atrium, DCL
While Medusa’s head can turn man to stone, her hair can be a great learning tool, and we hope it will enlighten you as it did our new members this year. It represents the heart of our organization; learning by doing.		
SigArch	SigArch Cylindrical Computer Display (SCCD)	East Atrium, DCL
The SCCD is an electronically controlled system capable of displaying animated color images on the surface of a cylinder spinning at nearly 2000 RPM using a computer designed specifically for the project.		
SigCAS	Digital Money in the Electronic Frontier	East Atrium, DCL
SigCAS will hold a discussion of new developments in electronic monetary transactions.		
SigGraph	Algorithm Demos	East Atrium, DCL
The project will present viewers with a set of unorthodox and innovative implementations of new and/or improved graphics algorithms, with a complete explanation of the underlying mathematics and programming techniques used.		
SigGraph	DataRace	East Atrium, DCL
DataRace is a three-dimensional, WAN-aimed networked game. The objective of the game is to survive in cyberspace by solving multiple spatial puzzles, and finding and completing “missions”.		
SigGraph	Virtual Juggler	East Atrium, DCL
SigGraph will explain concepts behind computer animation with some interesting twists.		
SigMicro, Astronomical Society	Computer Automated Telescope System (CATS)	Alcove across from stairwell in DCL
The CATS allows astronomers to select any cataloged celestial object and automatically tracks it through the sky over time.		
SigNet	The DNS Redirector	East Atrium, DCL
The redirector system was designed by students to distribute and redirect Domain Name System computer requests to several DNS servers. The end result is a more efficient use of UIUC’s main computer network.		
SigNet	The MUMBLE Project	East Atrium, DCL
MUMBLE is a networked collaboration tool that makes it possible for hundreds of users to hold conferences or conversations using a networking technology known as “multicast.”		
SigUNIX	The Illinet-Web Interface (IWI)	East Atrium, DCL
The aim of IWI is to apply a graphical user interface based on standard “Internet browsers” such as Mosaic or Netscape, to the old, text-based University library catalog.		
SigVR	Personal Low-cost Virtual-reality System	First floor, Engineering Hall
PeLViS will feature a head-mounted display and a Cyberman 6-d controller. This project is the culmination of several years of work encompassing all fields of computer technology as well as a significant contribution from physics. Users will experience a simulation in virtual reality.		