Software company to market search engine

Department transfers InQuery technology to Sovereign Hill

With the goal of getting University of Massachusetts Computer Science Department technology into the marketplace, Sovereign Hill Software has acquired exclusive commercial rights to market the InQuery search engine and related technologies developed by Professor Bruce Croft and his research group, the Center for Intelligent Information Retrieval (CIIR).

Buoyed by $3 million in start-up capital and incorporated last year, Sovereign Hill is named after a gold mine in Australia to conjure up images of both corporate success and data retrieval. The firm has set up shop in the new Mass Ventures building in Hadley, an "incubator" site designed for embryonic businesses. Some 25 employees are engaged in full commercial research, development, and marketing of the family of software products.

In its beta versions produced by the Computer Science Department and distributed commercially through the CIIR and ACSIOM, Inc., the department's private, nonprofit technology transfer corporation, InQuery — described as "a probabilistic information retrieval system using an inference network" — provides search power to some high-visibility reference accounts. Companies that began using the software include Infoseek, Lotus Development, the U.S. Library of Congress, Ziff-Davis Interactive, the White House, and the Holocaust Memorial Museum.

Although InQuery has its

See "Sovereign Hill," page 6

Loose Change

NEWSLETTER of the COMPUTER SCIENCE DEPARTMENT
(formerly COINS) at the UNIVERSITY OF MASSACHUSETTS AT AMHERST

Winter, 1997

Preliminary plans for the new Computer Science wing by Boston architect DiMarinisi & Wolfe show the new facility's south elevation.

New CS research center wing to break ground in spring of '97

The first phase of opening of bids for new Computer Science facilities signals a tangible step forward in what has been a long process.

"It's hard to say whether this has been *The Iliad* or *The Odyssey*," said Computer Science Department Chair David Stemple as he surveyed a 9-inch-tall pile of documents, memoranda, plans, and blueprints related to the building proposal and construction. The concept of the Engineering and Computer Science Research Center received state approval in 1992, beginning a four-year ride through university and state government bureaucracies.

Funding for the first phase of the project, the Computer Science Research and Development Center wing,

See "Building," page 5

Department to grow in next 5 years

Hoping to inject some new blood into a department where almost two thirds of the faculty have attained the rank of full professor, the Computer Science Department plans to expand faculty positions over the next few years.

Two new faculty members will be hired for the 1997–98 academic year, "and [the university] will allow us to recruit in subsequent years," says Professor Krithi Ramamritham, chair of the department's recruitment committee.

The department will look for hires in systems-related areas, but Ramamritham stressed that cross-disciplinary applicants will be welcomed. "We don't

See "Search," page 2

FROM THE CHAIR

Effective Chairmanship requires collaboration

As I think about chairing this department, I am reminded of many talks I have heard over the years from computer science researchers in one of the research areas. A typical talk devotes the first two thirds to a discussion of how *really hard* the particular problem turns out to be. The last third is spent detailing the way in which the problem failed to be solved. Future research generally includes the next harder problem in the area.

Along these lines, I discovered the top four reasons (I couldn't think of ten)management of this department is *really hard:*

4. There are at least four unions to be dealt with.

3. Most of the personnel cannot be fired. (No stick.)

2. Salary raises are not controlled by the Chair, but by an elected committee. (No carrot.)

1. The upper administration and its procedures make the Byzantine Empire look like a Shaker village.

Perhaps I have convinced you that there is some difficulty involved in this job. I may have also convinced you that anyone would be crazy to accept the job, but that is not the case.

Many faculty shoulder large parts of the administrative burden, and a good committee structure can actually work. Managing a department well depends on recognizing energy for certain tasks from faculty and staff and enabling this energy to solve the ongoing problems of departmental life.

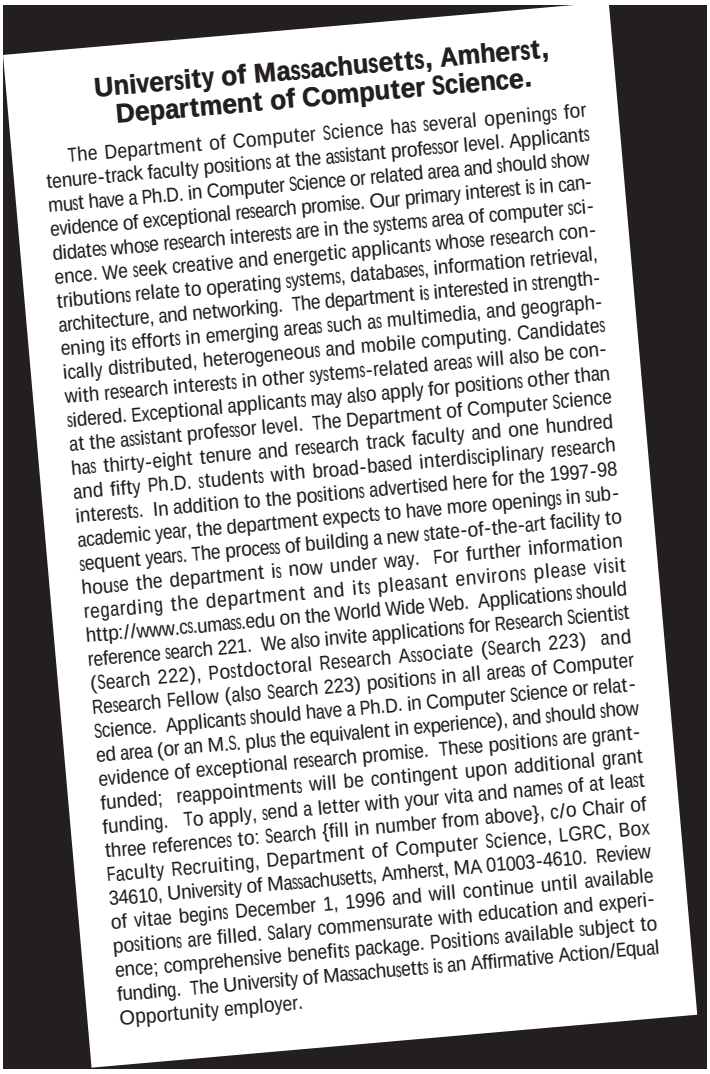
A chair is left, then, with getting the remaining tasks done and making sure that nothing falls through the cracks. This is where staff is crucial.

An effective chair needs to know who knows what, to keep track of who possesses the tribal knowledge that keeps the society functioning. This knowledge is typically distributed among the chair's assistant, the business manager, the office manager, the lab manager, the undergraduate secretary, and the graduate secretary, who may all be one person in some departments, but in Computer Science are each a different person. Sometimes a faculty member may know something about how things really work.

The chair must also help the faculty achieve goals. In times of fiscal stress, this requires much attention, good communications skills, and a willingness to defend the Department's case as powerfully as possible, sometimes confrontationally, as there are not enough resources to meet the needs of all departments. I prefer collaboration instead, and I try to minimize confrontation while still attending to departmental goals.

The jury is still out on how I have performed on this front. I'll keep you informed.

—David Stemple



University of Massachusetts, Amherst, Department of Computer Science.

The Department of Computer Science has several openings for tenure-track faculty positions at the assistant professor level. Applicants must have a Ph.D. in Computer Science or related area and should show evidence of exceptional research promise. Our primary interest is in candidates whose research interests are in the systems area of computer science. We seek creative and energetic applicants whose research contributions relate to operating systems, databases, information retrieval, architecture, and networking. The department is interested in strengthening its efforts in emerging areas such as multimedia, and geographically distributed, heterogeneous and mobile computing. Candidates with research interests in other systems-related areas will also be considered. Exceptional applicants may also apply for positions other than at the assistant professor level. The Department of Computer Science has thirty-eight tenure and research track faculty and one hundred and fifty Ph.D. students with broad-based interdisciplinary research interests. In addition to the positions advertised here for the 1997-98 academic year, the department expects to have more openings in subsequent years. The process of building a new state-of-the-art facility to house the department is now under way. For further information regarding the department and its pleasant environs please visit http://www.cs.umass.edu on the World Wide Web. Applications should reference search 221. We also invite applications for Research Scientist (Search 222), Postdoctoral Research Associate (Search 223) and Research Fellow (also Search 223) positions in all areas of Computer Science. Applicants should have a Ph.D. in Computer Science or related area (or an M.S. plus the equivalent in experience), and should show evidence of exceptional research promise. These positions are grant-funded; reappointments will be contingent upon additional grant funding. To apply, send a letter with your vita and names of at least three references to: Search {fill in number from above}, c/o Chair of Faculty Recruiting, Department of Computer Science, LGRC, Box 34610, University of Massachusetts, Amherst, MA 01003-4610. Review of vitae begins December 1, 1996 and will continue until available positions are filled. Salary commensurate with education and experience; comprehensive benefits package. Positions available subject to funding. The University of Massachusetts is an Affirmative Action/Equal Opportunity employer.

The text of the advertisement that Recruitment Chair Krithi Ramamritham hopes will yield two new faculty members and some "fresh blood."

SEARCH .....(from page 1)

want to pigeonhole anyone," he said.

Ramamritham anticipates several hundred applications, which will be sorted into five priority areas: databases, information retrieval, operating systems, networking, and architecture.

The expansion comes after several years of not hiring. "The vibrancy of the department depends on fresh blood coming in," Ramamritham said. "We do have a few retirements coming up, but that alone will not help us accrue fresh faculty."

Ramamritham said that beginning in November, ads have appeared in publications of the CRA, IEEE, and ACM, as well as the Chronicle of Higher Education. In addition, faculty and students will spread the word among their peers.

"Applications will start coming in until April, and we to start the interview process itself in early spring," Ramamritham said.

The Recruitment Committee is comprised of Ramamritham and professors Lori Clarke, W. Bruce Croft, James Kurose, and Edward Riseman.

FACULTY PROFILE

Junior Faculty make their marks

Three assistant professors reflect on academic life

The department's three associate professors, from left: Ramesh Sitaraman, Kathryn McKinley, and Shlomo Zilberstein.

For all three junior faculty members in the Computer Science department, the call to teach and to research was strong.

Now, three years later, assistant professors Kathryn McKinley, Ramesh Sitaraman, and Shlomo Zilberstein are making their marks on the department. They are fully engaged in research, teaching, publishing, and committee work, balancing their marriages and families with the rigors of academia.

"I always have had a deep interest in artificial intelligence," says Zilberstein, who arrived from U.C. Berkeley with a summa cum laude B.A. from the Technion-Israel Institute of Technology. "To me, it's the most interdisciplinary area of research. It raises questions like: What do we know about intelligence? How is our brain operating? How can we build a machine that does the same things?"

"This research area keeps you reading things that relate to interesting questions beyond computer science," Zilberstein adds. "When I teach undergraduates, I try to emphasize those links to bring an almost new perspective on AI or on computer science as a whole."

Indeed, Zilberstein cites the work of Nobel Prize–winning economist Herbert Simon, whose pioneering research into decisionmaking processes in economics have provided a cornerstone of AI theory.

Zilberstein heads the Resource Bounded Reasoning Research Group, which deals with finding solutions to AI problems with limited computational or informational resources. "Sometimes the cost of computation needed to provide the best solution can be greater than the benefit," he explains.

Zilberstein's current research interests — including decision theory, design of autonomous agents, real-time planning, resource-bounded reasoning, and reasoning under uncertainty — can be applied to planning and scheduling, decisionmaking, and information gathering on the Internet, as well as many other fields.

"I've had a reasonable set of expectations, and the department has given me all the resources I've needed to succeed. I'm the type of person that when things work, I always find it a good surprise," Zilberstein says. "And they've worked well."

"OUR DEPARTMENT has no trouble attracting high-quality graduate students," observes Kathryn McKinley, who says she has felt "well respected and welcomed" by the more senior members of the department after arriving to the department from Rice University in Texas. Senior faculty have been forthcoming in terms of guiding a new department member with techniques of teaching and writing grants.

McKinley's research focus, "on developing compiler algorithms and tools that enable programmers to use a high-level programming style and modern languages, and yet still achieve high performance on scalar, parallel, distributed, and heterogeneous architectures."

Between research and teaching — McKinley is teaching her first course to undergraduates this fall — she is hard-pressed for time. "I haven't been able to keep programming the way I thought I would," she admits.

"In my research area," McKinley says, "we build real things." The co–principal investigator, with Professor Eliot Moss, of the Systems for Advanced Architecture and the Object Systems Laboratories, McKinley is also associated with the Center for Intelligent Information Retrival research group. McKinley cites the "collaborative aspect" of the faculty as a plus for the department.

McKinley has also found that her position as the only untenured member on the department's Executive Committee puts her in a good position to "let you know how the university works."

RAMESH SITARAMAN grins broadly when describing his teaching, a focus he knew he wanted from his days at Princeton University. "I wanted an academic setting where I could do research and still have the opportunity to advise graduate students and teach undergraduates," he says.

That setting, and the friendly atmosphere, brought Sitaraman to UMass, where he works in the Theory group, particularly on "application-oriented theory, where we look at parallel and distributed systems' theory and design issues." What drives his research is the pleasure of understanding complex real-world phenomena through formal mathematical reasoning, a pleasure that he often conveys to his students, he says.

Sitaraman is struck by a contrast: with computer theory, he says, "it's a nonlinear process. You think about a problem for weeks, and then you solve it in two or three days." Teaching, on the other hand, is "an incremental process. The rewards are more immediate."

One major reward Sitaraman has received is a Lilly Fellowship, designed to help young professors become better teachers. Recipients join each other for seminars and programs from the university's Center for Teaching. His colleague, Professor Arnold Rosenberg, is his Lilly Fellowship mentor.

Sitaraman is grateful that he is able to focus on his research and teaching, that "you're not loaded up with administrative things." The department's general attitude, he says, is that "they really want you to succeed. I really appreciate that."

Editor's note: The professors' research is described in the faculty section of the department web site: `http://www.cs.umass.edu`.

DEPARTMENT NEWS

Recent technical reports

96-30 *The Design of a Next-Generation Process Language*, Stanley M. Sutton, Jr. and Leon J. Osterweil. May 1996.

96-35 *Intelligent Information Gathering Using Decision Models*, Shlomo Zilberstein and Victor Lesser. June, 1996.

96-38 *Source Time Scale and Optimal Buffer/Bandwidth Trade-off for Regulated Traffic in an ATM Node*. Francesco Lo Presti, Zhi-Li Zhang, Don Towsley and Jim Kurose, June 1996.

96-39 *Measures in Collection Ranking Evaluation*, Zhihong Lu James P. Callan W. Bruce Croft. June, 1996.

96-40 *Validating an Architectural Simulator*, Erich M. Nahum.

96-41 *Retrieval of Passages for Information Reduction*, Jody J. Daniels, July 1996.

96-43 *A Hybrid Discrete Event Dynamic Systems Approach to Robot Control*, Manfred Huber and Roderic A. Grupen, October 1996.

96-44 *A Model for Compound Type Changes Encountered in Schema Evolution*, Barbara Staudt Lerner, June 1996.

96-46 *Efficient Admission Control for EDF Schedulers*, Victor Firoiu, Jim Kurose, Don Towsley, June 1996.

96-48 *The Baystate Stroke Project: Getting Started on Segmentation of Stroke Lesions*, Justus H. Piater, August 1996.

96-49 *The Criticality of Modeling Formalisms in Software Design Method Comparison*, Rodion M. Podorozhny and Leon J. Osterweil, August 1996.

96-62 *Analyzing Partially-Implemented Real-Time Systems*, George S. Avrunin, James C. Corbett, Laura K. Dillon, August, 1996.

96-63 *Improving the Quality of Software Quality Determination Processes*, Leon J. Osterweil, September 1996.

96-64 *Automated Support for Seamless Interoperability in Polylingual Software Systems*, Daniel J. Barrett, Alan Kaplan, Jack C. Wileden, September, 1996.

96-65 *ELF: An Evaluation Function Learner That Constructs Its Own Features*, Paul E. Utgoff, October, 1996.

96-66 *Computationally Tractable, Conceptually Plausible Classes of Link Matrices for the Inquery Inference Network*, Warren R. Greiff, September, 1996.

96-67 *Corpus-Based Stemming using Co-occurrence of Word Variants*, Jinxi Xu and W. Bruce Croft, September, 1996.

96-68 *A Framework for Event-Based Software Integration*. Daniel J. Barrett, Lori A. Clarke, Peri L. Tarr, and Alexander E. Wise. To appear in ACM *Transactions on Software Engineering and Methodology* (TOSEM). August, 1996.

96-69 *A Framework for Relocation in Mobile Process-Centered Software Development Environments*. Supratik Bhattacharyya and Leon Osterweil. August 23, 1996.

96-70 *Empirical Comparison of Gradient Descent and Exponentiated Gradient Descent in Supervised and Reinforcement Learning*. Doina Precup, Rich Sutton. September 24, 1996.

96-73 *Scalable Reliable Multicast Using Multiple Multicast Groups*. Sneha K. Kasera, Jim Kurose and Don Towsley. October 1996.

96-75 *MANIC: Multimedia Asynchronous Networked Individualized Courseware*. James F. Kurose, Hu Imm Lee, Jitendra Padhye, Jesse Steinberg and Mia Stern. November, 1996.

96-77 *Communication and Secrecy: Issues in Stenography*, Christopher Jaynes, Susan Landau, and Alan Hanson. October, 1996.

96-78 *A Trainable Approach to Coreference Resolution for Information Extraction*, Joseph F. McCarthy. October, 1996.

96-79 *A Fast, Background-independent Retrieval Strategy for Color Image Databases*. M. Das, B. A. Draper, W. J. Lim, R. Manmatha, E. M. Riseman. November, 1996.

For more information, or for the reports

- Full reports are available by ftp.
  `ftp.cs.umass.edu/pub/techrept/techreport`
- Abstracts are also available from the department web site. Follow the links to *Loose Change:*
  `http://www.cs.umass.edu/`
- For a hard copy, write:
  Librarian
  Dept. of Computer Science
  Box 34610
  University of Massachusetts
  Amherst, MA 01003-4610
  (413) 545-2744
- Fax requests to (413) 545-1249
- E-mail
  `techrept@cs.umass.edu`

Note: Full reports require software to print or view

Dept. unveils new Web Site design

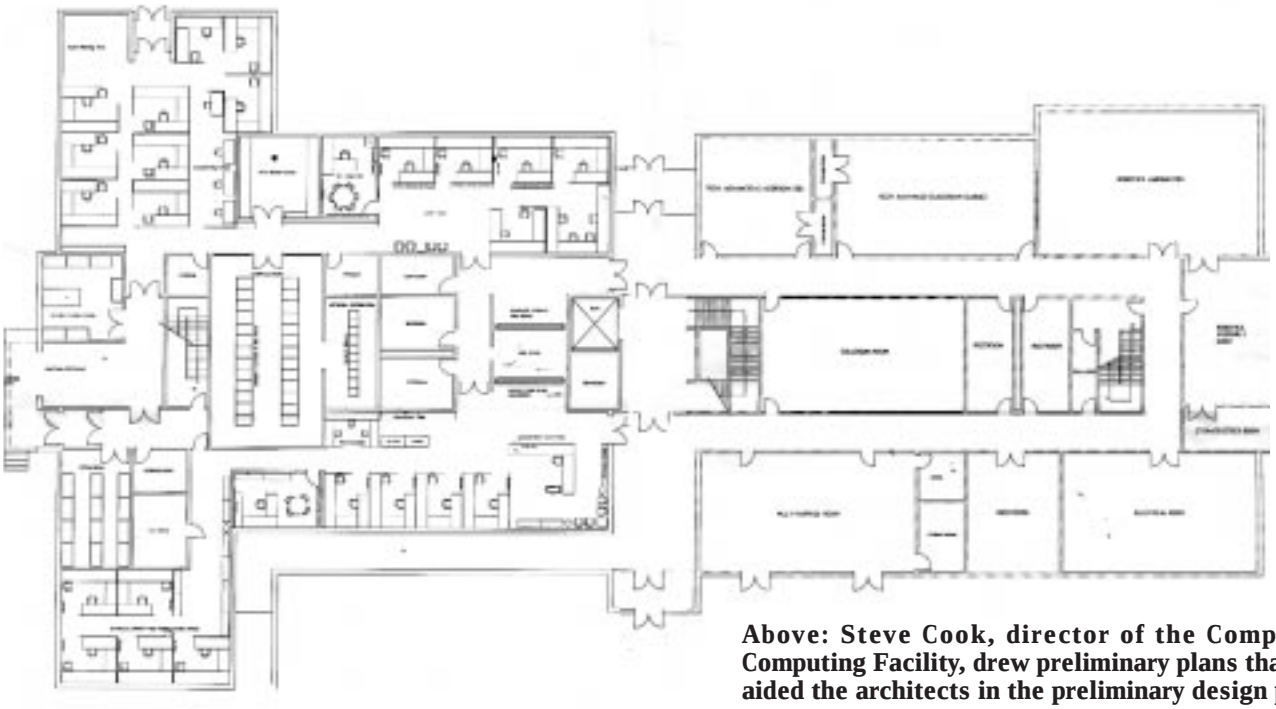
The Computer Science Department is sporting a new look on its World Wide Web presence.

Redesigned by a committee chaired by Professor Jim Kurose, the site features a visually appealing interface implemented by Peter Richards of ACSIOM.

The new home page.

The new design puts the main branches of the department's offerings on one opening screen. Further levels of pages are being redesigned progressively, and plans call for several new sections, including a faculty "research review."

DEPARTMENT NEWS



Above: Steve Cook, director of the Computer Science Computing Facility, drew preliminary plans that significantly aided the architects in the preliminary design process.

BUILDING .....(from page 1)

received final legislative approval this past spring, and the first bid opening, to evaluate the content of the bids and quality of the bidders, took place September 24.

The second phase of the plan is the construction of the engineering wing and a classroom/auditorium to connect the two structures.

Using space wisely

The layout for the three-floor, 78,500-square-foot building was developed collaboratively to yield not only the best use of the space, but provide a superior educational and research environment.

"We had two criteria: that as many people as possible get natural light, and that the faculty get sufficient offices," Stemple noted. The bright offices dotting the building's perimeter will house faculty, graduate students, and post-doctoral students.

Only conference rooms, restrooms, copier rooms, printer rooms, public workstation rooms, and utility closets will be housed in the windowless central core, said Professor Chip Weems, whom Stemple cited as a principal contributor to the design of the wing.

Weems looked to maximize the use of space, suggesting the building's H shape. "This meant the difference between being able to fit the department into the building and having to split it," he said. Weems's other contributions to the design will make the traffic flow clear and logical: "Visitors will first encounter a staff person to help direct them, and students can come to faculty office hours without passing the labs and research offices," Weems said. "This reduces traffic around those areas and improves security, while keeping grad students close to their advisors."

Personnel Director Claire Christopherson also contributed to the design, "arranging things so clerical and administrative staff can do their jobs."

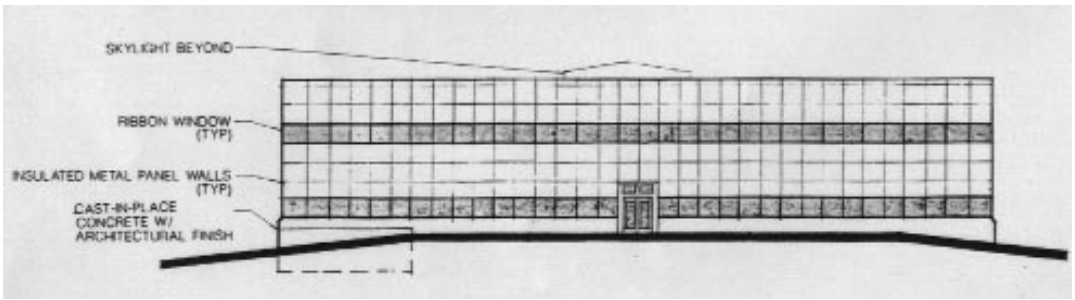
"We try to make everything run smoothly to create an environment for faculty and staff where the administration and the bureaucracy can be as invisible as possible," Christopherson said. "I think the way people are arranged in a space is a very important element to that."

With that in mind, the new building plan clusters staff devoted to student services and business functions on the first floor, and distributes the remaining administrative staff strategically near the faculty offices and labs.

Computer Science Computing Facilities Director Steve Cook put the different ideas into a design. Boston architectural firm DiMarinisi & Wolfe drew the plans that went with the requests for proposals.

The contract will be awarded after a second bid opening that takes cost into account, "and then the fun begins," Stemple said.

"[All prospective contractors] are all talking about a March groundbreaking, and we'll be in the building in September of 1998," Stemple said.



The east elevation of the Computer Science wing from the preliminary plans. Various firms used this design to bid on the final project, which is slated to begin this spring.

DEPARTMENT NEWS

Department technology, licensed to Sovereign Hill Software, is shown in Infoseek, a highly popular search engine (`http://www.infoseek.com`). Highlighted in color: InQuery is able to cross-reference other related topics based on the results of a search.

SOVEREIGN HILL .....(from page 1)

greatest public visibility as a search engine for the World Wide Web, Vice President of Marketing Paul McOwen notes that "Sovereign Hill is not just a search engine company." As companies need to maneuver through hundreds of databases, the need to find and manage this information becomes more pressing. "If you have 30 gigabytes of information, how do you search it?" McOwen says.

"By any measures we're aware of, it's by far the highest quality — i.e. the most effective — full-text search engine available," McOwen says. InQuery achieves that effectiveness by "rank ordering" the data that the search returns. The software is capable of searching multiple databases, McOwen says.

Transferring technology to the private sector

After developing the technology, CIIR passed commercialization rights to ACSIOM, which in turn arranged for the private sector use and exposure of InQuery. The process of creating a software company from the ground up and converting academic research to a marketable product took that process to its next logical phase, says Sovereign Hill Acting President Tripp Peake.

Peake is president of Mass. Ventures, which was instru-

CIIR resumes research focus

Research group that created InQuery will work on next generation of retrieval technology

Now that its most visible product, the InQuery search engine, is licensed for commercial use to Sovereign Hill Software (*article, page one)*, the Center for Intelligent Information Retrieval is enjoying a renewed emphasis on research.

"By removing most of the development-oriented aspects to Sovereign Hill, that strengthens our primary mission: basic research and early technology transfer," says CIIR Principal Investigator W. Bruce Croft.

With Sovereign Hill having assumed the development, marketing, and support for the commercial version of InQuery, the CIIR, which is funded by the National Science Foundation, is shifting its focus to research and development of the next generation of retrieval software.

"It's a whole new approach with integrating heterogeneous information systems and environments," Croft says. The CIIR is examining new algorithms to search multiple databases from legacy systems.

The CIIR is also examining issues of scale — "how you maintain the quality and speed among large amounts of information," Croft says. Faculty and staff are researching architecture and algorithms to provide optimal performance among multi-terabyte databases.

In conjunction with the VISION research group (`http://www.cs.umass.edu/vision`), the CIIR is in the early stages of creating non-text-based search algorithms among multimedia elements.

"Data mining is also an important part of what we're doing," Croft says. One special use of retrieval software is discovering previously unforeseen connections between data — "finding connections and trying to make sense of them," Croft says.

Croft cites an immediate practical application: "Searching text in different fields of medicine, [users have discovered] new treatments for medical conditions."

Back to the basics

The CIIR has reorganized into three distinct parts: a pure research group, a prototype and demonstration group, and a system support group. Since CIIR continues to license InQuery technology to academic institutions, the latter arm continues to provide support for those clients.

Croft also anticipates the makeup of the membership of the CIIR will change to companies that have a deeper interest in the group's research.

Bruce Croft

Even prior to Sovereign Hill's startup, with much of its resources devoted to technical support of its flagship product, the CIIR had been playing a key and influential role in this area of computer science. Croft cites the group's contributions in the international arena. At the last ACM SIGIR Conference on Research and Development in Information Retrieval, the group was responsible for six out of the 36 papers presented.

And a renewed research focus will "free up the time for faculty to do even more research," Croft said with a smile. "That's the biggest change."

DEPARTMENT NEWS

mental in getting Sovereign Hill's startup funding of $3 million from Blue Rock Ventures, a venture capital company in Wilmington, Delaware. "They see the makings of a very huge software company," Peake says.

Starting from an initial plan, which Peake says went through "a reality check" to ensure it made sense in the business world, Sovereign Hill formed and completed negotiations with ACSIOM to take the rights to InQuery out of that setting.

"The difference between getting a couple of reference accounts and sites going and having shrink-wrapped software is a big step," Peake says. "It requires product development and marketing that ACSIOM is not set up to do."

The startup capital will enable Sovereign Hill to hire a staff to do what McOwen terms "bulletproofing and hardening to make the software reliable enough to be competitive in a commercial marketplace." The commercial applications of InQuery require more thorough debugging, as well as departments for documentation and technical support, Peake says.

"Investors see the makings of a very huge software company."

—Tripp Peake, Sovereign Hill Software Acting President

Both officers say the effort will be worth it. "There's so much intelligence in using information in ways we never have before," McOwen says. "These tools have a place in existing markets and markets that have yet to emerge."

Or, as Peake simply puts it, "This is a kind of product that needs to be out there."

A description of InQuery and Sovereign Hill's other products can be found at the company's web site: `http://www.sovereign-hill.com`.

Center creates multimedia tools for university, local school systems

Two PCs sit in the W.E.B. DuBois Library loaded with software to show newcomers the basics of information science.

The Chemistry Department is changing a computer testing system for an introductory chemistry course from one that's aging, arcane, and difficult to change to an Intranet system that uses HTML.

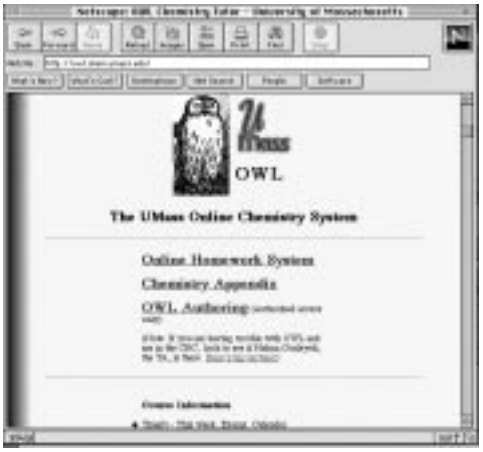
A computer works with elementary school students in the region asking the same caliber of questions of the girls in the classroom as the boys, in an attempt to eliminate gender bias in the classroom.

Working together with staff from the chemistry and psychology departments, the library, and high school teachers, the Center for Computer-Based Instructional Technology (CCBIT) is finishing these three projects.

University projects are selected by a multi-college committee, and outside projects are funded by grants. CCBIT receives such funds from ARPA, the National Science Foundation (NSF), and Apple Computer. The center, based in the department, draws on the resources of the university to develop computer-based teaching resources for UMass and other area schools, according to CCBIT Executive Director David Hart.

CCBIT was originally envisioned several years ago as a response to help former defense contractors adapt to a civilian economy. As Professors Beverly Woolf and others began a quest for grant funding, they noted a similar educational need on campus and in the local elementary school systems, prompting them to switch gears.

Other faculty who have been instrumental in creating the Center are Carole Beal from Psychology; Klaus Schultz from Education; and Paul Cohen and Jim Kurose from Computer Science.



A screen from the Chemistry Department's OWL (Online Homework) project. CCBIT recently automated the homework system, expected to go online for the spring semester.

Ten to twelve people in the Department sneak in some of their time on CCBIT projects. "We're funded on a shoestring," Hart explains.

Yet the technical staff and faculty, students from animation classes taught by CCBIT Director Professor Beverly Woolf, and "creative types" from the art and music departments have collaborated on the three projects using such software as Specular Infini-D, Adobe Photoshop and Premiere, and Macromedia Authorware and Director.

With a couple of clicks of his Power Macintosh's mouse, Hart fired up an almost-finished version of the library's application several weeks before the final version went live. The presentation, Hart says, is geared toward undergraduates who have little experience finding books catalogued under the Library of Congress system.

The software, featuring a tour of the Library from the perspective of an insect named Mort, combines animations with still photos of the library. It was developed with the help of Reference Librarians MJ Canavan and Emily Silverman.

In the case of the chemistry department Online Homework (OWL) project, Hart said the site also involved advanced programming to keep students from being able to fill in the questions on a previous screen with answers the system subsequently releases.

Professors will be able to modify the content of the homework sets more easily than the previous automated system that has been in use for some time.

The new system, which serves a course with seven sections and 1400 students, will be deployed this spring.

Chemistry professor Roberta Day and Chemistry Resource Director Beatrice Botch collaborated with department staff on the project.

A math tutoring project for students in grades four through six is funded by a grant from the NSF as part of a project to get more women to pursue careers in science. The project underwent a test flight at the Deerfield Elementary School. "The kids really liked it, and the teachers saw real changes in the children," Hart observed. Beal, a psychology professor, played an instrumental role in the project.

CCBIT has on tap several more multimedia projects for the Chemistry Department and some other projects, and Hart hopes to "ramp up" funding over the next three years.

For more information, see `http://www.cs.umass.edu/~ckc/ccbit`.

DEPARTMENT NOTEBOOK

Professors Al Hanson and Ed Riseman stand with their wives, Joan Hanson and Mary Olson, at the excavation site of the Terra Cotta Warriors. Flanking the couples are interpreters from two of their host universities.

Two professors represent Department at five universities in China

"Some of our students come from the best universities in China. A couple of their professors have visited us at UMass, and we've had a long-standing invitation to visit China," Professor Ed Riseman says.

So Ed Riseman and Allen Hanson, co-directors of the VISION research group, did just that for two weeks in October. Riseman and his bride, Mary Olson, also made a Hawaii side trip part of their honeymoon journey.

"We were treated like royalty from the moment we arrived," Riseman said. "We had VPs of universities giving us banquets when we arrived and banquets when we left."

Riseman and Hanson lectured at three of the top five universities in China on their computer vision work, including their autonomous land vehicle project. Their visits to five cities included Nanjing University and Prof. Yang, their host (and former advisor to one of their students), who organized their itinerary and covered their expenses. They also visited Tsinghua University in Beijing, where some of their current graduate students hail from. There was an interesting tour of the new library, where the associate director of that facility is the mother of Xiaoguang Wang, a current Ph.D. student in the department. At Changsha Institute of Technology, the group reunited with Wang Runsheng, who has twice been a visiting professor in the department over the past ten years. A trip to Zhejiang University was arranged to visit the former advisor of yet another Chinese alumnus of UMass, and this led their party to the city of Hangzhou, where Chinese couples go for their honeymoon at West Lake.

In a visit to Xian, China's ancient capital city, the group visited the ongoing excavation (begun in 1974) of the Terra Cotta Warriors, thousands of full-sized statues created to guard the tomb of China's first emperor — each with an individually sculpted face. It took 750,000 people working for 40 years to construct this army.

In addition to fond memories a month after their return, the 22-hour trip across 12 time zones has had profound effect on sleep patterns: "My sleep schedule took two weeks to straighten out" Hanson admits.

Faculty News

Professors **Shlomo Zilberstein** (Artificial Intelligence), **Krithi Ramamritham** (Databases and Realtime), **Jack Stankovic,** and **Jim Kurose** (Networks) were participants in the Strategic Directions in Computing Research conference, featuring the leading lights of computer science. Each participant is putting together a report, which appear in a special issue of *ACM Computing Surveys*. Also participating is Professor **Cathy McGeoch,** of Amherst College, who spent the 1995–96 year teaching in the department.

Stankovic has been awarded the IEEE Computer Society Golden Core Member award. He has also been elected to the Board of Directors of the CRA.

Professor **Rick Adrion** is coordinating a series of roundtables on issues of software quality sponsored by the LASER research group, headed by professors **Lori Clarke** and **Lee Osterweil**. Dr. Bill McKeeman of Digital and Dr. Anthony Wasserman, formerly of IDE, were the first two keynote speakers at gatherings in Newton. McKeeman followed up his talk with a lecture on Java programming at the department in Amherst, described as "standing room only."

Chip Weems has been selected to be the General Chair of the 1998 Symposium on the Frontiers of Massively Parallel Processing.

Professor **Andrew Barto** is one of seven principal investigators of a multi-university, multi-disciplinary $6.2 million center grant recently received from the National Institutes of Mental Health to investigate how brain networks control voluntary movement. The grant will be used to expand research efforts of the Center for Neuroscience Research on Neuronal Populations and Behavior that integrates the work of leading neuroscientists in the areas of motor control and motor behavior. The goal

of the center is to determine how interacting groups of neurons acquire critical information from the environment and use it to plan and control voluntary motor behavior.

Barto presented three talks in England in early September: "Learning Systems" at an EPSRC (Engineering and Physical Sciences Research Council) Postgraduate Seminar at Exeter, Sept 1.; "Reinforcement Learning Applied to Large-Scale Optimal Control Problems," the keynote address at the UKACC Control '96 conference (the major control conference in UK, held once every two years) on Sept 5 in Exeter, England; and a presentation at a session at Control '96 on Biological Control on Sept 5: "A Predictive Switching Model of the Cerebellum."

Professor **Don Towsley** began his sabbatical year as a Visiting Researcher at INRIA, Sophia-Antipolis France. In January, he returned to the U.S. and is spending the remainder of his sabbatical at ATT Research. He has also been named an ACM fellow *(see sidebar)*.

Assistant Professor **Shlomo Zilberstein** was awarded an NSF grant entitled "Intelligent Information Gathering Using Decision Models" (with **Victor Lesser** as a Co-PI). The three-year grant supports a new collaborative project between research groups aimed at developing an automated information gathering agent that can handle a variety of information sources with different levels of accessibility, reliability and associated costs.

"Our approach is to provide the system with an explicit representation of the user's decision model or task so that information gathering activity can be organized on the basis of its effect on the quality of the decision," Zilberstein says.

Professor **Edwina Rissland** has been elected a councilor of the AAAI for a three-year term. She is also president of the International Association for AI and Law for a two-year term, ending in January 1998.

Visiting Assistant Professor **Phillippe Nain** left the department on August 31. Nain had been part of the Network lab team.

Professor **Robbie Moll** has been nominated for the University Undergraduate Academic Advisor Award.

Professor **Ramesh Sitaraman** has been informed that he will receive an NSF Career Award.

Professor Emeritus **Conrad Wogrin** has been elected vice-president of the Association of Retired Faculty.

Post-doc news

Chris Eliot participated in a workshop on Applied Cognitive Diagnosis, Oct.5-6. Eliot has recently completed the following papers: "An Intelligent Learning Environment for Advanced Cardiac Life Support", with Kenneth Williams and Beverly Park Woolf, AMIA-96 (Forthcoming); "Multiple Agents Acting in Parallel within an Intelligent Real-time Tutor," with Beverly Park Woolf, Proceedings of the National Conference on Artificial Intelligence, AAAI-96; "Intelligent Simulation-Based Tutoring of Medical Technitions", Medtec-96, Orlando, Florida (1996); "Iterative Development and Validation of a Simulation-Based Medical Tutor," with Beverly Park Woolf, ITS-96, Montreal (1996); and "A Tutor that Reasons about Multiple Agents during Simulation", with Beverly Park Woolf, ITS-96 SBLT Workshop, Montreal (1996).

Sascha Englebrecht has joined the staff as a postdoctoral research associate in the ANW lab.

Staff news

James Foster and **David Motyl** are temporary technicians doing wiring in CSCF until early 1997. **Richard Mallory** did wiring this past summer. ... **Erik Haugsjaa** is a staff programmer in the CKC Lab. ... **Frank Klassner** is a senior research scientist in Victor Lesser's Distributed AI Lab. ... **Terrie Korpita** began work this summer as EKSL/CKC Secretary. ... **Jason Mark** is a temporary programmer in the CKC Lab. ... **Thomas Michel** is a senior software engineer for the CIIR. ... **Jeffrey Potter** edits and designs this newsletter and a number of other projects for the department. ... **Steven Solomon** started in September as CRICCS deputy director. ... **Gary Whitten** has joined the VISION lab as a senior research fellow.

The department bids adieu to the following staffers: **Jonathan Aseltine, Kathleen DiBella,** and **Juan Carlos Santamaria**.

Student news

Dan Barrett has written his second book, *NetResearch: Finding Information Online*, published by O'Reilly & Associates. *NetResearch* is a guide to locating information on any topic on the Internet. Dan is also a monthly columnist for *Keyboard* magazine, the most widely read computer music magazine in the USA. His column, "Net Smarts," addresses Internet-related issues of interest to musicians.

Jody Daniels participated in a consortium at AAAI '96 in Portland, Ore., in which PhD students explored their research interests in an interdisciplinary workshop with established researchers.

Two named ACM fellows

Professors **Bruce Croft** and **Don Towsley** have been elected fellows of the Association for Computing Machinery (ACM), the major international professional society of computer science.

Croft was honored for his contributions to the theory and practice of information retrieval, especially the development of new retrieval models and the transfer of research results to practice. He is editor-in-chief of *ACM Transactions on Information Systems* and past chair of the ACM Special Interest Group on Information Retrieval.

Towsley was elected for his significant contributions in the development of fundamental mathematical tools used by performance modelers, and the application of these (and other) techniques in evaluating the performance of a number of important computer and communication system architectures. He is recognized as a world expert in the area of computer and network performance evaluation. He is on the board of directors of ACM's Special Interest Group on Performance Modeling and has won several prize paper awards in the area. Towsley is also a fellow of the Institute of Electrical and Electronics Engineers (IEEE).

"This is a well-deserved recognition of these outstanding scientists; they represent the best, and we are lucky to have them in our department," said Department Chair David Stemple.

Croft and Towsley were two of 41 ACM fellows elected worldwide this year. To date, fewer than 300 of the more than 80,000 ACM members have been elected as ACM fellows.

Programming team ties for second place

Three UMass undergrads, coached by Professor **Robbie Moll,** will head to the international finals of the annual undergraduate progamming contest sponsored by the ACM.

More than 1,000 colleges and universities competed last fall in the ACM computer programming contest. The UMass team of department undergraduates **Brian Hanechak** and **Ben Horowitz**, and physics undergraduate John Sullivan, finished second in the Northeast regionals, tying Harvard for second and finishing just behind MIT. The team will participate in the international finals, a 50-team competition that will be held in San Jose, California in March.

ALUMNI PAGE

Department graduates a 'bumper crop'

"We've had a bumper crop of graduates," Professor Jim Kurose recently commented, adding that the latest PhD students from the Computer Science Department are finding new and expanding job opportunities awaiting them. Following are the department's most recent graduates:

Alan Kaplan (kaplan@ist.flinders.edu.au) finished his PhD in May and is now an Assistant Professor at Flinders University in Adelaide, South Australia, Australia. Alan and Ruth had a baby girl, named Kobi Samantha, on July 13. (Advisor: Jack Wileden.)

Robert Crites is working for a small company near Boston. (Advisor: Andy Barto.)

John Dolan received his PhD in September. He is principal engineer at Amerinex Applied Imaging, Inc. in Amherst. (Advisor: Edward Riseman.)

Chris Eliot, a postdoctoral research associate in the department, finished his PhD in February and has since published three conference papers, plus one forthcoming. He has been invited to present two workshop talks. (Advisor: Bev Woolf.)

Kousha Etessami (kousha@brics.dk) is a postdoctoral research associate in Denmark with Rutgers University. (Advisor: Neil Immerman.)

Alan Garvey is visiting assistant professor at Pacific Lutheran University in Tacoma, Washington. (Advisor: Wendy Lehnert.)

Joydip Kundu (kunduj@shogun.enet.dec.com) is a senior software engineer at Digital Equipment Corporation in New Hampshire. (Advisor: Janice Cuny.)

Tuomas Sandholm is an assistant professor at Washington University in St. Louis. (Advisor: Victor Lesser.)

Frank Klassner is a postdoctoral student at the University of Massachusetts. (Advisor: Victor Lesser.)

Robert Whitehair (102531.1330@compuserve.com) is director of technology at Decision Dynamics, Inc. (Advisor: Victor Lesser.)

Zhongfei Zhang (zhongfei@cedar.buffalo.edu) is a research scientist at SUNY/Buffalo. (Advisor: Alan Hanson.)

Tim Chamillard is at the United States Air Force Academy in Colorado Springs, Colo. (Advisor: Lori Clarke.)

Peri Tarr is working for the IBM Corporation's Thomas J. Watson Research Center in Hawthorne, N.Y. (Advisor: Lori Clarke.)

Matt Dwyer is Assistant Professor in the Department of Computing and Information Sciences at Kansas State University. (Advisor: Lori Clarke.)

Joe McCarthy finished his PhD over the summer and took a job with Arthur Andersen out near Chicago. (Advisor: Wendy Lehnart.)

Jim Salehi is at Hewlett-Packard Labs in Palo Alto. (Advisor: Don Towsley.)

ZhiLi Zhang is an assistant professor at the University of Minnesota. (Advisor: Don Towsley.)

Erich Nahum is working for IBM T.J. Watson Research Center. (Advisors: Jim Kurose and Don Towsley.)

Henning Schulzrinne is an Associate Professor at Columbia University. (Advisor: Jim Kurose.)

Jose Antonio Medina has just finished his PhD and is working for In Touch, a company based in Melville, N. Y. (Advisor: Neil Immerman.)

Marty Humphrey is at the University of Colorado at Denver. (Advisor: Jack Stankovic.)

Amer Diwan (diwan@cs.stanford.edu) is an research assistant professor at Stanford University. (Advisor: Eliot Moss.)

Scott D. Anderson (anderson@auc.edu) is assistant professor at Spelman College in Atlanta. (Advisor: Paul Cohen.)

Eric W. Brown (brown@watson.ibm.com) is a research staff member at IBM's T.J. Watson Research Center. (Advisor: Bruce Croft.)

Other alumni news

Keith Decker, who spent last year as a postdoctorate student at CMU, is now an Assistant Professor at University of Delaware.

CS Department Alumni

WE'D LOVE TO KNOW WHAT'S GOING ON WITH YOU.

Write us a few words here about life after UMass, or visit the Loose Change Exchange web site (http://www.cs.umass.edu/~loosechange) to submit your news to the editor. Send to Loose Change, Department of Computer Science, University of Massachusetts, LGRC, Box 34610, Amherst, MA 01003.

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NAME

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YEAR OF GRADUATION

. . . AND A LAST WORD FROM THE EDITOR

Pore over this issue of *Loose Change* in even a cursory manner and you'll see evidence of an academic department on the cusp of exciting change. New research — and new facilities to house and support those ideas — is evident on every page of this publication.

The new year has brought a new editor — me — and a new look to *Loose Change* and to the department publications. My job is to reflect that research and change in print, making it accessible and interesting to those with varying degrees of computer science understanding. Obviously, the audience for a publication like *Loose Change* is incredibly broad, and I call on those associated with the department for suggestions, comments, and constructive criticism.

I don't take the task lightly. In the four months I've been working in the department, I've met numerous professors and students who have expressed an infectious enthusiasm about their work. There is a warmth and humor about this department that makes it and its people a joy to write about.

In future issues, we hope to hear more from alumni, who can provide a depth and context to the news. Their own work and research ratifies the quality of education that UMass provides its students. Please drop us a line on the form on page 10, via e-mail, or on the Web version of *Loose Change*. Follow the links from the department site at `http://www.cs.umass.edu`.

Finally, we'd like to acknowledge the work of Karen Hayes, who has edited and designed numerous issues of *Loose Change* over the past few years since its incarnation. Karen, who's now working as marketing and public relations manager for UMass's Office of Science and Technology Advancement, did a terrific job and has provided advice of incalculable value through my transition. Thanks.

—Jeff Potter

Thanks for your support

The following alumni and friends have actively supported the Computer Science Department since November, 1994. Such financial support is greatly appreciated and helps maintain a world-clss instructional and research program. Contributions of alumni and friends help to fund important special activities that are not supported through the state budget.

Those interested in helping the department should send a check made to the order of the University of Massachusetts to the Alumni Office, Memorial Hall, Box 35410, University of Massachusetts, Amherst, MA 01003-5410. Please state that your gift is *restricted to Computer Science.*

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Kevin D. Ashley '88
* *Jonathan A. Bachman '82*
Barbara F. Bazemore '82
Steven R. Beckhardt '74
David J. Boutin '84
James B. Blackson '95
* *Donald A. Bray '86*
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Robert and Dawn Wiesel
Andrew B. Zaff '82
Sallie R. Zeil '85
Shirah Y. Zidel '91

Individuals whose names are starred have had their gifts matched by one of the following companies or foundations:

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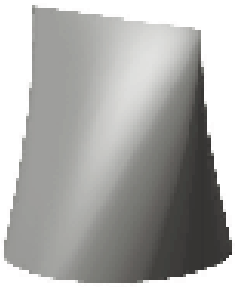
LOGOUT

Name that object!



Professor Jack Wileden has won a contest aming the object constructed as follows: "Start with a circle on the horizontal plane. 'lace a square on a vertical plane with its ›ase matching a diameter of the circle. Place ı triangle on an orthogonal vertical plane with its base matching a diameter of the circle, and with its tip on the pper edge of the square. Each horizontal cross-section of the solid is given by an ellipse-like curve with its major axis given by the intersection of the cross-section plane with the square, and its minor axis given by the intersection of the cross-section plane with the triangle."

"To see some trisquirclehedra, and the public announcement of my victory in the 'name that object' contest, go to: `http://www.research.digital.com/SRC/personal/Luca_Cardelli/TheoryOfObjects/ObjectSubject.html`," Professor Wileden writes.

Overheard

"I'm not going to go over several of these topics. Why? Because nobody can make me."

—Erich Nahum, at his Ph.D. seminar in September. Nahum had just collected all the required signatures to get his degree.

By the Numbers

- 14,742 cups of departmental coffee (caffeinated) consumed in a year
- 3,402 cups of departmental coffee (de-caffeinated) consumed in a year

Better safe than sorry

A UMass Computer Science graduate student recently received a brown envelope without a return address, and with a suspicious cylinder inside. It was postmarked Seattle. Upon inspection and opening by the elite UMass Police detective unit, it turned out to be ... a promotional from Microsoft, including a pen.

—E-mail broadcast from Cris Pedregal

Loose Change

NEWSLETTER of the DEPARTMENT OF COMPUTER SCIENCE (formerly COINS) at the UNIVERSITY OF MASSACHUSETTS

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