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NEWS FOR ALUMNI AND FRIENDS OF THE UB DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

# CSELINKS

FALL 2007 » IN THIS ISSUE



CSE PhD candidate Rajarshi Chakraborty presents a token of appreciation to alumnus Kulbir Arora (MS '85), Goldman Sachs managing director, after his talk at the graduate conference during the department's 40th anniversary celebration.

## NEW BUILDING TO HOUSE CSE

The School of Engineering and Applied Sciences has announced that a new building will rise at the school, between Ketter, Jarvis and Furnace halls, to house the Department of Computer Science and Engineering and the Department of Electrical Engineering.

The New York State Assembly recently committed \$49.6 million for the structure. These funds will be enhanced through a \$23 million capital campaign that will include naming rights for the building as a whole, as well as for laboratories, classrooms and common areas. The campaign has attracted early support.

The 130,000-square-foot structure, to be designed by Perkins and Will, a world-renowned group that has designed major buildings for the Georgia Institute of Technology and the University of Minnesota, will house a state-of-the-art "clean room" for intricate work with nanodevices; a "cybertorium" with sophisticated communications devices and smart technology; and flexible research labs, classrooms and meeting areas for interdisciplinary work.

The facility will also allow UB to use existing buildings to expand both enrollment and high-demand fields like bioengineering. These goals are aligned with UB's strategic plans, which call for the university to grow

## A YEAR TO CELEBRATE DEPARTMENT TURNS 40

**T**his past spring, the UB Department of Computer Science and Engineering capped a yearlong celebration of its 40 years of excellence in research and education with a two-day anniversary bash that drew alumni from around the country.

On Saturday, April 14, more than 150 guests—alumni, friends, faculty and students—gathered for a day of talks, panels, reunion and reminiscence. The day ended with a celebratory dinner to

mark and remember the formation of the original department in 1967.

The day's program opened with remarks by UB provost and CSE faculty member Satish Tripathi.

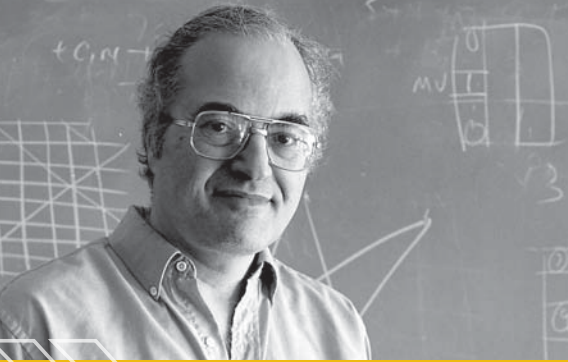
UB School of Engineering and Applied Sciences dean

Harvey Stenger showed architects concepts for a new building that will house CSE (see story opposite).

CSE chair Bharat Jayaraman and former chair Stuart Shapiro presented a brief history of the department from 1967 until 1998, when it was computer science alone, and after 1998, when the merger with computer engineering formed the department as it exists today.

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CONTINUED ON P04 »



## IN THE BEGINNING

*In the mid-1960s, UB had just merged with the State University of New York and was growing at a fantastic rate. Here, Professor Anthony Ralston recalls the moment of creation for the Department of Computer Science.*

"I went to UB in August 1965 as professor of mathematics and director of the Computing Center. I had twin mandates from the administration that hired me: (1) develop a modern computing center appropriate for a university developing into a major public research university, and (2) develop plans for an academic department of computer science.

"In the spring of the 1965–66 academic year, I submitted a proposal to establish a Department of Computer Science that would initially offer only master's and doctoral degrees. I believed—I think correctly—that only a graduate program would attract the desired quality of faculty since computer science faculty were then—and continued to be for the next 25 years, at least—in very short supply. This proposal was promptly approved in the 1966–67 academic year and the department was established (on the then newly built Ridge Lea campus) in the fall of 1967. This speed will seem amazing to 21st-century academics who live in times of budgetary stringency and massive academic bureaucracy.

"When I came to UB, I was the only faculty member who could reasonably be called a computer scientist. Since a one-person academic department is essentially an oxymoron, I set about in 1965–66, as soon as my proposal to establish a department was more or less assured of approval, recruiting faculty members for the new department. When the department opened for business in the fall of 1967, there were three faculty members: myself, Nick Findler and Arthur Stroud."

### CONTINUED FROM POI »

Invited talks were presented by C.L. Max Nikias (MS '80, PhD '82), provost of the University of Southern California; Bruce Shriver (PhD '71), UB's first doctoral graduate in computer science, now of Genesis 2 Inc. and professor at large at the University of Tromso, Norway; Deepak Kumar (MS '88, PhD '94), professor and chair of computer science at Bryn Mawr College; and former UB faculty member John Case, now professor in the Department of Computer and Information Sciences at the University of Delaware.

The celebration also included two lively alumni panel discussions on the future of technology and on the future of computing research. At the banquet concluding the special day, Anthony Ralston, founding chair,

described the formation of the original department (see box at left).

On the day before, the department's Graduate Student Association held its 20th annual graduate conference, featuring posters, student presentations and talks by alumni.

The anniversary year was also observed by devoting the department's 2006–07 distinguished speakers series to prominent alumni from academia, industry and government. (See page 4 for a complete list of speakers and their presentations.)

An extensive gallery of photographs, speakers' bios, abstracts of talks and more are available on a special anniversary Web site at <http://aluminum.cse.buffalo.edu/40>.

## CELEBRATING THE



UB provost Satish Tripathi (left) with University of Southern California provost C.L. Max Nikias (MS '80, PhD '82) (center) and his wife, Nikki.



CSE professor Chunming Qiao adds to the discussion at the graduate conference during the 40th anniversary celebration.



A panel discussion among (left to right) James Geller (MS '84, PhD '88), Deb Burhans (MS '95, PhD '02) and Srinivas Gollapudi (MS '96, PhD '04).

## CHOMICKI WINS FULBRIGHT

Associate professor **Jan Chomicki** spent the spring and summer teaching an advanced course on data integration and collaborating with faculty at the Institute of Informatics at Warsaw University in Warsaw, Poland, supported by a Fulbright grant.



Chomicki

Before he left for Poland, Chomicki, who has taught a data integration course at UB for four years, said that he would be teaching the course to fourth- and fifth-year students. "UW [Uniwersytet Warszawski] students have a very good mathematical training, so I will be able to teach the course emphasizing the logical aspects of data integration," he noted.

Chomicki joined the UB faculty in 2000. He previously was on the faculty at Kansas State University and Monmouth University in New Jersey, after receiving his PhD in computer science from Rutgers University. He has served as consultant for Bell Labs and Lucent Technologies, and as a visiting researcher at Hewlett-Packard Laboratories.

## MEDICAL TECH COMPANY COLLABORATES WITH CSE'S CHAUDHARY

Medcotek, a North Carolina medical technology company, is relocating to UB's New York State Center of Excellence in Bioinformatics and Life Sciences. One reason for the move is the opportunity to collaborate with CSE associate professor **Vipin Chaudhary**.



Chaudhary

Medcotek will work with Chaudhary as it implements and develops technologies to achieve a greater share of the market for digital transmission and remote diagnosis of X-rays and other medical images.

"Working with Medcotek is an exciting opportunity with tremendous market potential," says Chaudhary, an expert in medical imaging. Chaudhary has previously launched his own businesses and has been on the teams of several successful businesses.

Medcotek provides innovative medical software and networking technology solutions. Its expertise and proprietary systems permit low-cost, high-quality, very secure and dynamic medical communications solutions. This technology will permit medical imaging and consults to all parts of the world and increased utilization of disparate medical specialists.

Chaudhary joined CSE in fall 2006. His research has been funded by NYSTAR, New York state's program for recruiting leading entrepreneurial faculty doing science and technology research with commercial potential. He also has funding for his collaboration with Medcotek from the UB Center for Advanced Biomedical and Bioengineering Technology.

## SHAPIRO NAMED AN ACM DISTINGUISHED SCIENTIST

Professor **Stuart Shapiro** has been honored by the Association of Computing Machinery (ACM) with the designation Distinguished Scientist, a new category of membership recognizing at least 15 years of professional experience and accomplishment in the field.



Shapiro

CONTINUED ON P04 >>

## MESSAGE FROM THE CHAIR



Welcome to CSE Links, the semiannual newsletter of the Department of Computer Science and Engineering at the University at Buffalo! The year 2007 marks the 40th anniversary of computing as an academic discipline at the University at Buffalo. A yearlong celebration took place, with talks by our distinguished alumni, as well as a special two-day event on April 13-14. Please visit [www.cse.buffalo.edu/40](http://www.cse.buffalo.edu/40) for more about the program and to see a gallery of photos from the events.

Today, the department has 32 faculty members and more than 500 undergraduate students and 250 graduate students, a third of whom are in the doctoral program. Plans are afoot to create a new building for the CSE and EE departments. New York State has allocated nearly \$50 million toward this building, and the architecture firm Perkins and Will has been chosen to design the building.

CSE faculty include award-winning researchers and teachers, members of prestigious editorial boards and fellows of the ACM, IEEE, AAAI and AAAS. The research activities of many of our faculty are carried out through several successful centers: Buffalo Center for Biomedical Computing (BCBC), headed by Aidong Zhang; Center for Cognitive Science, headed by Stuart Shapiro; Center of Excellence in Information Systems Assurance Research and Education (CEISARE), headed by Shambhu Upadhaya; Center for Unified Biometrics and Sensors (CUBS), headed by Venu Govindaraju; Center of Excellence in Document Analysis and Recognition (CEDAR), headed by Sargur Srihari; and New York State Grid, headed by Russ Miller.

The department is proud of the achievements of its students, who have also excelled in research, winning best-paper awards at major research conferences and also in student research competitions here at UB. Our graduate students have also received awards for teaching and honorable mentions as teaching assistant.

I am pleased to report that UB was ranked 21st in the category of funding in computer sciences, according to a recent survey conducted by the National Science Foundation.

The department is strongly committed to its tripartite mission of teaching, research and service. I hope you enjoy reading this newsletter, and I look forward to hearing from you.

With best wishes,

Bharat Jayaraman  
Professor and Chair



CONTINUED FROM P01 &gt;&gt;

The new building to house computer science and engineering, and electrical engineering, here imagined in a architect's model.

40 percent by the year 2020 and to invest in such areas of strategic academic strengths as information and computing technology and integrated nanostructured systems.

The new building represents a private-public partnership in which individuals, corporations and foundations will be encouraged to support UB Engineering's future.

Ravinder K. Bansal, PhD, and his wife, Pratibha Bansal, MD, of Clarence, have made a \$500,000 gift to the School of Engineering and Applied Sciences to be used for costs associated with the construction of the new building.

Ravinder Bansal is chairman and CEO of Buffalo-based AirSep Corp., a manufacturer of PSA oxygen-generating systems for medical and industrial applications. Pratibha Bansal, a pain management specialist, is the medical director of Pain Rehab Center of WNY in Buffalo. In recognition of their generosity, UB will name the building's atrium the Bansal Atrium.

According to Ravinder Bansal, the majority of AirSep's senior engineering and R&D staff are graduates of the UB engineering school.

"These alumni have greatly contributed to the success of AirSep," he says. "As a result, AirSep has grown to become the world's leading manufacturer of PSA oxygen-generating equipment for use in industrial and home health-care fields.

"We are proud of the developments and initiatives being undertaken by the School of Engineering. We wanted to support UB Engineering because there is great promise for the region, the state and for national economies that are becoming increasingly dependent on science and technology."

Gina Bronkie Hammond (MS '73) has made a gift of \$150,000 to the school to support the new building. In recognition of her generosity, UB will name a graduate-undergraduate CSE laboratory the Gina Bronkie Hammond Laboratory.



Hammond

"I originally thought I would become a math teacher, but fell in love with computers," says Hammond, a vice president at Computer Sciences Corp. (NYSE: CSC) who manages CSC's GWAC (Government-Wide Acquisition

Contracts) Service Center. "The new lab is an ideal match for me: an improved teaching space for top-notch students and faculty that's fully equipped with new technology. It's an exciting opportunity." —J.M.

## NEW CSE FACULTY

**Jason J. Corso** has joined CSE as an assistant professor. He comes to UB from the Center for Computational Biology at the University of California–Los Angeles, where he has been a postdoctoral fellow since 2005. He received his master's and doctoral degrees in computer science from the Johns Hopkins University. Corso's main research interests are in computational analysis, including computer vision, medical imaging, computational neuroscience and learning.



Corso

**Atri Rudra** has joined CSE as an assistant professor. In June, Rudra received his doctorate in computer science from the University at Washington, where he studied problems in list decoding and property testing of error-correcting codes. His research interests also include game theory and algorithmic mechanism design, approximation algorithms, computational complexity, probabilistically checkable proofs, cryptography, and finite field theory and applications.



Rudra

## NEW IN THE OFFICE

**Elizabeth Lesny** has joined the department as special projects coordinator/student secretary. She will handle special projects and events and provide secretarial support for both graduate and undergraduate students. **Jennifer Tworkowski** has joined the department as business manager. She will process and monitor financial transactions for the department faculty, including staff and student appointments.



Lesny



Tworkowski

## 40TH ANNIVERSARY DISTINGUISHED ALUMNI SPEAKERS AT CSE

- » **Tin Kam Ho (PhD '92)**, IEEE fellow, Bell Laboratories. "Lighting Up the Internet's Biggest Pipes"
- » **Carl Kesselman (BA '82)**, fellow, British Computing Society, and director of the Center for Grid Technologies at the Information Sciences Institute, University of Southern California. "Distributed Infrastructure for Systems Level Science"
- » **Reid Simmons (BA '79)**, research professor, School of Computer Science, Carnegie Mellon University. "Social Robots"
- » **D. Sivakumar (PhD '96)**, Google. "Rank Aggregation"
- » **Andre van Tilborg (PhD '82)**, Deputy Under Secretary of Defense for Science and Technology, U.S. Department of Defense. "Future Directions in Department of Defense Science and Technology"



(Front to back) CSE alumni Kannan Govindaraju (MS '93, PhD '97), first doctoral graduate Bruce Shriver (PhD '71), and CSE friend Mike Gallo.

# AT THE FOREFRONT IN BIOMETRICS

Venu Govindaraju, professor of computer science and engineering, says that in the future, cameras will recognize passengers' faces at the airport while sensors sniff out chemical and biological markers or scan fingerprints as part of a comprehensive ID scan; smart cards will confirm shoppers' signatures on the spot to prevent credit fraud; and search engines will turn up foreign, handwritten and ancient texts almost as easily as they recognize Web pages today.

These are just a few applications of the cutting-edge research projects Govindaraju leads as founding director of UB's Center for Unified Biometrics and Sensors (CUBS) and associate director of the Center of Excellence for Document Analysis and Recognition (CEDAR).

"A lot of it feels like it's out of science fiction," he says, "but 10 years ago, didn't you think it would be science fiction if you could watch a TV show on a cell phone?"

In the 15 years since he earned a master's and a doctorate in computer science from UB, Govindaraju has been principal or co-principal investigator on about \$50 million in research projects with funding from such sources as the Department for Homeland Security, Office of the Director of Central Intelligence, National Security Agency, National Science Foundation (NSF), John R. Oishei Foundation and Google.

"CUBS has brought in about \$5 million of funding in various biometrics-related projects," he says. "We're just going into our fifth year, and for a young center I think we're doing quite well. I myself am surprised that we've been so successful. It must be the ... right place and the right time."

About half of Govindaraju's research relates to the field of biometrics, which he explains as "the science of identifying people." His introduction to the subject, he notes, came through his thesis work on facial recognition—a subject once seen as more relevant to artificial intelligence than to biometrics—and since then he has been at the forefront of biometrics' transformation into a red-hot field in computer science due to rising interest in both personal and national security.

"We at the center are looking at all different aspects of biometrics," Govindaraju says. "We look at facial recognition, voice recognition, fingerprint recognition, and how to combine these different methods." He includes iris recognition, gait recognition, odor detection and "hand geometry" among other identifying factors.

He explains that conventional identification methods require "tokens," such as badges, cards or keys—even passwords and PINs. "Someone else could take your keys and have the same access," he notes. "Or I could

take your credit card, swipe it and write a nursery rhyme for your signature." Biometrics renders these tricks useless, since high-tech cameras, scanners or smart cards ensure authentication based on person-specific characteristics—physical or behavioral.

"You can lose your keys or forget your PIN," Govindaraju says, "but you can't forget yourself."

In one of his current projects, Govindaraju is collaborating with UB experts in electrical engineering, computation and behavioral science to train computers to detect deceit based on "micro-expressions of the face." The project seeks to eliminate such problems as bias, fatigue and other human errors from this method of detecting deceit.

"Can you imagine someone sitting at the airport security counter asking everyone who comes in a question and then trying to study the expression on their face to decide what's going on?" he says. "We're putting together computer algorithms so that this same thing can be done by a program." This project's support includes \$1.5 million from the U.S. Department of Defense and a new \$800,000 grant from NSF.

Between his research in biometrics and other topics related to pattern recognition, Govindaraju estimates that he has been an integral part of more than 25 research projects and collaborations in the past four years.



**venu govindaraju**

Professor of computer science and engineering, Govindaraju (MS '88, PhD '92), is a leading expert in biometrics and handwriting recognition.

"UB has been putting emphasis on interdisciplinary research," he adds. "We want different groups to work together—from behavioral science to computer science to engineering to chemistry—wherever it makes sense for problem solving. You bring together experts from different areas and come up with a multidisciplinary approach."

Not all of his work concerns security. Govindaraju points to his effort to create algorithms that comprehend handwritten text in Arabic, English, Hindi and Sanskrit—he is fluent in the latter three languages—as a source of some unusual collaborations, such as a past project with Maureen Jameson, chair of the UB Department of Romance Languages and Literatures.

Support for this and his other research related to digital libraries comes from both local business and federal government sources, including more than \$1 million from the NSF since 2002. —KEVIN FRYLING

FROM THE  
LAB

**Michael Buckley**, from CSE's Assistive Technology Lab, was invited to address Microsoft's 2007 faculty summit in Seattle this summer on how

to attract more students to computer science. His answer: Give students real technology problems with real social relevance, and when they see the difference they can make in an individual life, they'll be hooked.

That's the founding principle in the lab he runs with CSE teaching assistant professor Kris Schindler. The first problem the lab took on five years ago was how to use technology to improve the ability to communicate of someone deprived of speech by stroke.

The real person in this case is a 44-year-old man named David, who many years before had been left with no speech and very limited motor skills, but intellectually unimpaired; his only means of communicating was pointing to letters and letter groups on a sheet of paper. Buckley, Schindler and their students built what is now called the UB Talker, a package of software and hardware David can use to express himself through a system of message composition and speech production running on a tablet PC.

Buckley got a call from David on the night he first used the finished system. "You'll have to be patient with me," David said, "because I haven't spoken on the phone in 20 years. Now I have to order a pizza." For the students watching David use the system they'd worked on, this was the real eureka moment.

The lab moved on to tackle the problem of building a "talker" system for children who can't speak and also can't read because of such handicapping conditions as cerebral palsy or autism. It is an exquisite user interface problem. And they know they solved it because now the children can tell them so. One idea for improving the graphics in the interface won recognition at UB's 2007 Celebration of Academic Excellence (see Student News, right).

The lab is now working on a "talker" for children who are too handicapped to search the interface for the right expression. It whispers basic phrases into an earpiece ("I want a drink"), allowing the child to select and "speak" the phrase when he hears the right one. Another project is adding contextually appropriate emotion to the adult "talker."

In a different area, the lab is working with Syracuse University and RIT on a system that monitors the physical condition and location of firefighters as they work a blaze. The goal is to put real-time tracking data on a laptop display at the scene of a fire to improve firefighter safety. —J.M.

» **Vikas Singh** (PhD '07) accepted a faculty position at the University of Wisconsin–Madison. Singh's research has been on algorithms for biomedical imaging, which was done under the supervision of Jinhui Xu (CSE) and Kenneth Hoffman (Toshiba Stroke Research Center).



Singh

» Doctoral student **Zhi Zhang** has been awarded the prestigious IBM fellowship. Zhang was an intern at IBM this past summer working with CSE alumnus Hanhong Xue (PhD '02), a previous IBM fellow. PhD advisor: Venu Govindaraju.



Zhang

» Doctoral students **Madhusudhanan Chandrasekaran** and **Vidyaraman Sankaranarayanan** received the Best Paper Award for their research on detecting evasive spyware at the IEEE Malware 2007 Workshop in April 2007. **Shambhu Upadhyaya**, who is their PhD advisor, was a coauthor of the paper.



Chandrasekaran

» CSE lecturer **Adrienne Decker** (PhD '07) received the Milton Plesur Excellence in Teaching Award in 2007, presented by the Undergraduate Student Association. Decker also was the opening speaker at the 2007 UB School of Engineering and Applied Sciences commencement. PhD advisor: William Rapaport.



Decker

» Doctoral student **Jeffrey Czyz** received first prize in the UB Engineering Graduate Research Poster Competition in April 2007 for his research on declarative and visual execution environments for Java. PhD advisor: Bharat Jayaraman.



Czyz

» Undergraduates **Rob Russello**, **Eric Nagler**, **Brenda Lynn Chodkowski** and **Johnpaul Wiejaczka** earned the UB Undergraduate Student Research and Creativity Award of Distinction at the UB Celebration of Academic Excellence for their poster on the UB Talker project to assist the speech-impaired. Faculty advisors: Kris Schindler and Michael Buckley.

## 2007 DOCTORAL PLACEMENTS

- » *Faculty positions:* **Vikas Singh**, University of Wisconsin–Madison; **Liyu Zhang**, University of Texas–Brownsville.
- » *Postdocs:* **Siyuan Chen**, NLM-NIH; **Maurice J. Jansen**, BRICS, University of Aarhus, Denmark; **Suryaprakash Kompalli**, Wayne State University; **Slawomir Staworko**, INRIA Futurs, Lille, France.
- » *Industry:* **Zhenming Chen**, Bloomberg Inc.; **Mingen Lin**, Bloomberg Inc.; **Robert Milewski**, Become Japan Inc., Tokyo.

# SUCCESSFUL SEARCH

Robin Li (MS '94), founder and CEO of the Chinese search engine giant Baidu.com, is definitely a CSE all-star alumnus, judged by entrepreneurial success. In fact, he qualifies as a UB all-star on that count as well.

Baidu, a Chinese-language search engine provider, was worth \$3 billion last year. This year, it tripled its first-quarter profits (to \$11.1 million), and its 65 percent share of the Chinese market eclipses even Google's.

Google is battling to compete with Li in one of the toughest, but potentially most lucrative, foreign markets. China boasts a booming economy and the world's second-largest population of Internet users—137 million. According to some reports, it should surpass the United States as the largest online population in as little as two years, and China has become the next great Internet frontier for new online technologies.

Li has enjoyed legendary status in China, where he is considered a "hai gui," or sea turtle—a term that refers to Chinese nationals who leave home to go to school in the U.S. and "swim" back to their home country to develop their careers. After studying information management at Peking University and earning a master's degree in computer science at UB in 1994, he went to work as a staff engineer at InfoSeek, a California-based search engine company.

Li left InfoSeek and headed to the East in 1999. He launched Baidu's Web site in 2001,

developing revolutionary online search technology now considered the industry's gold standard. In 2006, Li was worth an estimated \$645 million and was number 26 in Forbes magazine's list of the 400 wealthiest Chinese. That year, Li also received the George W. Thorn Award, given to UB graduates under the age of 40 for national or international contributions to their field.

At UB, Robin was known as Yanhong Li while a graduate student at the Center of Excellence for Document Analysis and Recognition (CEDAR), where he studied vector space models used to interpret word recognition results. He is remembered as a remarkably independent thinker, says Sargur Srihari, SUNY Distinguished Professor and CEDAR's found-

ing director. "Algorithms for information retrieval are central to search engines such as Google and Baidu," Srihari says.

Although Li's time at CEDAR was brief, he and Srihari kept in touch. "Baidu reached IPO status on the stock exchange on a Friday evening, and I sent him a congratulatory e-mail message the following Saturday," Srihari says. "I expected he would be deluged with people contacting him during the first 24 hours of Baidu going public. I was thrilled to receive a response from him within an hour, where he attributed his success to his studies conducted at CEDAR."

Today, Baidu's empire continues to grow. It launched a Japanese search engine this year, and it is negotiating to deliver services by cell phone in China. —L.N.M



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## VERY "COOL"

**Ram K. Krishnamurthy** (MS ECE '95) was named one of the 2006 Young Innovators Under 35 by MIT's *Technology Review*. The TR35, as the list is called, cites 35 of the top innovators in science and technology under the age of 35. Krishnamurthy joins a club that counts among its members such luminaries as Google's Sergey Brin and Apple's Jonathan Ive.

The head of Intel's high-performance and low-voltage circuits research group, Krishnamurthy is working on the problem of overheating computer chips, which are packed with an increasing number of transistors to increase computing power even as their overall size shrinks to fit smaller electronics.

Describing the work that put him on the list, *Technology Review* said: "By carefully plotting chip circuit paths, Intel engineer Ram Krishnamurthy has minimized energy leakage and improved performance; his prototype circuits run five times as fast as those in today's PCs but consume 20 to 25 percent as much power."

Krishnamurthy, whose UB advisor was Ram Sridhar, holds 53 patents in circuit design, and his advanced circuit prototypes are already being used by such companies as Intel, IBM and Hewlett-Packard to run servers without costly cooling systems and laptops with longer battery life.

"If PCs soon run at a cool 10 gigahertz," *Technology Review* said, "it may be thanks largely to Krishnamurthy's work."

**UB** Believers is the name of a new, broad-based advocacy group that has been created to help support the University at Buffalo and its plans to grow by 40 percent between now and the year 2020.

UB's positive impact on the quality of life in Western New York can be measured in many ways. Its annual economic impact, which already stands at an impressive \$1.5 billion, will grow exponentially as UB grows in the years ahead. A larger UB will be better positioned for success and will have a greater impact on the prosperity and quality of life of the region.

Launched in August, UB Believers is composed of dedicated individuals who recognize that they have an important role to play in helping UB achieve greater prominence among the nation's leading public research universities. Included are representatives from key constituencies, ranging from community leaders and alumni to parents and students to members of the UB faculty and staff.

Groups like UB Believers have been created in recent years at other leading public universities, including the University of Michigan, the University of Minnesota and Rutgers University. They have proven to be valuable advocates, helping to make the case to elected officials for funding those institutions.

Membership in UB Believers is free and open to all who want to support UB's growth to greatness. It is not limited to those who live in Western New York—we need the support of everyone who believes in UB. As a UB booster, you will receive regular e-mail updates from the university on its plans, progress and legislative issues. You also will receive e-mail communications asking you to become an active advocate on specific government and budgetary

issues important to UB and its future that will be under consideration by Governor Eliot Spitzer and members of the New York State Senate and Assembly.

When you are called to action, you will be referred to a special UB Web site where you will be able to direct e-mail to elected officials, using a prepared message or developing your own. You also will be able to encourage others to show they believe in UB by using the site to send them information about UB Believers and to encourage them to join.

Our goal is to assemble thousands of dedicated individuals like you as members of UB Believers. Together, we will have a tremendous impact on building the future of the University at Buffalo, as well as that of Western New York and its economy.

To join UB Believers,  
please go to  
[www.buffalo.edu/YourUB](http://www.buffalo.edu/YourUB).



## CSELINKS

NEWS FOR ALUMNI AND FRIENDS OF THE UB DEPARTMENT  
OF COMPUTER SCIENCE AND ENGINEERING

The University at Buffalo is a premier research-intensive public university, the largest and most comprehensive campus in the State University of New York system. UB's more than 27,000 students pursue their academic interests through more than 300 undergraduate, graduate and professional degree programs. Founded in 1846, the University at Buffalo is a member of the Association of American Universities.

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