THE LINK

news from the school of computer science

at carnegie mellon university

TECHNOLOGY IN PARADISE

< plus >

< The New SCS Complex >

< Leading the Way in Machine Learning >

< A Look Back at CS50 >

Calendar of Events

< 2006 >

October 12-15
Homecoming

Don't miss these SCS activities:

Friday: Attend a hands-on Alice workshop, sit in on an open class in Robotic Manipulation (George Kantor, SCS project scientist) or Principles of Computation (Tom Cortina, SCS lecturer) and hear SCS Professor Bernardine Dias on a panel about "Educating the Changemakers."

Saturday: SCS Professor Peter Lee and others discuss "Preserving America's Competitive Edge" and learn about "Transforming Lives Through Innovative Technology" with SCS Professor Jim Osborn.

October 17
SCS Alumni Networking Reception
> *Washington, D.C.*

October 19
Carnegie Mellon Network Night New York
> *Google Headquarters*

October 21
SCS Alumni Networking Reception
Host Chris Maeda (CS'92, '97)
> *Boston*

October 23
"Wall Street" Networking Night
An informal networking event for Carnegie Mellon alumni professionals currently working in investment banking, research sales and trading, asset management, private banking, corporate finance and hedge funds. Sponsored by the Tepper School of Business.
> *New York City*

December 4
Dan 60: Four Decades of Innovation
An event to honor Dan Siewiorek on his 60th birthday.
> *University Center, Carnegie Mellon campus*

December 6
Building Virtual Worlds
Stage presentation of the best interactive virtual worlds created by interdisciplinary teams this fall at the Entertainment Technology Center.
> *University Center, Carnegie Mellon campus*

< 2007 >

January 9
Carnegie Mellon Network Night San Francisco
> *San Francisco War Memorial & Performing Arts Center*

January 10
Carnegie Mellon Network Night Silicon Valley
> *The Googleplex*

January 11
Carnegie Mellon Network Night Los Angeles
> *Japanese American National Museum*

Carnegie Mellon Network Night Seattle
> *Location TBA*

February 2
Carnegie Mellon Network Night Pittsburgh
> *PNC Park*

March 8
Carnegie Mellon Network Night Washington, D.C.
> *Cannon House Office Building*

March 8-9
TK60: Celebrating Kanade's Vision
A symposium honoring Takeo Kanade on his 60th birthday.
> *University Center, Carnegie Mellon campus*

March 14
Carnegie Mellon Network Night Boston
> *Location TBA*

March 15
Carnegie Mellon Network Night Chicago
> *Symphony Center*

Visit www.alumni.cmu.edu and click on Upcoming Events for details.

Correction: *In the 50 Years of Computer Science at Carnegie Mellon timeline in the first issue of The Link, the 1984 work on MIME protocol was incorrect. The entry should have read as follows: The Andrew Messaging System creates the first multimedia email community and ultimately leads to the MIME standard (Borenstein, Everhart, Rosenberg). We apologize for the error.*

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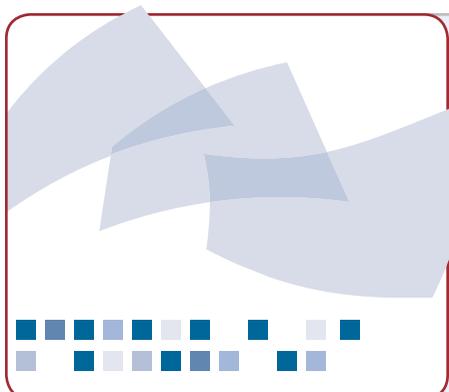
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Getting new innovations out of the lab and into the world.

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Four days of photos in just four pages.

From the Dean
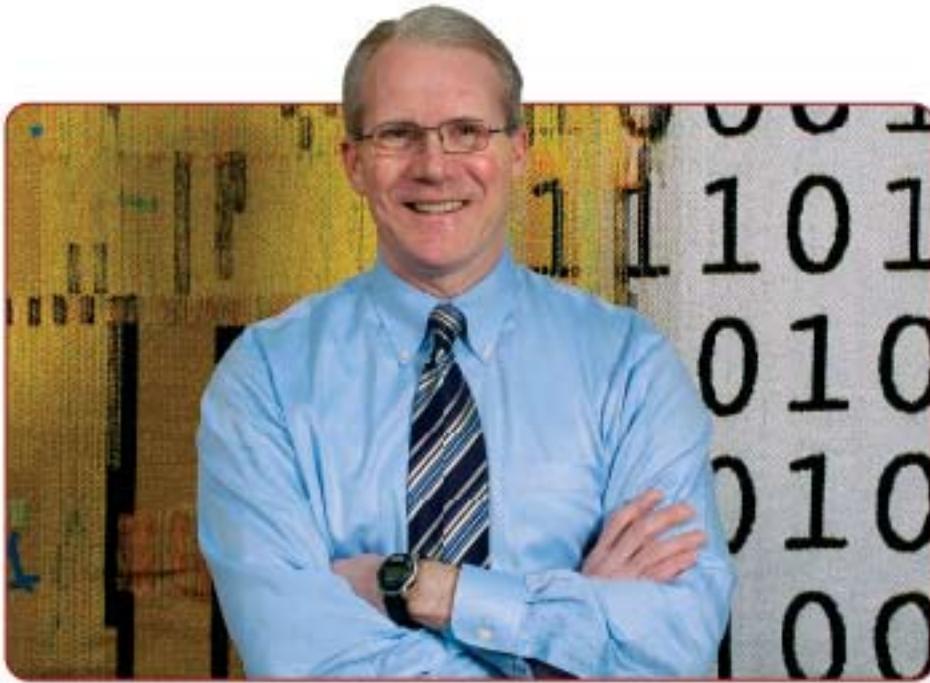
Welcome to our second issue of The Link.

We hope you enjoy reading about some of the innovative programs and people that make up the vibrant School of Computer Science (SCS) community.

Last April we had an exciting celebration on campus—CS50: Fifty Years of Computer Science at Carnegie Mellon. It was a remarkable success that brought together some of our earliest pioneers, myriad alumni and the current body of SCS students, faculty and staff. Turn to page 16 for a look back at the four days of activities and symposia. Even though I've been part of the CS community at Carnegie Mellon for 22 years, this event opened my eyes to the deep insights of our founders and the great impact that our efforts have had on many individuals and on society overall.

Many of the new technologies that continue to shape the world around us come from university research programs across the country. New efforts by Carnegie Mellon are helping to transfer more SCS technologies to independent companies and open-source ventures each year. A "Taste of Technology Transfer" on page nine gives us a glimpse into some of the recent SCS successes.

Our cover story, "Technology in Paradise," highlights a unique program that is contributing to modern society by making a difference in communities on both sides of the digital divide. This international opportunity is available to all Carnegie Mellon students through TechBridgeWorld, a university-wide initiative based in SCS.

Closer to home, the construction of the new SCS complex is having a great impact on the Carnegie Mellon campus. These new buildings, the largest of which will be the Gates Center for Computer Science, is one of the biggest construction projects on campus in over a decade. You can learn more about this impressive transformation by turning to page four, by visiting our building blog at *http://gatescenter.blog.cs.cmu.edu/overview* or by visiting campus and seeing it for yourself.

> **Randal E. Bryant,** dean

Leading the Way

Following in the footsteps of the visionaries who created the Computer Science Department back in 1965, Carnegie Mellon and the School of Computer Science (SCS) are once again leading the way in academics by creating the nation's first Machine Learning Department (MLD).

"Machine learning has grown and flourished at Carnegie Mellon, drawing ideas from and contributing to many parts of the university. It has evolved into an area of sufficient breadth and depth to merit recognition as a distinct academic discipline," says SCS Dean Randal Bryant. The new MLD will replace the existing Center for Automated Learning and Discovery (CALD) within SCS. The change reflects not only the importance of machine learning in the technology of the 21st century, but also a strong commitment by the university to continue its pioneering work in the field.

MLD's first department head will be Tom Mitchell, the Fredkin professor of artificial intelligence and learning. Mitchell co-founded CALD in 1997 and was instrumental in developing the current machine learning coursework, including the country's first Ph.D. in machine learning. The new department also boasts seven faculty members who are on the editorial boards of the field's top journals.

Over the past 50 years the study of machine learning has grown from a handful of computer scientists exploring whether or not computers could learn to play games and a separate group of statisticians who largely ignored computational considerations into a broad discipline that has produced fundamental statistical-computational theories of learning processes, has designed learning algorithms that are routinely used in commercial systems for speech recognition, computer vision and a variety of other tasks, and has spun off an industry in data mining to discover hidden regularities in the growing volumes of online data. "Even 20 years ago, machine learning had few commercial applications," Mitchell says, "but now it is the method of choice for an important niche of software applications that will grow rapidly as we develop more accurate learning algorithms." Today, machine learning enables data mining techniques that are used by grocery chains to analyze the purchasing habits of their customers and by astrophysicists to recognize new cosmic phenomena within sky survey data. The U.S. Postal Service employs computer-vision-trained machine learning on a massive scale to automatically sort 85 percent of the snail mail letters containing handwritten addresses. Their handwriting analysis software is trained to very high accuracy using machine learning over a very large data set.

Machine learning methods are also reshaping the practices of many data-intensive empirical sciences, like biology and physics, and many of these sciences now hold workshops on machine learning as part of their field's conferences. Likewise, the 23rd International Conference on Machine Learning, held this past June on the Carnegie Mellon campus, included interdisciplinary workshops such as "Learning in Structured Output Spaces" and accepted papers on topics ranging from medical image classification to cost-sensitive learning and from statistical debugging to Bayesian pattern ranking in the ancient game of Go.

"Machine learning has emerged as a distinct scientific discipline and one that is uniquely suited to Carnegie Mellon's strengths," says Carnegie Mellon Provost and Senior Vice President Mark Kamlet. "Drawing on both computer science and statistics, machine learning is another example of how the university's tradition of multidisciplinary research produces important scientific insights." Δ

< LOG ON >

www.ml.cs.cmu.edu
www.icml2006.org

Tom Mitchell,
Machine Learning Department head and the
Fredkin professor of artificial intelligence and learning

Creating the New SCS Complex

The transformation of the western side of campus has begun. The Publications Building and the old student center are gone, as are the steep metal steps leading down the hillside. Construction trailers fill the parking spaces and the air is abuzz with the hum of bulldozers, excavators and dump trucks. For now, you can see both Doherty and Wean halls as you drive down Forbes Avenue.

The new School of Computer Science (SCS) Complex will fill this now-empty space between upper campus and Newell-Simon Hall with two of the most innovative research and student-friendly buildings in Pittsburgh. The project will also convert the old drab asphalt roadways into the new West Campus Quad—a collection of unique green spaces filled with native plants and specially designed for the unusual ravine topography.

According to SCS Professor and Building Program Chair Guy Blelloch, the buildings were designed from the inside out to meet the needs of faculty, staff and students. "Every

The old student center on Forbes Avenue: going...going...gone!

These interior renderings for the new SCS complex show the broad use of natural light.

one of the 315 offices will have a window with natural light and there will be many open collaborative neighborhood spaces," says Blelloch. Other amenities include a 250-seat auditorium, 13 classrooms, 11 conference rooms and 8,000 square feet of open project space.

The larger of the two buildings, the Gates Center for Computer Science, was made possible by a lead gift of $20 millon from the Bill and Melinda Gates Foundation. The upper stories of the modern building will be twisted slightly so that rather than facing the plain brick back wall of the Purnell Center, the eastern windows will face the Cut and the southern windows will look out over the new green space towards Doherty Hall. Views of Oakland and the Cathedral of Learning will dominate the western windows.

The smaller trapezoid-shaped building, as yet unnamed, will be dedicated to research and will create a welcoming space on Forbes Avenue. Its green roof will be the second-largest of the five green roofs planned throughout the complex. The largest will cover a 150-space underground parking garage with a wide expanse of grass and be edged by Northern Bayberry shrubs and Quaking Aspens.

The SCS Complex will forge new connections across campus as well. A fully accessible pedestrian bridge will extend east from the fifth level of the Gates Center to the Cut. One floor down, another bridge will connect the Gates Center with the top floor of Newell-Simon Hall.

The buildings are scheduled to open in early 2009. Δ

"Our goal is for this new building to be a catalyst for computer science breakthroughs. Carnegie Mellon is one of the top schools for computer science in the nation, and we hope the foundation's gift will help the school continue to excel and push the envelope of human understanding and innovation."

> **Bill Gates,**
co-founder of the Bill & Melinda Gates Foundation

The Gates Center for Computer Science as it will look from the new West Quad between Newell-Simon and Smith halls.

In the Loop with SCS Faculty

Jeannette Wing

President's Professor of Computer Science

Head, Computer Science Department

Computational Thinking:

"Deep technical challenges remain in the field of computer science and we need to do something to engage the next generation of researchers. Promoting computational thinking across all disciplines and to younger students will convey the breadth and depth of our field and show them that there is more to computer science than just programming.

"As computer scientists, we think at many layers of abstraction, using various algorithmic and assertional approaches to research problems. But if we look around, many abstract computer science concepts can be found in our daily lives. For instance, when your daughter goes to school in the morning, she fills her backpack with the things she'll probably need that day. That's prefetching and caching. Choosing which line to stand in at the supermarket checkout is job scheduling. Computational thinking can be used as a 'bumper sticker' for the computer science community.

"The response to my article on computational thinking in Communications of the ACM has been fantastic so far. I've heard positive comments from hardcore academics to current industry leaders and from retired IT professionals to high school AP teachers."

Researching Trustworthy Computing:

"To build better systems, we have to look at not only the longstanding computer science concerns of security and reliability, but also at various privacy issues that until recently had been left to policy makers and lawyers. Another major system concern is usability. The human user is often the weakest link—no matter how strong your network security or how reliable your software, one successful social engineering scam can wreak havoc on an entire system. By taking a holistic approach, we can create systems that are more trustworthy."

The Administrative Angle:

"I love to teach and engage with our students and I am truly looking forward to co-teaching Models of Software Systems this fall. However, I also appreciate my role as department head. It gives me unique opportunities to share Carnegie Mellon's successes with a wide audience and to build awareness about the world-class research that happens here every day. I am extremely proud of our faculty, staff and students and feel lucky that I get to represent them."

Daniel Siewiorek

Buhl University Professor of Electrical and Computer Engineering and Computer Science

Director, Human-Computer Interaction Institute (HCII)

Humans, Computers and Engineers:

"Engineers tend to be bottom up thinkers and computer scientists tend to be top down thinkers. Human-computer interaction integrates these two complementary 'tool sets' and places the human user at the center of the computing system."

Context Awareness:

"We're on the verge of context-aware (CA) computing—creating systems that combine built-in sensors, artificial intelligence and mobile computing to proactively assist users. CA can help with infrequent problem solving, like when your car's dashboard *check engine soon* light flashes. Instead of you having to search through the entire maintenance manual for an explanation (it's usually caused by inferior gasoline), the car's built-in software could index the manual with the car's GPS system, noting when and where you last bought fuel, and then show you only the appropriate section of the manual or suggest a remedy.

CA applications can also be used to coach people 'in the wild' as opposed to only during controlled training situations. We're currently developing a wrist-worn unit for wheelchair users to help prevent repetitive use injuries like carpal tunnel and rotator cuff tears."

The Importance of Academics:

"Now that many of the industrial in-house research labs have been phased out, companies are looking to partner with innovative universities to solve the hard questions generated by real world problems. Theory is important, but so is taking real measurements with real systems, which often leads to new research questions. A number of very good Ph.D. thesis topics have come out of summers I've spent consulting with various companies.

Teaching gives me the opportunity to have an impact on the current curriculum, to write textbooks, to share new findings, to research cutting-edge applications. And about every 10 years, I get to sort of reinvent myself. With Moore's Law, the major parameters of computing are changing by up to a factor of 1,000 over a decade, so you'd better be doing something different because so much is possible now that wasn't possible before.

Besides, interacting with students keeps you young—they don't know what can't be done."
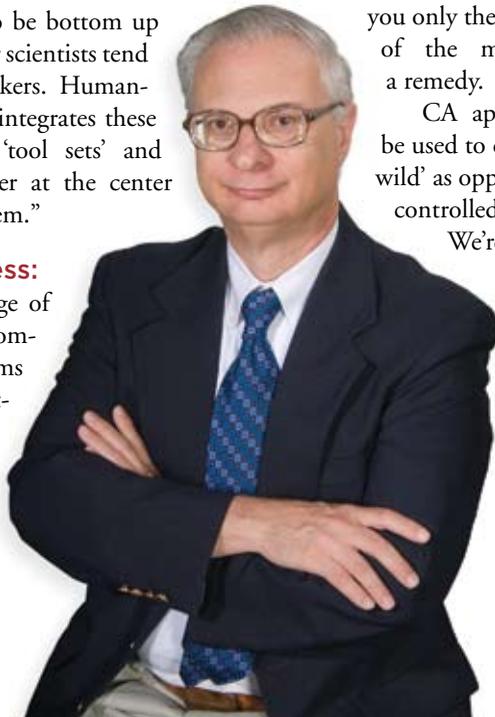
Student Awards

Throughout the 2005-06 academic year, many SCS students were honored for their accomplishments.

< Carnegie Mellon Awards >

Allen Newell Award for Excellence in Undergraduate Research

Kanat Tangwongsan (CS'06, CS doctoral candidate)
Active Data Structures and Applications to Dynamic and Kinetic Algorithms

Andrew Carnegie Society Scholars

Yanka Li (CS'06)
Benjamin J. McCann (CS'06, TPR'06)
David I. Murray (CS'06, A'06)
Gregory W. Price (CS'06)

Computer Science Department Ph.D. Scholarship

Tom Murphy VII
Virginia Vassilevska
This alumnus-endowed scholarship is awarded to current Ph.D. students whose innovative research has the potential to change the field in which they are studying.

Alan J. Perlis SCS Student Teaching Award

Luis von Ahn (CS'03, '05)

< External Scholarships and Fellowships >

ARCS Foundation Scholarship: Achievement Rewards for College Scientists

Michael Dinitz (CS doctoral candidate)
Daniel Wendlandt (CS doctoral candidate)

AT&T Laboratory Fellowship

Moira Burke (HCI doctoral candidate)

Boeing Leadership Scholarship

Jeffrey Grafton (CS'08)
Stephanie Rosenthal (CS'07)
Daniel Vann (CS'07)
Andrew Warshaver (CS'08)

Clare Boothe Luce Graduate Fellowship

Michelle Goodstein (CS doctoral candidate)

DSO Postgraduate Scholarship

Leonghwee Teo (CS'99, HCI doctoral candidate)

Fulbright Scholar

Francisco Calderon (RI master's candidate)
Rolf Allan Luders (RI master's candidate)

Google Anita Borg Memorial Scholarship

Preethi Bhat-Srinivas (CS'06)
Ariadna Font-Llitjos (CS'01, LTI doctoral candidate)

IBM Ph.D. Fellowship

Vincent Conitzer (CS'03, '06)
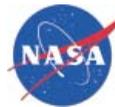
NASA Graduate Fellowship

Mary McGlohon (ML doctoral candidate)
Nick Patronik (CS'04, RI doctoral candidate)

National Defense Science and Engineering Graduate Fellowship

Nick Armstrong-Crews (RI doctoral candidate)
Andrew Ko (HCI doctoral candidate)
Matthew Wachs (CS doctoral candidate)

National Institutes of Health Fellowship

Alik Widge (CS'03, RI doctoral candidate)

National Science Foundation Fellowship

Lillian Chang (RI doctoral candidate)
Michael Dinitz (CS doctoral candidate)
James Hays (CS doctoral candidate)
Laura Hiatt (CS doctoral candidate)
Amy Hurst (HCI doctoral candidate)
Daniel Lee (CS doctoral candidate)
Mark Palatucci (RI doctoral candidate)
Deborah Sigel (RI doctoral candidate)
Andrew Stein (RI doctoral candidate)
Ling Xu (CS'04, RI doctoral candidate)

Siebel Scholarship

Anna Goldenberg (ML doctoral candidate)
Dinesh Govindaraju (CS'04, '06)
Estefania Pickens (ETC'06)
Alla Safonova (CS'04, CS doctoral candidate)
Sebastian Scherer (CS'04, RI doctoral candidate)

2006 Robot Hall of Fame Inductions

Dressed in a shimmering gold dinner jacket befitting his C3PO alter ego, actor Anthony Daniels served as master of ceremonies for the third Robot Hall of Fame induction ceremony, held this past June at the Sheraton Station Square in Pittsburgh as the finale to the 3rd annual RoboBusiness conference and expo. Prior to the inductions, keynote speaker Daniel Wilson (CS'05), author of "How To Survive A Robot Uprising," presented his humorous vision of the ways robots may eventually impact our world.

SCARA Selective Compliance Assembly Robot Arm

Developed in 1978, SCARA's revolutionary 4-axis design enabled cost-effective precision manufacturing of small electronics and produced an astounding effect on the world's economy. Today, there are nearly 100,000 instances of the robot in operation worldwide. SCARA's inventor, Hiroshi Makino, professor emeritus at Yamanashi University, traveled from Japan to accept the award at the ceremony.

AIBO Japanese for "companion"

A small programmable robodog with the ability to learn, Sony's AIBO was designed to bridge the gap between functionality and entertainment. Its enormous research potential spawned the international legged robosoccer league. Manuela Veloso, the SCS Herb Simon professor of computer science and advisor of the world-class Carnegie Mellon AIBO teams since 1998, praised its contribution to research in multirobot systems. Katsumi Muto, former president of Sony's Entertainment Robot company, accepted the honor.
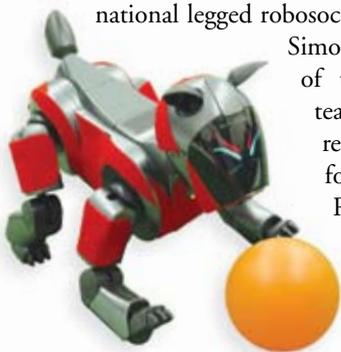
Maria Female robot icon

Born in the 1927 silent movie "Metropolis," the robot Maria is one of the most iconic images in film history. She is also one of only a handful of female robots in early science fiction. The stunning and powerful laboratory scene in which the human heroine's face is transferred to the robot has often been repeated, but never duplicated. Anne Balsamo, professor of interactive media and gender studies at the University of Southern California and a Maria expert, accepted the award.

Gort Intergalatic bodyguard

Another black and white classic film brought Gort to life in 1951 in "The Day the Earth Stood Still." A powerful yet peaceful force from an alien ship, Gort is an eight-foot tall robot with laser-like vision. Actor Billy Gray, who portrayed the young boy Bobby in the film, spoke of the fictional robot's ability to identify the aggressor in a conflict and how Gort "was the ultimate golden rule enforcer."
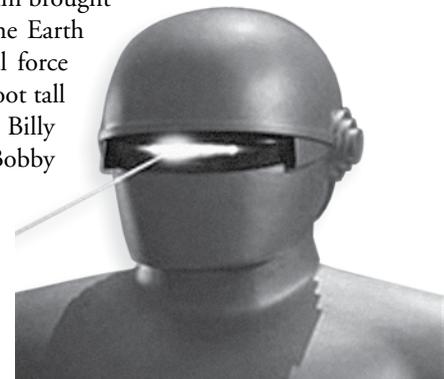
David Cyberchild

The final member of the Class of 2006 is from the modern film "A.I." The mechanical David is programmed to think he is a real boy and permanently bonds with his human mother. David's real world champion, Sherry Turkle, professor of the social studies of science and technology at the Massachusetts Institute of Technology, accepted the award and cited the characters' emotional journeys and their impact on society, "Decisions about the role of robots in the lives of children and seniors cannot turn simply on whether children and the elderly 'like' the robots. [Robots like David] make us ask 'what kind of relationships are appropriate to have with machines?'" Δ

Left to right: Hiroshi Makino and RI Director Matt Mason; Katsumi Muto and Manuela Veloso; Anne Balsamo and ETC Co-director Don Marinelli with a Maria replica; Billy Gray and Don Marinelli with a life-sized Gort replica; Sherry Turkle and Anthony Daniels.

a taste of
TECHNOLOGY
TRANSFER

It's been a good year for technology transfer at Carnegie Mellon University and the School of Computer Science (SCS). Of the 14 new companies launched by the university in FY 2006, seven have their roots in SCS. Many of them are based on robotic technologies, including medical, subterranean and autonomous navigation applications, as well as robotic toys. In 2005 the university spun out seven companies; in 2004 there were only four. Robert Wooldridge, director of Carnegie Mellon's Center for Technology Transfer and Enterprise Creation, says the increased number of start ups reflects a new effort by the center to seek out state and foundation funding to provide services for fledgling companies such as assistance with business plans, market entry strategies, media support and recruiting.

When including the group from 2006, Carnegie Mellon has rolled out 189 new companies over the last decade. More than 70 percent of them have located in and around the Pittsburgh area.

SCS spinoffs reflect some incredible technological advances—**Lycos** commercialized one of the world's first Internet search engines; **FORE Systems** became a leader in asynchronous transfer mode Internet switching equipment, and **Transarc**, based on the university's Andrew File System, represented pioneering work in distributed transaction processing and wide area file systems.

"SCS is unique when it comes to technology transfer," says Wooldridge. "A lot of what's developed is software that's open sourced. So, when we look at the real contributions of the school to technology transfer, we have to ask if we're talking dollars or are we talking impact?" Wooldridge speculates that "Sphinx," the first large-vocabulary, speaker independent, continuous speech recognition system, introduced by SCS researchers in 1988 and put into the public domain in the 1990s, might have had the greatest societal impact so far because so many companies have picked it up and continue to work with upgraded versions of the system. "If you stay strictly with numbers, you may miss the real impact on society," he says. "Another measure is how many technologies we moved out of our labs to [existing]

companies, other laboratories and other universities. It may be that moving a technology to several other universities is as important as starting a company."

The overall mission of any university is threefold: education, research and service, or getting the fruits of research back into society. The federal government wants technology developed at universities to be commercialized because it shows that the tax dollars used to fund the research were well spent.

Technology transfer as we know it today began in 1950 with the formation of the National Science Foundation, the independent government agency that supports fundamental R&D in all the non-medical fields of science and engineering, including computer science. A national watershed of change came about in 1980 with enactment of the Bayh-Dole Act, enhancing university-based technology development to include small business formation.

SCS' own history in technology transfer began in the early 1980s when computer science faculty members William Wulf (CS'99 honorary), John Nestor (E'82, '87) and Anita Jones (CS'73) founded **Tartan Laboratories** to commercialize a compiler optimization technology that Wulf's team had developed.

Today, the tech transfer stories are as varied as the companies themselves. Newly birthed **Sensible Machines**, started by SCS Associate Research Professor Sanjiv Singh (CS'90, '95) grew out of six years worth of work developing autonomous golf course lawn mowers. "Many equipment makers don't see themselves as experts in robotics," says Singh, "but they have a vision for making their equipment drive autonomously. There is a clear need for a company

that can provide the technology to make it work and as the research in this area matured, we realized we could be one of those companies." Sensible Machines recently received a grant from The Technology Collaborative, a Pittsburgh-based development initiative, to bring its efforts closer to commercial use. "The technologies we've developed at Carnegie Mellon that enable ground vehicle navigation could also be applied to specialty agriculture and demining."

Raul Valdes-Perez (CS'91) proudly shows off the headquarters of **Vivisimo**, a six-year-old enterprise search software company that competes with the likes of Google and boasts clients such as the American Association for the Advancement of Science and the RAND Corporation. Valdes-Perez developed the technology as an SCS faculty member. As of April 2006, the company had a roster of 40 employees and much larger goals. "We're profitable," he says. "We've been doubling our revenue over each of the last three years. We're looking at being a major software company with about 200 employees and $50 million in revenue in three years. We're all proud of building something from nothing."

Adjunct SCS faculty member Henry Schneiderman's (E'90, CS'00) two-year-old company, **Pittsburgh Pattern Recognition (PittPatt)**, now has six employees housed in Pittsburgh's Strip District. Working with university resources, Schneiderman developed PittPatt's face detection technology and has now licensed it. He holds one patent on the technique and others are in process. "I had been getting a lot of inquiries to use the technique for commercial purposes," he says, "and I realized it couldn't happen without me." PittPatt has been surviving on government contracts, but is now working with General Electric to build a motorized camera system to pan and tilt on people automatically and Lockheed Martin is looking at some security products. "Being from Carnegie Mellon certainly helps," says Schneiderman. "By nature of being faculty, you make a lot of contacts within the industry and have access to potential employees. Also," he notes, "rents in the Strip District are one-tenth of what they are in Silicon Valley and the place has lots more character."

NEWELL-SIMON HALL

Walk through the doorway of Carnegie Mellon's Newell-Simon Hall and you're crossing the threshold of the biggest technology transfer story in the university's history.

Newell-Simon, currently home to three divisions of the School of Computer Science, was built with some $20 million derived from the sale of the university's shares of Lycos, Inc., a company created in-house to commercialize one of the world's first Internet search engines.

Lycos was invented in 1994 by Michael "Fuzzy" Mauldin (S'83, CS'89), then a research computer scientist in the Language Technologies Institute. As he pulled all-nighters in his crowded lab, he couldn't have dreamed how much his work would change the way the world gathered information. Lycos became a public company, traded on the NASDAQ, just nine months after it was formed in 1995. It has since been sold and resold, but the name will always hold a stellar place in the history of the Internet.

"Carnegie Mellon got a building and I got to retire, but the thing I'm proudest about," says Mauldin, "is that Lycos gave everyone the ability to search a body of knowledge, get the information free and have it paid for by advertising. It's an incredible democratizing event and represents a huge shift in the way information is used."

Schneiderman says he got the confidence and inspiration to start his company from Dean Pomerleau (CS'92), who just sold his **AssistWare Technology** firm—an 11-year-old venture based on work he did at Carnegie Mellon's Robotics Institute—to Massachusetts-based Cognex Corporation. Both companies make a range of machine-vision and sensor systems for vehicles and their drivers.

"The university provides a good incubation environment," says Pomerleau. "The experience I got managing projects for the Department of Defense (DoD) and the Department of Transportation (DoT) were extremely valuable when I became a small business owner." At Carnegie Mellon Pomerleau managed several DoT projects involving runoff road collision warning systems that have been his company's "bread and butter." Now the DoT has funded a $25 million grandson of the original Carnegie Mellon program. That, Pomerleau says, was of great interest to Cognex.

"There's a tendency for faculty in a university setting to have blinders on to the potential commercial value of what they're doing," he observes. "Keep an eye out for those opportunities and jump on them when you get a chance." Δ

TECHNOLOGY
IN PARADISE

Students learn first-hand about bridging the digital divide with more than just computers and software.

Meg Richards (CS'07) and Hallie Parry (A'07, CS'07) on the beach at Hambantota, Sri Lanka.

The blue of the Indian Ocean stretches out endlessly from the southern shore of Sri Lanka. Near the village of Hambantota, large waves continually pound the beach, creating a swath of smooth, warm sand. A short walk inland, across the dunes and though the pine barrens, Meg Richards (CS'07) and Hallie Parry (A'07, CS'07) are mapping out a technology curriculum for the Children's Resource Center (CRC), a nonprofit organization offering health and education programs for children who lost parents in the devastating December 2004 tsunami. Richards and Parry have been here two weeks so far and have already designed an informational brochure and networked the CRC's six computers. Despite the intermittent and excruciatingly slow dial-up Internet speed, creating a Web site is next on their list.

Thirty-six hundred miles to the east, on the other side of Indonesia, the Rock Islands of Palau look as if they are floating above the clear blue Pacific Ocean. In-between these jungle-topped knobs of limestone, an anchored sailboat waits while Gopal Patel (E'07, CS'07) and Steve Maher (HS'06) snorkel through some of the world's most diverse aquatic life. The next week, Patel and Maher find themselves immersed in meeting after meeting at the Belau National Hospital in Koror, deciphering the diverse database needs of nine different departments.
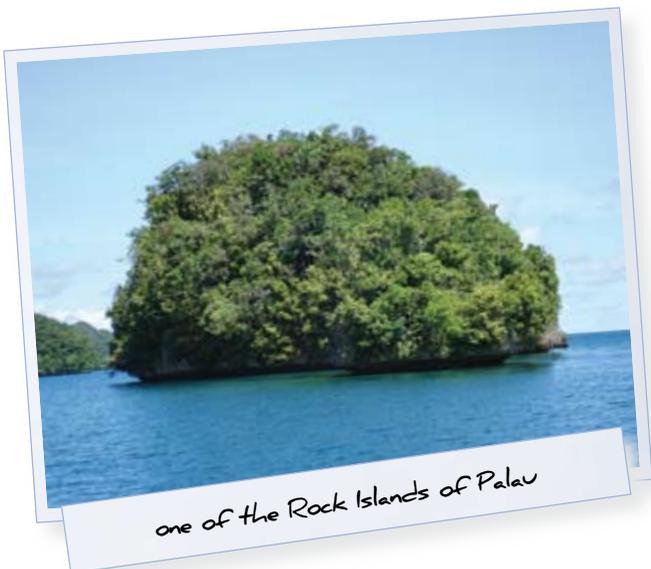
one of the Rock Islands of Palau

Still further east, in the middle of the Pacific Ocean not far from the International Date Line, Daniel Dvinov (CS'06) and Conrad Woodring (E'06) board the morning ferry for their workday commute. The 25-minute trip through the picture-perfect turquoise waters of the Marshall Islands takes them from the palm trees, clean beaches and modern facilities of Kwajalein to Ebeye, a low, flat sliver of land and one of the most densely populated places in Micronesia: 12,000 people living on 80 acres. There is little fresh water and the vegetation is sparse. The hospital where Dvinov and Woodring are headed relies on generators to overcome the island's four hour cycles of on-again-off-again power. One of their first tasks is to train the staff how to use a newly donated satellite communications system.

So how did these tech-savvy, email-addicted, self-described computer geeks from Carnegie Mellon find themselves working in such relaxed, remote and technically low-resourced environments?

It all began in Pittsburgh, in the fall of 1997, at a School of Computer Science (SCS) faculty seminar. Researchers Allan Fisher, then-SCS associate dean for under-graduate education, and Jane Margolis were studying current undergraduates' perceptions of computer science. They discovered that many of the young men were satisfied with the coding-focused curriculum and expected their future employment to include full-time programming, but many of the young women were drawn to a broader, more interdisciplinary pedagogy and were put off by the prospect of spending their careers in a cubicle.

In the audience was Joe Mertz, now an SCS and Heinz associate teaching professor. Over and above the gender disparity, Mertz was struck by the disparity between the students' perceptions of their future employment and the realities of working in computer science. As a former software developer at Bell Laboratories, Mertz had seen first-hand the difference between recent graduates with only programming skills and those who knew how technology could benefit the entire company. At the time of the seminar, Mertz was co-director of Carnegie Mellon's Center for University Outreach and was well aware of the need for technical knowledge and under-standing among local nonprofit organizations. "I proposed to Allan that we create a course where students could go out into the community and help these nonprofits, see how their technical skills really do play out and how technology affects people and organizations," Mertz recalls.

The new course, 15-391, Computer Science in the Community, held its first class barely eight weeks later in January 1998. The class later adopted the more appropriate and appealing name of Technology Consulting in the Community (TCinC).

Ebeye, Republic of the Marshall Islands

Priming the Local Pump

"Most students have a default image of consulting as more like 'contract programming'—someone's going to tell me what to do and I'll write a program and I'll be done," Mertz explains. Not so with TCinC. In addition to attending regular classes, each student works with a community partner, a decision maker at a Pittsburgh-based nonprofit organization who has a real problem that they think technology might be able to solve. Together they identify what technology can help the organization fulfill its mission, how it can be implemented within the limitations of the group's structure and budget and whether it can adapt to future changes.

A short documentary about a remote village in Togo provides a strong teaching metaphor for the students. In "The Water of Ayole" government engineers drill a well in Ayole and install a simple manual foot pump to supply clean drinking water. The health and economy of the village improves, but the pump eventually breaks down. No one in Ayole knows how to repair it, so they go back to collecting unsafe water from a river several miles away. Years later, through a partnership between government extension agents and the villagers themselves, the pump is finally repaired, a local techni-cian is trained and maintenance plans are implemented. The film vividly portrays the difference between just providing technology (the pump) and creating an appropriate, sustainable solution.

Over the past eight years, 257 students have taken the TCinC course and assisted more than 170 different organizations with everything from simple databases and staff training to custom applications and robust Web sites. "When you have that many interventions across so many organizations," says Mertz, "you start to make a contribution to the region."

Paul Freund, project director of Consumer Action and Response Team and a Spring 2003 TCinC partner, agrees. "The primary outcome for me in this project is that I've learned how to see tech-nology as part of our organization," says Freund. "What impressed me the most was [the students'] ability to listen and to help assess our needs and to then help us think about them critically."

Thinking Globally

With the success of the local program, Mertz considered replicating the consulting class on a global scale. Talented Carnegie Mellon students could provide valuable services to low resourced areas and receive the benefit of an international experience in return. The global initiative began in earnest in 2003 when Mertz met a former United Nations Association (UNA) member from California

writing in the sand at Babeldoab, Palau

who put him in contact with the UNA Hawaii chapter and its development program with the small island states of the Pacific.

Beautiful tropical islands, white sandy beaches and palm trees would certainly help recruit students, he thought.

The next step took Mertz to the annual Pacific Telecommunications Council conference in Hawaii in January 2004. At the very first coffee break, Mertz met with the CEO of Telecom Cook Islands and the development officer for the International Telecommunication Union (ITU is the department of the United Nations system that deals with telecom policy and development). They were definitely interested.

The Cook Islands may have many modern amenities, but they also face the same problem of rural communities the world over: small diminishing pockets of population isolated from educational resources, health care facilities and economic markets. And in the South Pacific, being isolated means more than not having a Starbucks in town. Consider this, if the city of Pittsburgh were the capital island of Rarotonga, the closest of the other 14 islands would be near Cleveland, Ohio and the farthest away would be outside Jacksonville, Florida. Plus, you need a boat to get there.

For the first iteration of Technology Consulting in the Global Community (TCinGC) in the summer of 2004, Carnegie Mellon selected and prepared two students to spend 10 weeks on Raratonga. The host government provided housing and a small stipend for food, laundry, local transportation and the like. ITU underwrote the students' travel.

The first year in Paradise

To TCinC student Lindsey Bleimes (CS'04), the opportunity to spend a summer in the South Pacific was just too good to pass up. Her soon-to-be employer, Lockheed Martin, agreed and delayed her hire date. "This wasn't a stint at a U.S.-affiliated school in Europe with 20 other kids doing home-work we could blow off because it's all pass-fail. This was the real thing," says Bleimes. "I was plopped

Conrad training the Ebeye hospital staff

down on an island 20 miles around, 6,000 miles from home, with one other kid I'd never met before and told to help fix their communications infrastructure."

The "other kid" turned out to be Mark Egerman (CS'05). Although he had nonprofit experience—he was on the board of directors for the Thomas Merton Center and he ran a housing co-op on campus—he was not originally selected to go because he had not taken the TCinC class. Four weeks before they were to leave for Rarotonga, one of the original students withdrew due to health concerns and Egerman was asked to fill the spot.

In addition to fixing numerous computers at the Cook Islands' Ministry of Health hospital, Egerman assisted in the planning and installation of a high-speed intranet and added functionality to the ministry's Web site. Bleimes spent her time with the Ministry of Education implementing and customizing a Web content management system. Each made a lasting contribution and increased the organizations' capacity for technology in the future.

heading back to the CRC after some fun on the beach

The students went home with added capacity, too. "I learned some technical things about networking and satellite communication infrastructure," Bleimes recalls, "but the real value of an experience like [this] is in the people you meet and the little obstacles you deal with, like how to operate a right-hand-drive car, how to crack open a coconut or how to get over your fear of bugs because they're in your bedroom no matter what you do."

The TCinGC summer program is now part of a unique university initiative called TechBridgeWorld, founded by SCS Professor Bernardine Dias in 2004.

An expert in robotics and a native of Sri Lanka, Dias was encouraged by her peers at Carnegie Mellon to think about how her current work might change the world in 20 years. What better way to do that, she thought, than to increase the diversity of both the creators and the consumers

Steve (left) and Gopal (right) receive
a certificate of appreciation from
Dr. Victor Yano, Palau's minister of health

of technology? By making technology accessible and relevant to developing and underserved communities around the world, both sides of the digital divide benefit tremendously. Today, TechBridgeWorld is a multi-disciplinary umbrella organization embedded within Carnegie Mellon to enhance technology education, research, development and deployment. "There are a lot of barriers to global projects: travel, culture adjustments, formal expectations and contracts," says Dias. "TechBridgeWorld provides an infrastructure and facilitates these details."

Over the past three years, Dias, Mertz and TechBridgeWorld have received outstanding support from the Carnegie Mellon administration, fellow faculty members and several generous donors, including software engineering entrepreneur Paul Egerman and his wife, Joanne. As Carnegie Mellon parents, they were impressed with the interdisciplinary opportunities available through SCS. "As technology continues to change our society, engineers and computer science professionals need to play a leading role in government and community," says Egerman. "I especially like the way that Carnegie Mellon students are exposed to nonprofit organizations in Pittsburgh. Through these programs, they have opportunities to learn the 'people skills' necessary to communicate their ideas and solve problems."

More global partners and an increase in funding for the summer of 2005 allowed 11 TCinGC students to add international consulting to their resume. This past summer, the ten students selected for TCinGC 2006 represented all seven schools and colleges at Carnegie Mellon; they were matched with global partners in Chile, the Federated States of Micronesia, Sri Lanka, the Republic of the Marshall Islands and Palau. The list of potential partners is growing and Dias and Mertz hope to secure funding for at least 20 TCinGC students next summer.

Experience of a Lifetime

Blogs are as popular in the middle of the Pacific as they are in the middle of Pittsburgh. Low bandwidth and dial-up modems may have limited the TCinGC student postings, but their combined commentaries provide insight into the breadth of their experiences.

Sri Lanka
Thursday, June 22, 2006

Yesterday, we held a staff meeting to introduce the new monthly report format. I've never experienced a bilingual staff meeting before. It was a trip. I get the sense that not quite everything was translated for me and the whole thing took two hours, but the bottom line is that the staff seemed happy, as did the administration.

Ebeye
Wednesday, June 21st 2006

The parallels between what we are doing and what happens in "The Water of Ayole" are astounding. There are many things here that they don't even really know are here. … It's like discovering gold, or better yet oil, in the place you'd least expect it.

Friday, July 21st, 2006

All computers working. All connections working. Exchange server working. Active directory server working. ISA server working. Firewall working. Life is good.

Many people have started using the exchange server and love it for its apparent speed. … We seem to have fixed many of the small bugs that have come up along the way and have learned a lot in the process.

Palau
Friday, July 28, 2006

We also went on a trip to Babeldoab [Palau's largest island]. Since we went during the work week, we stopped at some of the remote dispensaries along the way to check out their computers and fix internet connections/fax machines.

Jim Morris, Carnegie Mellon West dean and former SCS dean, was once heard to say, "We don't want to create the next Dilberts of the world."

So far, so good. ∆

Carnegie Mellon

FIFTY YEARS OF COMPUTER SCIENCE

The guest nametags waiting at registration read like a who's who of computer innovation and research: Feigenbaum, Traub, Geschke, Shoup, Jones, Spector and Rashid were just a few of the more than 600 registrants for CS50: Fifty Years of Computer Science at Carnegie Mellon and four days of remembrance and inspiration.

DAY 2

Beginning with the IBM 650 and the days of Herb Simon, Allen Newell and Alan Perlis, Carnegie Mellon has looked at the world of computer science from a unique perspective. The first symposium of CS50 honored the people and efforts central to creating one of the first independent schools of computer science in the country.

Angel Jordan (E'59), university professor emeritus and former provost, highlighted the transformation of computer science at Carnegie Mellon from a lone computer in the Graduate School of Industrial Administration into the world-class School of Computer Science.

DAY 1

"Our vision for CS50 was to focus on the people who created the stimulating and congenial environment that has allowed computer science to flourish at Carnegie Mellon for over 50 years. This vision worked out beyond anything we expected. Ed Feigenbaum, who was right there when Newell, Simon and Perlis first got together, and who went on to become a distinguished leader in artificial intelligence, set the tone for what would unfold over the next few days. Whether speakers talked about the past, present or future, everyone could see that Carnegie Mellon is the kind of place where people look beyond the near-term limitations of our systems and technology to come up with ideas and solutions that will have great impact over the long term."

> **Randal E. Bryant**
dean, School of
Computer Science

Governor Ed Rendell came to campus to officially open the CS50 celebrations.

Rick Rashid (CS faculty '79-'91), senior vice president of research at Microsoft, gave a special presentation on the future of computer science research in general and at Microsoft in particular.

Inspired to join the new field of computer science after reading through the manual for the IBM 701, **Ed Feigenbaum** (E'56, GSIA'60) joined the faculty at what was then Carnegie Institute of Technology after completing his Ph.D. here in 1960. Now the Kumagai professor of computer science emeritus at Stanford University, Feigenbaum told stories from the first decade, what he called "the supernova of computer science."

C. Gordon Bell (CS faculty '66-'72), senior researcher at Microsoft, joined the symposium via videoconference from the Carnegie Mellon West campus in Sunnyvale, California for a joyful recollection of the era when Carnegie Tech became Carnegie Mellon.

A student during the nexus of growth in computer science at Carnegie Mellon, **Jesse Quatse** (S'58, E'62, '69) reviewed how the hardware design of the G-21 contributed to the nascent computer industry and to the foundations of the School of Computer Science. He fondly recalled using the first portable data entry station: two large pieces that fit together to form "sort of a 70 pound laptop." Today, Quatse is the senior researcher for the biometric company Pay By Touch.

Pictured here with SCS Dean Randal Bryant (on the right), **Richard Shoup** (E'65, CS'70), adjunct professor at Carnegie Mellon West, reminisced about the stunning view from the computer lab on the top floor of Scaife Hall and reflected on the things he would not have believed in 1970 (i.e. that the word "crash" would still be in common usage). Looking toward the future, Shoup spoke on the challenge of reconfigurable computing and the need to strengthen the math foundations of future computer scientists.

Co-founder and chairman of Adobe Systems, **Charles Geschke** (CS'73) remembered the Computer Science Department culture of "getting people together" not only in research projects, but also during the unique Black Friday reviews and in informal situations like the lunchtime Brownie Plate Gang. He also noted how the ARPA grants of his time were a tremendous investment by the country with the incredible results now visible in numerous companies along Highway 101 in Silicon Valley.

J. Renato Iturriaga (S'64, CS'67) traveled from his home outside Mexico City to attend CS50. He has the distinction of receiving one of the first computer science-specific Ph.D. degrees awarded at Carnegie Mellon and currently heads the Special Unit for Priority Programs Monitoring of the Mexican Ministry of Health. Iturriaga spoke of the unique interdisciplinary approach and the impact of having spent time alongside "the big three" (Perlis, Simon and Newell, of course).

Joe Traub (CS faculty '71-'79), took on the mantle of head of the new Computer Science Department in 1971. He oversaw tremendous growth and is credited with coining the name "Black Friday" for the biannual intensive day of graduate student reviews. Traub is currently the Edwin Howard Armstrong professor of computer science at Columbia University.

CS50 attendees enjoy lunch on the bridge between Newell-Simon Hall and Wean Hall.

SCS Associate Professor **Norman Sadeh** (left) at the annual Supply Chain Trading Agent competition, along with University of Minnesota Professor John Collins, SCS doctoral candidate **Michael Benisch** and SCS Post-Doctoral Researcher **Alberto Sardinha**.

CS50 attendees verify their digital keys at the PGP Key Signing.

SCS Professor **Randy Pausch** (CS'88) delivered an entertaining keynote presentation highlighting "Fifty Years of Computer Science Innovation" at Carnegie Mellon.

DAY 3

The Semi-centennial Symposium brought together numerous alumni and faculty to present current issues and research topics.

The **CS50 Gala Reception** at the National Robotics Engineering Center was a chance to mix and mingle and marvel how entertaining technology can be.

Carnegie Mellon President **Jared Cohon** offers a toast at the CS50 Gala.

Leslie Valiant (CS faculty '73-'74), the T. Jefferson Coolidge professor of computer science and applied mathematics at Harvard University, opened the symposium with a look at AI theory and why computer science needs it.

Using analytical performance modeling to overturn age-old beliefs on load balancing and distributed system scheduling was the topic of an entertaining presentation by **Mor Harchol–Balter**, associate professor of computer science at Carnegie Mellon and the 2003 recipient of the Herbert A. Simon teaching award.

Alfred Spector (CS faculty '81-'89), vice president of strategy and technology at IBM, presented key elements of the technology agenda for people, process and information integration and the implications for both computer science education and research.

It's been said that one of the best predictors of the future is the past. **Robert Colwell** (E'78, '85), president of R&E Colwell and Associates, looked back through the previous five decades, extracting industry lessons and reviewing the patterns, to see what might be in store for our technological future.

When **Anita Jones** (CS'73) completed her Ph.D. at Carnegie Mellon, she was one of a handful of women in the world of computer science. Now the Lawrence R. Quarles professor of engineering and applied science at the University of Virginia, her presentation focused on the economic importance of university research and innovation.

Charles Leiserson (CS'82) believes that learning how to lead and communicate is an important part of the Carnegie Mellon undergraduate education. Now a professor of computer science and engineering at MIT, Leiserson created two interactive leadership workshops designed to address human-centered issues and enhance the participant's self-understanding of their role as leaders.

"Computer Scientists Can Save the World" was the title of **Latanya Sweeney's** semi-centennial session. As an SCS associate professor of computer science and public policy and an expert in privacy, Sweeney introduced Technology Dialectics as a new research paradigm for preventing or minimizing clashes between emerging technologies and the settings in which they are to be deployed.

SCS faculty **Raj Reddy**, the Mozah Bint Nasser university professor of computer science and robotics, and **Jaime Carbonell**, the Allen Newell professor of computer science and director of the Language Technologies Institute, co-presented the final session on the Million Book Digital Library project and the research problems it reveals in text mining.

A model of the new computer science complex, including the Gates Center and plenty of green space, was presented by architects **Mack Scogin** and **Merrill Elam**.

Friday's lunch brought attendees together in the Celebration Tent on the Cut.

Spring Carnival took place the same weekend and saw the very first SCS blitz booth on the Midway.

SCS alumni and friends gathered at the Alumni After-Party for an evening of entertainment from Bill Deasy and his band and **Scott Draves'** (CS'97) Electric Sheep screen saver art demonstration.

CS50 attendees gathered on Saturday for a RoboTour, the Software Engineering Institute open house and a memorial for Professor Jim Tomayko.

From the Director

The Globalization of Alumni Outreach

Recently, I've had an increasing number of graduates inquire about networking opportunities outside of the United States. There are definitely more alumni living abroad these days, thanks in part to the globalization of technology and numerous on-going research collaborations between our faculty and researchers at international universities and corporations. There are also more international graduates—alumni who have taken part in Carnegie Mellon's global educational opportunities. The School of Computer Science provides such opportunities through the Institute for Software Research International's MSIT-Software Engineering degree programs in India and Korea as well as via its distance education option. The College of Engineering's Information Networking Institute offers executive education courses in Athens, Greece, as well as a master's of science in information networking in collaboration with Athens Information Technology.

The university as a whole is committed to providing education on a global scale and has opened new campuses in Qatar and Australia. The Qatar campus offers undergraduate degrees in computer science and business. The Australian campus, located in Adelaide, offers master's degrees through the Heinz School of Public Policy and Management and the Entertainment Technology Center (ETC). The ETC also plans to open locations in Korea and Singapore.

Carnegie Mellon has also formed partnerships with institutes such as Taiwan's Industrial Technology Research Institute. This partnership allows researchers to come to Pittsburgh and work with our faculty on projects such as improving security technologies in both Taiwan and the U.S.

With more educational opportunities available, the body of international Carnegie Mellon alumni is growing, providing valuable networking connections to the university, to the School of Computer Science and to individual alumni.

We are dedicated to providing opportunities for all of our alumni to stay connected; creating and supporting regional alumni chapters is one of the best ways to encourage networking. The growth of the international alumni base has already resulted in an increase in the number of local alumni communities in other countries. For example, there are Carnegie Mellon alumni chapters in India (in Bangalore, Delhi and Mumbai) and in Korea. The Tepper School of Business has many international alumni chapters (U.K., Japan, Taiwan and more) and although these are school-based chapters, most events are open to all Carnegie Mellon alumni. You can search the alumni calendar at www.alumni.cmu.edu for events in your area.

The success of an alumni chapter depends on the participation of our alumni volunteers. We can't do it without you. Whether you live in the U.S. or abroad, you have the opportunity to help strengthen our world-wide network by volunteering. If there is a chapter in your area, get involved. If there isn't a chapter in your region and you would like to connect with local alumni, offer to help organize an event. It can be as simple as a meet-and-greet social hour or as complex as a golf outing. Contact me to discuss your ideas and how we can help one another. It's just one way you can help to energize both your local alumni community and the global university network.

Tina M. Carr

> **Tina M. Carr** (HNZ'02), director of alumni relations

< Stay Connected! >

Have you moved? Changed jobs? Have a new email address? Let us know!

Email your name, graduation year and your new information to Tina Carr, SCS director of alumni relations, at **tcarr@cs.cmu.edu** or visit the Carnegie Mellon alumni services Web site and submit your current contact information online.

LOG ON > www.cmu.edu/alumni

Cream of the Class of 2006

The Alumni Award for Undergraduate Excellence in Computer Science recognizes technical excellence in research and development by a graduating senior. The 2006 award was presented to David I. Murray during the SCS diploma ceremony in May for his thesis "Adaptive LAN-to-host Multicast: Optimizing End System Multicast via LAN Multicast Integration."

David graduated as a dual major, earning a B.S. in computer science with a minor in human-computer interaction and a B.F.A. in voice performance. Currently, David is an associate product manager for Google in Mountain View, California. As the most recent alumni award recipient, David is also member of the SCS Alumni Advisory Board.

LOG ON > www.cs.cmu.edu/alumni

Grace Lewis (CS'01), chair of the SCS alumni award committee and a member of the SEI technical staff, and alumni award winner David Murray (CS'06, A'06) after the SCS diploma ceremony.

@ SCS Alumni Events

Over 70 alumni attended the SCS/ECE picnic held at Seattle's Lincoln Park on August 13, including Denise Noyes (CS'04), Kayur Patel (CS'03), Ben Hollis (CS'05).

Scott Nettles (CS'93, '96), Larry Huang (E'91) and Derek Beatty (CS'93) met up with more than 50 SCS and ECE alumni at the Cool River Café in Austin, Texas on August 3.

David Steier (CS'86, '89), left, and Jim Morris (S'63), West Coast campus dean, are decked out in their favorite SCS shirts for the annual SCS/ECE summer picnic. They were just two of the nearly 100 alumni and students gathered on the Carnegie Mellon West campus for the July 22 event.

Alumni Snapshots

Peter Freeman

B.S., Physics
Rice University, 1963

M.A., Mathematics
University of Texas, 1965

Ph.D., Computer Science
Carnegie Mellon University, 1970

Peter Freeman's interests in computer science, academia and government first converged in 1987 when he served two years as Division Director for Computer and Computation Research at the National Science Foundation (NSF). In 2002, he returned to the NSF as assistant director of the Computer and Information Science and Engineering directorate and has enjoyed developing national strategies for computer science and engineering research funding ever since.

In-between his NSF appointments, Peter spent 12 years at Georgia Institute of Technology in Atlanta as both professor and founding dean of the College of Computing. Among many other accomplishments at Georgia Tech, he spearheaded FutureNet, a broad, high-performance campus network as part of the preparations for the 1996 Olympic Village. He was originally "loaned" to the NSF from the University of California, Irvine, where he was a faculty member of the Department of Information and Computer Science.

Peter's early research included one of the first interactive time-sharing operating systems (1964) and an initiative for applying artificial intelligence to the software design process (1965-75). He still today appreciates the broad view of computer science he gained during his Ph.D. years.

"On the Carnegie Mellon campus, there was a continual flow of (what are now seen as) the founders of computer science from all over the world. It was fascinating to meet and talk with them and learn first hand about the technical work they were doing."

An avid traveler, Peter has had the opportunity to teach professional short courses in venues from Japan to Argentina to Germany, and also taught for the United Nations in Budapest during the Cold War and in the Philippines during the Marcos regime. He and his wife of 20 years share four sons and currently live in Washington, D.C.

Elaine Rich

A.B., Applied Math & Linguistics
Brown University, 1972

Ph.D., Computer Science
Carnegie Mellon University, 1979

According to the subtitle of her very first book, Elaine Rich came to Pittsburgh "expecting the worse and never found it." The book, the first edition of "A Guide to Living in Pittsburgh" (co-authored with Brian Reid, CS'81), began as a simple listing of decent places to live and eat and grew into a best seller among graduate students throughout the city.

Studying at Carnegie Mellon provided Elaine with a broad perspective of computer science. Her doctoral thesis, "Building and Exploiting User Models," explored the idea of interactive systems working with the general population, which was "kind of a wild idea" in the late 1970s.

After completing her Ph.D., Elaine began teaching at the University of Texas at Austin. She then spent several years at the Microelectronics and Computer Technology Corporation (MCC) researching natural language processing and techniques for building intelligent human interfaces. She is currently a senior lecturer at UT-Austin and the author of the highly respected text "Artificial Intelligence." Earlier this year she presented a faculty seminar at Carnegie Mellon to discuss automata theory and its applications for her next book, due out in late 2007.

"I like writing books best of all the things I've done. You start teaching it for a number of years and you see what works and what doesn't and you evolve it. After a while you say 'hey, I think I've got it, so if I wrote it down and tied a ribbon around it, then other people could use it too.'"

Elaine is involved with TWIST, Tomorrow's Women in Science and Technology, an Austin-based nonprofit organization that works to keep middle school girls interested in math and science. She is a member of the advisory board for the SCS Language Technologies Institute and an accomplished quilter.

Ajay Jain

B.S., Biochemistry and Computer Science
University of Minnesota, 1986

M.S., Computer Science
Carnegie Mellon University, 1991

Ph.D., Computer Science
Carnegie Mellon University, 1992

As a student, Ajay Jain was drawn to computer science as a path to solving real-world problems. Today he is both an academic and an entrepreneur and is making an impact on cutting-edge cancer research.

After completing his Ph.D. thesis on parsing spoken language in 1992, Ajay joined multiple successive start-up biopharmaceutical companies to develop computational methods for structure-based drug design. In 1998, he founded the software company BioPharmics LLC, which announced a global partnership for product distribution this past summer. Ajay joined the University of California, San Francisco (UCSF) in 1999 where he is now an associate professor and director of the Informatics Core at UCSF's Cancer Center. His research focuses on the paradigm of predictive computational modeling.

"I am able to bring together computer science, particularly machine learning, with difficult problems in biophysics, biology and chemistry. The work ends up being theoretically interesting as well as having practical applications."

He recalls the varied interests of the Carnegie Mellon computer science community, the excellent diversion of the opinion b-board and the honest feedback of his advisor. Ajay is currently a member of the SCS Alumni Advisory Board. He and his wife, Ann, live in San Mateo, California.

Kelly Bowles Lyman

B.H.A., Information Design and Human-Computer Interaction
Carnegie Mellon University, 1999

M.S., Human-Computer Interaction
Carnegie Mellon University, 1999

Kelly Lyman was a true interdisciplinary student at Carnegie Mellon. Being able to easily cross academic boundaries, Kelly gained an understanding of computer science, visual design and social science, all key ingredients for designing technology products well.

She now works in the space where technology and art meet—studying people, developing insights for new uses for technology and creating new software concepts as a User Centered Design Lead at IBM Almaden Research Center in San Jose, California. Kelly enjoys seeing her team's business modeling ideas produce significant value for both IBM and its clients.

"Over the next decade, I believe there will be continued focus on communication and collaboration through technology. I can also imagine applications of computing to help issues in healthcare, transportation and the environment."

A highly organized and diverse student, she graduated with high honors while also DJ-ing at WRCT, co-editing Dossier for The Tartan and redesigning the SCS Web site. Her current extracurricular activities include salsa dancing "to unwind after work" and traveling with her husband of two years.

William Paredes

B.S., Computer Science
Carnegie Mellon University, 2001

M.E.T., Entertainment Technology
Carnegie Mellon University, 2001

According to his bio on the Entertainment Technology Center's Web site, Wil Paredes "has played video games in order to goof off for years." These days, however, he's making a living at it as a lead programmer for Rockstar Games. Wil was one of the original programmers as well as technical director for Rockstar's latest offering, the sports simulation game Table Tennis.

"In my career, I've used something from every class I took at Carnegie Mellon. Games are one of the few fields in which every aspect of computer science can be applied: graphics, physics simulation, artificial intelligence, interface design, operating systems and hardware-level optimization have all come in handy."

Wil's favorite Carnegie Mellon memories include dining at Mad Mex and the relaxed feel of Spring Carnival. He lives in San Diego and enjoys playing the piano, reading and, of course, playing video games. Wil is also a current member of the SCS Alumni Advisory Board.

SCS in the News

Quality of Life Technology Engineering Research Center

Information technology already has revolutionized manufacturing, the military and entertainment; now it is needed to help millions of people maintain their independence despite the frailties of old age—or the disabilities that can occur at any age. With support from the National Science Foundation, Carnegie Mellon and the University of Pittsburgh have established the Quality of Life Technology Engineering Research Center to develop those technologies, with SCS Professor Takeo Kanade and University of Pittsburgh Professor Rory Cooper as co-directors. The Associated Press carried the story nationwide, as did Health Business Week and other health and business publications.

Taken by Storm

This summer, LEGO Education rolled out its updated MIND-STORMS robot-building kit to the U.S. market, along with a new curriculum for middle and high school students developed by the director of the Carnegie Mellon Robotics Academy, Robin Shoop, and his team. The co-branded Lego Education/Carnegie Mellon curriculum, which Shoop believes will make robotics an even more powerful teaching tool, subsequently was released worldwide. Business Week, Electronics Weekly, Design News, the NSTA (National Science Teachers Association) Reporter and the Pittsburgh Post-Gazette were among those who reported that robotics is becoming the fourth "R" of education.
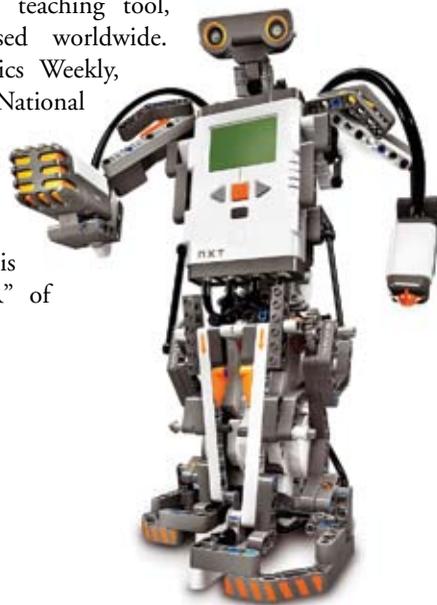
Ballbot

SCS Research Professor Ralph Hollis' latest robot, Ballbot, is the first to move about by balancing atop a ball. This dynamic stability makes possible a robot that is tall enough to interact with people, but thin and agile enough to fit in human-size spaces. A lot of people have a ball watching it – Popular Science and Business Week ran features and an Associated Press story got wide play on Web sites and publications worldwide. Ralph's video of Ballbot received thousands of hits on YouTube.com and an uncredited appearance on Rocketboom's video podcast.

Identity Angel

Identity Angel is a project based in SCS Associate Professor Latanya Sweeney's Data Privacy Lab that scans the Web for publicly available information about individuals that increases their risk for identity theft—their Social Security number, date of birth and address. The lab then warns vulnerable individuals and suggests how they can protect themselves. The latest iteration began in late July, drawing the attention of Newsweek, National Public Radio's All Things Considered, CNET news, the Salt Lake Tribune, ConsumerAffairs.com and others.

Global Connection

A team of researchers from Carnegie Mellon University, NASA's Ames Research Center and Google will be honored in November at the annual Tech Museum of Innovation award ceremony in San Jose, California for their work on the Global Connection Project. This jointly developed software helps rescue workers better respond to natural disasters by rapidly overlaying aerial photographs onto Google Earth's satellite images. Implemented for both Hurricane Katrina and the earthquake in Pakistan, evacuees and aid workers were able to use the Internet to assess damage and plan relief efforts. Early coverage of the nomination was carried by the AllPointsBlog.com, the San Jose Mercury News and the San Francisco Chronicle.

Bovik's Blog

19 SEPTEMBER 2006

The Monroeville Codex and the Antediluvian Computer Scientists

No, it's not the title of the latest Dan Brown novel, nor is it the next round of debate on intelligent design.

The ancient, and fictional, Monroeville Codex was the premise of the ninth annual International Conference on Functional Programming (ICFP) contest. It was created by three SCS graduate students and a rising SCS senior and is one of the cleverest bits of programming to come down the pike in many years.

According to the narrative, an ancient society devoted to the study of programming and computation was active in the Pittsburgh region more than 2,000 years ago, long before the invention of digital computers. During excavations for Carnegie Mellon's new computer science buildings, workers discover a Rosetta stone that enables researchers to decipher the society's artifacts. Contest participants were given a description of the society's computing device and 72 hours to work it all out. Once they simulated a virtual replica of the ancient computer, they could unlock the codex to reveal eight puzzles based on computer science research, popular culture and computer game lore.

This contest received more than double previous years' registrations: over 900 teams, including 60 brave enough to register in the last 24 hours of the game.

The programmers most successful at deciphering the codex and solving the puzzles will be revealed at the ICFP conference tonight in Portland, Oregon. They'll receive a monetary prize and bragging rights for the programming language that put them in the winner's circle.

The rest of us will get a peek at how it all came to be. Point your browser to www.boundvariable.org for the details.

For curious programmers who missed out on the original game and want to give it a try, an updated codex will also be available.

Never let it be said that geeks aren't imaginative folk. Especially those at Carnegie Mellon.

POSTED BY BOVIK AT 7:12 AM | 3 LINKS TO THIS POST

MY PROFILE

**HARRY Q. BOVIK
PITTSBURGH, PA**

Hi there, I'm Harry Bovik. For over three decades now people have been sending me opinions on all sorts of local topics. I'm grateful for any information you might have, so please pass it on!

VIEW MY COMPLETE PROFILE

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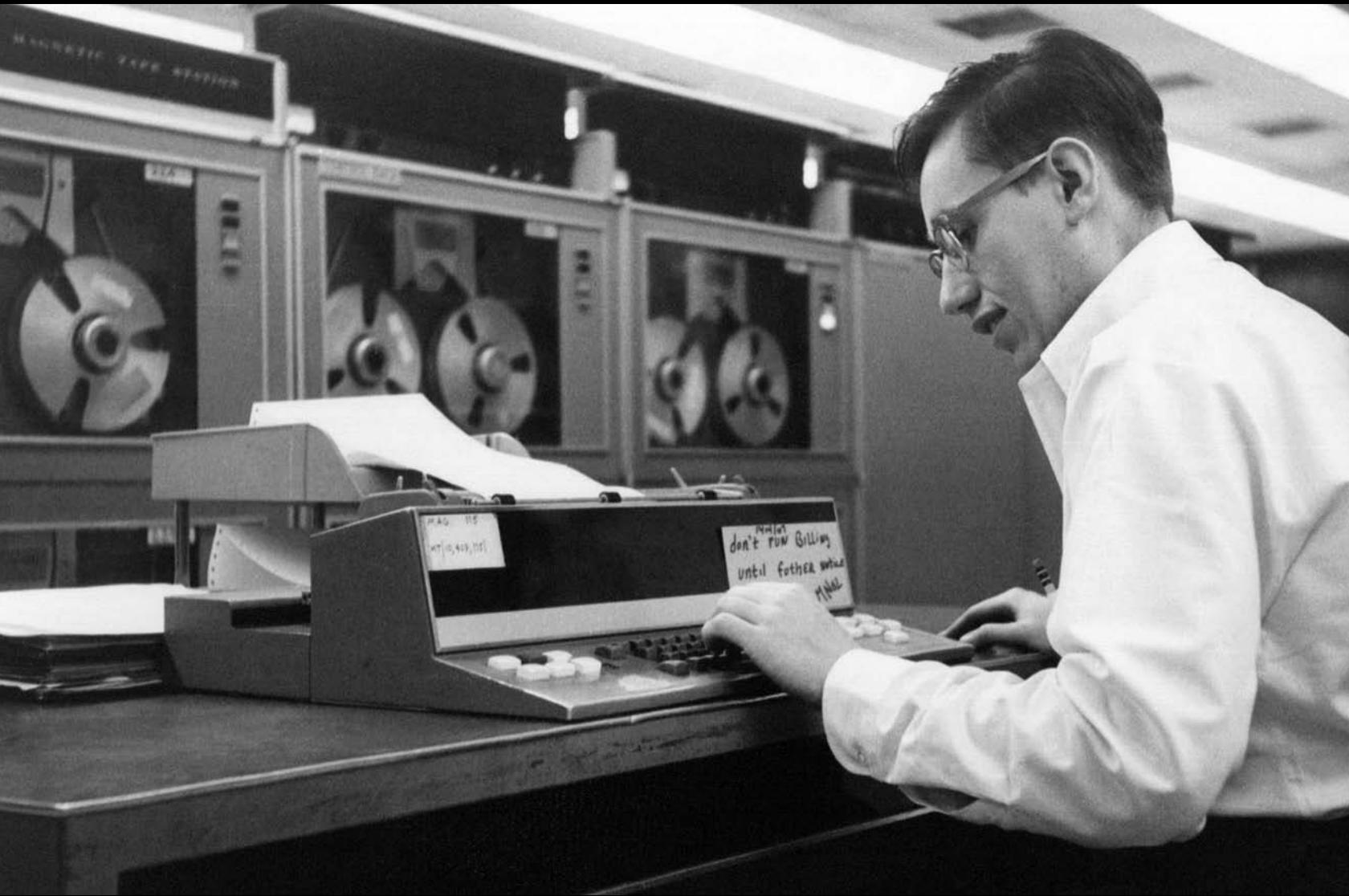
Roy Weil (E'70) sits at the data entry console of the Bendix G-21 in Scaife Hall. With its two central processors, card queue and teletype servicing monitor, the G-21 was the workhorse of the Computation Center for many years.

Do you have an interesting CS photograph to share? We'd love to see it! Send submissions via email to TheLink@cs.cmu.edu.

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