How I Spent My Summer
Calendar of Events

All events to be held at the Carnegie Mellon University campus in Pittsburgh unless otherwise noted.

October 4
SCS Distinguished Lecture
Fran Allen, IBM Fellow Emerita
2007 Turing Award Recipient
“Parallel Computers Will Be Everywhere: How Will We Use Them?”
> Wean Hall

October 12-13
Pittsburgh Perl Workshop
> University Center

October 14
Carnegie Mellon Network Night
San Francisco
> San Francisco War Memorial & Performing Arts Center

October 18
Carnegie Mellon Network Night
New York City
> 3 West Club

October 25-28
Homecoming

November 3
Urban Grand Challenge
> Victorville, California

November 10
College Puzzle Challenge
Sponsored by Microsoft
> Wean Hall

November 15
SCS Alumni Networking Reception
Hosted by Marc Donner (CS’82, ’84)
RSVP to tcarr@cs.cmu.edu
> New York City

December 7
Last day of classes, fall semester

January 8
Carnegie Mellon Network Night
Silicon Valley
Hosted by Google
> Mountain View, California

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

January 10
Carnegie Mellon Network Night
Los Angeles
Hosted by Hulu.com
> Location TBA

January 12
Carnegie Mellon Network Night
Seattle
Hosted by Microsoft
> Redmond, Washington

January 14
First day of classes, spring semester

February 1
Carnegie Mellon Network Night
Pittsburgh
> PNC Park

March 6
Carnegie Mellon Network Night
Washington, D.C.
> Location TBA

March 11
Carnegie Mellon Network Night
Boston
Hosted by eScription
> Location TBA

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

Correction: In the Faculty Awards section of issue 2.0, Research Professor Katia Sycara should have been included as an IEEE Fellow “for contributions to case-based reasoning, multi-agent systems and semantic web services and standards.” We apologize for the omission.
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Cover Image: Researchers pose with their robot, DepthX, in the warm waters of the La Pilila cenote in central Mexico. Image courtesy of Robin Gary.
The School of Computer Science has been a whirlwind of activity recently and we've received more press coverage than I could have imagined. Our Tartan Racing team is in the final stages of tuning up ‘Boss,’ a Chevrolet Tahoe outfitted with sensors, computers, and drive-by-wire controls. It is currently in Victorville, California, ready to compete in the DARPA Urban Grand Challenge. Our cover story in this issue tells a little about this as well as what several of our other robots were up to this past summer.

Closer to home, we celebrated the 25th anniversary of the smiley emoticon with a special TG and :-) cookies on the Cut. As chronicled in the last issue of The Link, Scott Fahlman first suggested this idea in a post to the Carnegie Mellon Opinion BBoard on September 19, 1982, and now it’s standard practice in email and instant and text messages throughout the world. Scott spent that week being interviewed by reporters in Australia, Russia, England and many other places.

Also in September, Randy Pausch gave his “last lecture” describing his life journey and lessons learned, being motivated to do so by the cancer that will soon end his life. Not only did 400 people fill McConomy Hall to see him give this lecture, many followed along via live Webcast and now the online videos have been watched an estimated 500,000 times. Randy has also received numerous interviews and accolades from far and wide. This certainly is not the path Randy would have chosen, but his courage and his generosity of spirit have served as an inspiration to many. One step we are taking is to make sure that his Alice program continues in its effort to transform the way young students are introduced to programming. Read Bovik’s Blog on page 17 for the URL to Randy’s home page and how you can help.

All in all, this fall has been a period with a lot of excitement mixed with many challenges life puts in our paths. I am pleased to be part of an organization that can generate such excitement and make the best of the challenges we face.

> Randal E. Bryant, dean
Excavation is complete, the crane is on site and construction has begun on the new SCS Complex. The first support walls for the Gates Center and the underground parking garage are up; the floors and roof of that part of the building will be placed later this fall. Concrete footings for the second, yet unnamed, research building and the footbridge to the Cut also will be poured over the next few months.

Even with 622 interior doors in the plans, the complex has been designed to foster collaboration and innovation: it will be equipped with nearly 20,000 square feet of whiteboard space and more than 700,000 feet of data cable. Letting in natural light is also a goal of the design. There will be seven atria, 53,000 square feet of exterior glass and more than 23,000 square feet of interior glass along the hallways and dividing some of the larger spaces.

Visit [http://SCScomplex.blog.cs.cmu.edu](http://SCScomplex.blog.cs.cmu.edu) to see the floor plans. Click on the link to the live webcam and see what the site looks like today!
On Campus

Festschrift:
(ˈfɛstˌʃrɪft/; plural, Festschriften, /ˈfɛstʃrɪf.tən/)
A book honoring a respected academic. The term, borrowed from
German, could be translated as “celebration publication.”

This past March, the School of Computer Science honored
Takeo Kanade with its own version of a festschrift and a technical
symposium on the occasion of his 60th birthday. The distinguished
line up of speakers at TK60: Celebrating Kanade’s Vision included
Yuichiro Anzai, president of Keio University in Japan, and Harry
Shum (CS’96), managing director of Microsoft Research Asia. The
technical program reflected the diversity of Kanade’s research inter-
ests and accomplishments and spanned the areas of computer
vision, medical technologies and robotics.

Videos of the symposium presentations and a PDF of the celebra-
tion publication are available online at www.ri.cmu.edu/events/tk60/.

Abstracts and presentations are also available
online for past festschrift symposia.

Daniel Siewiorek
Buhl University Professor of Electrical
and Computer Engineering and Computer
Science, Director of the Human-Computer
Interaction Institute
www.cs.cmu.edu/~dan60/

Edmund Clarke Jr.
Fore Systems Professor of Computer Science
www.cs.cmu.edu/~emc2/

Gary Miller
Professor of Computer Science
www.aladdin.cs.cmu.edu/workshops/millerfest/
Carnegie Mellon artist and associate professor Golan Levin describes himself as a “writer of programs, but I used to be a painter.” His creative twist on digital technology and the formal language of interactivity was the subject of the first seminar series lecture from the Center for Computational Thinking, held on campus this past September. Speaking to a standing-room-only crowd, Levin showed how technology can turn personal interaction into visible art and how he explores the intersection of abstract communication and interactivity.

The lecture was packed with examples of his whimsical technology-as-culture works, including Dialtones: A Telesymphony, a 2001 concert performance whose sounds were wholly produced through the choreographed ringing of the audience’s own monophonic mobile phones. For an online project called The Secret Lives of Numbers, Levin conducted an exhaustive empirical study to determine the relative online popularity of every integer between zero and one million. The resulting interactive artifact exhibits a variety of patterns which reflect our culture. There are spikes at historical dates and also at culturally specific numbers like 1040, 386 or 486.

Levin also integrated computer science technologies into an interactive exhibit where visitors and their words become part of the experience. In Re:Mark, a project he describes as “an augmented-reality speech visualization,” participants stand between a white screen and a light source so that the tops of their heads cast a shadow on the screen. As they speak into a microphone, computer vision algorithms detect the shadow, speech recognition software transcribes the sounds into text or shapes, and animation software floats the images from out of their shadows in real time. How the text behaves depends on the vocal metrics. Softer sounds are smaller and drift slowly upward, while more explosive sounds tend to be larger and travel faster. Participants can also sweep the screen clean with the shadow of their arm.

In addition to his current work on a robotic exhibit—a set of expressive eyeballs that would respond to the eye movements of the visitor—Levin teaches courses in electronic art in the College of Fine Arts.
On Campus

Honoring Excellence

Earlier this year, Carnegie Mellon University, in cooperation with the Tokyo University of Technology (TUT) in Tokyo, Japan, established the Katayanagi Prizes in Computer Science. The two annual prizes honor the ongoing collaboration between the universities and recognize important advancements in the field of computer science. Winners receive a cash award and are afforded the opportunity to give two presentations, one in Japan and one in Pittsburgh.

The first Katayanagi Prizes were awarded in March: the $20,000 senior prize for Research Excellence was given to David Patterson, the E.H. and M. E. Pardee chair of computer science at the University of California at Berkeley, and the $10,000 junior prize for Emerging Leadership went to Takeo Igarashi, associate professor in the department of computer science at the University of Tokyo. The prizes were endowed with a gift from Japanese entrepreneur and education advocate Mr. Koh Katayanagi, founder of TUT and several other technical institutions in Japan during the last 60 years.

Patterson’s distinguished research career encompasses all aspects of computer system design, including processors, storage and memory systems, and system management. Many of his results, including RISC microprocessors and RAID file systems, have led to multibillion-dollar industries. His project-oriented research style has served as a model for many academic computer scientists.

Igarashi has created a great deal of excitement among computer graphics researchers with his novel ways for creating complex animated objects using simple graphical interfaces. His work points to a future where animation design will be much more intuitive and less labor-intensive than it is today.

“Our selection committee considered computer science researchers from around the world. We are very excited about the winners for this inaugural awarding of the prizes,” said SCS Dean Randy Bryant.

Videos of the Pittsburgh lectures are available at www.cs.cmu.edu/katayanagi.
People and Programming

One of my favorite quotes says, “Programs must be written for people to read and only incidentally for machines to execute.” This is a statement about what is going on when you write a computer program. First of all, even if computers did not exist, people would still want to write down procedures about how to solve problems or how to organize information. This concept is at the heart of computational thinking—when you think about how to solve a problem or organize knowledge, what you’re actually doing is programming. Secondly, computer programs are written by people and we are expressing ideas about how to solve problems. I find this sort of thing incredibly beautiful; there’s something cosmic about the connections between ideas and programs.

Back to Basics

Computer science is really at a crossroads. Our field has produced an unimaginable amount of useful technology, and that’s great, but it’s also made it harder to remember the fundamental scientific questions. When we ask ourselves “What are the grand scientific challenges of computer science?” we actually don’t express them as science questions any more, but rather as social needs. We have grand challenges like “eliminate all highway traffic deaths,” which is a wonderful thing to do, but that’s not a scientific question like “How do we map the human genome?” As a field, I think we need to find a better balance between great social problems and the core science questions, and then mobilize our research efforts around the most important ones.

Keeping an Open Mind

Carnegie Mellon has always been broad-minded about what is computer science. We pride ourselves on all the core traditional research we do: systems, algorithms, artificial intelligence and so on, but we’re also really excited about and open to new emerging areas, like human computation, applied game theory, and the multi-agent Claytronics system that may some day be able to replicate numerous 3-D artifacts from a pile of tiny robots. How to program a large number of little computers to cooperate is a very interesting problem. This idea is becoming important in other parts of computer science research, too. The two big processor manufacturers are going multi-core, putting more and more processors on a single chip. We don’t really know yet how to program a system of small processors to work efficiently—and elegantly—together to solve a problem. Working on problems like this is just incredibly exciting.
While much of the university’s human community relaxed, a number of Carnegie Mellon robots were hard at work.

**At the Swimming Hole**

With a 17 meter drop from the edge of the arid Tamaulipas plateau to the surface of the warm, mineralized water, El Zacatón is no ordinary swimming hole. But then again, the bright orange sphere being slowly lowered into the 100 meter wide opening by a six-ton crane is no ordinary robot either. It’s an underwater autonomous vehicle that can travel through and map unknown areas in three dimensions. In the dark. Untethered. It’s official name is the Deep Phreatic Thermal Explorer (DepthX), but many of the researchers call her Clementine.

DepthX is a collaborative, NASA-funded robot designed to explore and accurately map flooded caves and mines here on Earth while its science payload analyzes the surrounding water and collects core samples from the walls. NASA’s ultimate goal is to explore other planets in this manner, particularly Jupiter’s moon Europa. Stone Aerospace coordinated the propulsion and system integration while Southwest Research Institute built the onboard science hardware for investigators from the Colorado School of Mines, NASA and the University of Texas at Austin. Research scientists at Carnegie Mellon’s Field Robotics Center, however, brought DepthX to life.

The robot’s “eyes and ears” are a combination of 56 sonar transducers and the thesis work of doctoral student Nathaniel Fairfield (CS’06). His Simultaneous Localization and Mapping software (SLAM) coordinates the 360 degree sonar data to orient the robot to where it is and, more importantly, to create an accurate 3-D map of where it has been. The brains of the robot—the 100,000 lines of control, mapping and planning software—can then autonomously guide the robot to potentially interesting sampling sites as well as safely back to the surface. “The goal of every mission is always to get back to the surface,” says SCS Associate Research Professor David Wettergreen (S’87, E’89, CS’95).

In its final field test last May, DepthX traveled to Mexico and explored El Zacatón.
the world’s deepest known flooded sinkhole, or cenote. This giant, vertical flooded cave had never been fully mapped and no one had ever reached the bottom. During the first field trial of the SLAM software in Zacatón in 2005, a tethered drop sonde recorded a “tantalizing shelf” at 290 meters below the surface, but nothing definitive beyond that.

The thrill of finding the bottom was a subtle experience for the Carnegie Mellon team. On the first dive, researchers monitored DepthX via a temporary fiber-optic tether. At 281 meters, the inertial measuring unit (IMU) sensor began to report wildly noisy values—a critical failure that needed to be corrected before robot the became confused about its location. The command to surface was conveyed and 15 minutes later, DepthX’s bright orange syntactic foam cap came into view. The sonar data looked promising, but it would be another 15 minutes of number-crunching to extract the telemetry log, build an octree evidence grid and create a 3-D model. At last, it was there on the screen: the floor of the cenote gently sloping down to an angled point just short of 319 meters. Regional and local media turned up the next morning to record the milestone.

The IMU sensor was recalibrated and the autonomous protocol for the second dive ran flawlessly: DepthX descended to the bottom, collected additional data for a highly detailed map of the entire cenote and resurfaced exactly as expected. Four additional dives followed to field test the science payload.

Although the rest of the summer was filled with final reports and closing out the project, Wettergreen is already looking forward to the next interdisciplinary venture, “We get to interact with biologists, geologists and hydrologists, learn about what they’re doing and then work with them to think about how we can use robots and the software for autonomous behavior that we develop here to aid in their scientific investigations.”

**Down by the River**

At first glance, the site of the former LTV coke works along the Monongahela River in Hazelwood is not the sort of place you’d want to spend your summer. It’s a rough reminder of Pittsburgh’s place in steelmaking history: rusting remnants of machinery poke out of the knee-high weeds, a few tattered buildings dot the landscape and it’s best to travel the heavily potholed access road only at a very slow speed. Unlike many of the other revitalized steel mill sites across Pittsburgh, there are no current plans to add new buildings or develop upscale riverfront housing. In fact, some of the more inhospitable elements may be left in place on a portion of the land now known as Robot City. It’s a 40-acre cooperative research environment where field robots of all kinds can be developed, tested and trained. Carnegie Mellon’s Tartan Racing team, led by Professor William “Red” Whittaker (E’75, ’79), is headquartered in the refurbished rail roundhouse and their newest autonomous vehicle, a Chevy Tahoe named ‘Boss,’ was assembled here. Boss is the city cousin of Highlander and Sandstorm, the two Carnegie Mellon autonomous Hummers that successfully completed the desert-based 132-mile DARPA Grand Challenge in 2005; on a hot, humid day this past June, more than 125 spectators gathered at Robot City to watch Boss successfully complete its qualification test.
for DARPA’s 2007 Urban Grand Challenge. As the vehicle accelerated down the newly paved test track and past the bleachers, the empty driver’s seat came clearly into view. “It’s always a little disconcerting—and thrilling,” said Tartan Racing team member and emcee for the day, Mellon College of Science Professor Bill Messner. Boss handled the first three corners of the rectangular course smoothly and steadily, its speed never wavering. Approaching the fourth corner, it slowed and came to a halt precisely at the stop line painted on the road. The left turn signal then began to blink and Boss turned left to start another lap.

Boss visualizes the road and its surroundings with a complement of more than two dozen different radar and LiDAR sensors and a pair of cameras. All of that data is then coupled with a highly accurate GPS navigation system and more than 300,000 lines of code to assess the area and plan a safe path up to ten times per second. Finally, behavioral algorithms make the tactical decisions and manipulate the drive-by-wire vehicle. During the multi-lap qualifier, Boss autonomously navigated around stopped cars, properly responded to opposing traffic at the stop sign and executed several perfect three-point turnarounds.

In late October, Boss will join 35 other DARPA semi-finalists on the streets of the former George Air Force Base in Victorville, California, for the National Qualification Event; the top 20 teams will then face off in the main race on November 3. They will have to overcome a string of parking challenges, intersection precedence issues and unexpected dynamic conditions. The team to successfully complete the 60-mile skill competition in the shortest time under six hours will take home the grand prize of $2 million.

On the Field

While Boss and DepthX were off exploring the world individually, five Carnegie Mellon robot teams spent their time training for the 11th annual RoboCup International competition, held this past July in Atlanta. “Coaches” ran practice session after practice session, recharged batteries, adjusted sensors and tweaked code. It was well worth the effort. The teams returned with a bronze award, a silver and two gold awards.

RoboCup is actually many competitions rolled into one: teams of small cylindrical robots, dog robots, even humanoid robots, play in soccer tournaments, plus there are dance competitions and several virtual robot and rescue simulations. The game of soccer provides a standard multi-agent problem against which various theories, algorithms and architectures can be evaluated. The organization’s grand challenge is to produce a robotic soccer team that can beat the human world champions by 2050.

The red and white AIBO dogs of the CMDash’07 team took third place in the Four Legged league, winning 6-5 on penalty kicks at the end of an unusual 3-3 tie game. This year, the team’s advisor, SCS Professor Manuela Veloso (CS’89, ’92), assigned each of the four human “coaches” to program just one of the robot players and then to integrate their various defense or attacking strategies into the overall game strategy.

In the new Nanogram Demonstration league, the robots are so small that you need a microscope to see what’s going on. Speed and agility count as these tiny 200-micron robots maneuver a 50-micron “ball” in three soccer-related drills: the 2mm Dash, the Slalom Drill and Goal Scoring. “At this size,” said Metin Sitti, associate professor of mechanical engineering and robotics, “you are dealing with really complicated physics and the limitations of actuation and power.”

Carnegie Mellon fielded two teams: Magic & Voodoo, comprised of Sitti and doctoral students Steven Floyd and Chytra...
“seeing a community of interest grow up around our work was the most satisfying thing.”

And, finally, in a repeat of last year’s performance, the CMDragons won the soccer world championship in the Small Sized category. Led by recent Ph.D graduate James Bruce (CS’06), these agile, cylindrical robots battled PlasmaZ from Thailand to an incredible 6-6 tie. The Dragons introduced a new multi-decision strategy for their attackers but it was the amazingly accurate predictive strategy for the goalie, developed by SCS doctoral student Stefan Zickler, that made the difference in the penalty kick phase. “The algorithm was a remarkable achievement,” said Veloso, who advises both the Dragons and the Dash teams.

In addition to winning the championship, the Dragons also made RoboCup history as the first winning team to use the same robot hardware in two consecutive years.

The next RoboCup competition will be held in Suzhou, China, and although it won’t be the Year of the Dragon for four more years, Veloso plans to enter the robots once again and is hopeful of another victory. If you want a unique summer adventure in 2008, it’s never too early to start making your plans to see these terrific Carnegie Mellon robots in action.
One Word Makes All the Difference

An average Internet user takes ten seconds to retype the random string of characters in a CAPTCHA, those distorted-letter tests found at the bottom of registration forms of Web sites such as Yahoo, Hotmail, PayPal, Wikipedia and hundreds of others. It’s an easy task for humans, but it’s quite difficult for computers. With more than 60 million CAPTCHAs being solved each day worldwide, it was only a matter of time before Luis von Ahn, assistant professor of computer science and one of CAPTCHA’s creators, figured out a way to make the puzzles work double time.

The result is reCAPTCHA, a two-word puzzle that continues to provide security for Web sites by differentiating between human users and rogue computer programs but that also helps make digitized books more accessible.
The easiest way to digitally capture books and other written works is often to scan them with an optical character recognition system (OCR) that automatically converts printed text to computer-readable letters, making the text both searchable and capable of being reformatted for other devices or programs. Unfortunately, OCRs are also often stumped by underlined words, embellished lettering and fuzzy or otherwise poorly printed text. ReCAPTCHA uses the power of “human computation” to decipher these troublesome words quickly and efficiently.

Rather than a string of meaningless characters, a reCAPTCHA presents Web site visitors with two recognizable words, one of which the system already knows and one that an OCR has not been able to process. Both words are skewed, stretched and bisected by a diagonal line. If the visitor types the known word correctly, the system has greater confidence that the unknown word is being typed correctly, too. Each unknown word is shown to multiple visitors and if several visitors type the same answer for the unknown word, that answer is assumed to be correct. Despite doubling the input needed to pass the test, users probably won’t notice any additional inconvenience. Researchers found online users were able to solve the recognizable two-word test in less time that it takes to accurately decipher the original CAPTCHA’s string of six to eight random characters.

Von Ahn and his colleagues, Professor Manuel Blum, undergraduate student Ben Maurer (CS’09) and Research Programmer Mike Crawford, developed the new test and implemented it on behalf of the Internet Archive, a San Francisco-based nonprofit group that administers the Open Content Alliance and is one of several large initiatives working to digitize books and other printed materials. “I think it’s a brilliant idea,” said Brewster Kahle, director of the Internet Archive. ReCAPTCHAs will speed the digitization process while also helping to improve OCR methods, he said. “This is an example of why having open collections in the public domain is important,” he added. “People are working together to build a good, open system.”

Since the launch of reCAPTCHAs in June, thousands of Web sites including the New York Times, Facebook, Twitter and Last.fm have begun using them. Von Ahn anticipates more than 250 million words will be decoded for the Internet Archive by the end of 2007.

Stop Spam. Read Books.

The reCAPTCHA test can thwart malevolent computer programs searching for free Web accounts, but von Ahn, recipient of a MacArthur Foundation “genius grant,” says the project can also help individuals safeguard their own email addresses from spammers. Whenever you display your email address online, even if you write it out like geeksrule [at] cmu [dot] edu or use javascript or encodings for the same effect, spammers will eventually collect your information. They keep up with the trends and can often work around well-known open source code.

With support from Intel Corp., the reCAPTCHA team devised a Web-based service called Mailhide that allows individuals to protect any email address posted on their personal Web page with an encrypted key. The address is obfuscated as geek…@cmu.edu. Visitors can click on the three dots, solve a reCAPTCHA and be rewarded with the full email address.

Both reCAPTCHA and Mailhide are free and install with just a few lines of HTML code. The team has written APIs and plugins for many of the popular blog and wiki sites. “If you’re suffering problems with spam,” says Maurer, “take a look at reCAPTCHA. Not only can you solve your problems with spam, you can help preserve mankind’s written history into the digital age.”
A Year-round Whirlwind

2007 started off with nine Network Night events, held across the country, giving alumni of all seven Carnegie Mellon schools and colleges the chance to meet fellow Tartans in their local area. Spring Carnival brought many younger alumni back to campus in April and May’s commencement produced more than 200 new SCS alumni. Throughout the spring and summer, Ph.D. alumni from the computer science department enjoyed four more regional receptions to celebrate the career and impending retirement of Sharon Burks, assistant department head and associate dean.

The arrival of summer is a chance for many in the campus community to catch its breath. However, for the Carnegie Mellon alumni relations staff, summer is as busy as ever. After all, alumni are alumni all year long.

In the summertime, we offer more family-friendly events, including boat cruises, museum luncheons, and, of course, picnics. Two new cities, Washington D.C. and Boston, were added to the roster this year, bringing the total number of summer SCS events to five. There were also many Carnegie Mellon-wide alumni activities held across the country.

Thank you to all our alumni for showing your support and contributing to the success of these summer events. Watch for announcements about the fall SCS alumni events and next year’s Network Nights. Also, if you have ideas for activities in your area, please feel free to email me at tcarr@cs.cmu.edu.

I look forward to seeing you.

Sincerely,

Tina M. Carr

@ SCS Alumni Events

SCS alumni gather for a photo opportunity with Mark Stehlik, assistant dean of undergraduate education (center, in the dark blue shirt) at the annual SCS-ECE alumni summer picnic this past July in Mountain View, California. More than 125 alumni and friends enjoyed the afternoon’s festivities at the Rengstorff House in Shoreline Park.
Jeremy Horn's first Internet start-up was off the ground a year before he graduated from Carnegie Mellon and he’s been running at top speed ever since. Today, he oversees the product strategy and operations, and is one of the founders, of SingleFeed, an online solution for syndicating products to multiple shopping comparison engines. He has been awarded 5 patents since 2004 and has another 6 pending. He’s also the author of a new blog, The Product Guy (www.tpgblog.com).

“I love bringing together my experiences in technology, art, design and business to create products for people that are fun and functional. When I’m not working on my own company, I’m providing advice, assistance and guidance to other people who are following similar entrepreneurial paths or working on emerging technologies and business models. Helping a new start-up get going or helping a company refine a new product is truly exciting.”

Jeremy credits his success not only to the “what” that he learned at Carnegie Mellon, but also the “from whom”—in particular, his SCS mentors and his friends in the business school.

Originally from Massachusetts, Jeremy now lives in New York City, where he has yet to find a match for one of his campus favorites: the coffee from the La Prima Espresso in the Wean Hall lobby.

Primed with the problem solving skills of a computer scientist, a strong technical foundation and the collaborative experiences of SCS, Philip Lehman set out on a career in technology management. He was a first day executive with Transarc Corporation, where he started both the distributed file system and the services business. When Transarc merged into the IBM Software Group, he managed more than 120 consultants and educators on five continents. For the past five years, Philip has served as senior vice president for iCarnegie, a subsidiary of the university that provides education-related services to educational institutions worldwide.

This fall, however, Philip is coming back home to SCS: he will take up the reins as associate dean for strategic initiatives, working with Dean Bryant and the university’s development office in sharing the amazing story of computer science at Carnegie Mellon.

“Computer science is still a relatively young discipline. As it matures, and as our processing and networking power increase, the opportunities to collaborate with and provide benefits to other disciplines will produce some of the most interesting and useful advances in technology.”

He’s a baseball fan and enjoys the culinary and learning experiences of international travel. Philip met his wife, Jill Fain Lehman (CS’87, ’89), when she visited campus as a prospective graduate student and he was on the Leiberman Queue for giving tours. They currently live in Pittsburgh with their two teenage children, Sarah and Charles.
Photoswap

Tools such as Photoshop make it possible to edit or alter a digital photo, but doing so in a convincing manner takes some skill. An online search can sometimes substitute for skill, however. With a program they call Scene Completion, Alexei Efros, assistant professor of computer science and robotics, and graduate student James Hays showed that they could often fill in holes in photos realistically by searching for matching pieces from among millions of images on Flickr. Another program, Photo Clip Art, devised by Efros and graduate student Jean-François Lalonde, makes it possible to realistically add people or objects from the LabelMe database to existing photos. New Scientist, MSNBC.com and CNET covered the story.

Kidney Exchange Algorithm

Tuomas Sandholm, professor of computer science, is accustomed to saving companies money by devising ways to mediate negotiations and reduce procurement costs. But now one of his algorithms is saving lives. Developed with Computer Science Professor Avrim Blum and graduate assistant David J. Abraham, this new method for matching living kidney donors with kidney disease patients already is being used by one kidney transplant program. Because it can be scaled substantially, however, the algorithm could make possible a national kidney exchange program, which each year might save another 2,000 people who otherwise would die waiting for one of the scarce organs. The story has been featured on numerous online sites and in print, including the Pittsburgh Post-Gazette, Toledo Blade and BusinessWeek.

Privacy Finder/Anti-Phishing Phil

The Internet makes it all too easy to invade people’s privacy or steal their identities. Privacy Finder, a shopping search engine developed by Lorrie Cranor, associate research professor in the Institute for Software Research, may help even the score. The search engine makes it easy for users to identify retail sites with strong privacy policies; lab studies suggest users might even pay a little extra to use such sites. Another product of her lab, an online game called Anti-Phishing Phil, could further protect Internet users by teaching them how to spot a phishing Web site. Reporters from the BBC, CNET, MSNBC.com and the Associated Press are among those who have written about her work.

How to Live Your Life

With equal parts humor and heart, Carnegie Mellon Professor Randy Pausch recently delivered a one-of-a-kind last lecture that first moved an overflow crowd on campus—and is now moving audiences around the globe. In his lecture entitled “Really Achieving Your Childhood Dreams,” Pausch first introduced the elephant in the room: he has terminal cancer. What followed was a “rollicking and riveting” journey through his childhood dreams and his groundbreaking achievements, and ending with a message on how to live your life so that the dreams come to you. In addition to nearly a million hits to the lecture video, Randy was featured in two Wall Street Journal articles. He appeared on the CBS Evening News, on Good Morning America twice and was named ABC News’ Person of the Week. Appearances on 20/20 and Oprah were in the works as of press time.
Of Brick Walls and Synthetic Life

While Professor Randy Pausch may have found all of the attention over his last lecture a bit embarrassing, we weren’t surprised one bit. He’s been an influential force on this campus for many years.

There is so much to say and yet nothing to say at all about Randy’s cancer. As he said on September 18, “That’s what it is. We can’t change it, and we just have to decide how we’re going to respond.”

Scott Stevens’ response included capturing a bit of Randy in a Synthetic Interview so that future educators, researchers and students might be able to experience a little of his expertise, his verve for learning, his love of helping others. Randy will join a growing list of existing Synthetic Interviews: Ben Franklin, Albert Einstein, master physics teacher Roberta Lang and several teachers in the NSF project “Putting a Face on Cognitive Tutors.”

The Synthetic Interview was born at the Entertainment Technology Center, the unique electronic artist-and-engineer program that Randy co-founded. The statistical language processing technology that allows viewers to ask questions and then hear appropriate pre-recorded answers has been patented and licensed for commercial use by MedRespond. Several ETC students have also used the technology to create a virtual presence of themselves to discuss their work and answer questions from recruiters.

Planning is underway for Randy’s interview and Scott is still collecting questions. What would you ask Randy if you could have a ‘fireside chat’ with him? Any question is a good one, says Scott, but questions related to Randy’s work, individuals and technologies that inspired him, etc., are especially relevant. Send your questions to Scott at sms@cs.cmu.edu.

At one point during his last lecture, Randy smiled and said, “Boy, am I glad I became a professor.”

So are we, Randy. So are we.

** Visit www.cs.cmu.edu/~pausch for more about Randy and links to the video and transcript of his lecture “Really Achieving Your Childhood Dreams.” It’s worth every minute.

** Visit www.cmu.edu/giving/pausch.shtml to make a contribution to the Randy Pausch Honorary Fund.
Making the Right Turn –
Graduate applications are due December 15, 2007

We found this snapshot of three new Ph.D. students taking their computational thinking on the road for the Immigration Course's long-standing Photo Scavenger Hunt, but we don’t know who they are or even when the traditional photograph was taken. If you can recognize any of these SCS folks or know what intersection they might be at, let us know at TheLink@cs.cmu.edu.