We are immersed in language. We spend a significant portion of our waking hours interacting via language: we send email, texts, instant messages, and “tweets;” we read books and newspapers; we talk with each other in meetings, on the phone, or at cash registers; we listen to TV, radio, or YouTube videos. The environments in which we encounter language are numerous, and human beings have an uncanny ability to quickly pick up the meaning of what was said or written. Human language is rich in variability, and people are easily able to adapt to unexpected usage—such as slang, regional accent, or metaphor. By contrast, computers lack our inherent capabilities in this area. The typical computer programming language has strict rules about what constitutes acceptable, syntactically-correct statements, and unexpected statements cannot be understood. Eric Fosler-Lussier’s work seeks to improve the ability of computers to recognize human language in all its complexity; but he also uses computational tools to understand human language and to assist people in a variety of language-related tasks.

Fosler-Lussier has spent the last seven years at Ohio State working with colleagues and students to try and tackle several challenging questions in speech and language processing: how do adults cope with the variations in language—understanding speech from people with different accents or speaking rates and in noisy environments? How do children learn to understand speech and language? Moreover, how can one use insights from understanding the human side to improve the performance of computer systems?

“Speech and language processing is an interdisciplinary field,” says Fosler-Lussier. “Ohio State is a great place to do this kind of research because of the vast expertise we have in linguistics, statistics, computer science, psychology, speech and hearing science, and electrical engineering. It really takes a village, as it were, to get a grip on modeling the complexity of language.”

Indeed, the list of collaborators in Fosler-Lussier’s research is extensive, and he is quick to credit his colleagues in these various disciplines. “It’s always fun to work with a colleague who has complementary skills in, say, child language acquisition, statistical modeling, or how the auditory system works. It’s key to keeping your own perspective flexible.” Fosler-Lussier co-directs the Speech and Language Technologies (SLaTe) lab with Chris Brew, who is jointly appointed between CSE and Linguistics; the SLaTe lab is part of the cross-departmental Computational Linguistics and Language Technology (CLLT) group which also includes professors from linguistics, Michael White and William Schuler, and psychology, Simon Dennis. The CLLT program sponsored the last international Association for Computational Linguistics meeting held in North America in 2008, a demonstration of the regard held by the international community for the group.

One of Fosler-Lussier’s first interdisciplinary projects at OSU was a National Institutes of Health funded grant with Mark Pitt, professor of psychology, and Keith Johnson, now of UC Berkeley linguistics, in which they developed the Buckeye Corpus of Speech, a searchable collection of recordings of speakers from central Ohio. Trained student linguists transcribed the speech sounds that they heard in 40 hours of recorded natural conversation, providing a detailed look at the different kinds of pronunciations people use in everyday speech. The corpus, in use by investigators world-wide, has been valuable for research both in linguistics and speech technology; the size of the collection (about 10 times the size of the previous largest phonetically transcribed corpus) enables researchers to better look for patterns of variation in speech. (Continued on Page 3)
Message from the Department Chair

Dear CSE Alumni, Parents, Friends and Colleagues,

I am finishing my first term as CSE chair. Over the past 4 years, the department has moved forward with several key collaborative efforts. First, the faculty has further strengthened their consensus to value the quality of education and impact of research, and we follow this principle in our daily operations. Second, we strive to accomplish more with less by running the department more efficiently. In the era of a scaled down economy, we have eliminated unnecessary expenditures while making critical investments in the future of our students and our department. Third, we have widely connected with our CSE alums in the country and all over the world. We continue to identify more CSE graduates who play important leadership roles in academia and industry. We continue to receive strong support from our alums through alumni visits, seminars for students, student recruitment and donations. Finally, we have effectively kept the world informed about the CSE progress and alumni achievements through our biannual newsletters, frequently updated web page and the departmental annual report.

This coming year marks an exciting time for our department. We continue to see an increased interest in the CSE major with the entering class of undergraduates. Compared to 2009, we have a 15% increase in the number of new pre-CSE students, as well as larger enrollments in pre-CIS. The students once again exemplify the trend of the “best and brightest” entering class as Ohio State continues its progress from Excellence to Eminence. We have also experienced an increase in the diversity of the population with a larger number of women represented than in previous years.

In this issue, you will continue to learn about developments within the department, activities of our students and faculty and the footprints of several of our graduates. I have been very impressed by the article about Jim Cates, which is truly a story of the American Dream. In the real world, many of our students have to face similar challenges to Jim, including social, intellectual and financial obstacles. However, with the unique supporting environment in this country, one’s hard work and talent can be recognized and rewarded. The story of David Johns is another depiction of the American Dream. Coming from a small town, David made the most of his experience at Ohio State, and today, he is the Senior Vice President and Chief Information Officer of a Fortune 500 company.

With strong support from the faculty, I have been renewed to chair the department for another term. With you, I look forward to many new exciting developments and the continued progress of CSE in the near future.

Xiaodong Zhang
Chair and Robert M. Critchfield Professor
Computer Science and Engineering

Steele Named to National Board

Coordinator of Academic Advising, Peg Steele has been elected to the Board of Directors for the National Academic Advising Association (NACADA). As a Board Member, Steele will be responsible for providing leadership, strategic planning and establishing policy. NACADA is a national organization which promotes professional development for academic advisors and works to ensure the educational development of students.

Take Your Child to Work Day

CSE Staff and Faculty participated in the annual Take Your Child to Work Day on April 22, 2010. Each year, OSU sponsors activities and workshops showcasing professions and fields in the university. Left, Human Resources Administrator, Catrena Collins and her daughter, Kayla, spend some time at the office.
The issue of handling speech variation in speech recognition technology was the impetus for Fosler-Lussier's NSF CAREER grant, in which he and his students investigate the application of new statistical models called conditional random fields to the problem of speech recognition. The technique allows system builders to incorporate different representations of speech, fitting them together like pieces of a puzzle, while attempting to allow for different kinds of variation. The technology has led to a platform where different research groups can incorporate novel ideas into one speech recognition system: Professors Brew and Fosler-Lussier recently co-advised the work of a Ph.D. student who developed a new way of representing the sounds of speech based on insights drawn from web search algorithms. The system has also been adapted to the task of acoustic source separation – the task of separating speech from background noise – drawing on some of the work from the lab of colleague DeLiang Wang.

Other recent work has been inspired by language learning in children. Working with colleagues Mary Beckman (Linguistics) and Misha Belkin (CSE), Fosler-Lussier and students have been working to develop computational models of the complex learning phenomenon that takes place when infants acquire the sounds of their language as part of an NSF Human & Social Dynamics grant. Of particular interest is the normalization problem: the sounds produced by a baby do not represent the sounds produced by the baby's mother (i.e. the baby is much higher pitched), so the infant likely learns a mapping between its acoustic space and that of the adult. This problem can be modeled statistically as a manifold mapping problem, where the acoustic spaces of the adult and child can be brought into alignment semi-automatically, using only a few known points of correspondence.

Also along the lines of child language learning, Fosler-Lussier is collaborating with Xerox to investigate machine learning techniques that can automatically assign the reading level of a child's book. While learning to read, children will usually progress through a series of increasingly difficult books: in early elementary education, these books are typically leveled via one of several systems to designate a particular reading difficulty. The project aims to develop computer models that show the tradeoffs between different features of the book (e.g., how many words per page, lines per page, syllables per word, images per page) in determining the difficulty of a book, so that the reading level of new books can be quickly determined.

Fosler-Lussier plans to expand his research in the educational domain; in the 2010-2011 academic year, he will spend a sabbatical period at the Nisonger Center, part of the OSU Medical Center, a federally funded University Center for Excellence in Developmental Disabilities. There he will be working with speech pathologists and young clients to see whether language technology and machine learning can improve the effectiveness of Augmentative and Alternative Communication (AAC) devices - computerized devices that must be extensively adapted for each person with a communication disorder.

"The nice thing about interdisciplinary research is that it can be a two-way street," says Fosler-Lussier. "A lot of my language technology research has impacted the way that we think about language, and similarly my linguistic research has impacted the way we think about technology. Being at OSU has enabled me to work with great students and colleagues on a large number of interesting problems."
When James Cates, MS ’71, graduated from Columbus East High School, his immediate plans called for enlistment in the U.S. Air Force. One of twelve children, Cates never thought much about a college education. He did not exactly pay much attention to his high school career either. Working late nights at restaurants, Cates was more concerned about earning money to help his family—college just wasn’t in the picture. But then a strange thing happened.

Cates received a mysterious phone call from Dr. Harold Eibling, superintendent of Columbus Public Schools and chairman of the board at Ohio Northern University. Eibling explained to Cates that four anonymous area businessmen were willing to finance Cates’ college education, as long as he adhered to four conditions: he had to attend one of three specific schools, he had to major in engineering, he had to maintain a 3.0 GPA in every quarter and finally, he could not make any attempts to discover the identity of the four benefactors.

“I wasn’t going to go. But my mother pushed, so I went back to see Dr. Eibling again,” he says. “We talked and he suggested Ohio Northern.” He said, “I’m the chairman of the board, so if you need help or guidance, it’s the school I know best.” So, Cates enrolled at Ohio Northern University (ONU) the following fall. Cates stepped on to the campus as a freshman in the fall of 1963. A few weeks into his ONU journey, a moment of tragedy provided the intense focus Cates needed to survive. After years of working in foundries, his father suffered a heart attack. On a rainy night in September 1963, Cates traveled home expecting to drop out of school to care for the family. Since his three older brothers were in the military and his three older sisters were married, he felt it was now his responsibility to help his mother. “I told him, ‘Dad, you almost died.’ And he replied, ‘I’m not going to die. I’m going to live long enough for you to get out of school. I’m probably not going to live long enough to raise all of the remaining children. But I’m counting on you to get out of school and help your mother.’ And that was when he really learned how to focus in life. The next four years, I focused more in my life than I think I have ever focused.”

College challenged Cates on several fronts. Academically, he felt like everyone else had a head start, since his high school had not prepared him well for the mathematics he needed for engineering. “I studied 15 hours a day; that’s about how long I had to study to keep up,” Cates recalls. Socially, he found challenges as well. “Most of the kids on campus were from the middle class,” he explains. “What they considered problems were not problems for me. It was the first time I had three meals per day in quite awhile, and they were complaining about how the food tasted. I thought the food was pretty good!”

Academic and social struggles were not the only hurdles Cates faced. “At the time, I think I was only the second black kid in the engineering school in 100 years at ONU.” After graduating cum laude, Jim came to OSU as a math major and then transferred to CSE for his master’s. Cates worked in the graphics lab, the Ohio State Information and Retrieval Lab, and at the OSU Instruction and Research Computer Center (IRCC). He remembered the positive influence professors Doug Kerr, Mike Liu, James Randles, B. Chandrasekaran Tony Petrarca, Lee White and other faculty had on his experience. Just before he received his degree, he read an article by Dr. Ted Codd on the relational theorem.

After reading the theorem, Cates wanted to go work with Codd to help build a commercial relational database system and he convinced IBM to send him to San Jose. The part of his IBM career he prides most was becoming the second line manager of the relational DB development group that developed the first release of DB2 with the SQL language. Cates left IBM after 21 years, and took executive leadership positions with a number of fortune 1000 companies in California’s Silicon Valley, including a three year term at Altera. There, Cates served as CIO and led their WW process transformation project which identified and redesigned major corporate processes and implemented these newly designed processes via a WW rollout of the SAP ERP system. This improved efficiency has resulted in a saving of millions of dollars per year in operating costs. Today, Cates is the President of his own business intelligence consulting company, LOBI Group, LLC.

Cates has also served on CSE’s Industrial Advisory Board for more than 20 years. He received the OSU Distinguished Alumni Award from the OSU College of Engineering for his many career accomplishments. In addition to a distinguished career, Cates has co-authored two books, CIO Wisdom and Climbing the Ladder of Business Intelligence. He convinced his fellow authors to donate the books’ royalties to a scholarship fund, creating the CIO Scholarship Fund (CSF). Cates served as president for the group from 2003-2009. To continue funding the CSF, Cates developed his “rent-a-CIO” model, in which companies donate $5,000 to the scholarship fund in exchange for two hours of consultation with three volunteer CIOs. To date, the CIO Scholarship Fund has distributed more than $160,000 in scholarships. CSF supports four universities and a community college as well as another charitable organization, the Glow Foundation. The Glow Foundation is a nonprofit organization that addresses the financial barriers facing high-potential, low income students as they attempt to enroll in college. Cates is the President and Chairman of the board and contributed greatly to the funding of the foundation during its first year in 2006. To date, Glow Foundation (glowfoundation.org) has provided financial education to approximately 580 students and college scholarships to 79 students.

Cates acknowledges the positive impact his OSU and ONU educations have had on his life. Though he does not know his own benefactors, Cates understands how important it is to repay the kindness afforded to him by others. He urges other graduates to do the same. “Once you get your degree, don’t forget to give back. Especially if you’re like me, where somebody helps you turn your life around. As far as I’m concerned, it’s a requirement for you to give back and help at least one more person.”

Adapted from Ohio Northern Alumni Journal, Winter 2010
David Johns
Owens Corning - Senior Vice President and
Chief Information Officer

David Johns, BS ’81, is the senior vice president and chief information officer of Owens Corning, a world leader in building materials and composite systems and solutions. Johns leads the Global Information Technology and Global Business Shared Services organization which includes all Owens Corning business shared service centers, manufacturing technology, project portfolio management and information systems. The information systems were ranked 62nd in the 2006 InformationWeek 5000 and 5th on the 2005 Baseline 500.

Johns came to Ohio State University as an undergraduate in 1976 on a wrestling scholarship. He always knew he wanted to attend Ohio State, “I was interested in computer science and knew that OSU had a successful program. I was also very interested in continuing my wrestling career and OSU afforded that opportunity as well,” Johns said. He walked on to the wrestling team as a freshman, and enjoyed five years on the team competing and engaging with his teammates and students from other universities. Johns remembers his wrestling days fondly, “My coach, Chris Ford, became like a second father to me. I got to travel and make great friends, many of who are still my friends today.” Today, Johns is still involved with the Ohio State wrestling program.

Johns always found computers fascinating, though he did not know much about them prior to his university studies. Johns’ interests have always been technical in nature and when he came to school computer science was a relatively new field. Johns remembers choosing computer science, “I wanted to be challenged and knew a degree in engineering would be absolutely challenging for me.” Johns said, “I have a lot of fond memories of certain classes and professors. As an engineering major, you do a lot of hands-on lab work, both individually and in teams. I always enjoyed that. Many of the classes were quite challenging and I worked hard.” During his time here, he always found satisfaction in his education.

After graduating for Ohio State, Johns went on to get his Master’s degree in Business Administration from the University of Dayton. In 1999, Johns was named senior vice president and chief technology officer where he led the Owens Corning Technology Group, which paired the company’s Science & Technology and Information Systems organizations. Prior to his current assignment, Johns served as senior vice president, chief information officer and chief supply chain officer. In this role, he was responsible for global information systems and supply chain functions leveraging people, process and technology to transform Owens Corning’s supply chain and drive change across the enterprise.

Johns also served as vice president and chief information officer with responsibility for leading and integrating the design, development and operations elements of Advantage 2000, the company’s enterprise-wide re-engineering program. The scope included process and technology application, global infrastructure and related services for the implementation of the SAP software system.

Before joining Owens Corning in 1994, Mr. Johns was a technology manager with Honeywell, Inc., in the company’s Minneapolis global resource center. In that role, he implemented fully integrated payroll, human resources and benefits systems throughout the company’s U.S. and Canadian business units as well as financial applications throughout Honeywell’s global financial organization.

Before his tenure at Honeywell, Mr. Johns was director of information services for Time Warner Cable Communications, Inc., in Dublin, Ohio, where he orchestrated major computer systems development and management activities at both the division and corporate levels.

Johns has spent a lot of time in the corporate world, but remembers the lessons he learned and experiences he had while in at Ohio State. He urges students to work hard and focus on three skills—thinking, communicating and efficiently working. This advice comes from his experiences in the corporate world, “One of the biggest challenges corporations have is finding the right talent. In the organization that I lead at Owens Corning, we look for 3 prime characteristics in the people we hire: people who can think critically and solve complex problems; people who can communicate; and people who can get things done. Of course we also look for people who share the Owens Corning values of Integrity, Respect, Accountability, Fun, Sharing, Candor and Innovation. The rest of it, the business or a specific technology we can teach. My last bit of advice is—work hard. My only regret from my university days is that I didn’t always give the best I could give.”

Johns and his wife Chris have been married for twenty six years. She is also an Ohio State alum who was an OSU cheerleader. Together, they have two children, AJ, who graduated from OSU as well and Lexie, who is a senior in high school. They enjoy traveling and spending time together as a family. Johns also enjoys golfing and serves on the Toledo Regional Chamber of Commerce Board of Trustees.

Buckeye Blog

Autumn 2010
Professor Santosh Kumar Named Brilliant 10 by Popular Science

Assistant Professor Santosh Kumar, PhD ’06 of the University of Memphis, has been named one of Popular Science’s Brilliant 10, an annual honor given to the 10 most promising young scientists under the age of 38. Professor Kumar leads the Wireless Sensors and Mobile Ad Hoc Networks Lab, which engages in both theoretical and systems research. In theoretical research, he is recognized for his work on coverage and connectivity. Kumar introduced two new models of coverage, Barrier Coverage, for intrusion detection, and Trap Coverage, for scalable tracking with provable guarantees. Additionally, he has collaborated with others to introduce an analytical technique for deriving reliable estimates for probabilistic events, obviating the need to insist on large network size to make probabilistic guarantees as is traditionally done in making “with high probability” claims. In systems research, he is building two novel systems, AutoWitness and AutoSense. AutoWitness is a burglar tracking system that will help law enforcement agencies in recovering stolen assets. The aim is to detect burglary without an explicit report from the owner, instantly notify law enforcement agency, and most importantly, to provide real-time updates on the current location of assets while en-route, maximizing the chances of timely recovery. The system is expected to last several years on a tiny self-contained battery. AutoSense aims to revolutionize research in behavioral sciences by enabling continuous, reliable and real time measurements of personal exposures to addictive substances and psychosocial stress as experienced by human subjects in their natural environment. This project is part of the prestigious Genes Environment Initiative (GEI) at the National Institutes of Health (NIH).

Brilliant 10 participants have gone on to win prominent awards in their disciplines, including the Fields medal and MacArthur Foundation fellowships. Last year’s winners include professors from MIT, Yale University and Virginia Tech.

Sitaram Asur, PhD ’09, is a Researcher at HP’s Social Computing Lab. He has been nominated for a Best Paper Award for Predicting the Future with Social Media at the ACM Web Conference for his research demonstrating how social media content can be used to predict real-world outcomes. In particular, the use of chatter from Twitter.com to forecast box-office revenues for movies. An article on his work was featured in the BBC blogs, http://www.bbc.co.uk/blogs/thereporters/maggieshiels/2010/07/america_are_you_happy.html

Amol Ghoting, PhD ’07, is a Research Staff Member at the IBM T. J. Watson Research Center. Ghoting received the Pat Goldberg Best Paper Award 2009 for his paper, Serial and Parallel Methods for i/o Efficient Suffix Tree Construction with co-author and colleague Konstantin Makarychev. The paper presents an approach that has the potential to have significant real-world impact. The experimental results illustrate that a 30-hour external memory suffix tree construction problem, human genome, is reduced by the introduced algorithm down to 15 minutes, a two-orders of magnitude improvement. More importantly, the paper provides both sequential and parallel construction algorithms and is illustrated through experimentation that the proposed techniques are effective in both cases.

The paper was originally accepted at SIGMOD 2009, one of the premier conferences in database systems, and was nominated as one of the best papers in the conference. His paper has received an invitation from the ACM Transactions on Database Systems (TODS) journal. The Pat Goldberg Best Paper Award is given annually for outstanding work in computer science, electrical engineering and mathematical sciences.

Gabe Brown, BS ’05, works with Microsoft focusing on campus recruiting at Ohio State and has given several talks at the Microsoft Patterns & Practices summit and other conferences on his teams research on Scrum.

Congratulations To Our Alumni Drawing Winner!

Sandip Bapat graduated with a PhD from CSE in 2006. Since then, he has been working as Lead Software Designer at The Samraksh Company, a wireless sensor network startup in Dublin, Ohio. Elements of his work at Samraksh on low-cost, low-power, mote-scale radar-based motion detection have been selected for demonstration at this year’s ACM SenSys conference in Zurich, Switzerland. Sandip lives with his wife Gauri in Dublin, Ohio, which allows him to closely follow his other passion - Buckeye football.

Seen in this picture: Sandip and Gauri at the Ohio State - Marshall football game on September 2, 2010. Sandip won tickets to the game for participating in our last newsletter challenge.
We Want to Hear From You!

Do you have an update to include in the next alumni newsletter? Do you have any suggestions for topics you would like to see covered? Do you have any photos from your college days or today that we can include? We want to hear from you! Email us your updates, photographs or suggestions to Carrie Stein at alumni@cse.ohio-state.edu or mail them in the attached envelope.

Amit Sheth, PhD ’85, is the LexisNexis Ohio Eminent Scholar for Advanced Data Management and Analysis, an endowed faculty position funded by LexisNexis and the Ohio Board of Regents at Wright State University. He directs the Kno.e.sis center for Knowledge enabled Information & Services Science. The Center is part of the Joshi Research Center at WSU, and is the focal point for statewide research in advanced data management, visualization, bioinformatics, sensor technologies and more. Professor Sheth’s research has led to several commercial products and two companies, which he founded and managed including Infocosm, with products and services in Enterprise Workflow Management and Taalee/Voquette/Semagix.

John Tolbert, BS ’83, spent 15 years working for TRW, Inc. as a software programmer and senior engineer. He led the system sizing and simulation modeling effort for the National Automated Fingerprint Identification System (NAFIS) which was developed for England and Wales. He is now CEO and President of his own company, First In Solutions Inc. which provides professional services to the intelligence community in the Washington Metropolitan Area.

William R. Lenzotti, MS ’85 is a Financial Advisor with Lincoln Financial Advisors

Richard Wildermuth, BS ’01, is the Manager in IT Risk with Cardinal Health.

Rajiv Roy, MS ’71, is a Solution Architect with SMS Consulting Group in Melbourne, Australia. He is also pursuing a PhD in Information Systems at Swinburne University of Technology in Melbourne.

Brent Watkins, MS ’04, is a character technical director at DreamWorks. His work can be seen in the new movie How to Train Your Dragon. Brent was recently featured in the Columbus Dispatch, discussing his work in the new movie, How to Train Your Dragon. Read the article here, http://www.dispatch.com/live/content/arts/stories/2010/03/26/ohio-state-grad-has-to-make-sure-dragon-is-waggin.htmlenablers.

Subash Sundaresan, MS ’90, is the Vice President of Engineering and Product Management at Amobee Media Systems, a startup that provides a platform for advertising on mobile devices located in the San Francisco Bay area.

In Memoriam: Dr. Jin-tuu Wang

A recipient of the 1995 Ohio State Distinguished Engineering Alumni Award, Dr. Jin-tuu Wang passed away on September 3, 2010, in Taipei, Taiwan, at the age of 73.

He received his BSEE degree from National Taiwan University in 1960, MSEE from University of Hawaii in 1968, and MS and PhD degrees in CIS from OSU in 1974 and 1978, respectively. He worked for Taiwan Telecommunications for 40 years, was promoted to number two position of deputy CEO before he retired in 1996. After retirement, he served as CEO of Alcatel, Taiwan, for 5 years.

Dr. Wang was a key figure in Taiwan’s telecommunications industry for more than 50 years. He is credited with numerous inventions and patents and received many awards and recognitions for his contributions to Taiwan’s telecommunications industry. He was also very active in OSI standards. He loved sports and played tennis and golf regularly.

He is survived by his wife, two sons and two daughters-in-law, two grandsons and two granddaughters. His wife is an artist specializing in Oriental painting. His elder son, Dr. Chang-jia Wang, also received a PhD degree in CIS from OSU in 1994. His elder daughter-in-law, Mei-ling Chen, received an MS in CIS from OSU in 1994. His younger son is a dentist, educated at Fukuoka University in Japan and specialized in dental implanting.

CSE Alumni: By the Numbers

530 Work in Software Engineering and Development
50 Graduates serve as President or CEO of a Company
117 Are University Professors
26 Own Their Own Companies
39 Are Active Members of the Armed Forces
83 Graduates are Vice Presidents of a Company
550 Have Received Their PhDs
CSE Welcomes New Assistant Professor

Assistant Professor Michael Bond received his PhD from the University of Texas at Austin in 2008, preceded by bachelor’s and master’s degrees at the University of Illinois at Urbana-Champaign, in 2002 and 2003, respectively, followed by a postdoc appointment at UT Austin. Bond’s research helps programmers write reliable software.

We need reliable software for science, energy, health care, and education, but achieving reliability is challenging, especially as software becomes more complex and concurrent. As a consequence of these trends, programmers cannot discover or diagnose many software errors without actually deploying their software, as in running the software in the real world, e.g., on customers’ computer systems. Bond has developed program analyses that help programmers diagnose errors, yet are also extremely efficient, so they can run alongside deployed software without noticeably slowing it down. These analyses help programmers fix many errors that would otherwise go unsolved, ultimately leading to software that is much more reliable than it is today. As part of this work, Bond has co-authored nine top-tier peer-reviewed papers, and his dissertation received the 2008 ACM SIGPLAN Outstanding Doctoral Dissertation Award.

At Ohio State, Mike plans to focus on the challenges of concurrent software. Software must become concurrent because tomorrow’s microprocessors are now providing more, instead of faster, cores. Unfortunately, writing concurrent software is notoriously difficult. He plans to develop new language and runtime support that helps programmers express concurrency, and new analyses that help programmers find and fix concurrency errors in their programs.

Bond grew up in Virginia near Washington, DC. In his free time, he enjoys running, biking, kickball, reading and spending time with his partner Julia, who studies plant biology and also plans to work at Ohio State.

Professor Chris Stewart Receives Best Paper Award

Professor Chris Stewart won the Best Paper Award at MASCOTS 2010 annual conference. The MASCOTS conference is a well-established forum for state-of-the-art research on the measurement, modeling and performance analysis of computer systems and networks, and is co-sponsored by IEEE and ACM. The 18th edition of this conference took place August 17-19, 2010 in Miami Beach, Florida. Professor Stewart’s paper, EntomoModel: Understanding and Avoiding Performance Anomaly Manifestations presents a rigorous study of real performance bugs taken from MYSQL, JBoss and other popular software, finding interesting patterns. EntomoModel enables online system management that avoids anomaly manifestations by dynamically adjusting system management parameters. Their trace-driven evaluations show that manifestation avoidance based on EntomoModel, or entomophobic management, can reduce 98th percentile SLA violations by 67% compared to an anomaly oblivious adaptive approach. In a cloud computing scenario with elastic resource allocation, his approach uses less than half of the resources needed in static over-provisioning. For the work, Stewart collaborated with colleagues Kai Shen at University of Rochester, Arun Iyengar of IBM T.J. Watson and Jian Yin of Pacific Northwest National Laboratory.

CETI Hosts Annual Industry Day

CETI held its annual Industry Day and Project Showcase on June 10th, 2010. This event presented industry-university collaborations of the CETI Industry University Collaborative Research Program, with a view to growing these critical collaborations between the computing-related industry and OSU. The program included a keynote followed by an industry panel on IT Innovations for a Service Oriented Economy. Panelists included, Dr. Dinesh Dhamija, Chief Technology Officer and Senior Vice President, TDCI, Mr. Moez Chaabouni, Deputy CIO, City of Columbus, Vijay Gopal, CTO for Shared Applications, Nationwide Insurance. Brief research talks highlighted key CETI research. In addition, thirty research and Senior Capstone projects were presented via posters where companies were able to view these projects and interact with the program’s students.

The CETI Program (http://www.ceti.cse.ohio-state.edu) is sponsored by the National Science Foundation, and affiliated with the Center for Experimental Research in Computer Science at the Georgia Institute of Technology (http://www.cercs.gatech.edu). The CETI Program (http://www.ceti.cse.ohio-state.edu) is directed by Rajiv Ramnath and Jay Ramanathan.
14th Annual CSE Awards Banquet

The Computer Science and Engineering Department held their 14th Annual Awards Banquet on May 21, 2010 at the OSU Faculty Club. This is a departmental event to honor our students’ academic achievements and the successes of our faculty and staff.

The department wishes to thank those alumni and industry donors who helped make this event possible – either by contributing to the undergraduate scholarship awards or by sponsoring a table. Raytheon Company, Conleth PhD ’90 and Christina “Curby” O’Connell, The Leggett Family including Ester ’45, Robert ’72 and Susan Leggett ’72, Matt Desch ’80, Crowe Horwath, Silicon Valley CIO Award and James Cates ’71 and the ACM Central Ohio Chapter all contributed financially to make this event a success.

Central Ohio Chapter of Association of Computing Machinery (ACM)
Benjamin Gilbert

Ernest William Leggett, Jr. Scholarship: The Leggett Family Award
David Mason
Katherine Tornwall
Michael Diekema
Jacqueline Telljohann

Dedication Award
Brian Swaney

The O’Connell Family Award
Meghan Day
Eric Perry

Matt Desch Award
Laura Housley

Crowe Horwath
Chirantan Ekbote

Raytheon Corporation
Greg Loesch
Natalie O’Connell

The Department of Computer Science & Engineering Scholarship
Brian Arand
Joel Zachrich
Jamie Colley
Christopher Mayer
Maksim Pritsker
Marc Khoury
Jason Link
Dorian Rahamim
Jonathan Silliman

Silicon Valley CIO Award
Angela Deady
Patrick Mulac

Outstanding Graduate Student Research Awards
Shirish Tatikonda
Guoqing (Harry) Xu

Mike Liu Graduate Research Fellowship Award
Feng Chen

Outstanding Teaching Award
James Davis
Tim Long

Outstanding Service Award
Shaun Rowland
Peg Steele

Eleanor Quinlan Memorial Award
Bruce Adcock
Raffi Khatchadourian

Above, Professor Emeritus B. Chandrasekaran speaks at the banquet. A fellowship to fund full-time graduate students has been established in Professor B. Chandrasekaran and Professor Sandra Mamrak’s honor.

Professor Chandrasekaran retired from the department in 1995 but remains active supporting students and research in artificial intelligence. Professor Emeritus Sandra Mamrak held positions in the department and university for over 30 years. Currently, she lives in New York City. The Mamraks have one daughter, Mallika.
Ohio State computer science and engineering researchers have developed software solutions to enable programs to run faster in multicore processors through better management of on-chip shared hardware caches.

Xiaodong Zhang, the Robert M. Critchfield Professor and department chair, and P. Sadayappan, professor, led a team whose research resulted in an innovative and effective cache partitioning algorithm that has been implemented in the Linux operating system, which is open-source. The work by Zhang and his colleagues also has been adopted recently by Intel Corporation as a software solution for various applications.

A multicore processor is a high-density integrated circuit chip where multiple computing units, or cores, are attached to achieve high performance and low power consumption. The last level cache is shared by all the available cores. Multicore processors have been widely manufactured by major processor vendors, such as Intel and AMD, replacing single-core processors in all types of computing platforms ranging from laptops to supercomputers. However, their efficiency in data-intensive applications is hindered because multiple processing tasks, or multi-threads, can simultaneously compete for the limited space of the last level caches, causing access conflicts and significantly delaying execution time.

“The memory problem in multicore processors has been paid serious attention since the chips were first shifted to the market,” Zhang says. For example, the article Multicore is Bad News for Supercomputers, published in a 2008 issue of IEEE Spectrum, demonstrated that adding cores slowed data-intensive applications based on scientific workloads from Sandia National Lab. And in an issue of IEEE Spectrum this summer, University of California-Berkeley Professor David Patterson recently published an article entitled The Trouble with Multicore, confirming that the same concerns have become increasingly more serious.

Zhang and Sadayappan and their colleagues found a way to solve the problem with scheduling algorithms for cache partitioning that allow multi-threaded programs to utilize the shared cache with minimum or no access conflicts, while speeding up the program execution and increasing the cache utilization and efficiency. The team, which included Ohio State computer science and engineering doctoral degree recipients Qingda Lu, CSE ’09, and Xiaoning Ding, CSE ’10, and, from Iowa State University, Jiang Lin, 2008 doctoral graduate, and Zhao Zhang, associate professor, both in electrical and computer engineering, demonstrated the effectiveness of their solution in the Linux system in their work. Their work was presented and published in the International Symposium on High Performance Computer Architecture (HPCA 2008).

The Intel Corporation Software and Services Group this summer issued a formal acknowledgment letter to the team, saying the research contributions “helped our engineers implement a solution that provided 1.5x latency reduction in a custom Linux stack running on multicore Intel platforms.” According to Intel, this software cache partitioning method “has been adopted by a major industrial automation vendor and facilitated the deployment on multicore Intel platforms.”

“I am very pleased to learn that another research work of ours has made a strong impact in the advancement of computer systems,” Zhang says. “I believe the solution is not only effective in the Linux system for Intel processors, but is also general-purpose and will be widely used as a critical component in any operating system to manage shared caches in any multicore processors.” This project has been supported by a collaborative grant from the National Science Foundation.
Prasun Sinha was elevated to an IEEE Senior Member in April and has been selected to serve as the Program Co-Chair for the 7th International ICST Conference on Broadband, Communications, Networks, and Systems (BROADNETS), 2010.

Yusu Wang and Misha Belkin received an NSF EAGER award entitled Integration of Computational Geometry and Statistical Learning for Modern Data Analysis.

Han-Wei Shen received a grant from the National Science Foundation entitled An Information-Theoretic Framework for Large-Scale Data Analysis and Visualization. In addition, Han-Wei received two Department of Energy awards entitled An Information-Theoretic Framework for Enabling Extreme-Discovery and Graph-based 3D Flow Field Visual Analytics.

Sriparthasarathy was promoted to full professor. In addition, he received an IBM Faculty Award for his work in data mining.

Hakan Ferhatosmanoglu received an IBM Faculty Award for his research on data management systems.

Tamal Dey has joined the editorial board of the journal Graphical Models and will serve as an associate editor.

The National Science Foundation awarded Ness Shroff a grant entitled Architecturing Manageable Interference for Next-Generation Wireless Networks.

The Department of Energy awarded P. Sadayappan and Nasko Rountev a three year grant entitled A Fault-Oblivious Extreme-Scale Execution Environment. The project is in collaboration with Sandia National Labs and several other research groups.

The National Science Foundation awarded Atanas (Nasko) Rountev a single-investigator grant entitled Understanding and Eliminating the Run-Bloat of Java Applications. Nasko has also been promoted to associate professor.

DeLiang (Leon) Wang has been selected as an IEEE Distinguished Lecturer for a three year term. As part of this distinction, he gave a plenary lecture at the 2010 ISNN in Shanghai entitled Cocktail Party Problem as Binary Classification in June. He also gave an invited talk entitled “Speech Segregation as Binary Classification” at the 2010 International Symposium on Machine Perception and Cognition, held in Peking University in Beijing, China.

Dhabaleswar (DK) Panda received a National Science Foundation grant entitled Dynamic Staging Architecture for Accelerating I/O Pipelines. He also received funding from Sandia National Labs for Scalable Fault Tolerance Properties of InfiniBand Subnet Management. He and RNET Technologies were awarded two Department of Energy awards entitled HPC Application Energy Measurement and Optimization Tools and Green Storage for HPC with Solid State Disk Technologies.

Xiaodong Zhang gave a keynote talk entitled Building a Domain-Knowledge Guided System Software Environments at the 7th Annual IFIP Conference on Network and Parallel Computing in Beijing, China. In addition, he served as General Co-Chair for the 30th International Conference on Distributed Computing Systems, ICDCS 2010.

Raghu Machiraju serves as a guest editor for the special issue of IEEE Transactions on Visualization and Graphics, associated with the Visualization Conference, where he also serves as paper co-chair. He also received a grant from the OSU Center for Clinical and Translational Science entitled PhenoLIMS – A Laboratory Information System (LIMS) for Gleaning Molecular and Morphological Phenotypes in Clinical Outcomes.
Undergraduate Travels to El Salvador with Engineers Without Borders

Last spring, CSE undergraduate Amanda Kauppila and other OSU engineering students traveled to the Las Pilitas neighborhood in San Pedro Puxtla, El Salvador to install latrines as part of an ongoing humanitarian effort in the area. Amanda is a member and the professional chapter liaison for the OSU Student Chapter of Engineers Without Borders (EWB). Members participate in the design, fund raising, marketing and gain knowledge attending general meetings to hear speakers on various topics and learn to apply their problem solving skills in creating solutions for developing countries.

Over the past year, the group has been working with mentors Amanda Engle and Kwasi Amoah of The Central Ohio Professionals chapter (EWB-COh), who are currently managing a municipal services project in the Las Pilitas neighborhood of San Pedro Puxtla, El Salvador, to design sustainable latrines constructed from local resources for the community. Las Pilitas is situated in a ravine, which makes travel difficult. Also, there is no treated drinking water in Las Pilitas, so the residents drink from a contaminated spring. As a result, they are often ill, making it difficult to work when work is available to the isolated neighborhood. Many of the residents work short term jobs in the fields of coffee plantations, sugar cane farms or construction. The latrines are a part of a broader plan which includes the installation of a water pipeline, and the construction of a road.

During their spring break, a group of EWB-OSU members traveled to El Salvador to begin latrine construction. Over the course of a week, they installed and altered their Twin Lined Ventilated Improved Pit, or V.I.P. One pit, or latrine, is used continuously for two years and is then sealed. At which point, the other pit is used for two years while the contents of the first pit detoxifies. After two years of detoxification waste can be safely removed with buckets and shovels or a hand pump. The pits are lined with cinder blocks to prevent the waste from leaking into the ground water, and removable concrete slabs cover the tops of the pits. One slab has a large hole, over which a toilet is placed. Another slab contains a smaller hole for a pipe. The pipe must extend two feet over the roof of the privacy structure to provide adequate airflow for ventilation. The tops of the pipes are covered with a screen to prevent flies from escaping and spreading disease. Flies are attracted into the latrine hole, and, as long as the privacy structure is kept dark, they will be attracted to the light at the top of the vent pipe. Since the screen is in place, the flies are not able to leave, thus decreasing the spread of disease. Even with design preparation, some changes were made on site. For example, the residents were concerned about earthquakes and the stability of the pit walls. After discussing this concern, extra rebar was added in the walls for support. The latrines are the first step toward general improvement for the neighborhood. Now that the latrines are in place, the local water authority can approve the installation of a waterline. Finally, a road will be built to connect Las Pilitas with the main town of San Pedro Puxtla.

While in El Salvador, the students stayed with host families, and one local woman prepared most of the meals, which included several traditional El Salvadoran dishes. Over the week, the students grew accustomed to the chickens wandering the streets and the sound of roosters in the morning. They enjoyed getting to know the residents as friends, even with the language barrier. Everyone learned that a lot of information can be conveyed through hand gestures and facial expressions. To help overcome the language barrier, OSU-EWB worked with PeaceCorps volunteer, Lauren Holt, in San Pedro Puxtla, for planning the project and corresponding with the community during their stay and construction. Lauren assisted as a translator and organized a system for other PeaceCorps volunteers in surrounding communities to translate at the site.

EWB-OSU plans to make an assessment trip to El Salvador in early September to begin a new project: bio-sand filters. These filters will provide clean drinking water to the residents until treated drinking water is available in Las Pilitas. The assessment trip is necessary to gather information on supplies, cost and feasibility and to determine if and how the sand filtering system will benefit the community. The information acquired on this trip will be used to write a proposal to EWB-USA with specifics on how the project will be implemented. The proposal must provide a compelling argument that the project will improve the quality of life for the local community, and that it uses technology that can be sustained easily and affordable.

EWB-OSU will hold a fund raising banquet and silent auction at the Faculty Club on October 20 so they can continue their humanitarian efforts. OSU president Gordon Gee will be the speaker and students will discuss the project. To learn more about EWB-OSU or EWB-COh, visit http://ewb.osu.edu/ or http://ewbcoh.org.
Graduate Student Ping Lai, Research Scientist Sayantan Sur, PhD ‘07, and Professor D.K. Panda were honored with the Best Paper Award at the International Supercomputing Conference 2010, held in Hamburg, Germany. Ping Lai is a fourth year PhD and is a member of the Network-Based Computing Laboratory led by Professor D.K. Panda. Her primary research interests include high performance computing, communication protocols and high performance data-centers.

Ms. Lai’s paper, Designing Truly One-Sided MPI-2 RMA Intra-node Communication on Multi-core Systems, was selected for the best paper award from a select group of competitive technical papers. Their paper enhances existing shared memory mechanisms, designing one-sided synchronization. The new design eliminates the overhead of using two-sided operations and eliminates the involvement from the remote side. Professor Panda and Sayantan attended the conference in May to accept the award on behalf of the group.

INTERNATIONAL SUPERCOMPUTING CONFERENCE
BEST PAPER AWARD

NEWPATH STUDENTS TRAVEL TO SILICON VALLEY

This summer, three CSE undergraduate students traveled to Silicon Valley for a unique program that immersed students in the world of technology commercialization and venture capital. CSE majors Andrew Stock, Zach Boerger and Parmeet Singh participated in the program. Stock and Boerger collaborated with MBA students Aaron Friedman and Dong Hyun Lee from the Fisher College of Business and worked with Pie Digital, an innovative tech support company. The students participated in the program as part of the NEWPATH initiative. NEWPATH is an NSF supported program at Ohio State with the mission to educate, train and nurture highly motivated students to become IT entrepreneurs of the information age.

Undergraduate Focus: Michael Shah

This summer Michael Shah, a CSE undergraduate student, participated in the Summer Undergraduate Research Institute (SURI) while conducting two research projects at the Ohio Supercomputer Center (OSC). SURI is a summer program run annually by the Undergraduate Research Office which provides resources, tutorials and a community for undergraduate research outside the traditional school year. Through SURI, Shah participated in workshops which guided him in writing sound abstracts, learned how to prepare posters for forums and conferences, as well as social events, connecting him with resources and other students. Shah says, “The SURI group is very involved in their activities and I was able to meet many other student researchers and learn how research is approached from different fields.” Shah’s own research interests combine computer science technologies and applications in medicine.

One of Shah’s projects at OSC is in partnership with the College of Veterinary Medicine. He has been working with Dr. Tatiana Motta developing a simulator to help veterinarian students learn to perform surgery on a dog knee, specifically, a dog-knee arthroscopy. The project involves an understanding of volume visualization, as well as high performance computing so they can interact with the volume in real-time. Shah’s supervisor is Don Stredney, the director of the Interface Lab at OSC.

Shah is also working with the School of Public Health, led by Dr. John “Mac” Crawford. They are exploring the use of networking and gaming technology in order to allow public health officials to consult with one another from remote locations. This project hopes to enable public health officials to communicate from isolated locations so they can develop and implement plans of action in the event of a disease outbreak, such as in his project, Chikungunya Mosquito Virus outbreaks. Several million indigenous cases of Chikungunya virus disease occurred in Africa, the Indian Ocean, India, Asia and, recently, Europe. The virus is responsible for explosive outbreaks and has a propensity for dispersal and emergence in remote ecological environments.

Shah will present his research at the Ohio State Undergraduate Research Day in October. The experience also provided Shah with a broader outlook on research as a whole. “While my research projects are focused on specific problems, I feel it is important to always be aware of what others in the professional and academic community are developing, and networking with others has helped improve my awareness of what skills I will need to acquire in the future. I enjoy research, and will keep an open mind to working with others—asking and answering the questions of tomorrow.”

Above: A screen shot of the virtual meeting room to allow public health officials to consult in remote locations of the world.
CSE Industrial Advisory Board Welcomes New Members

The CSE Industrial Advisory Board held their annual meeting on May 11, 2010. The department is pleased to welcome four new distinguished alumni as members to the board. Matt Desch, BS ‘80, is Chairman and CEO of Iridium Satellite LLC. Matt brings over twenty years of telecommunications industry experience to the board. He received his MBA from the University of Chicago in 1986. Mike Fortin, MS ‘78, PhD ‘91 is a Microsoft Distinguished Engineer in the Windows division and serves as the Multi-core Champion for Microsoft and is the Director of Development for the Reliability, Security, Performance, Telemetry, Licensing and Deployment, and Ecosystem Fundamentals teams. Ray Harishankar, MS ‘90, is an IBM Fellow and CTO of Global Solutions and Asset Management within IBM Global Business Services in Dublin, OH. He was named the Asian American Engineer of the year in 2009 by the Chinese Institute of Engineers USA. Julie Hartigan, MS ‘89, PhD ‘94 is the Chief Technology Officer of Federal Programs at Expert Systems in Washington, DC. Prior to joining Expert Systems, Julie served as Chief Technology Officer over Government Systems at Teradata.

The group was charged with the following missions: 1) Through the members' prominent corporate positions or via interaction with their extensive network, they will identify internships, jobs and grant opportunities for CSE students. Board members will also aid faculty members with collaboration opportunities as well new funding sources. 2) As leaders in their respective areas, they will inform the department of changes and new trends within the computing field and suggest adjustments in strategic planning to meet these shifts. 3) The Board will give direction for organizing individual and major donation activities. The department thanks the board members for their diligent service and looks forward to fruitful collaboration in the future.

The Department of Computer Science and Engineering has announced a 10% increase in its commitment to the “Students First” scholarship campaign, a thirty-month long, university-wide effort to ensure that all enrolled students have the financial assistance necessary to complete their degree programs.

Despite increased efforts, there is still evident need for scholarships. Projections indicate that as many as 600 students enrolled in the College of Engineering are at risk of financial hardship. In addition, we have received a 100% increase in scholarship applications from freshman students compared to last year.

To further our commitment to our students, we are organizing an Alumni Society. Though it is still in its early stages of forming, the organization promises to be a valuable means of networking for graduates and an opportunity for alumni to connect, socialize and provide an invaluable resource for our current students.

The Ohio State University Foundation is the vehicle which funds both of these initiatives for our department. The Foundation works on behalf of students to maintain consistent funding streams to support the strong academic programs, innovative technology and state-of-the-art facilities that define this institution. Private support to Ohio State can take several shapes, including cash and securities, gifts-in-kind, planned gifts such as bequests or trusts, grants administered through the Ohio State Research Foundation and pledges.

If you are interested in donating your time, by joining the Alumni Society, or donating a gift to our students, please contact me to discuss in further detail. Our Alumni and our Friends are the key to our continued success and the springboard for our students’ futures.

To contact Tim, call (614) 292-8893 or e-mail welsh.28@osu.edu.
Many Thanks to Our Alumni and Friends!

We appreciate the following alumni, faculty, staff and friends who directed their Ohio State gifts to the Computer Science and Engineering Department. Listed below are our benefactors over the past 6 months. These donations are making a difference. Private support can help us to attract outstanding students and promising young faculty. We have used gift dollars to improve research and teaching labs, as well.

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For more information about various means of giving, contact:
Tim Welsh, Director of Development, at (614) 292-8893 or welsh.28@osu.edu.

From Left: Xiaoning Ding, Prof. Xiaodong Zhang, and Feng Chen after Summer Graduation.

Incoming CSE graduate students attend orientation.

New graduate students take a break at orientation.
Congratulations to CSE Spring and Summer Quarter Graduates!

The Department wishes you the best of luck in your future endeavors.

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