



LINKS

Newsletter of the Department of Computer Science

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From the Chair, Rami Melhem

This year is the 40th anniversary of our department, which makes us one of the oldest computer science departments in the country. Although I cannot comment on the status of the department in the '60s and '70s, I can speak about the progress that the department has made during the last 27 years. During this time, I have been a student, a faculty member, and the chair. Thus, I have observed the progress of our department from many different perspectives.

The department has always been a first-rate research department with a great graduate program. Our PhD students have attained positions in fine academic research institutions, such as Carnegie Mellon, Clemson, Florida State, Florida International, Georgia State, Georgia Tech, George Mason, Michigan Tech, New York University, the State University of New York at Albany, Syracuse, and the Universities of Arizona, Buffalo, California (Berkeley), Delaware, Georgia, Maryland (College Park and Baltimore County), Pittsburgh, South Carolina, Texas (Dallas and San Antonio), Utah, and Virginia.

The federally funded research program within the department has grown to almost \$3 million expenditure, and many faculty members in the department are involved in multidisciplinary research with other schools and centers at Pitt, as well as with other academic institutions and industrial partners.

The department has always taken its undergraduate education mission very seriously. Over the years, thousands of our students have received an outstanding education that prepared them for leadership roles in industry. The most noticeable change that I have seen recently relates to a new sense of community among our students. Undergraduates have started to develop a sense of belonging through organizations such as the Society for Women in Computing, the Association for Computing Machinery student chapter, the computer science honor society, and the Technology Leadership Institute, among others. I have seen a noticeable increase in the number of undergraduate students attending departmental colloquia and functions, and participating in research projects. I have made it our goal to encourage undergraduate participation in the department.

Over the years, enrollment in computer science has had its ups and downs. The latest surge in enrollment was in the '90s and was followed by a sharp decline after the burst of the high tech bubble. The demand for computer science education will definitely bounce back. We are already seeing signs of a reversal in the declining demand for computer science education. In a recent issue, *Money* magazine rated software engineer as the best job in America. Moreover, rigorous computer science education will be crucial to deal with the increasingly complex role of computers in modern society. All aspects of our society are increasingly relying on computers, and despite the trend to outsource some computer-related jobs to other countries, the demand for computer scientists will continue to grow.

In the last six years, I have had the privilege to chair the department and to participate in its continued quest for improvement. I am honored by the trust that the faculty places in me and am excited about the opportunity to continue the journey toward excellence in both our research and education missions.

Sixth Annual Computer Science Day

"This event just keeps growing," said Compunetix Vice President Gerry Pompa before presenting an award at the sixth annual Computer Science (CS) Day, held on February 17, 2006, in Sennott Square. The statement was echoed by many others throughout the day, which saw the introduction of some exciting new additions to the successful events that have composed CS Day in previous years.



Most notable of the new events was a debate co-organized with the William Pitt Debating Union, titled "Digital Media: To Share or Not to Share?" It featured

Philadelphia attorney Geoffrey L. Beauchamp, an area counsel for the Recording Industry Association of America, and Charles Lee Mudd, an attorney who has represented several defendants in file-sharing lawsuits. Paired with the attorneys were two Pitt junior debators, Tony DiMattio and Melina Forte. Kevin Ashley, a Pitt professor of law, and Kristen Wlazeleck, a double major in political science and communication at Pitt, acted as questioners. Gordon Mitchell, associate professor of communication and director of debate at Pitt, moderated the event. The debate posed the question, "Should lawsuits against individual peer-to-peer users be sharply curtailed?"

The Second Annual Computer Science Bowl, a fast-paced competition in which teams of students were tested on their knowledge of computer science, began with the high school division, featuring students participating in Pitt's College in High School program. The Greenville area team (composed of Alan Hogan, Adam Stubert, and Kevin Jeffries) came in first place, and the Mohawk team (Kevin Kapraly, Jonathan Haski, and Andrew Berg) came in second. College students competed in a separate division of the bowl. In first place came Team Zissou (Robert Cleric, Nathan Homitsky, and Drake Wilson), and in second place was team Mocha Lotion (Ashley Kelley, Christopher Bejnar, and Joseph St. Onge).

Integrated with the Marketplace (in which representatives of local and national high-tech firms presented career information about their businesses to interested students) this year was a scavenger hunt. Participants were then entered into a drawing to win a video iPod, donated by the Industry Advisory Board. The winner was James Larkby-Lahet.

Graduate and undergraduate research was presented in posters, and the students vied for prizes in the poster competition. Faculty judges gave Nevine AbouGhazaleh the graduate grand prize, while the undergrad grand prize went

to Gregory Nicholas. Visitors also voted for their favorites, with the graduate people's choice poster award going to Amruta Purandare, and the undergrad people's choice award going to Vang Be Pha.

At the awards ceremony, AbouGhazaleh was given a special award for outstanding student citizenship. Also honored was the outstanding undergraduate CS student for 2005-06, Christopher R. Povirk. For the graduate research award, Mahmoud Elhaddad won for his paper "Scheduling in Buffer Limited Networks," while AbouGhazaleh was given an honorable mention.

Kathy O'Connor Receives Scholarship



Department of Computer Science Administrative Assistant Kathy O'Connor was recently awarded the Steele Gow Scholarship, which is an \$800 award given to students in the College of General Studies (CGS) who show academic merit, with special consideration given to members of

the Student Government Board (SGB). O'Connor has been involved with the SGB since 2004, when she began attending some of its events.

"My daughter Kerry had just gone to college, and I had more time on my hands, so I wanted to get involved or volunteer with something," O'Connor said. In 2005, she was elected vice president of SGB.

In her letter informing O'Connor that she won the award, Jane S. Micale, the assistant dean of student affairs, praised O'Connor as "an excellent example of a true nontraditional student. You are older, you are working full time, and you have family responsibilities that are time consuming and demanding. You are to be congratulated for juggling all of these balls, while maintaining an excellent QPA, and giving your invaluable time to CGS Student Government."

O'Connor has been a CGS student since January of 1983, when she took her first course. In fact, it was a computer science course, Introduction to Programming Basic. Since that time she has continued to take courses almost every semester. She has earned a certificate in statistical quality control, and she is getting ever closer to earning her bachelor's degree in natural sciences. O'Connor also was recently appointed to the provost's advisory committee on women's concerns, a group that seeks to identify areas in which the University could improve responsiveness to women's issues.

O'Connor remains very active in the CGS Student Government Board, and she was quite honored to receive the scholarship.

We are happy to report that our department's research funding continues to rise. During fiscal year 2005 our total research expenditure was approximately \$2.5 million; this fiscal year (2006) it was approximately \$3 million.

Below are new grants awarded since the last issue of *LINKS*.

Demand-Driven Software Testing (July 2005–June 2007)

Source: Provost

CS Faculty: Bruce Childers

Infocom 2005 Student Travel (June 2005–May 2006)

Source: National Science Foundation (NSF)

CS Faculty: Taieb Znati

Proteomics and Bioinformatic Core Facilities

(July 2005–June 2006)

Source: National Institutes of Health (NIH)

CS Faculty: Milos Hauskrecht

Processor Performance Characterization in the Presence of Transient Errors (July 2005–June 2007)

Source: Provost

CS Faculty: Sangyeun Paul Cho

Collaborative Research: Algorithmic Support for Power-Aware Computing and Communication

(July 2005–June 2008)

Source: NSF

CS Faculty: Kirk Pruhs

Hardening Ad-Hoc Networks with Secure Coprocessors (July 2005–August 2006)

Source: The Technology Collaborative

CS Faculty: José Carlos Brustoloni

Strategic Medical Intelligence Initiative

(August–December 2005)

Source: U.S. Department of Health and Human Services

CS Faculty: Alexandros Labrinidis

Collaborative Research: Debugging Dynamic Code Modifications (August 2005–July 2007)

Source: NSF

CS Faculty: Bruce Childers

Collaborative Research: A Revolutionary 4D Approach to Network-wide Control and Management

(September 2005–August 2006)

Source: NSF

CS Faculty: Taieb Znati

Collaborative Research: Fault-Tolerant and Secure Infrastructure for Time-Critical Embedded Systems

(September 2005–August 2006)

Source: NSF

CS Faculty: Daniel Mossé, Rami Melhem, Taieb Znati

SGER: Design of Efficient Testing and Screening in Molecular Biology (September 2005–August 2006)

Source: NSF

CS Faculty: Taieb Znati

SGER: Exploratory Research on Sensor-Based Infrastructure for Early Tsunami Detection

(September 2005–August 2006)

Source: NSF

CS Faculty: Daniel Mossé, Taieb Znati

Natural Language Processing Technology for Guided Study of Bioinformatics (September 2005–August 2006)

Source: University of Illinois/NSF

CS Faculty: Diane Litman

Modeling Immunity for Biodefense

(September 2005–September 2010)

Source: NIH

CS Faculty: Panos Chrysanthis, Alexandros Labrinidis

Protecting Intellectual Property in Collaborative Design

(September 2005–December 2006)

Source: Science Applications International

CS Faculty: José Carlos Brustoloni

Genetic Studies of Human Craniofacial Diseases

(January–September 2006)

Source: NIH

CS Faculty: Milos Hauskrecht

Algorithms and Metrics for New Generation Data Stream Management Systems (March 2006–February 2009)

Source: NSF

CS Faculty: Panos Chrysanthis, Alexandros Labrinidis, Kirk Pruhs

CR: CRI: A Community Resource Development Project for a Retargetable and Reconfigurable Software Dynamic Translation Infrastructure (March 2006–February 2008)

Source: NSF

CS Faculty: Bruce Childers

Student Research Workshop in Computational Linguistics, at the COLING-ACL 2006 Conference

(April 2006–September 2006)

Source: NSF

CS Faculty: Rebecca Hwa

Nonlinear Model Order Reduction for Behavioral Models of Emerging Technologies (May 2006–April 2007)

Source: NSF

CS Faculty: Donald Chiarulli

SPORE in Lung Cancer (May 2006–April 2011)

Source: National Cancer Institute

CS Faculty: Milos Hauskrecht

Natural Language Processing

“Buffalo buffalo buffalo Buffalo buffalo.” You might be surprised to learn that is a complete and correct sentence. (Hint: Look closely at the capitalization.) You might be even more surprised to know that some faculty in the Department of Computer Science take this kind of linguistic puzzle seriously. Puzzles like this can provide insights into the structure and function of language. And, because the ability to speak and understand complex and unrestricted language separates us from the rest of the world, these puzzles can help to shed light on the mysteries of the human mind.

The Natural Language Processing Laboratory, which is housed in the Department of Computer Science and Learning Research and Development Center at the University, is directed by Professors Rebecca Hwa, Diane Litman, and Janyce Wiebe. Faculty, graduate students, and staff in the laboratory pursue research into a wide range of natural language processing problems. Work ranges from theoretical to applied research, including discourse and dialogue, spoken language processing, affective computing, natural language learning, statistical parsing, and machine translation. While everyone in the laboratory is interested in fundamental questions about language, most research focuses on practical problems as a way to approach basic issues of computational linguistics.

Professor Hwa became interested in artificial intelligence during her undergraduate years. She received her BS degree in computer science and engineering from the University of California at Los Angeles, and her PhD in computer science from Harvard University. Hwa joined the Department of Computer Science at Pitt in 2003. Her research is in the areas of artificial intelligence and natural language processing. Her recent work investigates applications of statistical and machine learning methods to natural language applications such as parsing and machine translation. She is interested in characterizing human language processing as a computational model. A recurring theme in her work is the use of statistics and machine learning techniques to discover regular patterns and structures in languages.

Professor Litman became interested in artificial intelligence and natural language processing when she learned about Joseph Weizenbaum’s Eliza program in an undergraduate psychology course. After completing a BA in mathematics and computer science at the College of William and Mary, she earned a PhD in computer science from the University of Rochester, then worked for several years as a member of the Artificial Intelligence Principles Research Department of AT&T Labs. She joined the Department of Computer Science here at Pitt in 2001. Her recent work is in the area of spoken dialogue systems in which human users speak to a

computer in order to achieve their goals. She is doing much of this research in the context of ITSPOKE (an Intelligent Tutoring SPOKE dialogue system) in the Department of Computer Science and Learning Research and Development Center. Her research also includes computational linguistics, knowledge representation and reasoning, natural language learning, planning, spoken language recognition, user modeling, and applications to education. Her work ranges from fundamental research to applied work that has resulted in technology transfer and patents.

Professor Wiebe was an undergraduate at the State University of New York (SUNY) at Binghamton, where she majored in English literature, and earned her MS and PhD degrees in computer science at SUNY Buffalo. After graduate school, Wiebe was a postdoctoral fellow at the University of Toronto; then she joined the faculty at New Mexico State University. She came to Pitt in 2000. Her research areas are artificial intelligence and natural language processing. Her work with students and colleagues has been in discourse processing, word-sense disambiguation, pragmatics, and probabilistic classification. Her most recent work investigates automatically recognizing opinionated and evaluative language to support applications such as question answering, information extraction, text categorization, and summarization (see more about Wiebe’s research below).

The natural language processing group here at Pitt is highly regarded, and the faculty are recognized as leaders in the field. You can explore more about the group and its work on the Web at <http://nlp.cs.pitt.edu>.

Have you figured out how to parse that sentence yet? If not, here is another hint: It is probably true!

Wiebe’s Research Noted on Forbes.com

Professor Janyce Wiebe’s research on the field of sentiment analysis was noted in a November 15, 2006, Forbes.com article by Leah Hoffman, titled “Two Thumbs Up.” Sentiment analysis uses natural language processing to attempt to show how context impacts the meanings of words.

“The variety of words that people use for subjective expressions is staggering,” Wiebe said. She and her colleagues have already assembled a dictionary of some 8,000 indicator words and phrases.

“The dictionary tells you whether a word is positive or negative when it’s taken out of context,” Wiebe explained. “The challenge is to figure out whether it’s positive or negative in each individual instance.”

Daniel Mossé Wins Bellet Award

Reprinted with permission in part from a story by Peter Hart in the March 30, 2006, issue of the University Times:

Department of Computer Science faculty member Daniel Mossé recently received one of the 2006 Tina and David Bellet School of Arts and Sciences Teaching Excellence Awards. The annual teaching awards were established in 1998 with a \$200,000 donation from the Bellet family to recognize outstanding and innovative teaching in undergraduate Arts and Sciences.

Mossé, who joined the Pitt faculty as an instructor in 1992, was named assistant professor in 1993, associate professor in 1998, and professor in 2004. He also holds a secondary appointment in Pitt's computer engineering program and is an affiliated faculty member of the Center for Latin American Studies.

"I love teaching, and I am fascinated by computers and computer science," Mossé said. "My teaching philosophy is to use the classroom as a stage to facilitate learning, connect with the students, and allow them to absorb the material—not just memorize it—at a personal level."

Not that his courses are ever easy, Mossé added. "I start my courses telling the students that they will have to work very hard, but it will be worth it. I learn everybody's name in the first two or three weeks and use questions and answers throughout my courses, first to let me know who's keeping up with the material, but also to get students to think about questions, to be ready with answers even if I don't call on them. They have to be 'on their toes.' Eventually, they learn to ask questions themselves."

Because initially undergraduate students often think of computer science as boring or something to be dreaded, especially the required courses, Mossé presents the material with a positive and optimistic outlook. He also injects humor into his lessons. "Humor is one of my trademarks," he said. "Funny analogies work best to explain a point, or a joke related to the subject of the class works best when a break is needed. This all culminates in one point: it enables me to reach the student at different levels and transcend the classroom experience, sharing with them that if you are in a situation, you had better make the best of it. This attitude makes their time in the course a better experience."

Mossé also has mentored several undergraduates in research projects. "The top undergrad computer science students at Pitt are sensational and often better than many of our graduate students. That's why I like to offer the top undergrads a chance to do a research project with me that will introduce them to what graduate study is. It's especially satisfying to see more American students going into grad study, because we need more Americans in computer science."

"I was thrilled to win this award. Ecstatic. But I want to say that this award does not recognize only me, that it is an award that honors the whole department and the combined efforts of the faculty," he said. "You can see it in the interaction of the faculty, in the continuous feedback. And the department is very supportive of our teaching efforts. It's a wonderful environment to be teaching in."

Former student Regis R. Colwell recalled the high level of energy in Mossé's courses, a number of which he took a decade ago. "OS [Operating Systems] is a challenging course, but he made it entertaining. I can still remember his analogies of complex topics to fights with his siblings over the batter from his mother's mixing bowl. Relating the inner workings of a computer to things in real life helped me understand why these things were important before we even looked into the technical details," Colwell said. "To this day, he still stands out as one of the greatest influences in my academic studies."

New Faculty: Youtao Zhang



Youtao Zhang joined the Department of Computer Science as an assistant professor in January 2006, but he is not a stranger to the University of Pittsburgh. Youtao briefly attended Pitt as a graduate student in the department, before moving south and completing his PhD in computer science at the University of Arizona in 2002.

Prior to arriving in the United States, he received his BS in computer science from Nanjing University, Nanjing, China in 1993; and in 1996 he received his master's degree in engineering from Nanjing University. In 2002 he became an assistant professor at the University of Texas at Dallas in Richardson, Texas.

He has published more than 20 papers in peer-reviewed conferences and journals. He received the distinguished paper award of the IEEE/ACM International Conference on Software Engineering in 2003; and the most original paper award of the International Conference on Parallel Processing in 2003.

In January 2005 he received the National Science Foundation's prestigious Faculty Early Career Development Award. Youtao's research interests are in the areas of computer security, program analysis and compiler optimization, and computer architecture. In the spring 2006 term, he taught a graduate course in compiler design (CS 2210). He enjoys research because it allows him to explore new ideas, while teaching gives him the opportunity to convey the knowledge to those who need and want it.

Bruce Buchanan Honored



Bruce Buchanan, recently retired from the faculty, has maintained his affiliation with our department (his official title is University Professor of Computer Science Emeritus) and continues to work in artificial intelligence. Buchanan recently was honored by the American Association for Artificial Intelligence

and presented the Robert S. Englemore Memorial Lecture in Boston, Mass., on July 19. In his lecture, he talked about knowledge and power in intelligent systems. In addition to maintaining a busy schedule, Buchanan still corresponds with friends and collaborators, and occasionally visits Pittsburgh and the University. And, despite living close to Seattle, Wash., he cheered for the Steelers in the Super Bowl.

2004–05 Faculty Teaching Awards

The department's teaching awards are given to faculty for achieving the highest student evaluation score for overall effectiveness during the academic year.

George Jucha (among part-time faculty teaching a CS service course)

John Ramirez (among faculty teaching a CS core undergraduate course)

George Novacky (among faculty teaching a CS upper-level undergraduate course)

Daniel Mossé (among faculty teaching a CS upper-level undergraduate course)

Taieb Znati (among faculty teaching a CS graduate 2000-level course)

Student News

CS Hosts Technology Leadership Institute



Tonya Groover assists a TLI student

For six weeks this summer, more than 20 high school students—getting out of bed early, no less—came to the Department of Computer Science (CS) to learn about mathematics, programming, Web design, and other topics.

They were participating in the Technology Leadership Institute (TLI), a free program sponsored by the CS department and the School of Arts and Sciences. The institute was designed to encourage high school students to pursue degrees and careers in science and technology, and it was open to everyone who met the academic requirements. Students from underrepresented or disadvantaged groups were strongly encouraged to apply.

Tonya R. Groover, a Pitt CS and sociology major, founded and directed the program. Her goal was to promote an interest in computer science as a career option among traditionally

underserved student populations. Commenting on her dedication and ability, Rami Melhem, department chair, said, “Tonya did a wonderful job with this program. She is great at setting clear goals and focusing on results. During the last year, I was delighted to watch her develop into a very effective manager and leader.” Under her leadership, the TLI certainly realized its vision:

“By providing the foundation for students who have an interest in computing, we will strengthen the computing pipeline and our students will be future leaders in the information technology industry.”



TLI students at the ceremony

The closing ceremony was held on Thursday, July 27, 2006. With parents, family members, faculty, friends, and representatives from industry, the theme was appropriately A Celebration of Our Students. Alfred Moyé,

a University of Pittsburgh Board of Trustees member, gave the keynote address. After congratulating the students and Groover, he emphasized the need for programs such as the TLI to strengthen America's technical and scientific workforce in order to preserve our world leadership in those areas.

PhD Student Awarded \$10,000

A Pitt computer science PhD student has been awarded a 2006 Google Anita Borg Memorial Scholarship, for outstanding female undergraduate and graduate students completing their degrees in computer science or related fields.

Neven “Nevine” AbouGhazaleh was one of only 19 students in the country, out of more than 300 applicants, to receive a \$10,000 award. Of the 19 winners, three—the only winners from Pennsylvania—are from Pittsburgh universities.

AbouGhazaleh did not expect to win the scholarship but was encouraged to apply by her advisors in Pitt’s Department of Computer Science (CS), Professor Daniel Mossé and Professor and Chair Rami Melhem. She learned she had won while attending a retreat at Google’s headquarters in Mountain View, Calif., with the other finalists. “It was a very great surprise,” she says. “To be a finalist was itself an honor. I was competing with people from M.I.T., from Stanford, and so on. The moral of the story is, you never know what you can accomplish until you actually do it.”

While at the retreat, AbouGhazaleh and the other scholars toured Google and participated in a workshop on educational and career issues of women in computer science. “Interacting with other female students and previous winners was an enlightening experience,” she says. “The scholarship has made me morally committed to increasing the involvement of females in the field.”

“It is a pleasure to work with Nevine,” Melhem says. “She is motivated and very keen on exploring new research frontiers. In addition to her dedication to her research, she never turns down a request for helping other people or getting involved in service activities. She is just a joy to have around.”

AbouGhazaleh’s research focuses on reducing computers’ energy consumption so that, for example, laptops will last longer when running on a battery. Her other awards include two Andrew Mellon predoctoral fellowships and the CS department’s outstanding student citizenship award. AbouGhazaleh earned the Bachelor of Science and Master of Science degrees in computer engineering at the Arab Academy for Science and Technology in Alexandria, Egypt, in 1996 and 2000, respectively.

The Google Anita Borg Memorial Scholarship was established to honor the legacy of Anita Borg, a computer scientist for such companies as Nixdorf, Digital/Compaq’s Western Research Lab, and Xerox PARC. In 1997, Borg founded the Institute for Women and Technology, now The Anita Borg Institute for Women and Technology (ABI). For more information on ABI, visit www.anitaborg.org. More information about the scholarship can be found at www.google.com/anitaborg.

Computer Science Graduation



New graduates of the computer science program were once again honored during the computer science graduation brunch, held on commencement day. John Ramirez, director of undergraduate studies, is shown above addressing new graduates and their families.

Outstanding Undergraduate Student 2005

Christopher R. Povirk

The Outstanding Undergraduate Student Award is presented annually to the graduating senior who best represents the computer science department and its standards of excellence in the classroom, in research, and in extracurricular activities.

Undergraduate Honor Roll, 2004–05

Joshua S. Albrecht	Michael P. Nugent
Wesley G. Goodman	Christopher R. Povirk
Patrick J. Koshar	Ezra W. Smith
Gregory D. Nichols	Allen M. Stern
Anthony J. Zana	

Requirements for the yearly honor roll: full-time status for the past academic year (fall, spring) and qualifying computer science grade point average (GPA) of 3.75 and overall GPA of 3.5 during that period.

2006 Honor Society Inductees

The local chapter of Upsilon Pi Epsilon, the international honor society for the computing and information disciplines, is proud to welcome the following new members:

Robert A. Cleric	Michael P. Nugent
Wesley G. Goodman	Christopher R. Povirk
Elizabeth M. Herman	Allen M. Stern
Anthony J. Zana	

Come Celebrate the Department of Computer Science's 40th Anniversary

Friday and Saturday, October 20 and 21

All of our graduates are invited to return to Pitt for:

- A Graduate Student and Alumni Workshop
- A Special Dinner
- Reserved Seats at the Pitt-Rutgers Homecoming Game

We have reserved a block of rooms at a local hotel and are looking forward to seeing you again.

Please let us know you are coming by registering before September 4 at
www.cs.pitt.edu/events/40thanniversary.

For more information, e-mail 40thAnniversary@cs.pitt.edu.

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