

College of Engineering

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Spring 2009



Message from the Dean Dr. Costas Tsatsoulis

Dear friends of the UNT College of Engineering:

Welcome to our newly revamped newsletter! I am excited to have this venue to keep you apprised of what's going on at Discovery Park.

As you read this issue, you'll get a good sampling of the activities taking place within the College, and you'll learn about the exciting accomplishments of faculty, staff, and students. Among our many projects, we chose to highlight two recent research efforts. NSF awarded Dr. Rada Mihalcea an esteemed Faculty Early Career Development (CAREER) Award to continue her research in multilingual natural language understanding. Also, a group of Engineering and Science faculty received multi-million funding from the U.S. Air Force to establish the Institute for Science and Engineering Simulation (ISES) to determine how to develop stronger and more durable jet engines.

Our students have had their share of successes in 2008. In this issue you will read about the Texas Codeboys and IEEE Extreme, two student programming teams who brought the College accolades in national and international programming competitions.

Our enrollments continue to grow and the College now has almost 1500 undergraduate and over 300

graduate students, a growth of over 50% over four years ago. Our College is growing at a rapid pace and new opportunities keep us in the forefront of engineering training and practices.

In keeping with the mission of the College of Engineering, we want to take advantage of every opportunity for innovation and excellence, not only in teaching and research but also in service to our students.

Through this publication, I plan to keep you informed on the development of new departments and programs, on our research accomplishments, our students, and our alumni.

In addition, you'll learn about our supporters, whose donations help fund many of our projects and endeavors, and about ways that you, too, can help support the College of Engineering.

As we enter 2009, I am enthusiastic about the path we are following: We are continuing to offer excellent undergraduate and graduate education to outstanding students, we have a vibrant research program, we have well-respected faculty, and we are expanding in new and exciting areas by adding facilities and faculty. I am confident that the UNT College of Engineering will continue to make growing contributions.

About the front-page photos:

In an environment that encourages diversity, students participate in collaborative projects that keep them engaged in the learning process. With innovative curricular programs that include the very applied, to very research oriented, the students still find time to pursue their individual interests and strengths in state-of-the-art labs and research facilities.

"Engineering is a great profession. There is the satisfaction of watching a figment of the imagination emerge through the aid of science to a plan on paper. Then it moves to realisation in stone or metal or energy. Then it brings homes to men or women. Then it elevates the standard of living and adds to the comforts of life. This is the engineer's high privilege."

Herbert Hoover, U.S. mining engineer & politician (1874-1964)

About This Publication

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Rada Flavia Mihalcea, an associate professor in the Department of Computer Science and Engineering, is a 2008 recipient of the prestigious CAREER award by the National Science Foundation (NSF).

The "CAREER: The Faculty Early Career Development ... Program is a Foundation-wide activity that offers the NSF's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations."
[From the NSF Web site]

This CAREER award will help Dr. Mihalcea carry out a long-term research program that has broad implications in both research and education.

The goal of Dr. Mihalcea's project, funded for \$500,000, is to explore rich and flexible word meaning representations that combine the benefits of multiple monolingual and cross-lingual lexical resources and that can be adapted to the context and to the target application. In particular, the multilingual nature of these representations will allow for an effective exploitation of the knowledge and resources available in different languages.

Her project will explore the use of these multilingual word meaning representations in a number of applications, including lexical substitution, word and text translation, and text-to-text similarity. As part of this project, Mihalcea also plans to work on integrating the models for word meaning interpretation into educational applications and to use them to build a tool to help English as a second language (ESL) students comprehend English texts by providing simpler English synonyms or

CAREER Award Winner:

Rada Mihalcea, Ph.D.



translations into their native language.

Dr. Mihalcea has an impressive background in languages. Her native language is Romanian, but she learned Italian at an early age because her grandmother was Italian. In addition, she speaks English and French; and these days, she noted, "I'm trying to get Spanish going, but it's slow." This background certainly correlates to her interests in multilingual natural language processing.

Although she has received a highly prestigious and coveted award, Dr. Mihalcea stated that her proudest professional achievement is "to have gotten [her] dream job: something that feels like playing more than working, and get paid for it." Asked to mention something amazing about her students and their impact on her as a teacher, she remarked, "the moment when they surpass me. I know it sounds stereotypical, but it is truly a great feeling for a teacher. They start a bit unsure on their feet, and they get to the point where they teach me. That change of roles, even if 'unofficial,' is so rewarding."

On a personal level, Mihalcea's proudest achievement is having received the first prize in the state Mathematics Olympiad

when she was in the sixth grade. Although eventually she won some other prizes and had other achievements, she said, "It never felt again like that very first time."

In addition to her focus on multilingual studies, Mihalcea has also applied her knowledge in another interesting way. She presents a study of happiness in her article, "A Corpus-based Approach to Finding Happiness." This article, which she cites as one of her favorites, is also one of the most popular of her writings. She is very interested in happiness; so she worked on it "purely out of curiosity," she said, with no connection to her other research. The study found a strong correlation between novelty and happiness, which suggests that the discovery of new things (e.g., research) could be associated with a feeling of happiness.

Asked whether she applies the recipe of happiness in her own life, she replied, "yes," adding that she believes "the essence of that recipe is that happiness can be found here and now, not in some distant conditional future." In Slavic languages such as Russian and Bulgarian, the element <rad> in a name means "happy." Her first name being Rada, it's interesting to note this connection between her name and her study of happiness. "As for the connection to my name, if there is any, it's too mystical to be explained," commented Mihalcea.

Asked to share any final thoughts with the readers, Dr. Mihalcea commented, "I truly believe that if you really want something, it will come out true. So it's simply (or maybe not that simply?) a matter of knowing what you want."

Departmental News Briefs

New Faculty

Computer Science and Engineering (CSE)

CSE welcomes Dr. John Taber, Adjunct Professor; and Richard Goodrum, Lecturer.

Dr. Taber's research interests are expert systems, artificial intelligence, and geographic information systems.

Mr. Goodrum is currently pursuing a Ph.D. in CSE at Southern Methodist University.

Electrical Engineering (EE)

Dr. Kamesh Namuduri, Associate Professor, is the newest face in EE. His research interests are image/video processing, information assurance, and wireless sensor networks.

Engineering Technology (ETEC)

ETEC welcomes new arrival Dr. Haifeng Zhang, Assistant Professor, whose research interests are piezoelectric materials and devices and experimental ultrasonic detection methods.

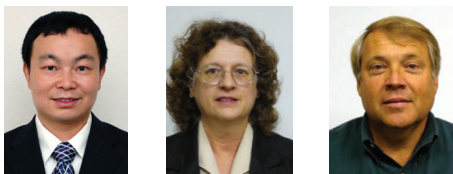
Dr. Althea Arnold, previously a lecturer, was promoted to assistant professor. Dr. Arnold's areas of research and teaching are energy use during construction, robotics and automated construction, and sustainability.

In addition, ETEC has two visiting assistant professors, Dr. Robert Hayes and Dr. Zhenhua Huang.



Photos:

Above – Taber, Goodrum, Namuduri.
Below – Zhang, Arnold, Hayes.



Dr. Hayes' research interests are control systems, signal processing, pattern recognition, and digital systems.

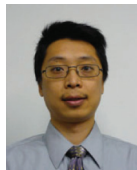
Dr. Zhenhua Huang specializes in earthquake engineering, wind engineering and structural dynamics.

Materials Science and Engineering (MSE)

MSE is proud to announce that Dr. Alan Needleman, a visiting professor, accepted a full-time position in the department. Dr. Needleman's primary research interests are computational modeling of deformation and fracture processes in structural materials, especially metals.

Also new in MSE is Dr. Srinivasan Srivilliputhur, Assistant Professor, specializing in atomistic simulations and modeling.

Photos below (left to right): Huang, Needleman, and Srivilliputhur.



Below: Texas BEST students at the 2008 robotics competition at UNT



Texas BEST

BEST Robotics Inc. is a non-profit volunteer organization based in Dallas whose mission is to inspire students to pursue careers in engineering, science, and technology through participation in a sports-like robotics competition.

BEST was started in 1993 with 14 competing schools and 221 students. In the fall of 2008, BEST exposed over 600 middle and high schools and over 11,000 students from 21 states to the world of engineering. Thousands of young people will make life decisions based on this experience.

The idea for a BEST (Boosting Engineering, Science, and Technology) competition originated when two Texas Instruments engineers, Ted Mahler and Steve Marum, were serving as guides for Engineering Day at TI in Sherman. Together with a group of high school students, they watched a video of freshmen building a robot in Woody Flowers' class at Massachusetts Institute of Technology. The high school students were so interested that Ted and Steve said, "Why don't we do this?" With enthusiastic approval from TI management, North Texas BEST was born.

On November 14 and 15, 2008, the University of North Texas (UNT) hosted Texas BEST. About 40 teams comprising about 1,000 competitors from Texas and New Mexico contended for the top title in the two-day 15th annual Texas BEST.

The visiting students were provided tours of the UNT main campus and the College of Engineering. In addition, keynote speaker Anousheh Ansari, the first female private space explorer and first astronaut of Iranian descent, addressed contest attendees at the UNT Coliseum.

First-place winners included Texoma Home Educators (BEST Award, BEST Notebook, and BEST Spirit/Sportsmanship), Whitewright High School (Game Award and IGUS Top Gun Award), Liberal Arts and Science Academy (BEST Presentation), and Brazos Valley Area Homeschoolers (Founder's Award).

New Institute for Science and Engineering Simulation (ISES) Funded by the U.S. AFRL

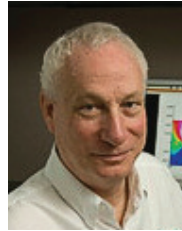
Jet-Engine-Failure Study

A powerhouse of UNT faculty will offer their expertise to ISES.

Dr. Tom Cundari, UNT Regents Professor of Chemistry and co-director of CASCaM, is one of eight professors working on ISES.



Dr. Alan Needleman will lend his expertise in computational modeling of deformation and fracture processes in structural materials, especially metals.

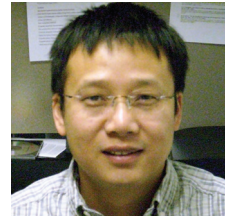


Dr. Raj Banerjee, an associate professor in Materials Science and Engineering (MS), will serve as director of ISES.

Dr. Rick Reidy, interim chair, MSE



Dr. Jincheng Du, MSE Asst. Prof., will study the structure and properties of advanced structural materials for aerospace applications.



Dr. Srinivasan Srivilliputhur, Assistant Professor, MSE



In October 2008, UNT researchers from the Department of Materials Science and Engineering at Discovery Park and the Chemistry Department at the UNT main campus received a multimillion-dollar contract from the U.S. Air Force Research Laboratory (AFRL) to study the causes of jet engine failure. UNT received ~\$2M this year and will receive an additional amount of ~\$6M in 2009 to fund ISES.

Through this study, researchers at UNT hope to determine how to develop stronger and more durable engines for jets flown by the U.S. Air Force. According to Dr. Banerjee, "The research at UNT will help maintain and extend the life of aging aircraft, prevent catastrophic engine failure and aid the Air Force in developing better materials for the next generation of aircraft." In view of the military conflicts in Iraq and Afghanistan, this research is especially important for the U.S. Air Force.

The research at ISES will consist of two prongs. The experimental portion of the research will involve advanced characterization, a process of determining the structure and properties of a material. State-of-the-art facilities in the Center for Advanced Research and Technology (CART) at Discovery Park will be used for conducting the characterization. Modeling and simulation activities will take advantage of the diverse modeling expertise at the Center for Advanced Scientific Computing and Modeling (CASCaM), located at UNT's main campus. Here, mechanisms associated with the failure of aircraft components will be studied.

ISES will serve as a hub to connect researchers in experimental characterization and processing, modeling, and simulation activities on collaborative projects and provide short courses and workshops at UNT and other locations in and outside the North Texas region.

Dr. Thomas Scharf, MSE Asst. Prof., is active in processing/characterizing functionally graded metal-ceramic /ceramic-ceramic composites.



Dr. Angela Wilson, Associate Professor of Chemistry and Co-Director of CASCaM



Center for Advanced Scientific Computing and Modeling (CASCaM) at the main campus, UNT



Senator Kay Bailey Hutchison of Texas and Representative Michael Burgess of Lewisville, with UNT President Gretchen Bataille, announce the award at a press conference at Discovery Park. Both Hutchison and Burgess helped secure this crucial funding for ISES.

Donor Recognition

The College of Engineering appreciates the funding received from the following foundations, corporations, and individuals during 2008 and fiscal year 2009. Their contributions make possible the establishment of new programs and the enhancement of others, thereby improving the stature of the College and the University in academia.

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College of Engineering Advisory Board – February 27, 2009

Left to right: Bill Lawrence, Wes Mays, John Beasley, César Moncada, Ed Moorehead, Carolyn Corbin, Jim Watson, Costas Tsatsoulis, Craig Berry, Euline Brock, Adri Ruitter, Rick Haws and Mike Severson.

Latest members of the College of Engineering Advisory Board

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ACM World Finals

UNT took two teams to the ACM South Central Regional Programming Competition at Texas A&M on November 3, 200. After 5 hours of continuous programming, Team 1 solved 8 out of 9 problems (the only team to solve 8 problems). The problem set included guiding a laser beam through a maze of objects with reflectors and splitters. UNT teams placed first and eleventh out of 76 teams throughout the south central United States. It is the first time a UNT team has advanced to the World Finals in the ACM Programming Contest sponsored by IBM.

The World Finals were held in April 2008 in Banff Springs, Alberta, Canada.

Team coach Ryan Garlick said, "We were very pleased with the results, in terms of the first team qualifying for the finals and for future events, as our second team did very well and was composed of all first-time competitors."

Through a haze of caffeine, first team captain John Rizzo said, "The problem set was diverse and challenging but we had a good day." Rizzo added the he and his teammates had been practicing individually and as a team every

week for the past few months. The first-place team was composed of John Rizzo, Hector Cuellar, and Robbie Mitchell Burke; Team 2 included Joey Parrish, Angel Fox, and Matt Bishop.

On April 6-9, 2008, John Rizzo, Robert Burke, and Hector Cuellar as the Texas Codeboys v2.0 (below) represented UNT and the South Central region in the ACM World Finals held in Banff Springs, Canada. The team received an Honorable Mention for their efforts at the contest, which was won by a team from the St. Petersburg University of IT, Mechanics, and Optics.



IEEEExtreme is a worldwide contest in which teams of student members, supported by an IEEE Student Branch, advised and proctored by an IEEE Member, compete in a 24-hour time span against each other to solve a set of programming problems.

