



The OWL

A PUBLICATION OF THE SCHOOL OF ENGINEERING

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Letter from the Dean

January 2009



In academic symposia and workshops and, most prominently, in meetings with industry leaders, the question of the future of this country in technological leadership is a perennial topic of conversation and concern. In recent years, we seem to be looking over our shoulder as our leadership in technical innovation, in training creative engineering manpower, even in our research universities, seems to narrow as large swaths of the world, namely India, China, South Korea, Japan, and even our European partners, are actively eroding our lead in engineering and technology.

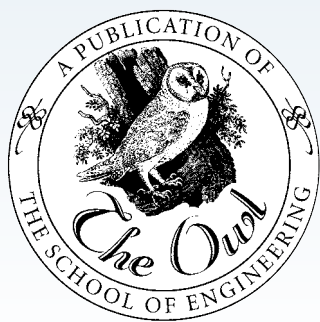
The National Academy of Engineering and the federal government have taken notice of this challenge to American science, engineering, and technology, and took steps to document and clarify it. In 2005, the National Academy released *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, prepared by a 20-member blue ribbon committee. The federal government responded by establishing and funding the National Innovation Initiative in the same year. Has this helped? It is too early to know. One would think that a nation with 300 million citizens ought to be able to attract and retain students in science and engineering, so that our graduation rate

of about 65,000 students with B.S. degrees in engineering should at least double.

My own view is that the challenge to our technological education and leadership has to be met locally, and, more narrowly, in individual universities with engineering and technology programs. And this, by the way, includes the two-year community colleges as well as the comprehensive and research universities in the state. Acting locally, and with the proper focus, is a necessary strategy for bringing to fruition actions by federal agencies. Along these lines, recent outreach efforts in the School of Engineering should be mentioned. We continue to take steps to strengthen our academic alliance with six community colleges in Connecticut and one in New York. Just as important, we have partnered with the Bridgeport Catholic high schools and public high schools to establish the Bridgeport High School Engineering Academy (HSEA) supported this year by a \$400,000 grant from General Electric. Adjunct faculty from the School of Engineering participate in instruction at the HSEA, using the national pre-engineering curriculum Project Lead the Way.

In our School, we continue to provide our students with the resources and pedagogy for a first-rate engineering education. We feel keenly our responsibility to prepare the next generation of innovators and

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Fairfield
UNIVERSITY

School of Engineering

SOE welcomes new faculty

Three talented new faculty have joined the School of Engineering in the last two years – Dr. Amalia Rusu and Dr. Wook-Sung Yoo in the Department of Software Engineering, and Dr. Ryan Munden in the Department of Electrical and Computer Engineering.



Dr. Amalia Rusu

Dr. Rusu earned her B.S. degree in computer science and engineering from the University of Craiova, Romania, and her M.S. and Ph.D. from the State University of New York, Buffalo, N.Y. Her Ph.D. thesis was *Exploiting the Gap between Human and Machine Abilities in Handwriting Recognition for Web Security*. Her research interests include the area of pattern recognition and its applications. Her professional interests include the

incorporation of research components into her courses. She joined Fairfield's engineering faculty as an assistant professor in September 2007.

Dr. Wook-Sung Yoo, has a D.D.S. (dentistry) degree from the Seoul National University in Korea, and earned his M.S. and Ph.D. in computer science from Florida Institute of Technology. His main interests are in bioinformatics and expert systems. Before joining the Fairfield faculty, Dr. Yoo served as associate professor in computer and information science at Gannon University. While at Gannon, he established a long-term collaboration with GE Transportation Systems, focused on systems development. He was appointed associate professor and chair of the Department of Software Engineering at Fairfield University in September 2008.



Dr. Wook-Sung Yoo

Dr. Ryan Munden earned his B.S. in physics, magna cum laude, from Stetson University, and his M.S. and Ph.D. from the Yale University School of Engineering and Applied Science. His thesis work is in the area of semiconductor nanowires under the direction of Dr. Mark Reed. Dr. Munden joined Fairfield's engineering faculty as an assistant profes-



Dr. Ryan Munden

or in Electrical and Computer Engineering in September 2008. He will offer courses in nanoscience and nanotechnology as part of a nanotechnology minor program of studies that has been established in Connecticut colleges and universities.

The School of Engineering is fortunate to have the services of Drs. Yoo, Rusu, and Munden as it expands its programs into new areas of engineering to remain on the cutting edge in fast growing fields of software engineering and nanotechnology.

New faculty member honored

Dr. Amalia Rusu, assistant professor in Software Engineering, was among nine colleagues in engineering and computer science selected as New Faculty Fellow at the 2008 ASEE/IEEE Annual Frontiers in Education (FIE) International Conference. The honor is bestowed on young faculty in the first two years of academic service whose scholarly contributions to the FIE conference were selected for presentation. A panel of peers completes a rigorous review of each eligible applicant's conference paper, and selects about two dozen for further consideration. Augmented by reference letters and a professional resume, the applicant's qualifications undergo further evaluation resulting in the selection of a small number among the finalists as New Faculty Fellow. The fellowship provides a \$1,000 grant. The School of Engineering is proud of Dr. Rusu's selection as a New Faculty Fellow in her first year on the Fairfield University faculty. She contributed two papers to the FIE conference, both of which were accepted for presentation. The first paper was titled "Integrating a Research Component into a Web Development Introductory Course," and the second, "An Industry-Academia Team-Teaching Case Study for Software Engineering Capstone Courses." Bravo to Amalia for her success.

SOE/Sikorsky Aircraft honor talented high schoolers

The School of Engineering and Sikorsky Aircraft Corporation honored high school juniors from Fairfield and New Haven counties at the 2008 Excellence in Mathematics and Science Awards on June 13, 2008. The awards ceremony, followed by a luncheon, took place at Alumni House. The students were accompanied by their teachers and/or family members.

Dean E. Vagos Hadjimichael and Susan Hitchcock, Sikorsky's director of community relations, presented students from 31 schools with medals and certificates to honor their academic accomplishments in science and mathematics. Dr. Hadjimichael encouraged the students to continue their hard work and to apply their talents to the study of engineering and science in college. "For the United States to continue to be a force to be reckoned with in the global economy, we need young people to pursue careers in science and engineering," he told the audience. "It is vital that we stay competitive. The global economy is knowledge-based. It follows that we need knowledgeable and technically skilled people in research and development to maintain our standard of living and meet

societal challenges in the 21st century. You can help be the answer to the nation's needs."

Hitchcock agreed, noting, "I'm looking at you and see the faces that will lead our industry one day... Some of you will make significant discoveries that will touch peoples' lives."



Students from Bridgeport area high schools received medallions and certificates at the 2008 Excellence in Mathematics and Science Awards.

TAU BETA PHI welcomes 16

In February 2008, during Engineering Week, 14 engineering students and two honorary members were inducted into Tau Beta Phi, the engineering honor society. Membership to the society signifies academic excellence among juniors, seniors, and alumni of the School of Engineering. The ceremony started with a welcome from Dr. E. Vagos Hadjimichael, followed by comments by Academic Vice President Orin Grossman on the subject of excellence in education. Dr. Jerry Sergent, chair of the Electrical Engineering department, recalled briefly the history of the engineering honor society.

Department chairs helped initiate 14 juniors and seniors into Tau Beta Phi. The inductees received a pin and a certificate. Dr. Hadjimichael then initiated two alumni of the Bridgeport Engineering Institute, the precursor to Fairfield's School of Engineering: Anthony J. Vallillo, president and chief operating officer of United Illuminating Company, and Timothy K. O'Neil, vice president, Program Management, ASML, Inc. They also received a certificate of recognition.

Vallillo and O'Neil serve also as the chair and vice chair, respectively, of the SOE Advisory Board. Hence their selection as

members of Tau Beta Phi was a well-deserved honor. The event closed with the keynote address by Dr. Mark Reed, the Harold Hodgkinson Professor of Engineering and Applied Science at Yale University, who reviewed recent progress and the role of nanotechnology in the future of engineering and science.

The 2008 student inductees into Tau Beta Phi are: Noah John Benjamin, Michael A. Colonnello, Daniel Joseph Ferrara,

Patricio Leonardo Garcia, Leon Joseph Gaudett, John Richard Kamorowski, Nikolas Bruno Kastor, Lauren Segen Loomer, Michael Joseph Lucchesi, Steven Andre Poirier, Brian Joseph Stanton, David Anthony Vailette, and Sean Joseph Zandan.



Dean Hadjimichael talks with Mike Zafetti '07, BSCE, and Marc Adams '07, BSEE, at Tau Beta Phi's induction.

As graduates leave, new freshmen take their places

In May 2008, the School of Engineering graduated 71 students; 52 with master's degrees and 19 with baccalaureate degrees. The master's graduates found, or continued, their employment in such companies as Northrop Grumman, Sikorsky Aircraft, ASL, Hubbell, Inc., Pratt & Whitney, Pitney Bowes, Priceline.Com, and UBS Warburg. Among the B.S. graduates, 12 earned minors in other areas, mostly in mathematics, but also in physics and environmental studies.

At the same time, we are very pleased to welcome 52 freshmen of the class of 2012. They hail primarily from Connecticut, Massachusetts, New York, and New Jersey, and a couple from such exotic places as Arizona and Hawaii. We first met most of them during the June orientation sessions. At that time they were given a reading assignment from *Science and Technology* by Nancy MacKenzie, offering them the opportunity to reflect, during the summer, on several themes related to the discipline of engineering and its impact on society. These themes were further explored at a half-day workshop on Sept. 13 with presenters from industry, the University's Center for Academic Excellence, and the engineering faculty. One new academic initiative to commence with this freshman class is personal

e-portfolios by all students, which will provide opportunities for reflective thinking and writing, and for nurturing their communication skills.



Area industry leaders address the freshmen at a fall workshop.

Software engineers participate in FAA project

By Dr. Amalia Rusu, Assistant Professor, Software Engineering

The Conflict Probe Assessment Team (CPAT) at the Federal Aviation Administration (FAA) Technical Center has always valued tools that supplement their data analysis with visual representations of the data. CPAT saw that collaboration with universities would provide an excellent opportunity for the continuing development and enhancement of their applications as well as enriching the academic opportunities of the participating students and their professors.

In Spring 2008, two remote student teams were formed and worked together – one at Fairfield University, one at Rowan University. They collaborated during the semester to develop visualization software for the CPAT at FAA, as part of their software engineering classes. The teams worked on the TrajectoryGUI and FlightGUI projects and redesigned these applications, enhancing their capabilities and adding many features lacking from earlier versions. The only face-to-face meeting between the two teams came on May 6, 2008, when they successfully presented their projects at the FAA Technical Center in Atlantic City, N.J.

Six Fairfield graduate students, who were enrolled in the Software Design Methods class under the guidance of Dr. Amalia Rusu, have successfully completed the projects and received certificates of appreciation from the FAA for their individual contributions.

These kind of collaborative industry-academia projects have been shown to make graduating students more workforce-ready, while offering various benefits to industry. In this collaboration with the FAA a novel setup was used for a single-semester, full lifecycle Software Engineering course, where theory is taught alongside a real-world project from an industry partner, with collaboration between students from two universities. This exposes students to an increasingly common practice in the workplace, namely to collaborate successfully with remote parties across the globe without meeting in person. This collaborative approach of learning and practicing software engineering ensures that students quickly become effective software developers upon graduation.

SOE Outreach

NACME partnership aids students

The School of Engineering is a partner institution with the National Action Council for Minorities in Engineering (NACME). NACME solicits partners among institutions, but also works closely with partners among business, government, and other non-profit organizations. The fundamental goal is to promote the study of engineering and increase the retention-to-graduation rates, especially among minorities, so as to ensure the nation's technological advantage. NACME Partners from the corporate world contribute a large portion of the organization's budget. At Fairfield, we identify annually at least two minority engineering students, the NACME Fellows, to whom we commit financial aid. There are currently 50 NACME Partner Institutions in the United States. Fairfield's School of Engineering is proud to be counted among them.

The High School Engineering Academy opens

A tripartite collaboration among the School of Engineering, the Bridgeport Diocesan Catholic high schools, and Bridgeport public high schools, established the Bridgeport High School Engineering Academy (HSEA) in September. The venture is funded by General Electric. The first-year grant is \$400,000. Sixty high school freshmen were selected to participate in the HSEA, which uses the *Project Lead the Way* pre-engineering curriculum. Classes are held in School of Engineering facilities every Saturday for three hours, throughout the academic year, and will continue in the summer over a two-week period with eight-hour daily sessions. Three adjunct faculty from the School of Engineering participate in instruction, along with six high school teachers, all of them trained to deliver the *Project Lead the Way* curriculum. Students selected for the Academy will remain in the program during their four high school years. In 2009, an additional 60 students from the Bridgeport schools will enroll in the Academy.

GE Computer Science Contest to be annual event

The School of Engineering is collaborating with General Electric to increase participation in engineering and computer science disciplines among high school juniors and seniors. In Spring 2008, Dean E. Vagos Hadjimichael and three SOE professors – Dr. Amalia Rusu, Bill Guelakis, and Maynard Marquis – met with Robert Primorac, chairman of the GE Volunteers Council for Fairfield and Shelton, Li Chen, computer contest leader, and GE staffer Susan Carroll to plan a computer science contest. The contest would serve to prepare high school

participants for the specialized Advanced Placement Test in Computer Science offered each May. The contest problems were prepared by Rusu, Marquis, Guelakis, and recent master's graduate Bama Govindaraja, and were based on introduction to the computer science curriculum using Java.

The 90-minute competition was held at General Electric Corporate Headquarters in Fairfield on April 24, 2008, and allowed teams of up to three students from more than 20 Connecticut public, private, and parochial high schools to test their proficiency in using Java.

Prizes from General Electric were awarded to the best three teams as well as to the top 10 individual students. In addition, the School of Engineering offered each of the top 20 participants one computer science course in the Department of Software Engineering each semester of either junior or senior year, free of tuition charge.

The School of Engineering and GE will collaborate again on the 2009 computer science contest. This is destined to become an annual event.

Academic alliance with community colleges thrives

The School of Engineering has an academic alliance with seven, two-year community colleges – six in Connecticut and one in New York – that has been in place for several years. The focus of the alliance is to facilitate graduates of community colleges to transfer to a four-year institution, preferably Fairfield University, to complete their B.S. degree in engineering. SOE has signed articulation agreements with the community colleges, and offers bridge courses to facilitate credit transfer and prepare students for the rigors of baccalaureate studies. This year, the School installed a video-teleconferencing system so cohort groups of students from several community colleges can take courses at the same time. Hence the School can reach a larger target population, and facilitate a pipeline of students from community colleges in the alliance to Fairfield University. In recent years, there has been a broader-based realization that partnerships between four-year institutions on one hand and community colleges on the other, are of great value to the nation's ability to educate its citizens. Fairfield's School of Engineering is proud to have been an early leader in this movement and continues to find ways to sustain it for the benefit of a more numerous and strong engineering workforce.

Gifts & Grants

- The Sikorsky Aircraft Corporation recently awarded a \$10,000 grant in support of the School of Engineering video-conferencing (VTC) link with several Connecticut community colleges. SOE will offer courses over the VTC link to community college students with interests in engineering. Successful completion of these courses will smooth their transfer to Fairfield University for the completion of a B.S. degree. Mark Miller, Sikorsky's vice president for engineering and innovation, and Susan Hitchcock, Sikorsky's director of community relations, presented the check to Dr. Hadjimichael.
- The Connecticut NASA Space Grant Consortium awarded \$18,000 for the completion of a minor curriculum in nanotechnology, which promises remarkable new applications in medicine, biology, materials science, electronics, and engineering.
- Fairfield alumnus Rob Casella, CEO of Massachusetts-based Hologic Corporation, of Massachusetts, gave \$50,000 for the completion of the video-conferencing link with community colleges.
- The National Science Foundation awarded \$79,000 to SOE, with Dr. Jerry Sergent as the principal investigator, for the acquisition of rapid prototyping equipment.
- The Engineering Information Foundation gave \$25,000 for developing further the freshman Fundamentals of Engineering course, with focus on communication skills and the integration of e-portfolios.
- Timothy O'Neil, vice president and program manager, ASML, Inc., gave \$3,000 in support of the VTC link with community colleges.

ASEE's Engineering Ethics Division

Dr. Bill Taylor, Associate Dean



During the last three years, Dr. Rao Dukkipati, associate professor, and I have served the American Association for Engineering

Education (ASEE) as members of the Executive Committee of the Engineering Ethics Division. In 2006, we were successful in petitioning the ASEE board to elevate the former Engineering Ethics Constituent Committee to the status of a division of ASEE. In June 2008, Dr. Dukkipati was re-elected to a three-year term as member-at-large, while I completed a second year as division chair and now serve as its past chair.

Engineering Ethics is the fastest growing of ASEE's 50 divisions and soon will become its largest. The executive committee sees this as largely due to the recognition of the importance of engineering ethics for the professional development of the engineer-in-training. All current and new ASEE members from both industry and academia are encouraged to join the new Engineering Ethics Division. In June at ASEE's annual

conference and exposition, members have the opportunity to share current information on ethics pedagogy, theory, and practice. In recent years, contributing members also presented papers on engineering and social responsibility, sustainability and poverty.

An excellent source of information on engineering ethics is the National Society of Professional Engineers (NSPE). NSPE provides resources for engineers at all career stages and recently hosted a webinar on engineering ethics education. The presenter, Dr. Mumtaz Usman of Wayne State University, pointed out that engineering ethics provides "an effective system for interaction between groups of people which results in predictability, sustainability, personal value, mutual success, and mutual growth." The ethical work environment helps to "boost confidence and pride in self and organization; improve trust and teamwork; enhance image and reputation; reduce stress and anxiety; improve job satisfaction; and improve productivity, performance, [and] quality of life."

The School of Engineering has always included an engineering ethics course in all its bachelor of science degree programs. The course, Applied Ethics 287, also satisfies the Fairfield University upper-level core curricular requirement in philosophy, religious studies or applied ethics. Dr. Lisa Newton, director of the Applied Ethics program, has served the SOE faithfully by offering this crucial course annually in the spring semester.

Commencement 2008



Advisory Board welcomes two new members

The SOE Advisory Board held its final meeting of the year on December 2, 2008 at Alumni House. Pictured (l to r) are: Michael Mulcahy (seated), Patrick O'Keefe, Associate Dean Bill Taylor, Mitchell Smooke, Jeff Post, Timothy O'Neil, Dean E. Vagos Hadjimichael, Anthony Vallillo, Manny Ratafia, Mark Miller, Jerry Parsons, Anthony Fischetti, and Joseph Ianniello (seated). Absent, Joseph Carbone, Steven Culmone. Ratafia and O'Keefe joined the Board in 2008.



Intern spotlight: Lauren Loomer '09



When she got to Fairfield University, Lauren Loomer thought she'd be a math major. Then she found herself reading her friend's engineering textbooks – for fun.

"I love the math and the physics that go with it," she said of the mechanical engineering program she ultimately chose as a double major along with math. "It's very real world-based. Everything applies to real life. It makes sense."

This year, those same textbooks she perused have come in handy at her internship at Sikorsky in nearby Stratford, where she is a stress analyst in the blades engineering department. For 20 to 24 hours a week, Loomer joins a team of stress analysts calculating whether helicopter blades will work smoothly or fall apart. Last fall, they were busy working on a newly designed helicopter Sikorsky hoped to get airborne in December.

With all that riding on their exacting calculations, she said the work of a stress analyst can be stressful itself. "It's hectic right now," she said, while taking a needed Thanksgiving break at home in San Diego, Calif.

Loomer lived in Connecticut for a time as a child and enjoys visiting her grandmother in Trumbull, Conn., when she has a break from classes and her internship. In addition, she is president of the Fairfield chapter of the math honor society, Pi Mu Epsilon, and a member of both Tau Beta Phi (the engineering honor society) and Alpha Sigma Nu (the Jesuit honor society). She was a tour guide during her sophomore year and volunteered for Residence Life.

Loomer said she might turn her internship into a full-time job at Sikorsky: She enjoys the work and the camaraderie and the company pays for graduate school, which is something she's considering after Commencement. She may even return to Fairfield. "I love the community at Fairfield," she said. "I love the adjunct professors who have actually worked out in the field and can teach to that. And I love the small class sizes, especially in engineering. My high school classes were bigger than some of my college classes!"



SAVE THE DATE

Feb. 20, 2009:
Conference on Automation
in Manufacturing

Feb. 21, 2009:
Engineering Honor Society
Tau Beta Phi induction
ceremony

March 3, 2009:
Advisory Board meeting

April 30, 2009:
GE/SOE computer science
contest for Connecticut
high schools

**For more information,
contact SOE at
(203) 254-4147.**

THE OWL

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Letter from the Dean *continued from page 1*

creators of solutions to societal problems. Some recent steps in introducing new dynamics into the undergraduate engineering studies include innovations in the freshman course, Fundamentals of Engineering, with assistance from a grant from the Engineering Information Foundation, additional support for the Engineering Student Society with Dr. Michael Brienza at its helm, and the approval by the Board of Higher Education of Automated Manufacturing Engineering as a stand-alone undergraduate program, separate from Mechanical Engineering.

We are also pleased with new faculty additions in 2008, namely Dr. Wook-Sung Yoo as associate professor and chair of the Software Engineering program, and Dr. Ryan Munden as assistant professor in Electrical Engineering. Furthermore, the School of Engineering Advisory Board has been strengthened by the addition of two new members, Manny Ratafia, and Patrick O'Keefe. Details on these developments are included in this issue of The Owl.

I hope that the past year has brought much success to all. Please feel free to contact me about stories in this issue that may have attracted your attention.

Sincerely,

E. Hadjimichael