



A PITCH for Better Technical Communication Skills: TCoE Secures Grant to Launch New Initiative

To be competitive in today's economy, engineers need to have strong technical communication skills. However, many colleges are struggling to provide this extra training effectively and still meet the ever-growing demands of an engineering curriculum.

At the University of New Haven, a \$185,500, three-year grant from the Davis Educational Foundation in Maine will fund a new program to provide students with strong technical communication skills. The grant will allow the university to establish a PITCH (Project to Integrate Technical Communication Habits) initiative that began this fall and follows students through all four years of college in all engineering and computer science programs.

"The goal of this project is to emphasize professional communication skills across engineering disciplines," said Ronald Harichandran, dean of the Tagliatela College of Engineering at UNH. "Employers want engineering graduates to display the ability to clearly communicate; good communications skills will give our graduates an advantage in the marketplace."

Harichandran says the program must train student engineers about when to communicate as well as how. "Good written, oral and visual communication skills are essential attributes for today's engineering graduates."

Before joining UNH in August 2011, Harichandran set up a similar program at Michigan State University with David Adams, who is now a consultant to PITCH. At many engineering colleges, a common approach to teaching technical communication skills has been to require students to take separate courses in that area. That approach has proven expensive and not especially effective since it is divorced from engineering content and is too often a one-time experience. Based on the model developed at Michigan State, the communication skills training at TCoE will be woven into regular engineering courses. PITCH contains a number of features that refine and extend that model:

- ▶ PITCH faculty developed a comprehensive set of outcomes based on surveys of both engineering faculty and TCoE alumni and employers.
- ▶ Communication assignments are based on engineering content and design to have students achieve stated outcomes in a developmental progression throughout their programs.
- ▶ PITCH will leverage technology to provide students and faculty with supporting resources.

- ▶ Engineering faculty engaged with PITCH are being trained to develop and evaluate effective technical communication assignments. That step, along with using a consultant, avoids the need to hire instructors from outside engineering and will help make PITCH sustainable and cost-effective.

To help faculty incorporate teaching these skills into their classes, Adams trained an initial group of UNH's engineering professors and a staff member from the UNH Center for Learning Resources at an intensive three-day workshop this past summer. Since the fall semester began, students have begun learning the new skills in both core and advanced classes. Each student will have to add evidence of achievement in

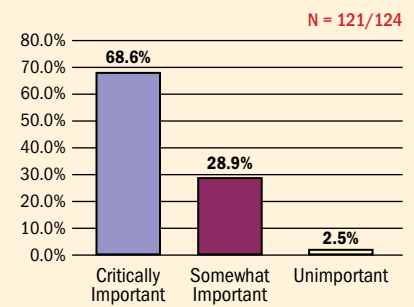
communication to his or her four-year portfolio. A random sample of those portfolios will be reviewed annually to ensure that the skills were actually learned.

Before settling on a set of core competencies, the college surveyed alumni, faculty and employers who often hire UNH graduates to determine which technical communication attributes, products and professional behaviors are essential. Data from the survey are being used to determine exactly what students must accomplish in their first two years, when they are taking core engineering courses, and during the remaining two years, when they are specializing in a particular engineering discipline.

"When employers are surveyed about what are the most important attributes that they desire in engineering graduates, we see the same response over and over—the ability to communicate," said Harichandran. "In addition to solid technical skills, engineers must have the ability to communicate technical content to clients, peers and the public, and they need to be able to do this in writing, verbally and using visuals."

Results from the surveys reinforced the notion that alumni and employers really do desire these skills from engineering graduates. More than 68% of those surveyed indicated that skill in technical communication played a "critical" role in hiring and promotion decisions, while another 29% marked those skills as "somewhat important." Furthermore, over 80% of those responding indicated that in their jobs they spend between 11 and 40 hours a week or more on the communication tasks: writing, reading, speaking and listening. A report of these survey results is posted on the PITCH Web site accessible from the college's home page.

Within my organization, to what degree are technical communications skills considered in hiring and promotion decisions?



Faculty members participating in PITCH are well aware of the need for such instruction. According to Dr. Amy Thompson, “For practicing system engineers, delivering a well-written requirements document, design specification, or testing and evaluation plan can be the difference between a successful development project or a project and product failure. PITCH grant activities will result in a new technical communication curriculum and assessment practices in SE 488: System Engineering Design Process. Those activities will help our students achieve better performance in all aspects of communication, including not only improving writing skills, but effective and persuasive oral communication skills as well.”

As PITCH goes forward, each engineering program will have a sequence of courses in which skills are introduced at one level and then reinforced and extended in succeeding levels. The fact that TCoE’s Spiral Curriculum already emphasizes developing professional skills made it a natural place to nest PITCH activities in the first two years. PITCH will then extend into third-year courses within each program and culminate in the senior design experience.

At the end of the three-year Davis Foundation grant, Harichandran said the program will have gone through multiple phases of assessment and improvement, and will be self-sustaining. At that point PITCH should mark TCoE as a national leader in developing strong technical communication skills among its graduates.

The Davis Educational Foundation was established as a public charitable foundation in 1985. As stated on its Web site, “The Foundation supports the undergraduate programs of public and private, regionally accredited, baccalaureate degree granting colleges and universities throughout the six New England states. Elisabeth K. Davis and Stanton W. Davis co-founded the foundation after Mr. Davis’s retirement as chairman of Shaw’s Supermarkets, Inc. The foundation is an expression of the couple’s shared support and value for higher education and has provided over \$89 million in grants to more than 165 institutions.”



Scholarship awardees—Front row from left: Doug O’Shea, Jessica Glade and Syed Razvi. Back row from left: Christian Ruiz, Frank Pellicano, Eric Brundage and James Pearson

ASPIRE: \$600,000 National Science Foundation Grant Aims to Boost Retention

The University of New Haven has been awarded a \$600,000 grant from the National Science Foundation (NSF) to boost engineering student retention rates. The five-year grant permits the university’s Tagliatela College of Engineering to participate in A Scholarship Program to Increase Retention in Engineering (ASPIRE), an NSF initiative to increase the retention rate of engineering students, especially those from underrepresented groups and with financial needs.

Pursuing a demanding engineering curriculum is difficult enough for most students. Adding in the need to work during the semester can multiply that difficulty to the point that it will take longer to get their degrees or they may even fail to complete their program. Students may have to work in jobs that do not complement their engineering goals. Beyond that, such students may lack the time to participate in the full range of activities and professional development that are available to other students.

According to TCoE Dean Ron Harichandran, “Our data show that 85 percent of UNH students need financial aid, but the university cannot fully meet all of their needs. The average gap between financial aid and what is still needed for engineering students enrolled in 2010-11 was \$7,400, which makes it very difficult for students with families—particularly women—to complete their degrees on time.”

Many students in the UNH engineering program must work at least part-time, the dean noted, and each year more than 20 percent reduce their course load to part-time so they can work more hours.

“Another benefit of awarding scholarships to these students is that they will gain confidence and more time to participate in the extracurricular programs, including service, internships and other activities, that the college has to offer reducing the need to work to support their studies,” said the dean.

The ASPIRE grant will permit the university to provide scholarships to sophomore and junior level students who have both financial need and have demonstrated merit. UNH will also award scholarships to community college transfer students, and provide support services including engineering tutors and mentors to guide the students.

The grant will allow some of those students to remain as full-time students, improving academic performance, allowing them to graduate in a shorter amount of time, and helping them focus more on academics during their sophomore and junior years.

“The scholarship program also will encourage students to complete the engineering internship requirement of the college during the summer while they are not taking a full course load,” said Jean Nocito-Gobel, professor of civil and environmental engineering at UNH and principal investigator on the grant.

Professor Nocito-Gobel, along with Co-PIs Christopher Martinez (assistant professor, Computer Engineering) and Maria-Isabel Carnasciali (assistant professor, Mechanical Engineering) were the authors of the grant proposal. An initial proposal submitted in 2010 was denied, but the authors were not discouraged and submitted a revised proposal in 2011. This one was

successful and became the first such scholarship program funded by the NSF at TCoE. The successful proposal detailed four major objectives:

- ▶ Provide scholarships based on both financial need and merit to sophomore and junior level students over 5 years, totaling approximately \$108,000 per year.
- ▶ Recruit and provide scholarships to high academically performing community college transfer students over 5 years.
- ▶ Provide support services that include engineering tutors to complement the current university-tutoring center.
- ▶ Increase student engagement in college- and university-wide activities that contribute to persistence such as mentoring STEM students, participating at academic conferences in their field, service learning activities, and graduate and professional networking events.

The first eight scholarship recipients were announced in December 2012 and will receive support for the spring semester: Courtney Collins (Electrical Engineering), Doug O'Shea (Civil Engineering), Jessica Glade (Civil Engineering), Syed Razvi (Electrical Engineering), James Pearson (Computer Engineering), Christian Ruiz (Computer Engineering), Frank Pellicano (Electrical Engineering) and Eric Brundage (Mechanical Engineering). Professor Nocito-Gobel estimates that the grant will provide support for up to 77 students during its five-year period, in addition to funding the targeted support services.

Reactions from students who received the scholarships indicate just how well the ASPIRE grant will make a difference here at UNH. As Courtney Collins noted, "To pay for school, rent and everything else I have to work two part-time jobs. The scholarship covers what I will need to pay out of pocket, not including loans, for each semester so far, so it will help tremendously. Having less pressure to work with more time to study really eases stress."

And Frank Pellicano's reaction speaks to many of the reasons why TCoE sought the ASPIRE grant in the first place. "My reaction upon receiving the award was complete joy. This scholarship will help me immensely. Due to the recent tough economic times, my parents have struggled to finance my aspirations to achieve my dreams of being an electrical engineer. This scholarship greatly helps lift the burdens the bills would have had next semester, which will give them time to prepare for the next few years and help keep them on their feet. As I continue to work hard, this scholarship will help me continue my path to achieve my dreams."

The Tagliatela College of Engineering offers bachelor's degrees in chemical, civil, computer, electrical and mechanical engineering that are accredited by the Engineering Accreditation Commission of ABET, www.abet.org. The college also offers a new bachelor's degree program in system engineering, a bachelor's degree in sustainability studies, and eight master's degree programs.



Front row from left: Ron Harichandran (Dean), Andy Bernhard, Murali Atluru, Ken Giuntoli, David Ziaks Back row from left: Frank Dworak, Kevin Williams, Rob Lee

TCoE Advisory Board Reconstituted

Dean Ron Harichandran, with the assistance of Leslie Kerr, Senior Associate Director of Development, reconstituted the TCoE Advisory Board in fall 2012. After a careful search over several months, the following seven successful alumni and friends of the college were selected to serve on the board:

- ▶ Dr. Andreas Bernhard (Chair of the Board), Director of Analytics & Technology, and Chief Engineer, Sikorsky Aerospace Services, Sikorsky Aircraft Corporation, a world leader in the design, manufacture and service of military and commercial helicopters.
- ▶ Dr. Murali Atluru, President/CEO of Diversified Technology Consultants, a privately owned professional services firm providing planning, design, and construction engineering services for government and business.
- ▶ Frank Dworak (BS Mechanical Engrg., '72), Chairman of Hobson & Motzer, manufacturer of precision metal stampings to deliver high quality components to customers in the medical device, consumer, automotive and aerospace industries.
- ▶ Ken Giuntoli (MBA '91), Business Development Manager at RBC Aerospace Bearings, provider of unique design solutions to complex problems of global industrial, aerospace, and defense customers.
- ▶ Robert Lee (BS Mechanical Engrg., '78), Executive Vice President of The Lee Company, developer of miniature precision fluid control components for aerospace, down-hole oil tools, machine tools, medical/scientific instrumentation, and ink-jet printing.
- ▶ Kevin Williams, Chief Technology Officer & Vice President of Research and Development of Gerber Technology, an advanced software, technology and services business.
- ▶ David Ziaks (BS Civil Engrg., '77), President/CEO of FA Hesketh & Associates, a multi-disciplinary civil and traffic engineering firm.

Additional people are being recruited to serve on the board and those interested in serving should contact Leslie Kerr at lkerr@newhaven.edu or 203-479-4883.



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