



Dean's Message

Welcome to the first newsletter of the Tagliatela College of Engineering (TCoE). Since becoming Dean of the College in August 2011, I have been impressed by many of the

innovative developments led by our faculty and feel that it is important to tell our stories. This newsletter is one vehicle for communicating our achievements and successes with alumni, students and peer institutions.

I came to UNH after a 26-year career in the Department of Civil and Environmental Engineering at Michigan State University, having served as chair of the department for the last 16 years. I am enjoying the transition from a large, research-oriented public university to a small, teaching-oriented private institution, where the focus of activities is student learning and engagement.

In order to attract high-caliber students to the TCoE, we need to offer exciting and relevant curricula that make our programs unique. The Spiral Curriculum and the KEEN initiative highlighted in this newsletter are two of our hallmarks. We also have just received a grant from the Davis Educational Foundation to integrate technical communication activities into first-year through senior-year courses in each of the engineering disciplines. We will describe this effort in more detail in our next newsletter. Our new faculty hires will include experts in renewable energy, sustainability, wireless communication, power systems and cyber forensics. We are developing curricular foci in these areas so that our students will have the opportunity to specialize in themes that will be important over the next few decades.

As we grow and launch new initiatives, we hope we can count on our alumni, friends and industry partners to support us in our quest for excellence.

Ron Harichandran
Dean

KEEN on Engineering: TCoE Among the Chosen Few



KEEN Faculty (left-right): Michael Collura, Jean Nocito-Gobel, Maria-Isabel Carnasciali, Sam Daniels and Amy Thompson.

Last year, UNH became one of a select group of institutions invited by the Kern Family Foundation, based in Waukesha, Wisconsin, to join the Kern Entrepreneurship Education Network (KEEN). KEEN's mission is to support efforts "to graduate engineers equipped with an action-oriented entrepreneurial mindset who will contribute to business success and transform the U.S. workforce." That mission fits nicely with TCoE's own efforts to enhance the professional skills of its engineering graduates.

KEEN only invites schools that have demonstrated an ability to implement change within their university. TCoE's implementation of its Spiral Curriculum, as well as its leadership role in Connecticut's Project Lead the Way initiative, contributed to the College joining the program. As part of the invitation to join KEEN, the TCoE received a \$75,000 grant to develop classroom and co-curricular opportunities for students. TCoE is working on the formation of a dense network with schools in its geographic region to advance to the next level.

A New Approach

The mission of KEEN is to develop an entrepreneurial mindset in engineering students. A traditional approach to engineering education focuses predominately on technical competence. An entrepreneurially minded engineer understands customer wants and needs, business concepts, societal values, and, specifically, how these may impact design.

Involvement in the KEEN initiative has already begun to impact both curricular and extra-curricular activities. One of the projects in EAS107P (Introduction to Engineering, Project-Based) was modified to have a customer-awareness focus. Working in teams, students developed a survey that they administered to potential customers. The survey results helped students develop an idea for a puzzle cube to compete with the Rubik's cube. Chris Barone, an alumnus of UNH and the research director for Energizer, worked with faculty to modify the project in EAS107P. Chris spoke to students in EAS107P classes about the process of taking a product from conception to production.

In addition, the college hosted an Engineering Challenge during Engineers' Week as a co-curricular program. One activity challenged students to build a table that could support two reams of paper using only newspaper and tape. Approximately thirty students competed in the challenges. Feedback from the students was very positive.

A Network for Change

The "N" in KEEN stands for "Network." The Kern Family Foundation sees collaboration and sharing as fundamental aspects of the whole initiative through which changes in engineering education will occur. KEEN schools are encouraged to share course modules or ideas with other member schools as a way of disseminating best practices and information. Professor Jean Nocito-Gobel offers an example: "Sri Condoor, a professor of aerospace and mechanical engineering at St. Louis University, has shared with me materials for a presentation on painstorming, a type of brainstorming technique in which the pains of using a product/service are identified as a means to generate new ideas. Sri also sent me information on the activities/problems they have used in their monthly Engineering Challenge."

A growing number of TCoE faculty members are actively engaged in KEEN activities. Professors Mike Collura, Maria-Isabel Carnasciali, and Jean Nocito-Gobel collaborated in developing the UNH KEEN initiative and attended the KEEN fall conference. Professor Amy Thompson attended the winter conference and the "Shaping the Entrepreneurship Experience" workshop. She plans to modify EAS232 – Planning Management and Economic Analysis, a junior-level course.

The College also has begun collaborating with some KEEN schools. This past spring, Professors Sam Daniels, Amy Thompson and Jean Nocito-Gobel met with faculty from Union College, Bucknell University, Widener University, Villanova University and Western New England University to discuss the formation of a new dense network.

A Chance to Get Involved

Alumni and employers can get involved in this initiative in a number of ways. The College needs people who can speak about entrepreneurship and who can help educate our engineering students about the importance of understanding the business of engineering.

Help is also needed with judging student designs and providing opportunities to have students visit engineering companies and facilities. Those who wish to provide assistance should contact Paula Hackenjoss at 203-932-7168 or phackenjoss@newhaven.edu.

Engineering Education Goes Spiral: Preparing Students for Multidisciplinary Work

Traditional engineering education has struggled to keep pace with dramatic and rapid changes in engineering practice over the last decade. This situation was highlighted in 2005 in the National Academy of Engineering's publication, "Educating the Engineer of 2020: Adapting Engineering Education to the New Century." Recommendations in that report included introducing students to the "essence" of engineering early in their academic careers and integrating interdisciplinary learning within the undergraduate curriculum. TCoE's Spiral Curriculum (the Multidisciplinary Engineering Foundation Spiral Curriculum or MEFSC) embraced both of these recommendations and even moved beyond them to include development of a full range of professional skills required of engineers in today's workplace.

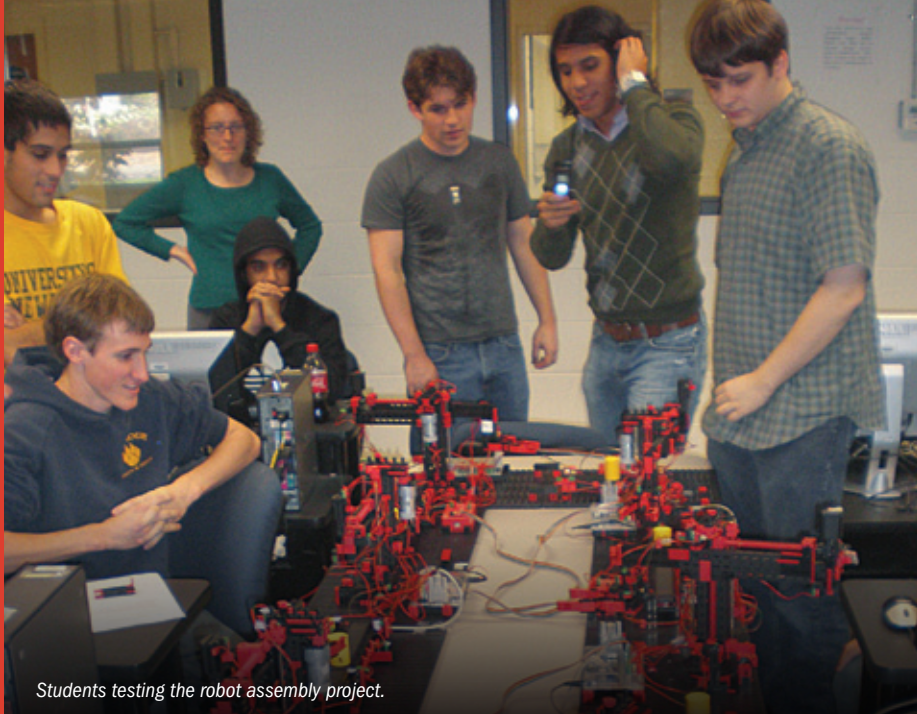
Professor Michael Collura explains the factors driving the need for change:

- ▶ Advances in computational technology are a major factor. Thirty years ago it would take a room full of engineers to do the work that can now be done by one or two engineers using modern computational tools. The skill sets are necessarily different. It is less critical for modern engineers to be fast at doing manual calculations. Instead it is more important that engineers have a greater understanding of the underlying concepts in order to make effective use of the technology.
- ▶ Another driver is the availability of information. Since one can get data, equations, etc. very easily, the practice of engineering is less about recall and more about conceptual understanding.
- ▶ These factors, combined with outsourcing, international commerce and related issues, create a climate for the practice of engineering that requires a broader set of skills than would have been needed in the past. Interpersonal skills and understanding other disciplines has become essential for an engineer to advance in his or her career.

A Decade of Dedicated Effort

The Spiral Curriculum has evolved over the past decade. In 2002, a small group of faculty worked to redesign the introductory engineering course to create a hands-on experience for students that would emphasize teamwork and communication skills, while providing a good overview of the engineering design process. This effort resulted in EAS107P – Introduction to Engineering: Project-Based. A donor provided funds to create a "studio-classroom" for this course. The idea was to combine lecture and lab seamlessly. That room is the existing B210 – referred to by some faculty as the "fishbowl" because of the windows to the hallway that allow visitors to see what is happening in the classroom.

Subsequently, with support from a National Science Foundation grant in 2003, a group of faculty sought to create a curriculum that would meet the needs of current practice, including a focus on the development of professional skills and a multidisciplinary perspective. The characteristics of the new model included: providing tight integration among the courses, including integration with math



Students testing the robot assembly project.

Ron Harichandran says:

“The Spiral Curriculum is one of the jewels in the TCoE that caught my eye when I interviewed for the Dean position last year. It is highly innovative and deeper than what has been done at most other institutions.”

and science classes; designing fundamental engineering courses that were multidisciplinary; and designing highly interactive courses to engage the students more actively in the learning process.

That effort evolved into the innovative Spiral Curriculum. The term “spiral” derives from the learning theory advanced by Jerome Bruner, who uses a constructivist approach. New learning builds on what students already know. The Spiral Curriculum uses an integrated approach to help students build an understanding of the fundamentals of engineering by revisiting topics in subsequent courses at increased levels of sophistication.

The MEFSC Approach in Practice

In the first-semester courses, students engage in several hands-on projects. In EAS109 – Project Planning and Development, students must build and program a robot to handle an artifact as part of an assembly-line process. For the project, the robot simply picks up the object and then places it in a particular spot, in a particular orientation. Students are given specifications about the locations of the pick-up and drop-off points. The robots are stationary, but must rotate and lift the object. Five or six different teams each have a different set of overlapping locations. That is, Team One’s

drop-off is Team Two’s pick-up. This arrangement sounds simple, but students may only communicate with other teams through formal means such as drawings and memos. The flow of information is intended to simulate an industrial project in which different components are built at different locations, or perhaps, in different countries. The various parts must then be brought together to assemble the final product.

Finally, the completed robots are set in place in a loop to simulate the assembly step. The simulation usually fails due to small differences in position or miscommunications of specifications, etc. From this experience, students learn the importance of precise communications, meeting specifications, designing to precise tolerances and, most importantly, the habits of design that can dictate success or failure.

Continuous Improvement

Through feedback obtained from students and alumni focus groups and examination of various data, the Spiral Curriculum has positively impacted student recruiting and retention, academic performance in the first three semesters and performance in the basic physics course.

Campaign Raises \$2 Million for New Engineering Equipment

In 2011, the University of New Haven’s Board of Governors established a \$500,000 challenge initiative to support the Tagliatela College of Engineering Equipment Fund. Gifts to the Fund would be matched dollar-for-dollar until \$1 million was raised for new engineering equipment.

In less than a year, the challenge was met – and then some. Thanks to an unexpected \$1 million gift from an anonymous alumni donor, the College was able to double the original goal. The funds raised will benefit all engineering departments and will allow for greater levels of hands-on learning and more sophisticated undergraduate research opportunities and career preparation.

“We want to ensure that our students receive an outstanding educational experience and are positioned to compete for challenging jobs in today’s marketplace when they graduate,” said Dean Ron Harichandran. “We are very appreciative of all of our donors for making the purchase of the new equipment possible. They have contributed to our ultimate goal of making the Tagliatela College one of the region’s finest and most innovative engineering schools.”



TAGLIATELA
COLLEGE OF ENGINEERING
 300 Boston Post Road
 West Haven, Connecticut 06516
www.newhaven.edu/engineering



THE BEST OF THE BEST

The Tagliatela College of Engineering has been ranked in the top-tier of undergraduate engineering programs nationwide by **U.S. NEWS & WORLD REPORT.**



My gift to the Tagliatela College of Engineering

Name _____ New Gift Pledge Payment

Enclosed is my check for \$_____ payable to the University of New Haven.

Please charge my credit card a **one-time** gift of \$_____

or \$_____ **monthly** (\$10 minimum) Until June 30 Until my credit card expires
(Then contact me).

Credit Card # _____ Exp. Date _____

Signature _____ Verification (CSC*) _____

**For MC or VISA, the last three digits in the signature area on the back of the card; for AMEX, the four digits on front right.*

- VISA
- MasterCard
- AMEX

Keep in touch:

- ▶ Update your contact information: www.newhaven.edu/alumni/updateinformation.
- ▶ Share news of recent accomplishments, awards or promotions: www.newhaven.edu/alumni/classnotes.
- ▶ Update us by mail: _____

Multiply the impact of your gift:

- A matching gift form is enclosed
- I or my spouse *(check one or both)* work(s) for a matching gift company:

Visit www.matchinggifts.com/newhaven to see if your company has a matching gift program.

Other ways to give:

- UNH is included in my estate plans
- Please send me information about:
 - Making a bequest
 - Designating UNH as the beneficiary of a retirement account or a life insurance policy
 - Making a gift of securities or real estate
- I wish to make a gift of securities
 Please call me at _____

Gifts can also be made online at www.newhaven.edu/supportunh, or by contacting Scott Davis at (203) 932-7046.



Please mail this form to:

Office of Advancement, University of New Haven, 300 Boston Post Road, West Haven, CT 06516
 For more information about alumni news and events, visit www.newhaven.edu/alumni.