

Innovation Incubation

SEAS fosters entrepreneurial ventures that innovate beyond the classroom and the lab

Creating as a Community

Yale's Center for Engineering Innovation & Design opens its doors

Special Delivery

Novel nanoparticles offer advances in cancer treatment, stem cell cultures, and more

2012

YALE ENGINEERING

Yale

Burning Up Conventional Formulas

Yale researchers cross boundaries to achieve breakthroughs in research and design



Yale

EDUCATION

Creating as a Community

Engineering's new innovation & design center is poised to connect groups throughout and beyond Yale's campus in open-ended problem solving



Yale's Center for Engineering Innovation & Design opened its doors this fall for the start of the 2012-2013 school year. First announced by Dean of Engineering T. Kyle Vanderlick in 2011, the \$6.5 million Center offers 8,500 square feet of space, all part of a goal to encourage collaborative idea generation not just among engineers, but with students from the many schools and programs on Yale's campus.

"Innovation develops by connecting ideas from seemingly unconnected areas," says Vanderlick. "Just as engineering acts as a bridge between the sciences and the humanities, the CEID will bring together Yale's most important assets, its wide-ranging students and faculty, in an intellectually stimulating environment."

"The Center will empower Yale students to realize their creative vision," agrees CEID Director Eric Dufresne, associate professor of mechanical engineering and materials science. "It will help students bridge the gap between formal coursework and the real challenges that face society."

More than just being a space to gather and generate ideas, the Center gives students the ability to realize their ideas with the resources it offers: its affiliated faculty and staff, available training (both in higher-level design and the basic skills required to work with tools), and the physical tools themselves. Beyond the traditional wood and machine shops found in design spaces, the CEID work areas offer two high-end 3D printers, computer-controlled

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milling machines, and a large bed laser cutter to enable rapid prototyping. In a unique and progressive move for a design space, the facility also includes a wet lab that can be used to support design efforts in medical devices or research in microfluidics, which is particularly well suited for undergraduate research efforts.

Situated on the first floor and mezzanine of Becton Center, the CEID's working space includes a reconfigurable classroom that seats 50, as well as five reconfigurable, reservable meeting rooms on the second floor. The meeting rooms, which offer whiteboard space as well as computer monitors, have movable walls and can be combined to accommodate larger groups when necessary.

Finally, the CEID's largest area is an open studio space on the ground floor, fully visible to passers-by on Prospect Street via its wall of floor-to-ceiling windows and outward-facing projectors displaying current center activities. This public face of the CEID serves as an inviting reminder that the space is open to the entire Yale community.

"One of Yale's greatest strengths is its diverse collection of leading academic programs and disciplines," says Richard Levin, Yale University President. "The new Center for Engineering Innovation & Design gives students throughout all of these disciplines the opportunity to leverage their different backgrounds and experiences and collaborate in open-ended problem solving."



As a natural progression of such collaborations, the CEID can also serve as an incubator for commercial product design, continuing the engineering school's tradition of entrepreneurial spirit (see "Innovation Incubation," page 8). The CEID also offers the potential for increased collaboration with the Yale Office of Cooperative Research and the Yale Entrepreneurial Institute, which already work with many engineering students and faculty on ventures ranging from cardboard furniture design to a remote dermatology device — both developed by Yale engineering students using equipment that the CEID now offers for use by students throughout the Yale community.

Academically, the CEID will support both existing and new classes, from capstone design courses, to new product development, to the popular ME491, "Appropriate Technology for the Developing World." The course (co-developed and co-taught by CEID Assistant Director Joseph Zinter) is open to students from across Yale, pooling their varied talents and backgrounds to address the multifaceted problems of the developing world.

Past groups of ME491 students have developed a mechanical intervention to promote economic growth among farmers and a system to increase the availability and

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EDUCATION

Caffeine and Creativity

Adjacent to the new Center for Engineering Innovation & Design space in Becton Center, a new engineering café will serve as a meeting spot for students and faculty from across campus, uniting many different disciplines within an engineering space — over a cup of coffee and under a sea of LED art.

The café features a signature 356 square foot installation of programmable art. Climbing to cover nearly a full wall and wrapping across the ceiling, the piece includes more than 23,000 individual LEDs, each individually programmable to display custom images and video visible throughout the space and to passersby on the street via new windows on the south side of the café space. (In the rendering shown, the installation is displaying images from the research of Nicholas Ouellette, assistant professor of mechanical engineering & materials science, who studies fluid dynamics.)

Students will have access to the blank canvas of the LED installation, so that not just engineering majors but all students can produce content to be viewed by the entire Yale community. As with the café itself and the neighboring CEID, the feature wall can draw a wide spectrum of students and faculty, enabling Yale community members who might not otherwise interact to do so in a space designed to promote creativity and the exchange of information.



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reliability of electricity in both rural and urban settings in Ghana. Last year's class included 15 graduate and undergraduate students from eight different disciplines: mechanical, chemical and environmental engineers worked alongside students from physics, global affairs, economics, management, and anthropology. ME491 aims to do what the CEID looks to achieve on a larger scale: actively engage students from different backgrounds in collaborative learning by focusing on real problems and, potentially, designing novel solutions.

Beyond integrating design into coursework, however, Dufresne is enthusiastic about extracurricular design opportunities as well.

“Yale students are creative, energetic and smart. They are not satisfied with challenging coursework,” says Dufresne. “They are passionate about extracurricular activities that allow them to express themselves creatively while working on real projects that have the potential to change lives.”

There are a number of student groups whose efforts could be well-served by the interdisciplinary capabilities and resources of the CEID, Dufresne notes, highlighting Yale's iGEM (International Genetically Engineered Machine) group as one such organization. Their efforts are particularly well suited to take advantage of the CEID's wet lab facilities, for example.

And of course, beyond organized student groups, the CEID will be open to the curious individual student as well — with hopes that he or she will end up collaborating with others.

“As we do within SEAS itself, we want to encourage collaboration between many different groups at Yale, and engage both engineering students and those from other disciplines in creative problem solving,” says Vanderlick. “Ultimately, the CEID will be a community of people creating.” 