Bridging Industry and Academia

When David A. Edwards, Gordon McKay Professor of the Practice of Biomedical Engineering, arrived at Harvard in 2000, he brought two perspectives. As a cofounder of AIR/Alkermes, Inc., a biotechnology company, he knew what life in a start-up was like. As a former associate professor of chemical engineering at Pennsylvania State University, he was also familiar with life in a classroom.

At Harvard, he aimed to bridge these perspectives by offering undergraduates the opportunity to taste life as an entrepreneur from the shelter of the classroom—twice.

Edwards's first course, called "Introduction to Technology Development in the Biomedical Engineering Industry," teaches students about product development in the genomics, drug-delivery, and medical-device industries. "To help students really get a sense of what product development is about, I break the class into teams, and assign each a biomedical company," says Edwards. "We cover all stages of development, from discovery, to preclinical and clinical development, to commercialization."

Each team evaluates its assigned company's financials, core technology, competition, and market. As students complete this analysis, many have the opportunity to interact with the company's senior officers and leading scientists. At the end of the class, each group presents its findings and its prognosis for the company's future opportunities before classmates and, in some cases, participating CEOs.

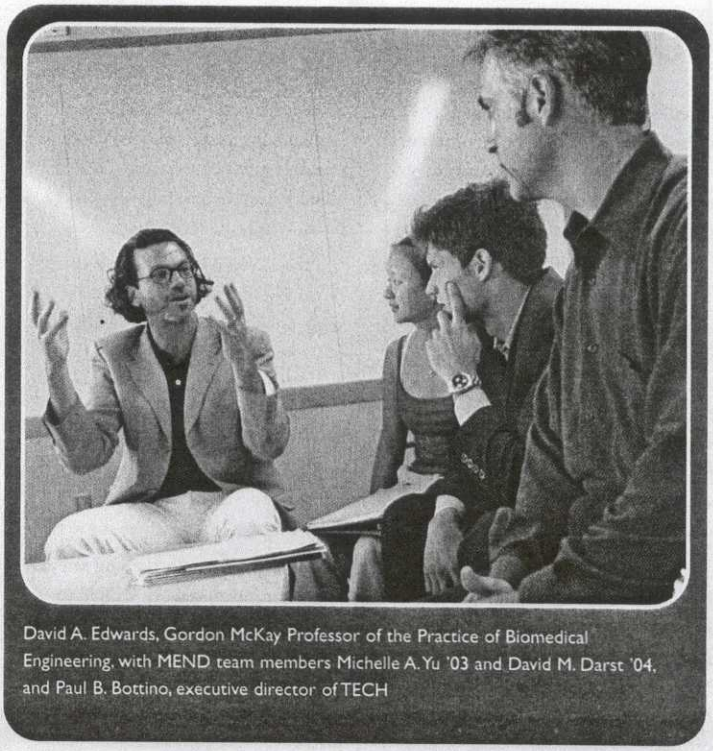
"What made it really successful was the mutual learning opportunity," says Edwards. "The students are exposed to real companies, and the companies are meeting Harvard students."

Edwards's second course, called "Biomedical Transport Phenomena as the Seed of a Biomedical Start-Up," enables students to try their hands at real entrepreneurship. The class, which focuses on biomedical problems and applications, organizes students into three start-up companies, each founded around a real patent or patent application.

"Although the course highlights start-ups, the essence of the class teaches biotransport [how drugs and other molecules move through and within cells and tissues]," says Edwards. "I want to stress to students that a successful biomedical company starts with successful science."

The start-ups each form two teams: one to focus on the science, and the other to concentrate on the business. Because class time mainly emphasizes science, extra support for the business side was provided by TECH (see *Innovating on Their Own Time*, page 5), with special seminars and workshops on business plans. At the course's end, TECH helped to arrange a forum for each group to present to the class, and to venture capitalists, bankers, and other professionals from the business community.

What's most impressive about this class is that, since it began, all three start-ups have evolved into functioning organizations. One, called Medicine in Need (MEND), is a nonprofit that is developing an inhalation drug delivery system for treating tuberculosis (TB). "We believe that our treatment will be more effective than current treatments because it delivers TB drugs directly to the lungs, possibly allowing for a shorter treatment regimen, as well as causing fewer gastrointestinal side effects," says Denise S. Kim '03, a computer science and biotechnology concentrator from Madison, Wisconsin. "In August, we traveled to South Africa to meet with TB researchers, doctors, and patients, and their response was very positive."



David A. Edwards, Gordon McKay Professor of the Practice of Biomedical Engineering, with MEND team members Michelle A. Yu '03 and David M. Darst '04, and Paul B. Bottino, executive director of TECH

Denise S. Kim '03, MEND team member, and Jonathan C. Man '03, a team member on another start-up

Edwards is amazed at the direction that each of these patent applications has taken. "Obviously, the course had to come to an end, and students got their grades," says Edwards. "But the students wanted to continue working with their ideas and pursue what has become a real opportunity. This dedication confirms how highly creative and motivated our students are. This is why I'm here."

The students are also very excited about the possibilities that lie ahead. "I never imagined that taking the first course would lead to starting a nonprofit company," says Kim. "With TB claiming more than two million lives a year, it's tragic so little is being done to combat it. It's amazing to see the impact we could have on global health."

"It's incredible to have had the real opportunity to try to build a company," says Jonathan C. Man '03, a biomedical engineering concentrator from Bellevue, Washington, who worked on one of the other start-ups. "We started with an idea on a piece of paper, and we've created a living, breathing entity. This class has really shaped what I want to do with my life."