

The Entrepreneurship Ecosystem
By Katharine Dunn September 2005



The first speaker at the Tuesday evening meeting of the MIT Entrepreneurs Club in early May is Pat, a former corporate CFO who is here to talk about ways to find new investors for the rock-climbing gym he plans to expand to a second location.

Pat has no MIT connection, he says, other than his friendship with an MIT alumnus who has invested in his business and invited him to the meeting. But that doesn't matter to the E-Club members--mostly MIT undergraduates, grad students, and alumni who convene every week. They listen to Pat's presentation, ask detailed questions about his insurance and business plan, and offer suggestions and contacts.

Pat could be called an old-fashioned entrepreneur, one who must rely on his own resources when trying to meet potential business contacts. But the future of entrepreneurship--the MIT style of entrepreneurship--is embodied by the second speaker that evening, Ian MacDonald.

MacDonald is a student in the Leaders for Manufacturing program, a partnership among the Sloan School of Management, the School of Engineering, and industry, in which companies supply funds, internship opportunities, and expertise to students who are studying to become marketing and project managers in manufacturing businesses. MacDonald is at the E-Club meeting to test his presentation of the business plan he and his teammates have entered in MIT's annual \$50K Entrepreneurship Competition. "It's an environment where you can get asked hard questions that are not devastating to your future progress," MacDonald says, because the people in the room aren't venture capitalists whose decisions on whether to fund a proposal could determine its fate.

By the time MacDonald asks E-Club members for help, he and his teammates have already made use of MIT's extensive entrepreneurial resources. MacDonald's \$50K team, Nanocell Power, formed in a class called Innovation Teams, in which students create marketing plans for MIT technologies. I-Teams is a collaboration between the Sloan Entrepreneurship Center, the student-run Venture Capital and Private Equity Club, and the Deshpande Center for Technological Innovation in the School of Engineering, which funds research that could be promising for industry. The technology behind Nanocell Power is a process for manufacturing a key component in fuel cells that makes them smaller and cheaper. Yang Shao-Horn, a mechanical-engineering professor, developed the technology with the help of two Deshpande Center grants. I-Teams students have regular access to professor-inventors and to industry mentors who help improve their marketing and business plans. The class also makes use of the Technology Licensing Office (TLO), where teams meet with licensing officers to learn about MIT's intellectual-property rules.

So MacDonald arrives at the E-Club meeting well prepared. It's little surprise that a week later, Nanocell Power is named first runner-up in the \$50K contest. The team wins \$10,000, office space, and, almost certainly, an edge when it comes to attracting financing and getting its product on the market. MacDonald is part of what many people call MIT's "entrepreneurship ecosystem." Over the last decade, dozens of organizations, courses, awards, and seminars have sprung up at the Institute, turning what was often a serendipitous route to the marketplace into a more formalized process. Today MIT offers support to everyone from high-school students to retired alumni on everything from developing ideas to preparing for an initial public offering, in cities as far flung as Boston and Dubai.

It's in the Genes

MIT has always encouraged both invention and entrepreneurship. Since the Institute's inception in 1861, students, faculty, and alumni have faithfully followed its motto, *mens et manus*, or mind and hand--taking what they've learned at MIT and applying it to the real world. "It's in our genes," Tom Magnanti, School of Engineering dean, told those gathered at a National Association for Engineers regional meeting last May. The Institute has spun off companies for more than a century, starting with Arthur D. Little in 1886 and progressing through Raytheon to the more than a thousand companies created in the last decade alone.

A 1997 study conducted by BankBoston found that there were 4,000 MIT-related companies employing more than a million people around the world with annual sales of about \$232 billion--a figure comparable to the gross domestic product of South Africa or Thailand. Between 1996 and 2004, an average of 20 startups formed each year to commercialize MIT-owned technology, according to the Technology Licensing Office. (The peak number was 30 in 2000, during the dot-com boom.)

"Fifty years ago, there were no formal [entrepreneurial] organizations such as we have today. But there still was the culture," says Merton Flemings '51, SM '52, ScD '54, director of the Lemelson-MIT Program, which supports invention. "Faculty were encouraged to do something with their ideas. It's in the charter that we're not only here to educate and do research but also to serve. Part of serving is interacting with industry."

There have been isolated entrepreneurial pursuits on campus for decades: Sloan ran an entrepreneurship course in the early 1960s; the Alumni Association launched the Enterprise Forum as a networking group for businesspeople in 1978; and E-Club started in 1988. But today there are many more, and they often collaborate. During the May meeting, Magnanti showed the audience a chart illustrating entrepreneurial programs at MIT. "I doubt there are more than a couple of universities in the country that could put up a slide like this," he said.

Invention Rewarded

Entrepreneurship starts with novel ideas, and MIT is long on them. Each year, according to the TLO, Institute scientists receive more than \$750 million in sponsored-research funding, which leads to about 400 new inventions. The TLO has more than 3,000 patents in its portfolio. MIT routinely ranks among the top three universities in the country in patents received, according to the U.S. Patent and Trademark Office. (In 2004, the top two were the University of California system and the California Institute of Technology.)

The campus organization that most visibly promotes invention is the Lemelson-MIT program, established in 1994. Lemelson awards a \$30,000 prize annually to an MIT senior or graduate student who shows promise as an inventor. In 2005, David Berry won for his synthetic protein to treat stroke patients. Berry was also a runner-up in the \$50K this year for a different project. Outside the Institute, Lemelson awards prizes to established inventors (the \$500,000 Lemelson-MIT Prize has been called the "Oscar for inventors") and provides grants that enable teams of high-school students around the country to work on inventions. Flemings calls the Lemelson program the "precursor" to the Deshpande Center, founded in 2002, in that it deals with the earliest stages of invention. Deshpande executive director Krisztina Holly '89, SM '92, says the center, which has already spun out seven startup companies, fills a void on campus, focusing on later stages of innovation and creating a bridge between professors and industry.

"Academia creates wondrous technology that gets lost in drawers," says Douglas Hart, SM '85, professor of mechanical engineering. In 2003, Hart received a \$250,000 Innovation Grant from Deshpande to prepare his research on single-lens 3-D imaging systems for outside funding. The center also offers Ignition Grants, awards of up to \$50,000 to fund what Holly calls early-stage "wild and wacky ideas" that could use a jump start.

After Hart and his research team won the Deshpande grant, Holly suggested they enter the \$50K. Holly says that Hart was a "reluctant entrepreneur," and he agrees. "I wasn't sure how entrepreneurship was going to be viewed in academia," he says. "I came from an era where your job was to be a faculty member and teacher, not spin out companies." But Hart decided that receiving business guidance under the auspices of the engineering school was safe enough.

At a \$50K event in fall 2003, Hart and his students met two Harvard Business School students and decided to team up with them. That spring, their team, Brontes Technologies, won a runner-up prize in the \$50K. They ran into a wall, however, in seeking financing: the venture-capital community resoundingly rejected their plan to use the technology in manufacturing, saying the market wasn't right. So Hart and his colleagues adjusted the focus of their business plan to find a different way to use the technology. They settled on a dental application: scanning teeth instead of making plaster molds of them. The venture capitalists were impressed, and the company spun off with \$8 million in funding.

"The Deshpande Center added legitimacy to the technology," says Hart, who especially liked that all Deshpande grant proposals are peer reviewed by MIT faculty. "And the \$50K added legitimacy to the business plan." Still, Hart says that with all the advice and support his team received--including access to volunteer business mentors through MIT's Venture Mentoring Service--his best resources were other faculty members who had also started companies.

"People may say [to an academic], 'If you wanted to go into business, why didn't you go into business?'" says Hart. "Deshpande says,

'Look, business needs you.'

Students as Entrepreneurs

While the Deshpande Center supports the creators of technology, the Entrepreneurship Center at Sloan nurtures the businesspeople involved with invention. The E-Center's chief purpose is education. Since 1996 it has housed the two dozen entrepreneurship-related courses offered by Sloan, including the I-Teams course. All of the courses are open to students campuswide. "We make an effort to market courses around campus," says former E-Center program manager Bob Ayan, MBA '02, who was known to hand out business cards at places like science and engineering business club meetings.

Still, about 75 percent of the courses' enrollment comes from Sloan. Two of the E-Center's most popular courses, the Entrepreneurship Lab and the Global Entrepreneurship Lab, place students with real-world companies, where they work for course credit in teams to solve problems "that keep the CEO awake at night," says Ayan. Those problems have included devising a marketing plan for a pre-IPO company and coming up with ways a company could expand. The center also supports several student entrepreneurship groups--including the Venture Capital and Private Equity Club, the BioPharma Business Club, and the \$50K--giving office space to some and advice to others.

It is only recently that entrepreneurship groups at Sloan and those from the rest of MIT have interacted with each other in an official way. For example, this year the \$50K will be co-led by a Sloan student and an engineering student for the first time in its 16-year history. The student leaders hope to improve the competition by supplementing the formal 200-person events it has hosted in the past with small networking dinners where scientists and business students will feel more comfortable interacting.

A Model for Others

For decades, outside organizations have looked to MIT for inspiration and support in their own pursuit of innovation and entrepreneurship. When Winston Churchill visited MIT in 1949, he spoke of how American technological innovations such as radar--developed at MIT--had helped the Allies win World War II. Britain, he said, had suffered from a paucity of colleges that made engineering and other practical disciplines a priority. A decade later, the University of Cambridge founded Churchill College, which focused on science and technology. In 2000, Cambridge forged a stronger link with MIT when the two schools teamed to create the Cambridge-MIT Institute, a \$100 million partnership to encourage entrepreneurship in the U.K.

Today there are many international entrepreneurship activities at MIT. The E-Center runs the \$50K Global Startup Workshop, which trains people from universities in other countries, such as Italy, the U.K., and China, to run their own business plan competitions. The Enterprise Forum has two dozen chapters around the world that provide business education and advice to members. Over the last year, Joe Hadzima '73, chair of the forum, has spoken to groups in Norway, Finland, Sweden, the U.K., Spain, and the Philippines about ways to adapt some of MIT's ideas for their countries.

"Switzerland has world-class science but not a lot of entrepreneurial activity. And we can't just take this system and put it over there," says Hadzima, who also teaches in the E-Center. Nevertheless, he says, "there is no reason the ecosystem concept can't be spread. We supply the water and food, and [they] provide life in a local environment." Hadzima's goal is to better connect the chapters of the forum, so they can make use of each other's resources. So, for example, the Detroit chapter could help members in other states get in touch with people in the auto industry.

MIT's entrepreneurial ecosystem isn't perfect. Hadzima says that things can get "messy" when, for example, groups fail to communicate with each other and schedule activities for the same night. The \$50K organizers are concerned that many engineering and science students continue to see the competition as a Sloan event, not one open to them. And it's yet to be determined what roles student-researchers can assume in the Institute spin-off companies they help form. But entrepreneurship, by its nature, is about taking risks. So it's no surprise that MIT is coming up with new ways--including some that may not always work--to support and nurture its future entrepreneurs.



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