

## **Deshpande Center for Technological Innovation**

The Deshpande Center for Technological Innovation serves as a catalyst for innovation and entrepreneurship by supporting research of MIT faculty and students and facilitating collaboration with entrepreneurs, venture capitalists, and innovative businesses. It carries out its mission through its Grant Program, Catalyst Program, Innovation Teams course, and sponsored events.

The Deshpande Center was founded in 2002 through a generous gift of \$20 million from Jaishree and Desh Deshpande, cofounder and chairman of Sycamore Networks, Inc. The center depends on the generous support of the entrepreneurial community and seeks additional support to sustain its programs beyond the initial five years made possible by the Deshpande gift.

Executive director Krisztina Holly spearheads the Deshpande Center's efforts, along with faculty director Charles L. Cooney, professor of chemical and biochemical engineering. A steering committee that includes Desh Deshpande, honorary chairman of the Corporation Alex d'Arbeloff, and School of Engineering dean Thomas Magnanti administers the fund that supports the Deshpande Center.

### **Highlights**

In academic year 2004–2005, a number of the research teams that the Deshpande Center has supported since 2002 began to realize significant commercial success. From the 44 teams that have won \$4.9 million in Deshpande Ignition and Innovation Grants to date, nine new companies have been formed, raising a total of \$23 million in start-up venture financing.

Nanocell Power, a business plan based on Professor Yang Shao-Horn's fuel-cell technology, was named first runner-up in the 2005 MIT \$50K Entrepreneurship Competition. The Nanocell Power team formed in a new graduate course called i-Teams (more on i-Teams below). MicroDiagnostics, Inc., based on Professor Todd Thorsen's project Microfluidic Platform for High-Density Multiplexed Biological Assays reached the semifinals of the \$50K.

Starting with the spring 2005 grant round, the Deshpande Center opened up proposals to the entire Institute rather than just the School of Engineering.

The MIT News Office wrote about—and the media subsequently reported on—Francesco Stellacci's nanoprinting technology. See the Deshpande Center's press web page for links: <http://web.mit.edu/deshpandecenter/press.html>.

### **Awards and Recognition for Deshpande Center Grantees**

Professor Vladimir Bulovic of Electrical Engineering and Computer Science (EECS) and Professor Martin Culpepper of Mechanical Engineering were named to the 2005 TR100, a list of top young innovators in technology published annually by *Technology Review*. Professor Angela Belcher of Materials Science and Engineering was one of 10 New

England innovators to be honored in Mass High Tech’s 2005 Women to Watch program. Professor Robert Langer of Chemical and Biomedical Engineering was named Institute Professor (the highest honor awarded by the MIT Faculty and administration), shared the \$1 million 2005 Dan David Prize, and received the Albany Medical College Prize. Professor John Gutttag of EECS was elected to the American Association of Arts and Sciences. Adjunct professor Michael Stonebraker of the Computer Science and Artificial Intelligence Laboratory won the 2005 IEEE John von Neumann Medal. Professor Todd Thorsen of Mechanical Engineering was a cowinner of the \$75,000 Futures grant from the National Academies Keck Futures Initiatives. Ronak Bhatt, a graduate student in physics and a member of research scientist Chipping Chen’s ribbon-beam amplifier project, received a Best Student Paper prize at the spring Particle Accelerator Conference in Tennessee for his paper on the project.

### **Deshpande Grant Program Awards**

The program provides research funds that permit MIT faculty and students to create and investigate new technologies and supports the transfer of new knowledge and technologies from the Institute to young companies. The Grant Program consists of two types of awards: Ignition Grants of up to \$50,000 and Innovation Grants of up to \$250,000. Multiple experts in academia and industry review each application in two stages: preproposal and final proposal. The center announces awards twice annually.

The Deshpande Center awarded 15 grants in FY2005 totaling almost \$1.3 million. The awards support a wide range of emerging technologies, including biotechnology, information technology, new materials, tiny technology, and energy innovations.

### **Ignition Grants**

With up to \$50,000, Ignition Grants target projects focusing on novel, enabling, and potentially useful ideas in all areas of technology. Though it might enable only exploratory experiments to establish proof of concept, an Ignition Grant can position projects to receive further funding, such as an Innovation Grant, to take a concept to full development.

### **Academic Year 2005 Ignition Grant Recipients**

*John Brisson: Novel ice-cream production method.* This cheaper, more energy-efficient way to make ice cream could change large-scale ice-cream production as we know it—and generate a creamier dessert.

*Clark Colton: Finding early-stage cancers using novel contrast agents for enhanced MRI.* This technology could help pinpoint early-stage tumors, dramatically improving the chances of cancer survival.

*Paula Hammond: Implant coatings for sequential drug delivery.* “Smart” drug coatings that can conform to medical devices of any shape (e.g., stents, bone implants, pills, and microparticles) and that allow the release of multiple drugs at varied times could make multiple surgical procedures and drug-dosing schedules a thing of the past.

*Timothy Jamison: Fine chemicals in one step.* A one-step process of coupling bulk chemicals to produce fine chemicals creates a new economic equation for the multitrillion-dollar fine chemicals industry and one of its main customers: pharmaceuticals.

*Lionel Kimerling and Anuradha Murthy Agarwal: Low-cost multispectral infrared detector arrays.* The large potential for infrared sensors may be unlocked by this novel approach for making commodity-priced multispectral photodetector arrays.

*Samir Nayfeh: Short-warp weaving for fast-changing fashions.* A new way of weaving cloth could disrupt the upscale fashion market by enabling clothing production schedules to meet rapidly changing demand.

### **Innovation Grants**

With as much as \$250,000, an Innovation Grant benefits projects that have established proof of concept and identified an R&D path and IP strategy. Each grant helps a project build a package to bring to venture capitalists or companies that might invest in its technology. Some projects require additional funds to reach the venture funding or licensing stage, and these renewals go through the same rigorous application process as new grant requests, since the Deshpande Center aims to minimize the financial support needed to get the technologies out the door.

### **Academic Year 2005 Innovation Grant Recipients**

*Angela Belcher: Fast discovery of ion channel-targeting drugs.* This nanotechnology-based approach to monitoring key proteins could open up new drug markets worth billions.

*Vladimir Bulovic: New light-emitting device for flat-panel displays.* A new quantum-dot-based light-emitting device that lowers manufacturing costs and dramatically improves picture quality could accelerate growth of the \$35-billion market for flat-panel displays.

*Chiping Chen: Making 3G and 4G a reality with low-cost amplifiers for wireless base stations.* The cost of base station amplifiers has been a significant barrier to next-generation wireless deployment. A revolutionary new advancement of a decades-old technology—microwave tubes—could change all that. (Renewal)

*Martin Culpepper: HexFlex—enabling nanofabrication with a six-axis nanomanipulator.* Current developments in nanotechnology are limited by the difficulty of manipulating objects to extreme precisions; this invention is an elegant and inexpensive solution to the problem.

*Rutledge Ellis-Behnke: New compound stops bleeding instantly.* A new transparent compound that not only stops bleeding instantly but can be operated through and breaks down harmlessly within the body has the potential to revolutionize surgery and trauma care.

*Klavs Jensen: Accelerating innovation in the chemistry lab with integrated automated microchemical systems.* The classical chemical lab has changed little in the last hundred years—until now. These tiny “laboratories” could make chemical and pharmaceutical development faster, less expensive, and more innovative. (Renewal)

*Yang Shao-Horn: Engineered electrode assemblies for PEM fuel cells.* Proton Exchange Membrane (PEM) fuel cells have great potential for powering cars and other applications, but the most expensive part of the fuel cells, the electrode assemblies, have been cost-prohibitive—until now. (Renewal)

*Francesco Stellacci: Nano-contact device lithography.* Much in the same way the printing press revolutionized the creation of reading matter, the nano-contact printing technology being developed in this renewal project enables mass production of nano devices currently built one at a time.

*Michael Stonebraker: Hybrid DBMS optimized for read-intensive applications.* Commercial database management systems are designed as “row” stores for update-intensive applications, leaving an opportunity for a radical new hybrid approach that is optimized for both reading and writing.

### **Catalyst Program**

Through our Catalyst Program, the Deshpande Center connects projects with local entrepreneurs, investors, customers, potential partners, and other key people who can help increase the chances that our projects get commercialized.

There are currently over a dozen committed “catalysts” who serve as advisors to the center and liaisons for Deshpande Center projects. They contribute at least one day per month to the center and help turn research into real companies and licensable innovations. Catalysts are selected from those volunteers who have contributed the most to the center, and generally they are venture capitalists or entrepreneurs.

### **Innovation Teams**

Innovation Teams, or i-Teams, a course that piloted in the spring of 2004, officially launched in fiscal 2005. Taught jointly by the School of Engineering and the Sloan School of Management, the i-Teams course is for entrepreneurial and highly qualified graduate students throughout the Institute who want to help bring innovations from Deshpande Center–funded research projects to the marketplace. Guided by the project’s principal investigators, faculty from MIT’s Entrepreneurship Center, and Deshpande catalysts, each team is expected to create a go-to-market strategy for a technology developed by Deshpande Center–funded research.

With the help of i-Teams, Nanocell Power, a business plan based on Professor Yang Shao-Horn’s fuel-cell project (Engineered Electrode Assemblies for PEM Fuel Cells) was named first runner-up in the 2005 MIT \$50K Entrepreneurship Competition.

### **Deshpande Center Events**

Through its sponsored events, the Deshpande Center seeks to bring together the components needed for MIT technologies to reach commercialization. These events connect faculty members and students with members of the emerging technology industry. The Deshpande Center conducts workshops for faculty entrepreneurs, holds

networking events for grant recipients, and hosts an annual conference, the IdeaStream Symposium.

### **Faculty Entrepreneurship Workshops**

The Deshpande Center holds workshops for faculty members who are interested in entrepreneurship. The workshops address the unique challenges of faculty entrepreneurs and the development of innovations to serve market needs. Workshops for AY2005 included the following:

- “SBIR Grants: Finding Research Money for Your Startup,” with Bob Kispert, director of federal programs for the Massachusetts Technology Collaborative; Mark Lundstrom, CEO of BioScale, Inc.; and Errol Arkilic, SBIR program manager for the National Science Foundation.
- “Angel Funding,” with Lucinda Linde (SM '83, Materials Science and Engineering) of Walnut Venture Associates.

### **IdeaStream Symposium**

On April 26, 2005, the Deshpande Center held its annual IdeaStream Symposium, aimed at connecting MIT researchers with the entrepreneurial community. Highlights of the symposium included presentations from some of the most exciting Deshpande grant recipients; Innovation Showcase, at which MIT researchers pitch their innovative technology ideas to and get market feedback from venture capitalists and successful entrepreneurs attending the symposium; and addresses by MIT president Susan Hockfield and filmmaker and mountaineer David Breashears. This year, 47 researchers had the opportunity to showcase their projects to an invitation-only audience of over 250 entrepreneurs and venture capitalists. The conference sold out almost three weeks in advance.

### **Innovation Showcase**

Innovation Showcase took place for the second time at this year's IdeaStream Symposium. This program provides a unique opportunity for MIT researchers to pitch their innovative technology ideas to venture capitalists and successful entrepreneurs. Eighteen participants were selected from a pool of applicants across the Institute. These participants gained visibility for their work, made connections, and received real-world feedback on how they might be able to commercialize their ideas. Just as important, they received coaching ahead of time from a panel of catalysts and other experts from the Deshpande Center network.

### **Catalyst Parties**

Each semester, the Deshpande Center organizes a small party to celebrate the latest grant recipients in advance of announcing the grant round. It's an opportunity for the grant recipient teams and catalysts to get to know each other, and all new grant recipients are asked to give a brief “elevator pitch” of their project. It is not unusual for MIT collaborations to evolve from this event.

### **Fall Innovation Week and Other Collaborations**

The Deshpande Center teamed with the MIT Venture Capital and Private Equity Club, MIT \$50K Entrepreneurship Competition, and MIT TechLink to present the first MIT Fall Innovation Week, December 2–8, 2004. Activities included the Deshpande Center VIP Open House, the MIT \$50K preliminary awards, lab tours, the MIT Venture Capital Conference (including a Deshpande Center Emerging Technology Showcase, modeled after Innovation Showcase and featuring the fall term i-Teams), and a panel discussion titled “Creative Ways to Raise Early-Stage Capital.”

### **Administrative Changes**

Katja Wald joined the center as program coordinator.

**Krisztina Holly**  
**Executive Director**

*More information on the Deshpande Center for Technological Innovation can be found online at <http://web.mit.edu/deshpandecenter/>.*