

Deshpande Center for Technological Innovation

The Deshpande Center for Technological Innovation (the Deshpande Center) 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, and events.

The Deshpande Center was founded in 2002 through a generous gift of \$20 million from Jaishree Deshpande and Desh Deshpande, the 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

At this year's IdeaStream Symposium in April, the Deshpande Center announced its first licensing and funding deals resulting from center-funded projects: the licensing of a memory cell technology to a nanotechnology start-up and the launch of Pervasis Therapeutics, a new biotechnology company. More information about these successes can be found at http://web.mit.edu/deshpandecenter/release_040804.html.

In addition, Chiping Chen, principal research scientist at the MIT Plasma Science and Fusion Center, announced in June that his team received a patent for work related to a Deshpande Center-funded project on a novel low-cost power amplifier for wireless base stations.

A Deshpande Center project called Active Joint Brace won the top prize in the 2004 MIT \$50K Entrepreneurship Competition. Another Deshpande project, Active Spectrum, reached the finals. These successes came about in part through the help of a new Deshpande Center program called i-Teams. (More about the \$50K winners and i-Teams is given below.)

Executive director Krisztina Holly was named on the *Boston Business Journal's* annual list of "40 Under 40" — 40 of the best and brightest of greater Boston's businesspeople under 40 years old. Grant recipient Jovan Popovic was honored as one of the top young innovators in *Technology Review's* TR100 for his work being funded by the Deshpande Center.

Deshpande Grant 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 university 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 form. The center announces awards twice annually.

The Deshpande Center awarded 21 grant awards in fiscal year 2004 totaling almost \$2 million. The fall announcement of 13 grant awards was made in October 2003. In March 2004 the Deshpande Center announced another eight grant awards to MIT faculty. The awards support a wide range of emerging technologies, including biotechnology, information technology, new materials, tiny technology, and energy innovations.

Ignition Grants

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 2004 Ignition Grant Recipients

George Barbastathis: Ultra-Fast low actuation voltage RF MEMS switch. This innovation could lead to the first commercially viable replacement for solid-state switches, paving the way for next-generation radio frequency products in testing, military radar, and consumer wireless markets.

Vladimir Bulovic: Slim format spectrometer. A rugged, slim-format spectrometer the size of a personal digital assistant (PDA) and costing much less than current portable spectrometers could benefit field applications from point-of-care medical devices to environmental sensors.

Chiping Chen: Low-cost amplifiers for 3G wireless base stations. A novel power amplifier for wireless base stations could improve the performance of third-generation wireless networks and help create new markets worth \$100 billion.

Yet Ming Chiang: Ionic colloidal crystals. The ability to manufacture ionic colloidal crystals—a new family of materials with fascinating properties—could lead to exciting applications in ultra filtration, drug delivery, photonic fingerprinting, and numerous other areas. (Renewal)

Fredo Durand: Tonal management for digital photography and video. This new technique for digital photography can compensate for low light, capture the style of master photographers, and improve the quality of medical imaging and video surveillance. (Renewal)

Bill Green: New engine to replace diesel. A new take on the fuel-efficient, low-emission HCCI engine would be more robust and less complex than the original and could prove to be a long-awaited alternative to the polluting diesel engine.

Tom Knight: A new approach for speech recognition. A risky new processing approach could be the breakthrough necessary to finally make speech recognition a reality.

Dick Lanza: Low-cost X-ray imaging systems. An inexpensive X-ray imaging system using off-the-shelf scanners and personal computers could be a boon to medicine in developing countries and could be used in homeland security and inspection applications.

Alex Slocum: Growth of long, strong carbon nanotube fibers. This could be the first commercially viable way to produce strong carbon nanotube fibers, whose remarkable properties could create new classes of composite materials with billion-dollar potential.

Francesco Stellacci: Contact printing: Bridging nano-lithography with industrial production. This innovative approach could solve the most elusive challenge with nanotechnology: scaling the manufacturing process. (Renewal)

Greg Wornell: Advanced algorithms to increase wireless network capacity. Really smart antenna algorithms have the opportunity to increase the capacity of wireless networks to prepare for the upcoming explosion in demand for wireless video services.

Innovation Grants

For 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 2004 Innovation Grant Recipients

Srini Devadas: Authenticating and protecting digital information in portable devices. This approach could make devices like smart cards unclonable and could have applications in digital rights management, particularly in low-powered devices such as cell phones and PDAs.

Woodie Flowers: Powered limb braces to help the mobility impaired. A low-cost, easy-to-use medical device could help millions of disabled people achieve increased independence and save \$40 million in out-of-pocket expenses for physical rehabilitation and assisted living. (Renewal)

John Guttag: An accurate, inexpensive cardiac screening system. This is a computerized cardiac screening system that is as noninvasive, inexpensive, and fast as a stethoscope, but much more accurate, and it could be a boon to cardiac diagnostics.

Doug Hart: 3-D imaging technology to enable minimally invasive surgery. A novel 3-D image-processing system could greatly enhance the medical procedure of endoscopy and enable robotic-assisted, minimally invasive surgery. (Renewal)

Klavs Jensen: The personal chemistry system: Revolutionizing the chemical lab. A personal chemistry system, compact and capable of rapid discovery and development of new products, would revolutionize the chemical laboratory—and chemical research as we know it.

Dave Perreault: 3-D circuit boards to enhance electronics at low cost. Three-dimensional printed circuit boards (3-D PCBs) would provide better performance than current 2-D technology and could capture a substantial portion of the \$30 billion annual market in PCBs.

Caroline Ross: A low-cost way to produce microelectronic devices. Simple, inexpensive magnetic devices could replace complex and costly silicon-based semiconductors used in a variety of applications, from smart cards to merchandise tags.

Don Sadoway: A radical steelmaking method that could revolutionize the steel industry. Electrolytic steelmaking, a radical carbon-free method of producing steel, could clean up the industry and take control of a \$200 billion worldwide market.

Peter So: A new device for noninvasive tissue biopsy. A new type of endoscope using two-photon imaging could diagnose disease without tissue removal and create a new market for noninvasive tissue biopsy.

Todd Thorsen: Microfluidic platform for high-density multiplexed biological assays. Here is a less expensive, more productive platform for identifying genes and proteins that could capture a share of the \$1.5 billion market.

Catalyst Program

Through our Catalyst Program, launched in fall 2003, the center connects projects with local entrepreneurs, investors, customers, potential partners, and other key people who can help increase the chances for our projects to become commercialized.

Catalyst Network

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.

i-Teams

During the spring 2004 semester, the Deshpande Center partnered with the MIT Venture Capital and Private Equity Club and the MIT Entrepreneurship Center to pilot a new course called i-Teams (short for Innovation Teams). i-Teams is for entrepreneurial and highly qualified graduate students from across campus 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, two business plans based on Deshpande Center projects were successful in the MIT \$50K Entrepreneurship Competition in May 2004. Active Joint Brace won the competition’s top prize of \$30,000. It is developing an affordable, wearable, noninvasive brace that augments physical capability in people with spinal cord injuries and other disabilities. Active Spectrum, based on a project called The Nanogate: A Tunable MEMS LC Filter, was a finalist.

Innovation Showcase

Innovation Showcase was piloted 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 importantly, they received coaching ahead of time from a panel of catalysts and other experts from the Deshpande Center network.

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, supports special seminars that focus on technology innovation, holds “open house” events for grant recipients, presents Ignition Forums on various technologies, and hosts an annual conference, the IdeaStream Symposium.

Faculty Entrepreneurship Workshops

The Deshpande Center holds semimonthly 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 2004 were:

- “Managing the Faculty’s Role in a Startup,” with American Superconductor founders Greg Yurek and Materials Science and Engineering professor John Vander Sande; Aspen Tech founder and chairman Larry Evans; and Yosef Sheffi,

civil and environmental engineering professor and founder of five logistics-related companies

- “Working with the MIT Technology Licensing Office,” with TLO director Lita Nelsen
- “How to Split Equity,” with Eric Silverman of St. James Capital and Transitions Capital; Alex Laats, Deshpande Center catalyst and venture partner at Commonwealth Capital; and Barbara Johnson, partner of Testa Hurwitz & Thibault, LLC’s Business Practice Group

Ignition Forums

Ignition Forums seek to spark new inventions that address real market opportunities. Each focuses on a particular technology or industry area, with a panel of experts comprising investors, analysts, and thought leaders in that industry, and each serves to define market needs. Two Ignition Forums were held in late 2003:

- Ultra Wideband Wireless on October 8, with Bob Egan, president and founder of Mobile Competency; Bob Heile, chairman of IEEE’s 802.15 working group and founder of Apparent Technologies, a spin-off of the Eastman Kodak Co.; Craig Mathias, principal of the advisory and systems-integration firm Farpoint Group; and Yoram Solomon, general manager of Texas Instruments’ Consumer Networking Business Unit
- BioMEMS on December 11, with Christoph Westphal of Polaris Venture Partners; Seth Rodgers, CTO of BioProcessors Corp.; and Joseph Baron, principal of PureTech Development; Charles Cooney, professor of chemical and biochemical engineering and faculty director of the Deshpande Center, moderated the discussion

Deshpande IdeaStream Symposium

On April 8, 2004, the Deshpande Center held its annual IdeaStream Symposium, aimed at connecting MIT researchers with the entrepreneurial community. Highlights of the symposium included the announcement of the center’s first licensing and funding deals (the licensing of a memory cell technology to a nanotechnology start-up and the launch of Pervasis Therapeutics, a new biotechnology company) and a new component called 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. Keynote addresses were given by Rob Chernow, senior vice president for entrepreneurship at the Kauffman Foundation, and Lita Nelsen, director of the MIT Technology Licensing Office.

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. The spring 2004 Catalyst Party also served to celebrate the pilot of i-Teams.

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 4–11, 2003. Activities included the Deshpande Center Open House, the MIT \$50K preliminary awards, lab tours, the MIT Venture Capital Conference (including the first Deshpande Center Innovation Showcase), and an Ignition Forum on bioMEMS. In November, the center partnered with the Massachusetts Technology Collaborative to cohost a session of the Massachusetts Nanotechnology Initiative's Nanotech Venture Conference.

Administrative Changes

Lauren Clark joined part time as communications assistant. The Deshpande Center moved into permanent office space in Room 1-229.

Krisztina Holly
Executive Director

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