# Deshpande Center for Technological Innovation

The Deshpande Center for Technological Innovation serves as a catalyst for innovation and entrepreneurship by supporting the research of MIT faculty and students and facilitating collaboration with entrepreneurs, venture capitalists, and innovative businesses. It carries out its mission though several activities, including the Grant Program, the Catalyst Program, the Innovation Teams subject, and sponsored events. The center's goal is to be able to accelerate the movement of technology from the laboratories at MIT into the commercial marketplace where the technology can have an impact.

The Deshpande Center was founded in 2002 through a generous gift of $20 million from Jaishree and Gururaj "Desh" Deshpande, co-founder and chairman of Sycamore Networks. The center depends on the generous support of industry, the entrepreneurial community, and the MIT alumni communities to sustain its programs.

Executive director Leon Sandler spearheads the Deshpande Center's efforts, along with professor Timothy Swager, the faculty director. On May 1, 2014, Professor Swager succeeded Charles Cooney as faculty director. Professor Swager is the John D. McArthur professor of chemistry. Guidance is provided by a steering committee that includes Vladimir Bulovic, associate dean for innovation and professor of emerging technology; Charles Cooney, professor emeritus; Neha Hemang Dave; Desh Deshpande; Mark Gorenberg of Zetta Venture Partners; Robert Langer, institute professor; and Martin Schmidt, provost.

## Highlights

In academic year 2014, the center continued to see more of its projects move toward commercialization. Since its inception, the Deshpande Center has funded more than 100 projects with more than $13 million in grants. Twenty-eight projects have spun out of the center into commercial ventures that have collectively raised more than $500 million in outside financing.

## Deshpande Grant Program Awards

The Deshpande Grant Program provides research funds that permit MIT faculty and students to create and investigate new technologies and support the transfer of new knowledge and technologies from the Institute to recently formed 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 at two stages: pre-proposal and full proposal. The center announces awards annually.

The Deshpande Center awarded 12 grants in fiscal year 2014 totaling $949,764. The awards supported a wide range of emerging technologies and included seven new and five renewal grants.

## Ignition Grants

Ignition Grants target projects that focus on novel, enabling, and potentially useful ideas in all areas of technology. Although 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.

## Innovation Grants

An Innovation Grant benefits projects that have established proof of concept and identified a research and development path and intellectual property strategy. Each grant helps a project advance its technology and reduce technical and market risk. The goal is to reach a point where investors would invest in a start-up to commercialize the technology or where an existing company might license the technology and develop it.

### *FY2014 Grant Recipients*

*Sangeeta Bhatia: Ultrasensitive Noninvasive Disease Monitoring Platform*
This project will leverage advances in nanotechnology to allow disease-specific enzymes to generate highly predictive "synthetic biomarkers" that appear in the urine of patients for easy analysis. The approach dramatically broadens the number of diseases that could be detected and monitored by urinalysis, and increases detection sensitivity and specificity.

*Jane-Jane Chen and Manijeh Goldberg: Targeting Oral Cancer*
The current treatment of oral cancer is to intravenously administer a highly toxic chemotherapy drug with systemic side effects. This project is developing a novel oral delivery of the drug that can significantly reduce side effects while allowing for a more effective cancer treatment.

*Alan Grodzinsky: Drug Delivery System for Treating Post Traumatic Osteoarthritis*
Joint trauma can injure cartilage and lead to osteoarthritis within 10 to 15 years. Treating the joint and cartilage immediately after the injury could prevent long-term damage and arthritis. This project is developing a drug delivery system for the treatment of injured joints to prevent arthritis.

*Jeff Grossman: Nanoporous Thin Films for Water Desalination and Purification*
The project focuses on the development of graphene nanoporous thin-films, which promise significant value for the fields of water desalination and filtration. The aim of this project is to develop fabrication techniques for ultra-permeable thin film membranes and to identify and optimize specifications for commercial applications with a global impact.

*John Hart: High Resolution Digital Printing of Particulate Matter*
There is a growing need for innovative printing technologies that can adapt to emerging electronic and biological materials, with compatibility to large-area and flexible substrates. This project will develop a new technology for high-speed digital printing with a higher resolution and expanded materials capability compared to industrial inkjet printing.

*Jeremiah Johnson: Stable Carbenes As General Surface Anchors*
This project is developing a new methodology for attaching materials to surfaces using carbene molecules. The technology has applicability in the manufacture of semiconductors, development of medical devices, and many other industries.

*Wojciech Matusik: A Platform for Multi-Material Fabrication*
Current multi-material additive manufacturing systems have many software and hardware limitations. This project proposes to develop a complete end-to-end platform for multi-material additive manufacturing, with many components that can be used for a variety of applications in both academic and industrial markets.

*Bradley Pentelute: Fast Flow Peptides*
Peptides are an important and growing area of therapeutics. The development of peptide-based pharmaceuticals requires the synthesis of custom peptide sequences made on demand. With current batch systems synthesis can take weeks. This project is developing a flow system that greatly accelerates the rate of production and reduces overall synthesis time to minutes.

*Ramesh Raskar: eyeMITRA: Feature Revealing Computational Retinal Imaging and Predictive Analysis*
Early detection of diabetic retinopathy allows treatment that can prevent blindness. The high cost of retinal imaging devices and the expertise required to use them makes early detection unavailable to millions around the word. The eyeMITRA technology being developed by this project will bring retinal exams into the realm of routine care at a fraction of the current cost.

*Chris Schuh: Shape Memory Actuators*
Shape memory materials are solid-state actuators that can produce both large forces and displacements, making them ideal materials for actuation applications in (e.g. robotics, electronics, and haptics). The project will develop shape memory actuators to meet the growing need for advanced actuators.

*Tim Swager: Selectivity for Key Markers and the Development of Scalable Manufacture*
Gases emitted by plants indicate the ripeness of produce. This project will develop an inexpensive, low-power gas sensor that would optimize the harvest, storage, transportation, and distribution of food by allowing for less food spoilage and more efficient distribution.

*Michael Watts: Scalable Photonic Links for Ethernet Systems*
Network limitations can have an adverse affect on the performance of large-scale computing systems such as data centers. This project will integrate laser sources with silicon photonics to create versatile and scalable photonic links for Ethernet systems that will enable unprecedented performance and scalability.

## Catalyst Program

Volunteers from the business community, known as “catalysts,” are integral to the Deshpande Center’s mission of helping MIT innovators achieve market impact.

Catalysts are a highly vetted group of individuals with experience relevant to innovation, technology commercialization, and entrepreneurship. They provide individual contributions to the center and do not represent any company interests in their role as catalysts. Catalysts are chosen based on the following qualifications:

- Experience in commercializing early-stage technologies and/or mentoring researchers and entrepreneurs as well as industry expertise
- Willingness to proactively provide assistance to MIT research teams
- Willingness to abide by time commitment, confidentiality, and conflict of interest guidelines
- Commitment to the interests of MIT researchers and the Deshpande Center

All catalysts must sign a catalyst guidelines document and agree to abide by the Deshpande Center's volunteer guidelines for managing privileged information and conflict of interest.

## 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 and students with members of the emerging technology industry.

### IdeaStream Symposium

On April 11, 2014, the Deshpande Center held its annual IdeaStream Symposium, connecting MIT researchers with the entrepreneurial community. The symposium included presentations and posters highlighting grantees whose work is at different stages, from new grant recipient to spin-off. Roughly 200 entrepreneurs, industry executives, venture capitalists, and MIT researchers attended the conference, which had the generous support of ten corporate sponsors.

### Catalyst Events

Near the start of each semester the Deshpande Center arranges a small reception to celebrate the latest grant recipients. This event is held in advance of announcing the grant awards to the general public. It is an opportunity for the grant recipient teams and catalysts to meet and mingle with each other and with staff and other volunteers. All new grant recipients are also asked to give a brief "elevator pitch" of their project.

### Open House

The Deshpande Center hosted its annual fall open house in December 2013, offering grant project teams the opportunity to present a poster and share their research findings thus far. The event gathered nearly 200 members of the Deshpande Center community for an evening of camaraderie and networking.

## Other Collaborations

The Deshpande Center met with delegates from many national and international universities and organizations to discuss the center's and MIT's approach to innovation

and technology commercialization. Deshpande Center staff also spoke at numerous forums, conferences, and events; the center is recognized as an internationally renowned model for stimulating technological innovation.

Within the MIT community, the Deshpande Center actively collaborates with other members of MIT's innovation ecosystem, including the Technology Licensing Office, the Martin Trust Center for MIT Entrepreneurship, the Venture Mentoring Service, the Industrial Liaison Program, and numerous student organizations.

**Leon Sandler**
**Executive Director**