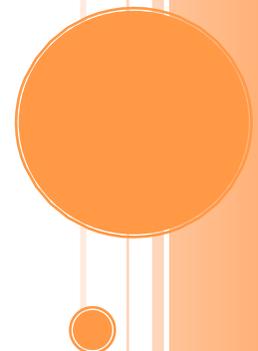


# MIT DESHPANDE CENTER: GRANTEE (PI) INTERVIEWS

*Summary and Analysis*

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# MIT Deshpande Center: Grantee (PI) Interviews

## *Summary and Analysis*

### BACKGROUND

The MIT Deshpande Center has funded faculty research since 2002, with a focus on supporting top researchers to develop and commercialize innovative technologies. To date, more than 80 MIT faculty members have received funding from the Deshpande Center.

In support of the Deshpande Center's desire to understand the range and depth of positive impacts it has had through this funding, this report provides a summary of eight in-depth interviews conducted in May and June of 2014. Interviewees were all current or past faculty recipients of one or several Deshpande Center grants.<sup>1</sup>

The purpose of the interviews was to understand the range of impacts Deshpande Center funding has had on research and career trajectories, with a focus on what might be called the 'softer side' of impact, including changes in attitudes or approach.

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<sup>1</sup> See Appendix I for departmental affiliation and interview date. See Appendix II for the interview guide. Interviews were conducted by phone, notes taken by hand. Any omissions or errors are the responsibility of the author.

## OVERVIEW

Several important themes emerged from the interviews and will be explored further in this report.

These include:

- the unique nature of Deshpande Center funding;
- the importance of the Deshpande Center process as an educational opportunity for faculty;
- refinement, and to some extent reframing, of faculty views on impact of research;
- deepened understanding of the challenges and opportunities embedded in the commercialization process;
- broadened networking and collaboration;
- new approaches to communicating research and technical expertise; and
- impacts on teaching, advising, mentoring, and student career paths.

The general view of the Deshpande Center in the interviews was overwhelmingly positive. There is a great deal of support for the model and process, as well as for the center's leadership, network, and activities.

In terms of interviewee's experiences with technology commercialization prior to their first Deshpande Center grant, some had licensed technologies or served as technical advisors to startups, but all indicated that their experience post Deshpande Center grant was significantly improved and different in nature.

The Deshpande Center grant funding process and related activities are viewed as a highly impactful, well-aligned with the MIT mission, and highly supportive of faculty and students with an interest in commercialization and entrepreneurship.

“Really point out that it is **very impactful** to the overall mission of MIT and enables us to better do what some of us really want to do.”

## DIFFERENT FROM THE START

One of the key characteristics of Deshpande Center funding is the small size of grants and limited duration, coupled with a range of activities related to commercialization.

Faculty interviewed pointed out that most government-funded research grants do not provide for time and resources to explore commercialization. In contrast, the Deshpande Center sanctions thinking about commercialization, including at an early stage, and it provides resources to support this activity, including funding students.

*“The funding allows you to think broadly about the model – what you would want to do. The sums of money are not so huge, but what they do is enable your coworkers to think about commercialization. It opens up a new window.”*

*“It makes you think about things you don’t normally do. It gives you a totally different perspective of how you take a basic discovery and formulate how you might make a practical project. It is very different than a 25 year NIH grant.”*

In this way, Deshpande Center funding “gives legitimacy to the idea of trying to commercialize” and provides resources to support of faculty and students to engage in this activity.

One result of the distinctive focus and approach is that faculty credit the Deshpande Center grants for research and discoveries that would not have happened through other funding mechanisms:

*“The Deshpande Center funding has allowed me to do something so different than everyone else – I wouldn’t have done it otherwise....It funded ideas that were too radical to be funded elsewhere and it therefore gave me a start on major initiatives that might not otherwise have gotten off the ground.”*

This is particularly true for research that is of an applied nature:

*“The Deshpande Center is having a tremendous impact. The research would not have happened without the funding – NIH was not available because it is of a very applied nature. I would never have worked on the drug delivery aspect until Deshpande Center funding.”*

## EDUCATIONAL OPPORTUNITY

Over half the faculty interviewed emphasized the importance of the Deshpande Center process as an educational opportunity for faculty. All of the activities of the Deshpande Center were called out as important to this process.

From the application stage, Deshpande Center engagement presents faculty with opportunities to think about possible commercial applications, as well as a structured process to follow.

*“The educational component is important. On a grant you list a team that includes your co-workers. They also get a dose of reality: what it takes to get out there. The process is good – it puts you through a stage gate where you decide things as you go along. It helped me to learn how to position things. It provides chances to fail without any consequences.”*

*“Even going through the application process – a very unique experience. You get a lot of practical questions: Is this something that should stay in the lab as basic research or go into commercialization?”*

After receiving the grant there are many opportunities to learn through safe conversations with the venture capital and entrepreneurial community, and advice from the Deshpande Center director.

*“It gave me time and space to educate myself, and experiencing it – especially talking to high level executives and venture capitalists who were friends of MIT – friendly conversations when in a collegial way they could tell you what you are doing is wrong without making you feel stupid.”*

*“When the time came to get started commercially, the Deshpande Center was a willing advisor – something I didn’t learn in school, and a few hours in Leon’s office was quite helpful.”*

Interviewees also described the importance of presenting their ideas to venture capital and industry communities in poster sessions and at IdeaStream, participation i-Teams. They also recognized the value of the process of reviewing grants and networking opportunities.

**“The Deshpande Center is an educational tool for the faculty. It prepares them to take on creating a company. How better to explore the external world than to try and launch a new technology or product?”**

Through these activities, the Deshpande Center helps to develop and realize aspirations that faculty may have, but may not know how to move forward:

*“The main benefit is it gets the idea of starting a company out of your imagination and into some sort of concrete action. You do something that could be a baby step in starting a company, instead of just saying ‘we are thinking about it.’ It raises the possibility that a business could spring out of this.”*

The Deshpande Center process was also described in interviews as “lowering the barrier”, “bridging the gap”, and “enabling.”

## RESEARCH IMPACT

In many of the interviews, faculty credited their Deshpande Center experience for enhancing their view of impact. Faculty talked about the ability “to see things more broadly.” It didn’t change their fundamental science, and in most cases didn’t change the research area that faculty worked in, but it did broaden and clarify the way they understood the impact of their work in the world.

*“My outlook changed to looking at research in terms of how it might lead to impact. If I solve this problem, who will it help? Will it lead to help solving energy? I have a broader viewpoint on how I assess the value of my work. Before it was fundamentally an intellectual problem or puzzle. I still have that, but now I ask will it be of value to someone else? To society?”*

More tangibly, the Deshpande Center process, including the involvement of students and others, is needed to realize the impact of the type of basic research that is done at MIT.

*“The Deshpande Center is incredibly critical. Technology out of the lab is never at a place that it can draw attention from industry, and it shouldn’t, but industry needs it. The Deshpande Center allows us to bridge this gap. It lowers the barrier. It really fuels MIT. An alumni group of students will start companies and they will remember”*

Also, by making the idea of impact broader and more concrete, it also made faculty “even more excited to be at MIT.”

## MARKET PULL

In terms of innovation, one of the key contributions is thinking about issues including customer perceptions, costs, and manufacturing at an early stage in the research. This shift in thinking is described as “basic science, but with a very practical idea in mind we didn’t have prior to the Deshpande Center.”

Deshpande Center work changed perspectives on innovation by “making me, even when I was doing academic research, think about who is the customer of the technology.”

All of the faculty interviewed commented on how their involvement with the Deshpande Center influenced their perspectives on commercialization. Central to this is an understanding of the challenges involved: “It is not a great product or need, but teams, money, and a single point where demand becomes so great it overcomes all obstacles.”

Deshpande Center involvement prompts faculty to ask questions such as “how scalable is it? What is the market?” Interviewees emphasized that thinking in this way it did not fundamentally affect their research discoveries or desire to do basic science, but it did prompt them to think much earlier about potential barriers to commercialization.

Companies who court MIT researchers are often excited about possibilities and innovations in a general way, but when it comes to actually funding research, challenges such as impact on the company ecosystem, specifications, performance requirements, etc. are raised and get in the way of funding.

Interviewees explained that when research is conducted relatively independently of the commercial context, it is possible to miss hidden but important issues that must be overcome for a technology to be adopted.

*“As a researcher you are used to accepting certain laws as fundamental, for example the laws of physics. But market and cost are not considered fundamental. Commercialization – market forces and cost – have to be considered every bit as fundamental. It is a big, big step coming out of MIT and we aren’t prepared for that. Why maintain the distinction between fundamental laws and cost and manufacturability? Accepting those as just as fundamental is a key of getting technology out of the lab and into people’s hands.”*

Commercialization is “much more complex than having a good idea or a good product....how society would accept my product – this is not something I thought about before but I do now.”

The Deshpande Center activities provide a “window to the rest of the world, especially the business world” that “helps us get out of our science/engineering bunkers.”

## BROADER CONNECTIONS

An important and frequently discussed value-added activity of the Deshpande Center is networking.

*“Networking is a product of the public forums that the Deshpande Center promotes through meetings, poster sessions, and IdeaStream. I meet a completely different group of people than at a scientific conference with the same poster – a wide network of people looking for new ideas.”*

Many faculty cited “better ties to the entrepreneurial community” and connecting to venture capitalists and other professionals, a world “for those of us who have spent our lives in basic research, is very different.”

Concretely, these external networks are useful for finding the resources necessary to start a company, “MIT is an extremely powerful brand to raise venture capital. Unless you are in a really hot area, normally VCs won’t talk to you.”

Networks also were important in providing an opportunity to get input into the research process, including “reaching out to companies at an early stage about how to shape the technology.”

Broadened contacts and collaboration within MIT was also discussed. The Deshpande Center grantees are also a network, and engaging through the Deshpande Center “introduced me to a lot of other colleagues in the beginning, and now I’m able to mentor them. It improved my interactions with like-minded faculty interested in entrepreneurship.”

For several faculty, an important focus of their extended internal network is the MIT Sloan school. For example one outcome of involvement with the Deshpande Center was engagement in organizing the minor in entrepreneurship on campus. Another interviewee described “a second layer of collaboration, the outcome of which is a business plan.” Several mentioned that key team members for their start-ups came from Sloan. Another described how working with Sloan has influenced his idea of innovation.

## ENHANCED COMMUNICATION

A very tactical aspect of the learning faculty described is related to communication. “Awareness of the market, learning the jargon, appreciation about how business world people think about things.”

While faculty generally will frame their research in terms of impact, by doing this within the Deshpande Center context it becomes more focused:

*“It taught me to be more focused in my comments – I learned to be more specific and self-critical. I realized making global statements is fairly unhelpful when it comes to innovation: talk about the short run, and also economic and social significance.”*

Or, as another interviewee put it, “scientific audiences are interested in scientific details. For venture folks, you are going to have to frame the discussion differently. I have learned a new way to describe research to this audience, looking for more than basic research results.” You “learn to promote your work depending on the audience.”

This ability extends beyond funding conversations and impacts public speaking, including a TED talk, and also into teaching.

## IMPACT ON STUDENTS

Close to 25% of the comments made in the interviews related to the impact the Deshpande Center grants have on teaching, mentoring, and career paths of students.

Graduate students are very important to the overall structure of the Deshpande Center grant process. They are tasked by faculty with thinking through commercialization, they present in the sessions with industry, and frequently, they carry the torch beyond MIT as co-founders of companies that are formed.

**“It is important to recognize it is not just about the faculty.”**

In terms of undergraduate education, the influence is seen in new courses on entrepreneurship and also in providing examples and stories of “very practical issues that you can add to basic work in the classroom.” Faculty have “an extra aspect to what I can tell them: how to apply this to the outside world.” Faculty talk about science but also the economic side and “students love this!”

Building on their positive experiences through the Deshpande Center, several of the faculty interviewed are now involved in directly teaching entrepreneurship and also in mentoring students in this area.

*“Students are incredibly interested in – starved for – basic knowledge in entrepreneurship and not very many faculty can mentor them. I now can speak meaningfully to my students. I understand far better what it involves, the risks, and how to go about it. I am a far better mentor. Also, I ask my students, why are you solving this problem? I had this but it is intensified and refined.”*

Prospective graduate students “get very excited about the translation into impact...the possibility the research will see the light of day.” It has given students “a much broader perspective on opportunities.”

Understanding impact from an industry perspective is also credited for making students “more competent as scientists and engineers.” Students are “way more rounded – it triggers a whole new range of growth....growth that feeds back into growth as a scientist.”

From a faculty perspective, having students who are able to take a technology out of MIT is attractive from an impact standpoint: “I get a chance to amplify myself – students and postdocs that carry the torch forward and impact society.” This is seen as one of the greatest potential impacts of the Deshpande Center funding, albeit a long-term one: “even 20 entrepreneurs a year, that’s huge!”

Unlike faculty who are fairly advanced in their careers and unlikely, therefore, to lead the companies they help found, graduate students are “at a formative stage – you can have a much more dramatic influence on their career trajectory.”

Deshpande Center funding and activities also make these faculty-student interactions more straightforward from a relationship standpoint: “we can talk about entrepreneurship or spin-out without getting into an uncomfortable situation. It makes it an academic conversation, a nice soft runway.”

Not all students take an entrepreneurial career path even when exposed to it through the Deshpande Center. While one faculty reported his students were “serial entrepreneurs, every single one” others had students deeply engaged in the Deshpande Center work who went off to positions in academia and industry.

## RECOMMENDATIONS

The group interviewed was strongly in favor of the current model, and even the small size of the grants was considered to be an important component.

Recommendations were focused on strengthening what the Deshpande Center is doing already. There were also cautions that impact model is one that is significant but will continue to take more time before its full power is felt, especially given the lead time it takes for major technical innovations to realize their market potential.

There were several funding-related suggestions. Because the grants are both small and fully over-headed, it was suggested that doubling the size was potentially helpful in that it would allow for full (instead of partial) funding of a student for a year. It was also suggested that offering a third year of funding would make it easier to support doctoral students. Increasing the number of grants per year was also encouraged.

Other suggestions included a “crash course” during IAP that might help engage and educate faculty prior to starting the application process. There may be opportunities to tie the Deshpande Center more closely into the range of entrepreneurship courses now being taught on campus. The importance of having a broad pool of good mentors was stressed.

One other area where there might be opportunities is in the types of grants. Focusing on technology applications was seen as a strength, but there also might be opportunities with more of a social focus – providing grants for research that was less technical in nature and closer to being a product.

## CONCLUSION

Across the board, the faculty interviewed highly valued the experiences that Deshpande Center has provided them, and they were enthusiastic about its current and future impact on MIT.

The Deshpande Center has come up with a method to productively support faculty and students through a complex process that many people aspire to, but few are able to realize: getting basic research out of the lab and into commercialization.

In the words of one interviewee, “the Deshpande Center is doing what a lot of people expect we enjoy at MIT: money to seed fund ideas.” Its impact, however, is much broader than that.

Through its unique staged process, its educational components, its deep network, and its skilled leadership, the Deshpande Center is building value in the areas of research, teaching, and commercialization will be realized by MIT for years to come.

## APPENDIX I: FACULTY INTERVIEWED

Vladimir Bulovic  
Electrical Engineering and Computer Science (EECS)  
interviewed on May 12, 2014

Joel Dawson  
ETA devices (formerly EECS)  
interviewed on May 21, 2014

Patrick Doyle  
Department of Chemical Engineering  
interviewed on May 16, 2014

Alan Grodzinsky  
Biological Engineering, EECS, Mechanical Engineering  
interviewed on June 3, 2014

Douglas Hart  
Mechanical Engineering  
interviewed on May 16, 2014

Ramesh Raskar  
MIT Media Lab  
interviewed on May 28, 2014

Donald Sadoway  
Materials Science and Engineering  
interviewed on June 10, 2014

Tim Swager  
Chemistry  
interviewed on May 12, 2014

## APPENDIX II: INTERVIEW GUIDE

Leon Sandler has asked me to conduct interviews of eight MIT faculty who have received funding from the Deshpande Center. The purpose of these interviews is to better understand the range of impacts the Deshpande Center funding has on faculty research and career trajectories. As part of our exploration process, we are eager to get your input!

I will be summarizing these interviews in a report for him, and we will also be using the results of the interviews to develop an online survey that will go out to all faculty who have received grants in the past.

These interviews are intended to supplement more quantitative measures such as the number of grants funded or dollars spent.

Today, we will focus on what you might call the ‘softer side’ of impact, for example how the Deshpande Center might have changed your attitudes or added value to your professional relationships.

When answering the questions, if you can provide a comparison of how you felt or thought before and after your grant experience, that is great.

Do you have any questions for me? Otherwise, let’s begin.

I will be asking you a total of seven questions. At the end we will have the opportunity to talk about any topics or thoughts you have that aren’t covered in the questions directly. This interview should take about 45 minutes.

- (1) First, I’d like to get a sense of your experience with commercialization of your research prior to working with the Deshpande Center. Had you commercialized any technology prior to your first grant? Had you participated in any spin-out companies or other commercialization-related projects?
- (2) When you think about the impact that the Deshpande Center has had on you and your research since the time you got your grant, what comes to mind?  
*[redirect if focus is on funding: Aside from the dollars and cents, can you think of other types of impact?]*
- (3) If you were mentoring a faculty member who had just received Deshpande Center funding, what might you tell him or her to do in order to gain the most benefit?

- a. Do you feel that these are some of the areas where you also most benefited?
- (4) I'm going to go through a list of 8 specific areas where there might have been impact on you and your work, and I'd like for you to react to these: let me know if they resonate for you and also how they resonate. Examples are great, if you can think of them :
- a. how you think about or act on innovation
  - b. how you think about or understand commercialization
  - c. how you frame or talk about your research  
[prompt: is it easier to talk about your research with a non-technical audience?  
If so, in what way]
  - d. the way you collaborate within MIT – your network here and connections here
  - e. your network and connections beyond MIT – who you talk with, resources you might have, or how you think about external collaboration
  - f. any new skills you've gained
  - g. how you might work with or advise students or colleagues
  - h. how or what you teach
  - i. any other areas I've missed?
- (5) If you were to have a conversation with the Dean or Provost about the Deshpande Center, and he asked you about the benefits, how would you summarize them?
- (6) Looking forward, do you see things you will continue to do differently (or perhaps things you already did that you will do more of) based on your Deshpande Center experience?
- (7) What changes did you see in your students or postdocs after the Deshpande Center involvement? (How was this valuable as part of their educational experience)

- (8) What does the Deshpande Center not do that you feel would be valuable to you or your students? (what could it or should it do?)
- (9) Is there anything I haven't asked you that I should have? Is there anything else you'd like for me to be sure and capture?