



MASSACHUSETTS INSTITUTE OF TECHNOLOGY

10.807/15.371 Innovation Teams
Spring 2009

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| Faculty Director | Professor Fiona Murray (fmurray@mit.edu) |
| Lecturer | Dr. Luis Perez-Breva (lpbreva@mit.edu) |
| Teaching Assistants | Daniel Pressl (dgp@mit.edu) & Susan Zawaski (zawaski@mit.edu) |
| Time: | Monday & Wednesday 5:30PM – 7:30PM |
| Room: | STATACENTER 32-144 |

Overview

i-Teams brings together creative, highly qualified and motivated graduate students to work collaboratively with course faculty, researchers in MIT labs and advisors from the local business and venture community. i-Teams projects focus on assessing the commercial feasibility of scientific and engineering breakthroughs (in both economic and social terms). Most of the projects are based on ideas that have received Deshpande Center grants although we also draw on other parts of MIT (and in some cases Harvard) for projects. Together we determine technological directions and identify product markets. This process ensures that we deliver on the promise of bringing university-born discoveries into the marketplace.

i-Teams (short for "Innovation Teams") is a unique MIT course that guides student teams as they develop a "go-to-market" strategy for a scientific or engineering breakthrough developed in one of MIT's labs. By collaborating with faculty and students in the research lab, mentors from the business community and fellow students you will assess the economic and social prospects of the innovation and develop your insights into a thorough go-to-market plan.

Class Goal

The goal of the class is to explore, identify and analyze the path "from idea to impact" for an emerging technology from one of MIT's leading laboratories. At the end of the semester, your team will have identified the market(s) and application(s) with the most promise. For most technologies this will mean commercial applications. In some instances, however, social impact and not-for-profit applications will be more appropriate. It's also entirely acceptable for your team to come to a well-researched conclusion that there is **no** apparent use for the technology.

Identifying the best commercialization path for a breakthrough technology is an iterative process. Throughout the semester we expect you to present commercialization hypotheses, test them, then go back and revise them based on customer input or other validation steps. We will guide you through this process with lectures, assignments, milestones and coaching.

Your final report will evaluate the technology's status and then analyze 1-2 of the most attractive applications. Specifically exploring the key customers, the value created for them, the intellectual property and business model issues that will determine profitability, and likely drivers of success (failure) e.g. competition, regulation etc. This analysis will be used to drive recommendations for next steps including the allocation of additional funds.

Class Approach - Action-based learning guided by strategy & practice skills

This class is designed to be an action-learning experience that teaches strategic and practical skills for commercializing early-stage ideas and immediately puts these skills into action on your i-Team project. There is no formula for developing a go-to-market strategy for novel MIT discoveries. There is a necessary element of uncertainty that we hope you will embrace. i-Teams is therefore less structured than many classes because the process of developing a coherent commercialization strategy and go-to-market plan is complex and iterative. Class sessions are designed to provide you with the strategies (theories, frameworks etc.) and the practical skills that will make you more effective at early-stage commercialization. This includes the practical skills and knowledge to operate effectively in the complex and at times contentious ecosystem at the academic-commercial boundary.

Text/Readings

There is no text book for the class. A series of relevant articles have been assembled into a course reading packet available for purchase from CopyTech in the basement of E52. Ask for the packet for 15.371J. Additional materials will be posted to Stellar.

Class Schedule

The class will meet on Mondays and Wednesdays for two hours sessions. Class time will combine lectures and open discussion time. Open discussions will be used to gather class feedback that is intended to advance team projects. Some class sessions (particularly later in the semester) will be devoted to team-based project work. This will allow class faculty and TAs to give you detailed coaching. Even though there will be some time to work in projects in some classes, you should be ready to commit an average of 4 extra hours per week to work with your team on your project.

Scheduling Note: During the week of 3/16 Sloan School students have an “Independent Period” with alternative classes and trips. We will NOT be holding classes that week.

Grading

Grading has three equally weighted components:

- *Team written reports*
- *Team presentations (mid-term & final)*
- *Attendance, class participation, and performance reviews*

A Note on Reviews: The instructors and TAs will assess each individual’s contribution to the overall project. Also, each team member will confidentially grade his/her peer team members twice during the semester. **Attendance at every class is mandatory.** Unexcused absences will have a significant effect on your grades.

THANKS TO THE DESHPANDE CENTER & THE ENTREPRENEURSHIP CENTER FOR THEIR SUPPORT!

CLASS OUTLINE

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| 1 | Wed Feb 4 | WHAT IS i-TEAMS? Murray & Perez-Breva Professor Robert Langer (MIT)* | <ul style="list-style-type: none"> •What does it mean to do something “valuable” in academia and in industry & how are the two different? •How would you define the complex “ecosystem” of commercialization? •What lessons does the Langer Case teach us about successful commercialization? | Langer Lab Case Study* Lehrer & Asakawa, Pushing Scientists Into the Marketplace* |
| 2 | Mon Feb 9 | THE TECHNOLOGIES - PI PRESENTATIONS Murray & Perez-Breva PIs, Leon Sandler & Catalysts* | <ul style="list-style-type: none"> • Learning about all the PI projects • Meeting the PIs and talk technology, applications and opportunities! • Meeting other students | Project Descriptions Deshpande Center Website |
| 3 | Wed Feb 11 | HOW DO ENTREPRENEURS & INVESTORS EVALUATE YOUR TECHNOLOGY? Murray Dr. Carmichael Roberts (North Bridge)* | <ul style="list-style-type: none"> • Stages from invention to innovation – the commercialization process. • Defining opportunities in the commercial world. How can & should they be evaluated? What three metrics would you use? Why? • How would you evaluate 3DP? • Differences in academia v. industry? Respecting both types of evaluation! | How Do Venture Capitalists Evaluate Opportunities* 3DP paper & patent Shane (2001) Organization Science |
| 4 | Tues Feb 17 <i>Note day change</i> | TEAM KICK-OFF & UNDERSTANDING YOUR TECHNOLOGY Murray & Perez-Breva | <ul style="list-style-type: none"> • Team kick-off - ground rules for working as a team & navigating in the “complex innovation ecosystem” • Step 1 - Describing a technology as features, performance metrics etc. - not as successful experiments. • How would you describe <i>your i-Teams technology to potential users?</i> | Henry Tam Case Study* |
| 5 | Wed Feb 18 | UNDERSTANDING NEEDS (meets with E-Lab) Murray Ken Morse (Entrepreneurship Center)* | <ul style="list-style-type: none"> • Describing <u>your</u> technology to a potential customer. • Engaging effectively with customers and experts. • Going into the market with someone else’s idea – What are the academic “sensitivities”? What can we learn from SpudSpy about the pitfalls? | Shane Chapter 4 Ulrich & Eppinger Chapter 4 (Customer Needs) Spudspy Case Study* |
| 6 | Mon Feb 23 | BUILDING YOUR NETWORK Perez-Breva Steve Brown (MIT & i4Gc)* | <ul style="list-style-type: none"> • Building brainstorming skills to identify needs & customers • Designing & developing a network of ideal “contacts” | Kelley (2002) The Art of Innovation Chapters 3 & 4 |
| 7 | Wed Feb 25 | MATCHING TECHNOLOGIES TO REAL NEEDS & TEAM TIME Murray Mr. Ralf Kuriyel (Pall Corporation)* | <ul style="list-style-type: none"> • What do we really need to learn from potential customers? • What are the technical dimensions often forgotten but critical to realize successful commercial opportunities? • Understanding key tests for your new technology in the market place. | Ulrich & Eppinger Chapter 5 (Product Specs) |
| 8 | Mon Mar 2 | BUILDING INTERVIEW SKILLS Perez-Breva Dr. David Sosson (MIT VMS)* | <ul style="list-style-type: none"> • Building customer interview skills via role play exercises and feedback • How should we talk to customers to elicit the information we want? | How to interview your customers (Pragmatic Marketing) & http://www.izix.com/pro/interviewing/ |
| 9 | Wed Mar 4 | FACTORS THAT SHAPE OPPORTUNITIES Murray & Perez-Breva | <ul style="list-style-type: none"> • What factors can make an opportunity <u>less</u> attractive? Consider competing technologies, changing regulations & market dynamics. • What are the key factors that reduced the attractiveness of Heartport’s technology to potential customers (surgeons)? | Heartport Case Study* Kelley Chapter 9 Shane Chapter 5 |
| 10 | Mon Mar 9 | MID-TERM REHEARSAL Perez-Breva | <ul style="list-style-type: none"> • Perfect your mid-term presentation! | |
| 11 | Wed Mar 11 | MID-TERM PRESENTATION & DINNER Murray & Perez-Breva PIs, Catalysts & Distinguished Guests | <ul style="list-style-type: none"> • Present your understanding of the technology & the opportunities it affords for different customers. • What are your key assumptions and key hypotheses? • What are the key uncertainties? | |

| Sloan Independent Period | | | | |
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| Spring Break | | | | |
| 12 | Mon Mar 30 | CONCEPT SELECTION, MILESTONE-DRIVEN PLANNING – TESTING ASSUMPTIONS Murray & Perez-Breva | <ul style="list-style-type: none"> Focusing your go-to-market planning – identifying key assumptions & key risks. Developing strategies and actions to reduce uncertainty and <u>test</u> assumptions. Team Therapy! Refocus & Regroup – addressing key team challenges | Ulrich & Eppinger Chapter 8 Crutchfield Case Study* Too Hot to Handle* |
| 13 | Wed April 1 | COMMERCIAL STRATEGY - LEGAL DYNAMICS Murray Phil Chase (Alnylam)* | <ul style="list-style-type: none"> How can we leverage & defend our technical features? How valuable is intellectual property? How many patents do we really need? Strengthening your negotiating position with key partners. The role of prototypes, tacit knowledge, Non-Compete Agreements. The value of NOT patenting! | Learn about patenting - see reading list for web-based resources |
| 14 | Mon April 6 | TEAM TIME Perez-Breva | | |
| 15 | Wed April 8 | MAKING MONEY – ANALYZING “VALUE CHAINS” Murray Dr. Vedat Eyuboglu (Airvana)* | <ul style="list-style-type: none"> Defining the value chain for specific markets and applications. Choosing what elements of the value chain to build and what to partner. Staging - choosing your initial application and staging your entry into each market. | Gans & Stern |
| 16 | Mon April 13 | TEAM TIME Perez-Breva | | |
| 17 | Wed April 15 | FINDING YOUR PLACE IN THE VALUE CHAIN - FIRST STEPS TO THE MARKET Murray & Perez-Breva Mike Grandinetti (Virtual Iron Software)* | <ul style="list-style-type: none"> Approaching your first serious customer – timing. Key contractual issues with initial partners/customers– retained rights etc. Key technical considerations – readiness of prototypes etc. Sales strategies for the first approach. | |
| 18 | Wed April 22 | TECHNOLOGY TRANSFER PROCESS & COMMERCIALIZATION CHOICES Murray Steve Brown (MIT & i4Gc)* | <ul style="list-style-type: none"> Securing a license to your technology – key contractual elements & key mistakes? Selecting between possible commercialization routes – licensing to a large corporation versus establishing a start-up. | Tech Transfer Primer http://www.ncia.org/r_primer.html |
| 19 | Mon April 27 | TEAM TIME Perez-Breva | | |
| 20 | Wed April 29 | TEAM TIME Perez-Breva | | |
| 21 | Mon May 4 | FINAL REHERSAL Murray & Perez-Breva | <ul style="list-style-type: none"> Perfect your final presentation! | |
| 22 | Wed May 6 | FINAL PRESENTATION & DINNER Murray & Perez-Breva Catalysts, Pls & Distinguished Guests | <ul style="list-style-type: none"> Present your understanding of the technology & the key opportunities it offers. Lay out the approach (staging) for each market, initial customers to approach. Suggest critical technical next steps to push technology to market. List your key assumptions. How are they supported? What uncertainties remain? | |
| 23 | Mon May 11 | WHAT DID i-TEAMS DO TO YOU & WHAT WOULD YOU DO TO i-TEAMS? Murray & Perez-Breva Sandler & Morse | <ul style="list-style-type: none"> Suggest critical technical next steps to push technology to market. What are your key assumptions? How are they supported? What are the key uncertainties? | |
| 24 | Wed May 13 | PROJECT DE-BRIEFS Murray & Perez-Breva | | |

READING LIST

(* denotes material included in the Course Pack & # denotes material available on Stellar)

- *Bowen, K. et al. 2004. The Langer Lab: Commercializing Science. *Harvard Business School Case Study* 9-605-017
- *Lehrer, M. & Asakawa. 2004. Pushing Scientists into the Marketplace. *California Management Review* 2004:55-76
- *Roberts, M. & L. Barley. 2004. How Do Venture Capitalists Evaluate Potential Venture Opportunities? *Harvard Business School Case Study* 9-805-019
- Sachs, E, et al. 1993. Three Dimensional Printing Techniques. Patent # 5204055 available at <http://patft.uspto.gov/netahtml/PTO/search-bool.html> [HINT - search by patent number]
- #Sachs, E, et al. 1992. 3DP 3-Dimensional Printing - Rapid Tooling And Prototypes Directly From a CAD Model. *Journal Of Engineering for Industry Transactions of the ASME*. 114: 481-488
- #Shane, S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, April 2000:448-469
- *Polzer, J., I. Vargas & H. Efenbein. 2004. Henry Tam and the MGI Team. *Harvard Business School Case Study* 9-404-068
- #Shane, S. 2005. Finding Fertile Ground, Wharton School Publishing, Chapter 4
- #Ulrich, K. & S. Eppinger. 2007. Product Design. Chapter 4 Identifying Customer Needs, pp. 53-70.
- *Fleming, L. & D. Snow. 2005. SpudSpy. *Harvard Business School Case Study* 9-605-059
- #Kelley, T. 2002. The Art of Innovation. *Chapter 3 "Innovation Begins with an Eye" and Chapter 4 "The Perfect Brainstorm"*.
- #Ulrich, K. & S. Eppinger. 2007. Product Design. Chapter 5 Product Specifications, pp. 71-93.
- Zhivago, Kristin. How to interview your customers. Pragmatic Marketing available at <http://www.pragmaticmarketing.com/publications/magazine/1/2/04kz>
- Isaacs, Ellen. Interviewing Customers. Discovering what they can't tell you! Available at <http://www.izix.com/pro/interviewing/> [click thru to "slides for the course"]
- *Pisano, G. & S. Dobrow. 2000. Heartport. *Harvard Business School Case Study* 9-600-020
- #Kelley, T. 2002. The Art of Innovation. *Chapter 9 "Barriers Jumping"*.
- #Shane, S. 2005. Finding Fertile Ground, Wharton School Publishing Chapter 5
- #Ulrich, K. & S. Eppinger. 2007. Product Design. Chapter 7 Concept Selection, pp. 123-140.
- *Schatzel, E. & T. Amabile. 2004. The Lumen & Absorb Teams at Crutchfield Chemicals. *Harvard Business School Case Study* 9-804-118
- *Edmondson, A. & D. McLain Smith. 2006. Too Hot to Handle? How to Management Relationship Conflict. *California Management Review*
- Tutorial on patenting available at <http://www.libraryweb.org/tutorials/patents.html> and also at <http://www.ieee.org/web/publications/rights/tutorials.html> (see bottom of the page)
- Tech Transfer Primer available at http://www.ncia.org/r_primer.html

APPENDIX

Notice on intellectual property for i-Teams students

The goal of the class is education. As a consequence of your educational endeavors, commercial activities might arise from your work. You will be working with groups that may be filing patents or otherwise involved with confidential information, intellectual property, and product development. The MIT Technology Licensing Office oversees any questions on these matters, and wants to stimulate the transfer of MIT technologies for the benefit of society.

Here are guidelines to consider when you participate in i-Teams.

Confidentiality: You may come in contact with confidential information. The faculty PI (or others on the team) may tell you which information is confidential. Treating such information with care is vital to securing the intellectual property rights to the technology. Be aware of how you propagate confidential information when talking to potential customers or market experts.

No public disclosure: Discussions in an MIT classroom or other MIT setting (with teammates and faculty) do not constitute a “public disclosure.” However, presentations where the public is invited or present **must not include confidential information**.

Assignment of inventions: While you are working with the team, intellectual property (copyrights, inventions, trade marks, etc) may be developed. Ownership of intellectual property is governed by MIT policy. If the research leading to an invention was supported by sponsored research funding or made significant use of MIT facilities and/or MIT-administered funds, then MIT owns the intellectual property.

No implied eligibility for compensation or equity participation: Serving on an i-Team does not entitle you to get paid by or own stock in any company that might be created as a result of your work. There is nothing to prevent you from later seeking employment with the company; at that point you may be compensated by the company for future work (but not your i-Teams work). If MIT licenses a patent or copyright on which you are an inventor/author, you are entitled to receive a portion of the royalty and/or equity MIT receives from the licensee in accordance with MIT’s royalty distribution policy.

Copyright of work-product produced during i-Teams class: You and your team have the right to own the copyright of various reports that you might author as part of your i-Teams work. This material will be shared with the PI and LL. You also grant to MIT the right to distribute this copyrighted material within the academic community. You acknowledge that there may be good reason to not distribute this material. If your report discusses MIT-owned, non-publicly disclosed intellectual property, you agree to seek MIT’s permission before distributing the report or otherwise disclosing the information.