

NEW COURSE—CONTENTS SUBJECT TO CHANGE

SLOAN SCHOOL OF MANAGEMENT
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Andrew W. Lo 15.S05 and 15.S13 Special Seminars in Management
John Parsons

Fall 2026

CATAPULT Translating Theory into Practice

How do breakthrough discoveries in the lab become real-world technologies, systems, products, policies, and practices that improve human life and address urgent societal challenges? CATAPULT is designed to equip the next generation of scientists, engineers, and innovators with the knowledge and skills to answer that question—and to act on it.

Unlike many entrepreneurship courses that implicitly assume students have already decided to launch a startup, CATAPULT is designed to support MIT STEM PhD students interested in translating their research into practice, but are still deciding which career path to follow, academia, industry, government service, or some hybrid. The course helps students understand the diverse pathways through which ideas can be turned into real-world impact, including academic research, university–industry collaboration, licensing, startups, public-sector partnerships, investment, standards-setting, policy, and mission-driven deployment.

The course is organized as a hub-and-spokes model. Across both the hub and the spokes, CATAPULT emphasizes the practical skills required to succeed at the interface of science, engineering, management, and society. The first half of the semester forms the common “hub”: five shared sessions focused on management, institutional, and professional issues that arise in translational work across STEM fields. These sessions introduce core skills and frameworks for communicating technical ideas to diverse stakeholders, evaluating translation pathways, managing intellectual property in academic settings, navigating conflicts of interest, structuring collaborations, combining public and private funding, negotiating effectively, and leading interdisciplinary teams.

In the second half of the semester, students choose a domain-specific “spoke” consisting of five focused sessions in one of two concentrations (more will be added in the future): biotechnology and advanced energy technologies. Each spoke applies the shared CATAPULT framework to the unique innovation ecosystem of a particular domain and explores the scientific, regulatory, commercial, financial, deployment, and institutional factors that shape translational opportunities and challenges. Students will learn specific translational pathways in their preferred domain, including how technologies are evaluated, valued, protected, financed, tested, scaled, adopted, and governed. Topics include STEM career pathways across academia, industry, startups, investing, government, and policy; valuation and decision-making under uncertainty; company creation when appropriate; and domain-specific development and deployment pathways.

The course will conclude with one final joint session that provides a synthesis of the CATAPULT program and next steps for those interested in translation.

Students will learn to communicate complex ideas clearly, frame research in terms of real-world use, assess stakeholders and incentives, work across disciplinary and organizational boundaries, manage uncertainty, and make decisions when scientific, technical, financial, ethical, and institutional considerations interact. The course also addresses the human side of

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translation: leadership, negotiation, resilience, team formation, conflict management, and dealing constructively with both failure and success.

Prerequisites and Enrollment

CATAPULT is intended primarily for MIT STEM PhD students interested in translating scientific and technological ideas into real-world applications. No prior business or management experience is required. Students from scientific, engineering, and related backgrounds who are curious about the “how” behind research impact—and who want to understand the practical, managerial, institutional, and domain-specific pathways by which discoveries become useful products and services—will benefit most.

Enrollment in this course is not determined by the Sloan bidding process—permission of instructor is required and MIT STEM PhD students will be given priority. There are no pre-requisites. To enroll, please complete the short application form here: https://survey.qualtrics.com/jfe/form/SV_ePss5i8ceQPNOxU.

Class Schedule and Format

The class meets once per week on Tuesdays from 4:00 to 7:00pm. Classes will consist of a mix of lectures and guest speakers. Class locations will vary as follows:

- **H1 CATAPULT Hub (Sept. 15 through Oct. 20; December 8):** All spokes meet together in 34-101
- **H2 CATAPULT Biotechnology (Nov. 3 through Dec. 1):** 34-101
- **H2 CATAPULT Advanced Energy Technologies (Nov. 3 through Dec. 1):** 45-230
- **H2 CATAPULT Wrap-Up Session (Dec. 8):** 34-101

Course Websites

The primary course website is Canvas:

- **CATAPULT Biotechnology:** <https://canvas.mit.edu/courses/38629>
- **CATAPULT Advanced Energy Technologies:** <https://canvas.mit.edu/courses/38623>

All teaching materials will be posted on this site, including announcements, TA office hours, lecture notes, assignments, readings, and handouts.

Some assignments, exercises, and other class session prework will be completed or submitted on the iDecisionGames (iDG) platform: <https://idecisiongames.com>.

To create an iDG account, please visit: <https://idecisiongames.com/promo-home?code=CATAPULT-Fall2026>.

If you already have an iDG account, please follow these steps to add the class:

- Log in at <https://idecisiongames.com/promo-signup>.
- Select “Join Class” from the left sidebar menu.
- In the pop-up that appears, input the access code: CATAPULT-Fall2026.

Teaching Assistants (TAs)

- Joonhyuk Cho, joonhyuk@mit.edu
- Alex Haig Montes, alexhaig@mit.edu

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Course Admin

The course administrator is Viniqua Gooding (goodin41@mit.edu), who is responsible for all logistical aspects of the course.

Office Hours

- **Joonhyuk Cho:** Tuesdays, 2:30–3:30pm ET, in E51-242 and by appointment.
- **Alex Haig Montes:** Wednesdays, 12:00–1:00pm ET, in E51-242 and by appointment.
- **Andrew Lo:** By appointment; please contact Viniqua Gooding (goodin41@mit.edu).
- **John Parsons:** By appointment; please contact him directly.

Course Requirements and Grading

Course requirements include: (1) regular attendance (which includes coming to class **on time**, no absences will be excused other than for documented medical reasons) (25% of the final grade); (2) four individual and team-based assignments (40%); and (3) one group “translational practicum” due before the end of the semester (35%). Students may earn extra credit by completing one or more coaching sessions with the MIT Communication Lab. Extra credit will be awarded upon confirmation of participation by the Communication Lab. There is no final examination for the class.

The translational practicum will involve proposing a live translational challenge—perhaps a technology being developed by a team member or a hypothetical technology that the entire team chooses—and then applying the principles covered in class throughout the semester, culminating in a written plan for translation and a 5-minute video presentation of the plan.

Course Materials

- ***Launching from the Lab***, by Lita Nelsen and Maureen Stancik Boyce, MIT Press. (optional)
- ***Healthcare Finance***, by A. Lo and S. Chaudhuri, Princeton University Press. (optional)
- ***Science Business: The Promise, the Reality, and the Future of Biotech***, by Gary P. Pisano, Harvard Business School Press. (optional)
- Research articles and case studies will be made available on the course website and Study.net.

MIT Communication Lab Coaching

Students will have access to coaching through the [MIT Communication Lab](#) to support the development of their CATAPULT presentations. Communication Lab coaches can provide feedback and guidance to help students communicate technical ideas clearly and effectively to a broader audience.

Two coaching opportunities will be available during the semester:

- **Individual coaching:** Students may schedule an individual coaching session while preparing their three-minute Translational Project Proposal Presentation. Individual coaching will be available between October 20 and November 3.
- **Team coaching:** Translational Practicum teams may schedule a group coaching session to receive feedback as they develop their final practicum presentation. Team coaching will be available between November 3 and December 1.

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Students should come to coaching sessions prepared with a draft, outline, presentation, or other work in progress and with a specific question or goal they would like to address during the session.

Participation in Communication Lab coaching is optional. Students who complete a coaching session and whose participation is confirmed by the Communication Lab will receive extra credit.

Additional information about scheduling appointments, Communication Lab assignments, and coaching expectations will be provided during the semester.

AI Policy

Unless otherwise indicated for specific assignments, this course encourages students to explore the use of generative artificial intelligence (GAI) tools such as ChatGPT, Claude, Gemini, or DeepSeek for all assignments and assessments. Any such use must be appropriately acknowledged and cited. It is each student's responsibility to assess the validity and applicability of any GAI output that is submitted; you bear the final responsibility. Violations of this policy will be considered academic misconduct. We draw your attention to the fact that different classes at MIT Sloan may implement different AI policies, and it is the student's responsibility to conform to expectations for each course.

Sloan Values

You are responsible for upholding Sloan's code of conduct, which mandates zero tolerance for cheating and plagiarism. For more details on Sloan's academic policies, please read the document "Classroom Values in Practice" which is available on the course website.

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Class Schedule

All readings and assignments listed under a class date must be submitted or completed by that class session unless otherwise indicated.

Class	Topic
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H1: CATAPULT HUB All spokes meet together in 34-101

L1: 9/15 **STEM Career Paths and Core Skills for Success**

- Overview of career pathways across academia, industry, startups, investing, and policy—including how roles differ in incentives, impact, and success metrics
- Core translational skills including communication, problem framing, and connecting technical work to real-world applications
- Navigating career decisions and professional growth including working in interdisciplinary teams, evaluating opportunities, and building networks and mentorship
- Time management

Faculty Lead: Andrew Lo, MIT

Guests: Bill Aulet, Martin Trust Center for MIT Entrepreneurship; Dimitris Bertsimas, MIT; Yet-Ming Chiang, MIT; Michael Goldberg, Surge Tx; Rana Gupta, Deshpande Center; Rhett Smith, The Engine

Assignments 1 Released

L2: 9/22 **Writing and Delivering STEM Topics Effectively**

- Translating complex science into clear, impact-oriented narratives that resonate with both expert (grants) and non-expert (pitches, business plans) audiences
- Tailoring communication to stakeholders including government funding agencies, investors, executives, and policymakers with different goals and incentives
- Communicating data, uncertainty, and risk in a credible way that supports decision-making and enables funding and partnerships

Faculty Lead: Neal Hartman, MIT

Required Reading: Blanding (2022); Duarte (2024); Gershman (2019)

Assignment 1(a) Due

Assignment 2 Released

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Class	Topic
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H1: CATAPULT HUB (cont'd)	All spokes meet together in 34-101
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L3: 9/29	From Ideas to IP: Creating and Managing Your IP in Academic Settings and Navigating Conflicts of Interest
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- The role of patents and IP in translating academic research
- When patenting arises in the journey of academic discovery
- The process of patenting with the university Technology Licensing Office
- How patents and other forms of IP enable the commercialization, both through startups and through collaboration with large companies
- The role of graduate students in patenting and licensing
- Identifying and navigating conflicts of interest in academic settings

Faculty Leads: Fiona Murray and Scott Stern, MIT

Guests: Lauren Foster, MIT TLO; Rupinder Grewal, MIT; Deirdre Zammit, MIT TLO

Required Reading: Gans, Scott, and Stern (2024); Murray and Kolev (2015)

Assignment 1(b) and 2 Due

Assignment 3 Released: NOTE 3(a) MUST BE COMPLETED BY 10/4 11:59pm ET

10/4	Assignment 3(a) Due by 11:59pm ET
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L4: 10/6	Negotiating for Impact*
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- Integrating scientific, technical, and managerial priorities in a simulated negotiation
- Understanding core negotiation skills, including value claiming, value creation, and subjective value
- Identifying individual negotiation strengths and opportunities for growth via personal feedback report

Faculty Lead: Jared Curhan, MIT

Session TA: Lu Zhang, MIT Sloan

Assignment 3(b) Due

10/13	No Class – Monday Schedule of Classes
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* Please note that in the negotiation session, some of the classroom exercises double as research investigations. In many cases, you'll be asked to complete confidential questionnaires before or after the experience. This also fits the philosophy of the session: Almost all of the exercises you will experience have been studied in previous research projects in former classes, like yours. Students from those classes have contributed to your learning experience. By participating in new research projects, you contribute to the experiences of future students. In every case, these new exercises are designed to maximize both learning value and research potential. We've had a lot of practice satisfying both these criteria in the past, so don't worry about experiencing new exercises. They help keep the course fresh. If you would not like the outcomes of your participation in this course to be included—anonously—in our research database, please email Jonathan Smith (jonsmith@mit.edu) as soon as possible. Approved on 15-Nov-2001, MIT IRB Protocol #0403000325, Expires 09-Oct-2026.

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Class	Topic
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H1: CATAPULT HUB (cont'd) All spokes meet together in 34-101

L5: 10/20 **Dealing with People, Failure, and Success**

- Leading interdisciplinary teams across scientific, engineering, business, and policy domains
- Hiring, incentives, and culture in early-stage ventures
- Negotiation and stakeholder management across investors, partners, and regulators
- How to deal with difficult people, and what if **you** are the difficult person?
- Learning from setbacks and successes
- Scaling responsibly after failure or success including governance, capital strategy, and long-term impact

Faculty Lead: Rick Locke, MIT

Guests: Joshua Cohen, Amylyx; Justin Klee, Amylyx; Derek Sutherland, Realta Fusion

Required Reading: Carroll (2019)

Assignment 4 Released

10/27 **No Class – Sloan LEAD Week**

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Class	Topic
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H2: CATAPULT BIOTECHNOLOGY SPOKE Meets in 34-101

B-L6: 11/3 Introduction to Career Paths in the Life Sciences

- The life-science academic career ladder—from PhD student to postdoc to principal investigator, tenured professor, and scientific leader
- Building a research program
- The evolution from individual contributor to mentor, manager, and steward of a scientific community
- Alternative models for achieving impact beyond the traditional faculty path

Faculty Lead: Andrew Lo, MIT

Guests: Jacob Becraft, Strand Tx; Stephen Berenson, Flagship Pioneering; Neal Hartman, MIT Sloan; Angela Koehler, MIT; Phillip Sharp, MIT

Assignment 4(a) Due

Translational Practicum Released

B-L7: 11/10 Drug Development 101

- Translating academic research into therapeutic candidates, including target validation, preclinical studies, and regulatory milestones (IND-enabling work)
- Fundamentals of Phase 1–3 trials, randomized controlled trials, endpoints, patient selection, and adaptive/innovative trial designs
- FDA approval processes, interactions with regulators, and how clinical strategy shapes financing, partnerships, and go-to-market decisions

Faculty Lead: Andrew Lo, MIT

Guests: Freda Lewis-Hall, Pfizer (retired); Sabrina Paganoni, Mass General Hospital

Assignment 4(b) and Translational Practicum Team Formation and Project Selection Due

B-L8: 11/17 Device, Biomarker, and Diagnostic Development 101

- Key differences between therapeutics, devices, and diagnostics including development timelines, risk profiles, and evidence requirements
- Regulatory pathways for devices and diagnostics including FDA classifications, 510(k), PMA, and companion diagnostics
- Clinical validation, reimbursement, and adoption challenges for diagnostics and biomarkers in real-world settings

Faculty Lead: Andrew Lo, MIT

Guests: Martha Gray, MIT; Ashik Mohan, Getinge Acute Medical Care; Delphine Zurkiya, McKinsey

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Class	Topic
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H2: CATAPULT BIOTECHNOLOGY SPOKE (cont'd) Meets in 34-101

B-L9: 11/24 Valuing Biomedical Assets

- Translating scientific milestones into value including stage-gating and key inflection points
- Risk, expected value, and decision-making under uncertainty in drug development
- Indication prioritization as a value-defining choice including tradeoffs across probability of success, speed, cost, and market opportunity

Faculty Lead: Andrew Lo, MIT

Guests: Christiana Bardon, MPM BioImpact; Andrew Hack, Bain Capital

Translational Practicum Progress Update Due

B-L10: 12/1 How to Start a Biotech Company If You Must

- Building the founding team, securing early funding, and defining the initial strategy
- Evaluating when to spin out a company versus partnering or licensing
- Translating scientific vision into a compelling business case for investors and partners
- Who gets how much equity and why?

Faculty Lead: Neil Kumar, BridgeBio

Guests: TBA

Translational Practicum Final Deliverables Due

L11: 12/8 The Future of Translation: Course Wrap-Up and Next Steps

- The future of technology and the evolving role of universities
- How to start translating
- Resources at MIT

Faculty Leads: Andrew Lo and Rick Locke, MIT

Guests: **SURPRISE!**

Translational Practicum 360 Evaluation Due

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Class	Topic
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H2: CATAPULT ADVANCED ENERGY TECH SPOKE Meets in 45-230

E-L6: 11/3 Introduction to Career Paths in Advanced Energy Tech

- Career pathways for translating energy technologies into impact
- Why energy innovation is different
- Lessons from leaders who transformed scientific ideas into commercially viable technologies
- Building organizations that matter—from research groups and innovation centers to startups, manufacturing companies, project developers, and mission-driven institutions

Faculty Lead: John Parsons, MIT

Guests: Neal Hartman, MIT Sloan; Tim Heidel, VEIR; Johanna Wolfson, Azolla Ventures; Billy Woodford, Form Energy

Assignment 4(a) Due

Translational Practicum Released

E-L7: 11/10 Energy System Design and Regulatory Framework

- Understanding how electricity markets work, including who buys electricity and how power plants generate revenue
- Comparing different utility and power market models and how they influence investment and deployment decisions
- How power plants earn money through electricity generation, capacity markets, and other revenue sources
- Financing large-scale energy projects, including milestone-based funding, offtake agreements, construction financing, and federal loan guarantees
- Regulatory and end-of-life considerations, including spent fuel management, fuel recycling, and decommissioning

Faculty Lead: John Parsons, MIT

Guests: JD Dowell, Fluor; Heather Jackson, U.S. Department of Energy; Guinevere Shaw, REV

Assignment 4(b) and Translational Practicum Team Formation and Project Selection Due

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Class	Topic
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H2: CATAPULT ADVANCED ENERGY TECH SPOKE (cont'd) Meets in 45-230

E-L8: 11/17 The Commercialization Journey

- Mapping critical materials, components, and capabilities across advanced energy systems—e.g., superconducting materials, nuclear fuels, high-temperature materials, drilling technologies, and specialized manufacturing—and assessing current availability and bottlenecks
- Building the workforce and industrial ecosystem required to scale emerging energy technologies, including partnerships with national laboratories, universities, and private industry, and government programs in supporting commercialization
- Scaling deep-tech supply chains, qualifying vendors, and managing long lead-time procurement under uncertainty

Faculty Lead: Rachel Bielajew, REV

Guests: Carlos Araque, Quaise Energy; Michael Segal, Commonwealth Fusion Systems

E-L9: 11/24 The Role of Techno-Economic Analysis and Other Quantitative Economic Modeling

- Using cost models to evaluate how advanced energy technologies can be manufactured and deployed at scale
- Understanding the tradeoffs between smaller and larger energy projects, including cost, risk, and scalability
- How economic modeling informs technology and reactor design decisions
- Evaluating how new energy technologies fit within a broader electricity system alongside other generation sources
- Introduction to grid planning models and how they evaluate the role and economics of emerging technologies
- Assessing how complementary technologies, such as thermal energy storage, affect system performance and project economics

Faculty Lead: John Parsons, MIT

Guests: Phil Larochelle, Breakthrough Energy Ventures; Koroush Shirvan, MIT

Translational Practicum Progress Update Due

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Class	Topic
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H2: CATAPULT ADVANCED ENERGY TECH SPOKE (cont'd) Meets in 45-230

E-L10: 12/1 How to Start an Advanced Energy Tech Company If You Must

- Building the founding team across physics, engineering, and business, securing early funding from government grants, venture capital, and strategic investors, and defining an initial technical and commercial strategy
- Evaluating when to spin out a company versus pursuing a public-private partnership or licensing approach, including navigating DOE IP rules, lab partnership agreements, and institutional conflicts
- Translating scientific vision into a compelling investment thesis—articulating the pathway to a pilot plant, managing investor expectations around long timelines, and structuring equity among founders, early employees, and capital providers

Faculty Lead: John Parsons, MIT

Guests: Ray Rothrock, Shield Capital; Ally Yost, Commonwealth Fusion Systems

Translational Practicum Final Deliverables Due

L11: 12/8 The Future of Translation: Course Wrap-Up and Next Steps (Meets in 34-101)

- The future of technology and the evolving role of universities
- How to start translating
- Resources at MIT

Faculty Leads: Andrew Lo and Rick Locke, MIT

Guests: **SURPRISE!**

Translational Practicum 360 Evaluation Due

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Required Readings

- Blanding, Michael (2022). “Why People Crave Feedback—and Why We’re Afraid to Give It,” Harvard Business Review, August 5.
- Carroll, John S. (2019). “The Three Lenses: A Guide to Understanding Organizations,” MIT Sloan School of Management Case 11-122R.1.
- Duarte, Nancy (2024). “Are Your Presentations Too Emotional—or Too Analytical?” MIT Sloan Management Review, August 13.
- Gans, Joshua, Erin L. Scott, and Scott Stern (2024). “Intellectual Property Strategy” (Ch. 9). In Entrepreneurship: Choice and Strategy (1st ed., pp. 191–214). W. W. Norton & Company
- Gershman, Sarah (2019). “Do You Need Charisma to Be a Great Public Speaker?” Harvard Business Review, December 13.
- Murray, Fiona, and Julian Kolev (2015). “An Entrepreneur's Guide to the University.” In The Chicago Handbook of University Technology Transfer and Academic Entrepreneurship (pp. 97-137)