

14.46: Innovation Policy and the Economy
MIT, Spring 2018

Instructor: Heidi Williams (heidw@mit.edu), E52-440
Office hours: By appointment
Assistant: Nikhil Basavappa (nbasavap@mit.edu)

Class: Mondays and Wednesdays, 9-10.30am, 32-124
Recitation: Fridays, 9-10am, E51-151

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Writing advisors: [TBD]

Course description. Is the patent system helping or hindering innovation? How should the US National Institutes of Health (NIH) allocate its funding across diseases? Would the US benefit from raising caps on the employment of skilled immigrants through the H-1B visa program? This course aims to give you an introduction to the field of economics, through the lens of analyzing questions like these of how to best design innovation policies. Within that topical area, the course focuses on teaching the skills of effective writing, satisfying the CI-H requirement.

Course prerequisites. There are no course prerequisites. The material is meant to be an introduction to how the field of economics can be applied to try to solve some of society's most important problems. Freshmen and students from other fields are welcome.

Course attendance. Attending class and completing the required readings in advance of class is a requirement: if you cannot attend class consistently and arrive on time, you should not take this class.

Course structure. In order to make the class more participatory, the class will be randomly divided into two groups, and in most weeks each group will meet on either Monday (group A) or Wednesday (group B). The lecture schedule below clarifies days in which the two groups will meet together as a full class.

Course readings. There is no textbook for this course. The course website will host all readings (both required and recommended). Valid MIT web certificates are required for full access to the website.

Course assignments. Your grade will be based on full participation in all aspects of the course. This includes three major writing assignments, each of which will be described in detail in class. Your grade will also be based on class attendance and a series of short assignments related to the required course readings (25%). In fairness to students who complete assignments on time, we will not grant extensions for any assignments; late assignments will receive no credit. On an individual basis, I may adjust the weights to reward substantial improvement in performance over the semester. There will be no exams, and nothing will be due during finals week.

Course lecture schedule.

Week 1: Wed 7-Feb (full class)	<ul style="list-style-type: none"> • Course introduction + WCC introduction (15 minutes) • Required reading: none
Week 2: Mon 12-Feb (group A) Wed 14-Feb (group B)	<ul style="list-style-type: none"> • Lecture 1: <i>Economics for the Common Good</i>, and an introduction to patents • Required reading: Tirole (2017) Introduction and Chapter 1
Week 3: Tues 20-Feb (group A) Wed 21-Feb (group B)	<ul style="list-style-type: none"> • Lecture 2: Case study - Patents for cancer drugs • Required reading: Williams (2017) • Recommended reading: Budish et al. (2015) • <i>Note: Monday classes rescheduled to Tuesday due to President's Day</i>
Week 4: Mon 26-Feb (group A) Wed 28-Feb (group B)	<ul style="list-style-type: none"> • Lecture 3: Case study - Patents on human genes • Required reading: Stiglitz and Sulston (2010); Epstein (2010) • Recommended reading: Jensen and Murray (2005); Lander (2013); Sampat and Williams (2017)
Week 5: Mon 5-Mar (group A) Wed 7-Mar (group B)	<ul style="list-style-type: none"> • Lecture 4: Patent reform • Required reading: Cohen et al. (2016); Haber and Levine (2014) • Recommended reading: Shapiro (2007); Scott Morton and Shapiro (2016); Jaffe and Lerner (2006)
Week 6: Mon 12-Mar (group A) Wed 14-Mar (group B)	<ul style="list-style-type: none"> • Lecture 5: Public funding of R&D • Required reading: Coburn (2014); Bolden (2015); Nelson (2015) • Recommended reading: Li et al. (2017); Macilwain (2010); Sampat et al. (2013)
Week 7: Mon 19-Mar (group A) Wed 21-Mar (group B)	<ul style="list-style-type: none"> • Lecture 6: Funding innovative research • Required reading: Azoulay et al. (2013)
Spring break: Mon 26-Apr Wed 28-Apr	
Week 8: Mon 2-Apr (group A) Wed 4-Apr (group B)	<ul style="list-style-type: none"> • Lecture 7: "Aging" of NIH funding • Required reading: Reardon (2017) • Recommended reading: Jones (2011)
Week 9: Mon 9-Apr (group A) Wed 11-Apr (group B)	<ul style="list-style-type: none"> • Lecture 8: University licensing • Required reading: Contreras and Sherkow (2017) • Recommended reading: Litan et al. (2007); Thursby and Thursby (2010)
No class: Mon 16-Apr Wed 18-Apr	<ul style="list-style-type: none"> • <i>Monday classes cancelled for Patriot's Day; Wednesday class also cancelled</i>
Week 10: Mon 23-Apr (group A) Wed 25-Apr (group B)	<ul style="list-style-type: none"> • Lecture 9: Private philanthropy • Required reading: Murray (2013)
Week 11: Mon 30-Apr (group A) Wed 2-May (group B)	<ul style="list-style-type: none"> • Lecture 10: Facts about scientific labor markets • Required reading: Stephan (2012) Chapter 7
Week 12: Mon 7-May (full class) Wed 9-May (full class)	<ul style="list-style-type: none"> • Mon 7-May (full class) <ul style="list-style-type: none"> – Lecture 11: Immigration and innovation – Required reading: Kerr and Lincoln (2010); Doran et al. (2016) – Recommended reading: Stephan (2010); Borjas and Doran (2015); Kerr et al. (2015) • Wed 9-May (full class) <ul style="list-style-type: none"> – Lecture 12: Guest lecture with Professor John Van Reenen – Required reading: Bell et al. (2016)
Week 13: Mon 14-May (full class) Wed 16-May (full class)	<ul style="list-style-type: none"> • Mon 14-May (full class) <ul style="list-style-type: none"> – Panel discussion with Professors David Autor, Amy Finkelstein, and Ben Olken – Required reading: none • Wed 16-May (full class) <ul style="list-style-type: none"> – Lecture 13: Innovation and inequality – Required reading: none – Recommended reading: Cutler et al. (2012); Lleras-Muney and Lichtenberg (2005)

Course reading list (both required and recommended readings).

- Azoulay, Pierre, Joshua S. Graff Zivin, and Gustavo Manso, "National Institutes of Health Peer Review: Challenges and Avenues for Reform," *Innovation Policy and the Economy*, 2013, 13, 1–22.
- Bell, Alex, Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen, "The Lifecycle of Inventors," *Working Paper*, 2016.
- Bolden, Charles F. Jr., "Letter to the Editor," *Wall Street Journal*, 2015.
- Borjas, George J. and Kirk B. Doran, "How High-Skill Immigration Affects Science: Evidence from the Collapse of the USSR," *Innovation Policy and the Economy*, 2015, 15, 1–25.
- Budish, Eric, Benjamin N. Roin, and Heidi Williams, "Do Firms Underinvest in Long-Term Research? Evidence from Cancer Clinical Trials," *American Economic Review*, 2015, 105 (7), 2044–2085.
- Coburn, Tom, "NASA Is Lost in Space," *Wall Street Journal*, 2014.
- Cohen, Laurnen, Umit G. Gurun, and Scott Duke Kominers, "The Growing Problem of Patent Trolling," *Science*, 2016, 352 (6285), 521–522.
- Contreras, Jorge L. and Jacob S. Sherkow, "CRISPR, Surrogate Licensing, and Scientific Discovery," *Science*, 2017, 355 (6326), 698–700.
- Cutler, David M., Ellen Meara, and Seth Richards-Shubik, "Induced Innovation and Social Inequality: Evidence from Infant Medical Care," *Journal of Human Resources*, 2012, 47 (2), 456–492.
- Doran, Kirk, Alexander Gelber, and Adam Isen, "The Effects of High-Skilled Immigration Policy on Firms: Evidence from Visa Lotteries," *Working Paper*, 2016.
- Epstein, Richard, "Finding the Right Balance on Gene Patents," *Financial Times*, 2010.
- Haber, Stephen and Ross Levine, "The Myth of the Wicked Patent Troll," *Wall Street Journal*, 2014.
- Jaffe, Adam B. and Josh Lerner, "Innovation and Its Discontents," *Innovation Policy and the Economy*, 2006, 6, 27–65.
- Jensen, Kyle and Fiona Murray, "Intellectual Property Landscape of the Human Genome," *Science*, 2005, 310 (5746), 239–240.
- Jones, Benjamin F., "As Science Evolves, How Can Science Policy?," *Innovation Policy and the Economy*, 2011, 11, 103–131.
- Kerr, Sari Pekkala, William R. Kerr, and William F. Lincoln, "Firms and the Economics of Skilled Immigration," *Innovation Policy and the Economy*, 2015, 15, 115–152.
- Kerr, William R. and William F. Lincoln, "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention," *Journal of Labor Economics*, 2010, 28 (3), 473–508.
- Lander, Eric S., "Brief for Amicus Curiae Eric S. Lander in Support of Neither Party," *The Association for Molecular Pathology et al. v. Myriad Genetics et al.*, 2013.
- Li, Danielle, Pierre Azoulay, and Bhaven N. Sampat, "The Applied Value of Public Investments in Biomedical Research," *Science*, 2017, 356 (6333), 78–81.
- Litan, Robert E., Lesa Mitchell, and E. J. Reedy, "Commercializing University Innovations: Alternative Approaches," *Innovation Policy and the Economy*, 2007, 8, 31–57.
- Lleras-Muney, Adriana and Frank R. Lichtenberg, "Are the More Educated More Likely to Use New Drugs?," *Annales d'Economie et de Statistique*, 2005, 79/80, 671–696.
- Macilwain, Colin, "What Science Is Really Worth," *Nature*, 2010, 465 (10), 682–684.
- Morton, Fiona Scott and Carl Shapiro, "Patent Assertions: Are We Any Closer to Aligning Reward to Contribution?," *Innovation Policy and the Economy*, 2016, 16, 89–133.
- Murray, Fiona, "Evaluating the Role of Science Philanthropy in American Research Universities," *Innovation Policy and the Economy*, 2013, 13, 23–60.
- Nelson, Bill, "Letter to the Editor," *Wall Street Journal*, 2015.
- Reardon, Sara, "NIH to Limit the Amount of Grant Money a Scientist Can Receive," *Nature News*, 2017.
- Sampat, Bhaven and Heidi Williams, "How Do Patents Affect Follow-on Innovation? Evidence from the Human Genome," *Working Paper*, 2017.
- , Kristin Buterbaugh, and Marcel Perl, "New Evidence on the Allocation of NIH Funds Across Diseases," *Millbank Quarterly*, 2013, 91 (1), 163–185.
- Shapiro, Carl, "Patent Reform: Aligning Reward and Contribution," *Innovation Policy and the Economy*, 2007, 8, 111–156.
- Stephan, Paula, "The 'I's Have It: Immigration and Innovation, the Perspective from Academe," *Innovation Policy and the Economy*, 2010, 10, 83–127.
- , *How Economics Shapes Science*, Harvard University Press, 2012.
- Stiglitz, Joseph and John Sulston, "The Case Against Gene Patents," *Wall Street Journal*, 2010.
- Thursby, Jerry and Marie Thursby, "University Licensing: Harnessing or Tarnishing Faculty Research?," *Innovation Policy and the Economy*, 2010, 10, 159–189.
- Tirole, Jean, *Economics for the Common Good*, Princeton University Press, 2017.
- Williams, Heidi, "How Do Patents Affect Research Investments?," *Annual Review of Economics*, 2017, 9, 441–469.