

15.357 – Economics of Ideas, Innovation, & Entrepreneurship

Tuesdays 6:00-9:00pm
E62-450

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Professor Scott Stern	sstern@mit.edu	E62-476

This course begins with an introduction to the economics of ideas and uses the economics of ideas to evaluate the origins of invention and discovery, innovation, entrepreneurship, and the diffusion of new technology. The focus throughout is on the microeconomic and institutional foundations for phenomena that have been studied mostly at an aggregate level. The course focuses on (a) the micro-foundations of the knowledge production function (including the role of creativity and the impact of Science), (b) the impact of institutions and strategic interaction on the commercialization of new technology, and (c) the diffusion and welfare impact of ideas and technology. The course emphasizes how the unusual characteristics of ideas can result in social inefficiency, and how the microeconomic and institutional environment influences the gap between private and social welfare. The course includes a mixture (and explicit comparisons of) both theoretical and empirical research.

Requirements:

- two group homework assignments (due October 6th and November 24th);
- two individual “referee” reports (out of a possible seven pertaining to working papers which we have highlighted in red on the syllabus);
- a succinct individual paper proposal, three to five pages, on a topic germane to the class, due on the last day of class (December 1st);

Administration:

- readings, the current version of the syllabus, assignments, and class slides are available through Stellar;
- please contact Tetyana Pecherska, tetyana@mit.edu, for access to Stellar or other questions about course logistics;
- there are no “official” office hours; please feel free to make appointments with Scott or Pierre individually or together.

Schedule at a Glance

Class 1	Ideas, Innovation, and Economic Growth	September 15	Scott
Class 2	The Nature of Ideas and Innovation	September 22	Scott
Class 3	The Supply of Innovators	September 29	Pierre
Class 4	Incentives for Innovators: Contracting and Control Rights	October 6	Pierre
Class 5	Incentives for Innovators: Market-level Rewards	October 13	Pierre
Class 6	GUEST LECTURE: The Life Cycle of Inventors	October 20	Raj Chetty
Class 7	Open Science as an Economic Institution	October 27	Scott
Class 8	Strategic Interaction in Cumulative Innovation Environments	November 2*	Scott
Class 9	Entrepreneurial Strategy	November 10	Scott
Class 10	GUEST LECTURE: Markets for Technology	November 17	Alfonso G.
Class 11	The Measurement of Innovation	November 24	Pierre
Class 12	The Measurement of Entrepreneurial Ecosystems	December 1	Scott

*Note the odd (and exceptional) timing for this session: Monday, 6-9pm instead of Tuesday at the same time.

- (*) Jones, Charles I. 2001. Chapter 4 and 5, pp. 78-86 and 96-122 in *Introduction to Economic Growth*. New York: W. Norton & Company.
- (*) Varian, Hal R. 2004. "Review of Mokyr's 'Gifts of Athena'." *Journal of Economic Literature* **42**(3): 805-810.
- (*) Nelson, Richard R. 1962. "The Link Between Science and Invention: The Case of the Transistor." In *The Rate and Direction of Inventive Activity: Economic and Social Factors*, pp. 549-583. Princeton, NJ: Princeton University Press.
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- (*) Jones, Charles I. 1999. "Growth: With or Without Scale Effects?" *American Economic Review* **89**(2): 139-144.
- (*) Jones, Benjamin F. 2009. "The Burden of Knowledge and the 'Death of the Renaissance Man': Is Innovation Getting Harder?" *Review of Economic Studies* **76**(1): 283-317.
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- Weitzman, Martin L. 1998. "Recombinant Growth." *Quarterly Journal of Economics* **113**(2): 331-360.

Class 3

The Supply of Innovators

September 39

Who Is (or Who becomes) an Innovator?

- Shu, Pian. 2012. "The Long-Term Impact of Business Cycles on Innovation: Evidence from the Massachusetts Institute of Technology." Working Paper, Massachusetts Institute of Technology.
- (*) Shu, Pian. 2013. "Are the 'Best and Brightest' Going into Finance? Career Choice and Skill Development of MIT Graduates." Working Paper, Harvard University.
- Stephan, Paula E. 2012. *How Economics Shapes Science*. Cambridge, MA: Harvard University Press. Chapter 7 ("The Market for Scientists and Engineers").
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Immigration

- Hunt, Jennifer, and Marjolaine Gauthier-Loiselle. 2010. "How Much Does Immigration Boost Innovation?" *American Economic Journal: Macroeconomics* **2**(2): 31-56.
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- (*) Moser, Petra, Alessandra Voena, and Fabian Waldinger. 2014. "German-Jewish Emigrés and US Invention." *American Economic Review* **104**(10): 3222-3255.
- Kerr, William R., and William F. Lincoln. 2010. "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention." *Journal of Labor Economics* **28**(3): 473-508.
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Superstars, Concavity and the Concatenation of Talent

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Waldinger, Fabian. 2012. "Peer Effects in Science: Evidence from the Dismissal of Scientists in Nazi Germany." *Review of Economic Studies* **79**(2): 838-861.

Zucker, Lynne G., Michael R. Darby, and Marilyn B. Brewer. 1998. "Intellectual Human Capital and the Birth of U.S. Biotechnology Enterprises." *American Economic Review* **88**(1): 290-306.

Discrimination and Stratification

Ding, Waverly W., Fiona Murray, and Toby E. Stuart. 2013. "From Bench to Board: Gender Differences in University Scientists' Participation in Corporate Scientific Advisory Boards." *Academy of Management Journal* **56**(5): 1443-1464.

Arcidiacono, Peter, Esteban Aucejo, and V. Joseph Hotz. 2015. "University Differences in the Graduation of Minorities in STEM Fields: Evidence from California." *American Economic Review* **105**(12): xxx-xxx.

Blau, Francine D., Janet M. Currie, Rachel T.A. Croson, and Donna K. Ginther. 2010. "Can Mentoring Help Female Assistant Professors? Interim Results from a Randomized Trial." *American Economic Review: Papers & Proceedings* **100**(2): 348-352.

(*) Breda, Thomas, and Son Thierry Ly. 2015. "Professors in Core Science Fields Are Not Always Biased against Women: Evidence from France." *American Economic Journal: Applied Economics* **7**(4): 53-75.

Brooks, Alison Wood, Laura Huang, Sarah Wood Kearney, and Fiona E. Murray. 2014. "Investors Prefer Entrepreneurial Ventures Pitched by Attractive Men." *Proceedings of the National Academy of Sciences* **111**(12): 4427-4431.

Ginther, Donna K., Walter T. Schaffer, Joshua Schnell, Beth Masimore, Faye Liu, Laurel L. Haak, and Raynard Kington. 2011. "Race, Ethnicity, and NIH Research Awards." *Science* **333**(6045): 1015-1019.

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Manpower Analysis' Sad Track Record

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Romer, Paul M. 2000. "Should the Government Subsidize Supply or Demand in the Market for Scientists and Engineers?" *Innovation Policy and the Economy* **1**: 221-252.

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Freeman, Richard B. 1975. "Supply and Salary Adjustments to the Changing Science Manpower Market: Physics, 1948-1973." *American Economic Review* **65**(1): 27-39.

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Teitelbaum, Michael S. 2014. *Falling Behind? Boom, Bust and the Global Race for Scientific Talent*. Princeton, NJ: Princeton University Press.

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Committee on Science, Engineering, and Public Policy (COSEPUP). 2006. *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. Washington, D.C.: National Academies Press.

Class 4 Incentives for Innovators: Contracts and Control Rights

October 6

- (*) Manso, Gustavo. 2011. "Motivating Innovation." *Journal of Finance* **66**(5): 1823-1860.
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- Holmstrom, Bengt. 1989. "Agency Costs and Innovation." *Journal of Economic Behavior and Organization* **12**(3): 305-327.
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PROBLEM SET #1 DUE!

Class 5 Incentives for Innovators: Intellectual Property, Prizes, and Secrecy

October 13

- (*) Gallini, Nancy, and Suzanne Scotchmer. 2002. "Intellectual Property: What is the Best Incentive System." *Innovation Policy and the Economy* 2: 51-77.
- (*) Wright, Brian. 1983. "The Economics of Invention Incentives: Patents, Prizes, and Research Contracts." *American Economic Review* 73(4): 691-707.
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Prizes and Prize Design

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- Kremer, Michael, and Heidi Williams. 2010. "Incentivizing Innovation: Adding to the Toolkit." *Innovation Policy and the Economy* 1: 1-17.
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Economics of the Patent System

- Nordhaus, William D. 1967. "The Optimal Life of a Patent." Cowles Foundation Discussion Paper #241.
- (*) Lemley, Mark A., and Carl Shapiro. 2005. "Probabilistic Patents." *Journal of Economic Perspectives* 19(2): 75-98.
- (*) Scotchmer, Suzanne. 1991. "Standing on the Shoulders of Giants: Cumulative Research and the Patent Law." *Journal of Economic Perspectives* 5(1): 29-41.
- (*) Sampat, Bhaven, and Heidi L. Williams. 2015. "How Do Patents Affect Follow-on Innovation? Evidence from the Human Genome." NBER Working Paper #21666.
- Galasso, Alberto, and Mark Schankerman. 2015. "Patents and Cumulative Innovation: Causal Evidence from the Courts." *Quarterly Journal of Economics* 130(1): 317-369.

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Patenting and Firm Behavior

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Patenting and Antitrust

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Secrecy

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- Friedman, David D., William M. Landes, and Richard A. Posner. 1991. "Some Economics of Trade Secret Law." *Journal of Economic Perspectives* **5**(1): 61-72.
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- Arundel, Anthony. 2001. "The Relative Effectiveness of Patents and Secrecy for Appropriation." *Research Policy* **30**(4): 611-624.
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Class 6 The Life Cycle of Inventors October 20

Class 7 Open Science as an Economic Institution October 27

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- Sauermann, Henry, and Michael Roach. 2014. "Not All Scientists Pay to Be Scientists: PhDs' Preferences for Publishing in Industrial Employment." *Research Policy* **43**(1): 32-47.
- Gans, Joshua S., Fiona E. Murray, and Scott Stern. 2013. "Contracting over the Disclosure of Scientific Knowledge: Intellectual Property and Academic Publication." NBER Working Paper #19560.
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PROBLEM SET #2 DUE!

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