MIT SLOAN SCHOOL OF MANAGEMENT
Fall 2025

15.357 — Economics of Ideas and Innovation

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

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Professor Scott Stern	sstern@mit.edu	E62-476
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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 of (and explicit comparisons between) theoretical and empirical research.

Requirements:

- Two group homework assignments (due October 14th and November 25th);
- Two individual "referee" reports (out of the working papers we have designated as eligible on the syllabus); this report will be due by 9pm the night before the class session for which they are listed as part of the readings. For example, if you choose to do a referee report on one of the potential referee papers from Class 2, it is due by 9pm on September 16th. To submit, please e-mail the TA;
- A succinct individual paper proposal, three to five pages, on a topic germane to the class, due during the last week of class (December 9th).

Administration:

- Readings, the current version of the syllabus, assignments, and class slides are available through Canvas;
- Please contact the TA for access to Canvas or other questions about course logistics;

- There are no "official" office hours; please feel free to make individual appointments with Scott and/or Pierre.
- The class will take place in person, except for Class 10 and Class 11 since we have outside speakers on zoom for these class sessions.

Schedule at a Glance

Class 1	Ideas, Innovation, and Economic Growth	September 9	Scott
Class 2	The Nature of Ideas and Innovation	September 16	Scott
Class 3	Open Science as an Economic Institution	September 23	Scott
Class 4	The Rate and Direction of Scientific Progress	September 30	Pierre
Class 5	The Supply of Innovators	October 7	Pierre
Class 6	Incentives for Innovators: Contracting and Control Rights	October 14	Pierre
Class 7	Incentives for Innovators: Market-level Rewards	October 21	Pierre
Class 8	Measuring Innovation and the Impact of Innovation Policy	October 28	Adam Jaffe
Class 9	Measuring the Returns to R&D Investments	November 4	Pierre
	No Class	November 11	
Class 10	The US Patent System and Innovation Policy	November 18	Bhaven Sampat
Class 11	Innovation Policy	November 25	Heidi Williams
Class 12	Measuring Entrepreneurship and the Impact of Entrepreneurship Policy	December 2	Scott
Class 13	The Economics of Ideas and Innovation Policy—Wrap-Up	December 8	Scott

Note: The last session will take place on a MONDAY night to accommodate Scott's schedule

Class 1 Ideas, Innovation and Economic Growth September 9

Jones, Charles I. 2001. Chapter 4 and 5, pp. 78-86 and 96-122 in *Introduction to Economic Growth*. New York: W. W. Norton & Company.

Bryan, Kevin A., and Heidi L. Williams. 2021. "Innovation: Market Failures and Public Policies." In Kate Ho, Ali Hortaçsu, and Alessandro Lizzeri (Eds.), *Handbook of Industrial Organization*, pp. 281-388. Amsterdam: North-Holland.

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.

Romer, Paul M. 2018. "On the Possibility of Progress." Nobel Prize Lecture. Available at: https://www.nobelprize.org/prizes/economic-sciences/2018/romer/lecture/

Supplementary Papers

Aghion, Philippe, and Peter Howitt. 1992. "A Model of Growth through Creative Destruction." *Econometrica* **60**(2): 323-351.

Romer, Paul M. 1990. "Endogenous Technological Change." *Journal of Political Economy* **98**(5): S71-S102.

Rosenberg, Nathan. 1979. "Technological Interdependence in the American Economy." *Technology and Culture* **20**(1): 25-50.

Mokyr, Joel. 2005. "The Intellectual Origins of Modern Economic Growth." *Journal of Economic History* **65**(2): 285-351.

Mokyr, Joel. 1992. *The Lever of Riches: Technological Creativity and Economic Progress*. New York: Oxford University Press.

Rosenberg, Nathan. 1974. "Science, Invention, and Economic Growth." *Economic Journal* **84**(333): 90-108.

Jones, Charles I. 2022. "The Past and Future of Economic Growth: A Semi-Endogenous Perspective." *Annual Review of Economics* **14**: 125-152.

Schmookler, Jacob. 1966. *Invention and Economic Growth*. Cambridge, MA: Harvard University Press.

Class 2 The Nature of Ideas and Innovation September 16

Potential Referee Reports

Kim, Soomi. 2025. " Navigating the Rugged Data Landscape: The Impact of Data-Extrapolation Technologies on Knowledge Production." Working Paper, Columbia University.

Required Readings

Arrow, Kenneth. 1962. "Economic Welfare and the Allocation of Resources for Invention." In *The Rate and Direction of Inventive Activity: Economic and Social Factors*, pp. 609-625. Princeton, NJ: Princeton University Press.

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.

Wuchty, Stefan, Benjamin F. Jones, and Brian Uzzi. 2007. "The Increasing Dominance of Teams in Production of Knowledge." *Science* **316**(5827): 1036-1039.

Jones, Benjamin F. 2010. "Age and Great Invention." *Review of Economics and Statistics* **92**(1): 1-14.

Bresnahan, Timothy F., and Manuel Trajtenberg. 1995. "General Purpose Technologies: Engines of Growth?" *Journal of Econometrics* **65**(1): 83-108.

Bloom, Nicholas, Charles I. Jones, John Van Reenen, and Michael Webb. 2020. "Are Ideas Getting Harder to Find?" *American Economic Review* **110**(4): 1104-1144.

Supplementary Papers

Akcigit, Ufuk, Douglas Hanley, and Nicolas Serrano-Velarde. 2021. "Back to Basics: Basic Research Spillovers, Innovation Policy, and Growth." *The Review of Economic Studies* **88**(1): 1-43.

Jones, Benjamin F., and Xiaojie Liu. 2024. "The Human Capital Stock: a Generalized Approach." *American Economic Review* **114**(5): 1448-1487.

Agrawal, Ajay, Avi Goldfarb, and Florenta Teodoridis. 2016. "Understanding the Changing Structure of Scientific Inquiry." *American Economic Journal: Applied Economics* **8**(1): 100-128.

David, Paul. 1990. "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox." *American Economic Review* **80**(2): 355-361.

Henderson, Rebecca, and Kim Clark. 1990. "Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms." *Administrative Science Quarterly* **35**(1): 9-30.

Kortum, Samuel. 1997. "Research, Patenting, and Technological Change." *Econometrica* **65**(6): 1389-1419.

Murray, Fiona. 2002. "Innovation as Co-Evolution of Scientific and Technological Networks: Exploring Tissue Engineering." *Research Policy* **31**(8-9): 1389-1403.

Ó Gráda, Cormac. 2016. "Did Science Cause the Industrial Revolution?" *Journal of Economic Literature* **54**(1): 224-239.

Nelson, Richard R. 1959. "The Simple Economics of Basic Scientific Research." *Journal of Political Economy* **67**(2): 297-306.

Rosenberg, Nathan, and Manuel Trajtenberg. 2004. "A General-Purpose Technology at Work: The Corliss Steam Engine in the Late-Nineteenth-Century United States." *Journal of Economic History* **64**(1): 61-99.

Stokes, Donald. 1997. *Pasteur's Quadrant: Basic Science and Technological Innovation*. Washington, DC: Brookings Institution Press.

Weitzman, Martin L. 1998. "Recombinant Growth." *Quarterly Journal of Economics* **113**(2): 331-360.

Class 3 Open Science as an Economic Institution September 23

Potential Referee Reports

Baruffaldi, Stefano and Fabian Gaessler. 2021. "The Returns to Physical Capital in Knowledge Production: Evidence from Lab Disasters." Max Planck Institute for Innovation & Competition Research Paper No. 21-19. Available at https://ssrn.com/abstract=3912401.

Cristelli, Gabriele. 2025. "Funding the Ivory Tower: The Effects of NSF Institutional Grants on Universities and Local Innovation." Working Paper, Stanford University.

Required Readings

Merton, Robert K. 1957. "Priorities in Scientific Discovery: A Chapter in the Sociology of Science." *American Sociological Review* **22**(6): 635-659.

Merton, Robert K. 1968. "The Matthew Effect in Science." *Science* **159**(3810): 56-63.

Aghion, Philippe, Mathias Dewatripont, and Jeremy C. Stein. 2008. "Academic Freedom, Private Sector Focus, and the Process of Innovation." *RAND Journal of Economics* **39**(3): 617-635.

Azoulay, Pierre, Toby Stuart, and Yanbo Wang. 2014. "Matthew: Effect or Fable?" *Management Science* **60**(1): 92-109.

Bikard, Michaël. 2018. "Made in Academia: The Effect of Institutional Origin on Inventors' Attention to Science." *Organization Science*, 29 (5):818-36

Fleming, Lee, and Olav Sorenson. 2004. "Science as a Map in Technological Search." *Strategic Management Journal* **25**(8-9): 909-928.

Murray, Fiona, Philippe Aghion, Mathias Dewatripont, Julian Kolev, and Scott Stern. 2016. "Of Mice and Academics: Examining the Effect of Openness on Innovation." *American Economic Journal: Economic Policy* **8**(1): 212-252.

Stern, Scott. 2004. "Do Scientists Pay to Be Scientists?" *Management Science* **50**(6): 835-853.

Dasgupta, Partha, and David. Paul. 1994. "Towards a New Economics of Science." *Research Policy* **23**(5): 487-521.

Furman, Jeffrey, and Scott Stern. 2011. "Climbing Atop the Shoulders of Giants: The Impact of Institutions on Cumulative Knowledge Production." *American Economic Review* **101**(5): 1933-1963.

Broad Surveys

Stephan, Paula. 2013. "The Endless Frontier: Reaping What Bush Sowed?" NBER Working Paper #19687.

Stephan, Paula E. 2010. "The Economics of Science." In Bronwyn H. Hall and Nathan Rosenberg (Eds.), *Handbook of The Economics of Innovation*, pp. 217-273. Amsterdam: North-Holland.

Nelson, Richard R. 2016. "The Sciences Are Different and the Differences Matter." *Research Policy* **45**(9): 1692-1701.

Hess, David J. 1997. *Science Studies: An Advanced Introduction*. New York: NYU Press.

Varmus, Harold. 2009. *The Art and Politics of Science*. New York: W. W. Norton & Company.

What is Science?

Brooks, Harvey. 1994. "The Relationship Between Science and Technology." *Research Policy* **23**(5): 477-486.

Gieryn, Thomas F. 1983. "Boundary-work and the Demarcation of Science from Non-science: Strains and Interests in Professional Ideologies of Scientists." *American Sociological Review* **48**(6): 781-795.

Stokes, Donald. 1997. *Pasteur's Quadrant: Basic Science and Technological Innovation*. Washington, DC: Brookings Institution Press.

Murray, Fiona. 2010. "The Oncomouse that Roared: Hybrid Exchange Strategies as a Source of Productive Tension at the Boundary of Overlapping Institutions." *American Journal of Sociology* **116**(2): 341-388.

Balconi, Margherita, Stefano Brusoni, and Luigi Orsenigo. 2010. "In Defence of the Linear Model: An Essay." *Research Policy* **39**(1): 1-13.

Science as a Social Institution

Dasaratha, Krishna. 2023. "Innovation and Strategic Network Formation." *Review of Economic Studies* **90**(1): 229-260.

Merton, Robert K. 1973. *The Sociology of Science: Theoretical and Empirical Investigation*. Chicago, IL: University of Chicago Press.

Nagaoka, Sadao, and Hideo Owan. 2014. "Author Ordering in Scientific Research: Evidence from Scientists Survey in the US and Japan." IIR Working Paper #13-23*,* Hitotsubashi University, Institute of Innovation Research.

Zuckerman, Harriet A. 1968. "Patterns of Name Ordering Among Authors of Scientific Papers: A Study of Social Symbolism and Its Ambiguity." *American Journal of Sociology* **74**(3): 276-291.

Gans, Joshua S., and Fiona Murray. 2013. "Credit History: The Changing Nature of Scientific Credit." NBER Working Paper #19538.

Leahey, Erin, Christine M. Beckman, and Taryn L. Stanko. 2017. "Prominent but Less Productive: The Impact of Interdisciplinarity on Scientists' Research." *Administrative Science Quarterly* **62**(1): 105-139.

Bourdieu, Pierre. 1975. "La Spécificité du Champ Scientifique et les Conditions Sociales du Progrès de la Raison." *Sociologie et Sociétés* **7**(1): 91-118.

Bourdieu, Pierre. 1991. "The Peculiar History of Scientific Reason." *Sociological Forum* **6**(1): 3-26.

Latour, Bruno, and Steven Woolgar. 1979. *Laboratory Life*. Beverly Hills, CA: Sage Publications.

Owen-Smith, Jason. 2001. "Managing Laboratory Work Through Skepticism: Processes of Evaluation and Control." *American Sociological Review* **66**(3): 427-452.

The Relationship Between Science and Technology

Murray, Fiona and Scott Stern. 2007. "Do Formal Intellectual Property Rights Hinder the Free Flow of Scientific Knowledge?: An Empirical Test of the Anti-Commons Hypothesis." *Journal of Economic Behavior and Organization* **63**(4): 648-487.

Rosenberg, Nathan, and Richard R. Nelson. 1994. "American Universities and Technical Advance in Industry." *Research Policy* **23**(3): 323-348.

Ahmadpoor, Mohammad, and Benjamin F. Jones. 2007. "The Dual Frontier: Patented Inventions and Prior Scientific Advance." *Science* **357**(6531): 583-587.

Krieger, Joshua L., Monika Schnitzer, and Martin Watzinger. 2024. "Standing on the Shoulders of Science." *Strategic Management Journal* **45**(9): 1670-1695.

Azoulay, Pierre, Christopher C. Liu, and Toby Stuart. 2017. "Social Influence Given (Partially) Deliberate Matching: Career Imprints in the Creation of Academic Entrepreneurs." *American Journal of Sociology* **122**(4): 1223-1271.

Science in the Private Sector

Rosenberg, Nathan. 1990. "Why Do Firms Do Basic Research (with their own money)?" *Research Policy* **19**(2): 165-174.

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.

Arora, Ashish, Sharon Belenzon, Konstantin Kosenko, Jungkyu Suh, and Yishay Yafeh. 2021. "The Rise of Scientific Research in Corporate America." NBER Working Paper #29260.

Arora, Ashish, Belenzon, Sharon, and Andrea Patacconi. "Killing the Golden Goose? The Decline of Science in Corporate R&D." NBER Working Paper #20902.

Science and its Institutions

Iaria, Alessandro, Carlo Schwarz, and Fabian Waldinger. 2018. "Frontier Knowledge and Scientific Production: Evidence from the Collapse of International Science." *Quarterly Journal of Economics* **133**(2): 927-991.

Adda, Jerôme, and Marco Ottaviani. 2023. "Grantmaking, Grading on a Curve, and the Paradox of Relative Evaluation in Nonmarkets." *Quarterly Journal of Economics* **139**(2): 1255-1319.

Tripodi, Giorgio, Xiang Zheng, Yifan Qian, Dakota Murray, Benjamin F. Jones, Chaoqun Nie, and Dashun Wang. 2025. "Tenure and Research Trajectories." *Proceedings of the National Academy of Sciences* **122**(30): e2500322122.

Hager, Sebastian, Carlo Schwarz, and Fabian Waldinger. 2024. "Measuring Science: Performance Metrics and the Allocation of Talent." *American Economic Review* **114**(12): 4052-4090.

Andrews, Michael. 2023. "How Do Institutions of Higher Education Affect Local Invention? Evidence from the Establishment of U.S. Colleges." *American Economic Journal: Economic Policy* **15**(2): 1-41.

Li, Danielle. 2017. "Expertise vs. Bias in Evaluation: Evidence from the NIH." *American Economic Journal: Applied Economics* **9**(2): 60-92.

Li, Danielle, and Leila Agha. 2015. "Big Names or Big Ideas: Do Peer-review Panels Select the Best Science Proposals?" *Science* **348**(6233): 434-438.

Boudreau, Kevin J., Eva C. Guinan, Karim R. Lakhani, and Christoph Riedl. 2016. "Looking Across and Looking Beyond the Knowledge Frontier: Intellectual Distance, Novelty, and Resource Allocation in Science." *Management Science* **62**(10): 2765-2783.

Azoulay, Pierre, and Wesley H. Greenblatt. 2025. "Does Peer Review Penalize Scientific Risk Taking? Evidence from NIH Grant Renewals." NBER Working Paper #33495.

Gentil-Beccot, Anne, Salvatore Mele, and Travis C. Brooks. 2009. "Citing and Reading Behaviours in High-Energy Physics: How a Community Stopped Worrying about Journals and Learned to Love Repositories." Working Paper, CERN, arXiv:0906.5418.

Furman, Jeffrey L., Kyle Jensen, and Fiona Murray. 2012. "Governing Knowledge in the Scientific Community: Exploring the Role of Retractions in Biomedicine." *Research Policy* **41**(2): 276-290.

Card, David, and Stefano DellaVigna. 2020. "What Do Editors Maximize? Evidence from Four Leading Economics Journals." *The Review of Economics and Statistics* **102**(1): 195-217.

Waldinger, Fabian. 2016. "Bombs, Brains, and Science: The Role of Human and Physical Capital for the Creation of Scientific Knowledge." *Review of Economics and Statistics* **98**(5): 811-831.

Helmers, Christian, and Henry G. Overman. 2017. "My Precious! The Location and Diffusion of Scientific Research: Evidence from the Synchrotron Diamond Light Source." *The Economic Journal* **127**(604): 2006-2040.

Class 4 <u>The Rate and Direction of Scientific Progress</u> September 30

Potential Referee Reports

Bertolotti, Fabio, Kyle R. Myers, and Wei Yang Tham. 2025. "Productivity Beliefs and Efficiency in Science." NBER Working Paper #34000.

Boudou, Justine and John McKeon. 2025. "Innovation Under Resource Constraints: Supercomputing in Scientific Research." Working Paper, Harvard University and Boston University.

Required Readings

Carnehl, Christoph, and Johannes Schneider. 2025. "A Quest for Knowledge." *Econometrica* **93**(2): 623-659.

Gans, Joshua S. 2025. "A Simplified Quest for Knowledge." NBER Working Paper #33815.

Azoulay, Pierre, Christian Fons-Rosen, and Joshua S. Graff Zivin. 2019. "Does Science Advance One Funeral at a Time?" *American Economic Review* **109**(8): 2889-2920.

Myers, Kyle. 2020. "The Elasticity of Science." *American Economic Journal: Applied Economics* **12**(4): 103-134.

Hill, Ryan, Yian Yin, Carolyn Stein, Xizhao Wang, Dashun Wang, and Benjamin F. Jones. 2025. "The Pivot Penalty in Research." *Nature* **642**(8069): 999-1006.

Hill, Ryan, and Carolyn Stein. 2025. "Scooped! Estimating Rewards for Priority in Science." *Journal of Political Economy* **133**(3): 793-845.

Hill, Ryan, and Carolyn Stein. 2025. "Race to the Bottom: Competition and Quality in Science." *Quarterly Journal of Economics* **140**(2): 1111-1185.

The Direction of Science

Kuhn, Thomas S. 1962. *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press.

Rosenberg, Nathan. 1982. "How Exogenous is Science?" In *Inside the Black Box*, pp. 141-158. New York: Cambridge University Press.

Hopenhayn, Hugo, and Francesco Squintani. 2021. "On the Direction of Innovation." *Journal of Political Economy* **129**(7): 1991-2022.

Bryan, Kevin A., and Jorge Lemus. 2017. "The Direction of Innovation." *Journal of Economic Theory* **172**: 247-272.

Bramoullé, Yann, and Gilles Saint-Paul. 2010. "Research Cycles." *Journal of Economic Theory* **145**(5): 1890-1920.

McMahan, Peter, and Daniel A. McFarland. 2021. "Creative Destruction: The Structural Consequences of Scientific Curation." *American Sociological Review* **86**(2): 341-76.

Akerlof, George A., and Pascal Michaillat. 2018. "Persistence of False Paradigms in Low-power Sciences." *Proceedings of the National Academy of Sciences* **115**(52): 13228-13233.

Rubin, Amir, and Eran Rubin. 2021. "Systematic Bias in the Progress of Research." *Journal of Political Economy* **129**(9): 2066-719.

Scientific Competition

Wade, Nicholas. 1981. *The Nobel Duel: Two Scientists' 21-year Race to Win the World's Most Coveted Research Prize*. Garden City, NY: Anchor Press/Doubleday.

Bobtcheff, Catherine, Jérôme Bolte, and Thomas Mariotti. 2017. "Researcher's Dilemma." *The Review of Economic Studies,* **84**(3): 969-1014.

Werth, Barry. 1995. *The Billion Dollar Molecule: One Company's Quest for the Perfect Drug*. New York: Simon & Schuster.

Class 5 The Supply of Innovators October 7

Potential Referee Reports

Jia, Ruixue, Gaurav Khanna, Hongbin Li, and Yuli Xu. 2025. "The Ripple Effects of China's College Expansion on American Universities." NBER Working Paper #34391.

Ganguli, Ina, and Raviv Murciano-Goroff. 2025. "Exposure to Science and Scientific Careers: Evidence from Minimum Wage Increases and University Lab Employment." NBER Working Paper #34244.

Ekerdt , Lorenz K.F., and Kai-Jie Wu. 2025. "Self-Selection and the Diminishing Returns of Research." Working Paper, Center for Economic Studies, US Census Bureau.

Biasi, Barbara, and Song Ma. 2023. "The Education-Innovation Gap." Working Paper, Yale School of Management.

Boudou, Justine. 2025. "Not All That Glitters is Gold: Firm Hiring in the Market for Knowledge Workers." Working Paper, Harvard University.

Cheng, Stephanie, Joseph Staudt, Elisabeth Perlman, and Wei Yang Tham. 2025. "Scientific Talent Leaks Out of Funding Gaps." Working Paper, University of Toronto.

Bernstein, Shai, Rebecca Diamond, Abhisit Jiranaphawiboon, Tim McQuade, and Beatriz Pousada. 2025. "The Contribution of High-Skilled Immigrants to Innovation in the United States." Working Paper, Harvard University.

Required Readings

Bell, Alexander M., Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen. 2019. "Who Becomes an Inventor in America? The Importance of Exposure to Innovation." *Quarterly Journal of Economics* **134**(2): 647-713.

Shu, Pian. 2015. "Are the 'Best and Brightest' Going into Finance? Career Choice and Skill Development of MIT Graduates." Harvard Business School Working Paper #16-067.

Borjas, George J., and Kirk B. Doran. 2012. "The Collapse of the Soviet Union and the Productivity of American Mathematicians." *Quarterly Journal of Economics*, **127**(3): 1143-1203.

Moser, Petra, Alessandra Voena, and Fabian Waldinger. 2014. "German-Jewish Émigrés and US Invention." *American Economic Review* **104**(10): 3222-3255.

Deming, David J., and Kadeem L. Noray. 2020. "Earnings Dynamics, Changing Job Skills, and STEM Careers." *Quarterly Journal of Economics* **135**(4): 1965-2005.

Azoulay, Pierre, Wesley H. Greenblatt, and Misty L. Heggeness. 2021. "Long-Term Effects from Early Exposure to Research: Evidence from the NIH 'Yellow Berets'." *Research Policy* **50**(9): 104332.

Agarwal, Ruchir, and Patrick Gaulé. 2020. "Invisible Geniuses: Could the Knowledge Frontier Advance Faster?" *American Economic Review: Insights* **2**(4): 409-424.

Ahmadpoor, Mohammad, and Benjamin F. Jones. 2019. "Decoding Teams and Individual Impact in Science and Invention." *Proceedings of the National Academy of Sciences* **116**(28): 13885-13890.

Supplementary Papers

Who is (or Who Becomes) an Innovator?

Bell, Alexander M., Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen. 2019. "Do Tax Cuts Produce More Einsteins? The Impacts of Financial Incentives versus Exposure to Innovation on the Supply of Inventors." *Journal of the European Economic Association* **17**(3): 651-677.

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.

Stephan, Paula E. 2012. *How Economics Shapes Science*. Cambridge, MA: Harvard University Press. Chapter 7 ("The Market for Scientists and Engineers").

Ellison, Glenn, and Ashley Swanson. 2016. "Do Schools Matter for High Math Achievement? Evidence from the American Mathematics Competitions." *American Economic Review* **106**(6): 1244-1277.

Toivanen, Otto, and Lotta Väänänen. 2016. "Education and Invention." *Review of Economics and Statistics* **98**(2): 382-396.

Aghion, Philippe, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell, and David Hémous. 2019. "Innovation and Top Income Inequality." *Review of Economic Studies* **86**(1): 1-45.

Jones, Benjamin F., and Bruce A. Weinberg. 2011. "Age Dynamics in Scientific Creativity." *Proceedings of the National Academy of Sciences* **108**(47): 18910-18914.

Levin, Sharon G., and Paula E. Stephan. 1991. "Research Productivity over the Life Cycle: Evidence for Academic Scientists." *American Economic Review* **81**(1): 114-32.

Ganguli, Ina, Patrick Gaulé, and Danijela Vuletić Čugalj. 2022. "Biased Beliefs and Entry into Scientific Careers." *Journal of Economic Behavior & Organization* **202**: 17-33.

Biasi, Barbara, David J. Deming, and Petra Moser. 2022. "Education and Innovation." Chapter 12 in *The Role of Innovation and Entrepreneurship in Economic Growth*, Michael J. Andrews, Aaron Chatterji, Josh Lerner & Scott Stern (Eds.), pp. 537-551. Chicago, IL: University of Chicago Press.

Deteriorating science careers

Cheng, Stephanie D. 2023. "What's another year? The lengthening training and career paths of scientists." *PLoS One* **18**(5): e0285550.

Kahn, Shulamit, and Megan MacGarvie. 2024. "New evidence on international postdocs in the US: Less pay, different experiences." *Research Policy* **53**(9): 105077.

Kahn, Shulamit, and Donna K. Ginther. 2017. "The impact of postdoctoral training on early careers in biomedicine." *Nature Biotechnology* **35**(1): 90-94.

Immigration

Hunt, Jennifer, and Marjolaine Gauthier-Loiselle. 2010. "How Much Does Immigration Boost Innovation?" *American Economic Journal: Macroeconomics* **2**(2): 31-56.

Kerr, William R. 2020. "The Gift of Global Talent: Innovation Policy and the Economy." *Innovation Policy and the Economy* **20**: 1-37.

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.

Stephan, Paula E. 2012. *How Economics Shapes Science*. Cambridge, MA: Harvard University Press. Chapter 8 ("The Foreign Born").

Doran, Kirk, Alexander Gelber, and Adam Isen. 2022. "The Effects of High-Skilled Immigration Policy on Firms: Evidence from Visa Lotteries." *Journal of Political Economy* **130**(10): 2501-2533.

Franzoni, Chiara, Giuseppe Scellato, and Paula Stephan. 2015. "International Mobility of Research Scientists: Lessons from GlobSci." In Aldo Geuna (Ed.), *Global Mobility of Research Scientists: The Economics of Who Goes Where and Why*, pp. 35-65. Amsterdam: Elsevier.

Ganguli, Ina. 2015. "Who Leaves and Who Stays? Evidence on Immigrant Selection from the Collapse of Soviet Science." In Aldo Geuna (Ed.), *Global Mobility of Research Scientists: The Economics of Who Goes Where and Why*, pp. 133-154. Amsterdam: Elsevier.

Agarwal, Ruchir, Ina Ganguli, Patrick Gaulé, and Geoff Smith. 2023. "Why U.S. Immigration Matters for the Global Advancement of Science." *Research Policy* **52**(1): 104659.

Gaulé, Patrick, and Mario Piacentini. 2013. "Chinese Graduate Students and U.S. Scientific Productivity." *Review of Economics and Statistics* **95**(2): 698-701.

Prato, Marta. 2025. "The Global Race for Talent: Brain Drain, Knowledge Transfer, and Growth." *Quarterly Journal of Economics* **140**(1): 165-238.

Borjas, George J., Kirk B. Doran, and Ying Shen. 2018. "Ethnic Complementarities After the Opening of China: How Chinese Graduate Students Affected the Productivity of their Advisors." *Journal of Human Resources* **53**(1): 1-31.

Kahn, Shulamit and Megan J. MacGarvie. 2016. "How Important is U.S. Location for Research in Science?" *Review of Economics and Statistics,* **98**(2): 397-414.

Superstars, Concavity and the Concatenation of Talent

Cole, Jonathan R., and Stephen Cole. 1972. "The Ortega Hypothesis." *Science* **178**(4059): 368-375.

Azoulay, Pierre, Joshua Graff Zivin, and Jialan Wang. 2010. "Superstar Extinction." *Quarterly Journal of Economics* **125**(2): 549-589.

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Class 9 Measuring the Returns to R&D Investments November 4

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Class 10 — The US Patent System and Innovation Policy, Guest Lecture by Bhaven Sampat (Johns Hopkins University) — November 18

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Class 11 Zoom Guest Lecturer: Heidi Williams — November 25

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PROBLEM SET #2 DUE!

Class 12 Measuring Entrepreneurship and the Impact of Entrepreneurship Policy and Institutions — December 2

Potential Referee Reports

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Class 13 The Economics of Ideas and Innovation Policy December 9

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