THE UNIVERSITY OF CHICAGO

**Artificial Intelligence, Innovation, and Growth**

## ECONOMICS 23050/33050

## SOCIOLOGY 20620/30620

DATA 20620, MCSS 33050

***Tuesday/Thursdays 2:00 – 3:20 PM*** Winter 2025

***Canvas:*** Classroom: SHFE 021

***Instructors:***

Ufuk Akcigit James A. Evans

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Office Hours: Wednesday 4:00-6:00 PM Office Hours: Thursday 3:30-5:30 PM

Office & [Zoom](https://uchicago.zoom.us/j/2994692730?pwd=dHo3Sk8vNzFZY3FQSy94TVVjODZ5Zz09), sign-up [here](https://docs.google.com/spreadsheets/d/11kRd-14xVQHALZJEiwLtviNm_BUyHvRbzB11v15nWEw/edit?usp=sharing)

***TAs:*** Craig Chikis: [cachikis@uchicago.edu](mailto:cachikis@uchicago.edu)  
Discussion Session: Fri 1:30 PM - 2:20 PM in SHFE 203 and Fri 2:30 PM - 3:20 PM in SHFE 146.  
Office Hours: Monday and Tuesday 5-6 PM in SHFE Graduate Student Lounge

### **I. The Course**

Social and cultural innovation, alongside economic growth, are among the most compelling, critical and challenging phenomena in modern social science. Innovation has always been associated with unleashing transformative growth in art, science, and the economy, and in this class we explore these issues in the context of the contemporary emergence of Artificial Intelligence (AI). AI represents a novel source of innovation in the economy and society, but also a powerful tool for understanding, modeling, and steering innovation in new ways. The primary purpose of this course is to enable students to understand innovation and growth in the age of AI, and with tools from AI alongside theoretical frameworks and methods from economics, sociology, evolution, and complex systems necessary to study them. The course strives to provide students with a background in dynamic analysis, data analysis, and modern AI requisite for studying innovation in the modern age. We will also consider a number of compelling theoretical and empirical challenges, ranging from the paradox of institutionalizing innovation to inequalities that emerging AI capacities could create or remove to advances it could unleash in science and technology to the spread of misinformation to consequences of AI tools and “agents” in all domains of modern life to existential risks associated with AI. We will cover theories and models at an abstract and advanced level. We recommend a degree of quantitative and computation maturity (e.g., basic calculus, matrix algebra, statistics, and programming). The course will involve a technical homework and mid-term, along with a final proposal and single or group project involving theoretical and data analysis that explores innovation and growth in the age of AI.

### **II. Readings and Computational Tools**

Readings, homework, and assignments will be circulated in class and through the course’s Canvas site.

### **III. Course Requirements**

**Class Lectures:** Class lectures will happen in person Tuesdays and Thursdays from 2:00-3:20 PM.

**Discussion Sessions**: Students will attend one weekly hour-long discussion session focused on the week’s lectures, required readings, and final projects. Each discussion will include 2-3 student presentations, on the week’s topic/lecture. Discussion session times Fri 1:30 PM - 2:20 PM in SHFE 203 and 2:30 PM - 3:20 PM in SHFE 146.

**Reading:** Students are expected to read and reflect on all of the assigned readings each week in advance of the relevant class. Each session there will be three to five modest readings.

**Questions:** Every week students will post one question of less than 150 words to our [course GitHub site](https://github.com/KnowledgeLab/AI_Innovation_Growth_2025) (also accessible through [Canvas](https://canvas.uchicago.edu/courses/62081)) by Monday or Wednesday @ midnight prior to our class session (students will be assigned a Monday or Wednesday time slot). By 1pm Tuesday or Thursday, each student will up-vote (“thumbs up”) what they think are the five most interesting questions for that session. Some of the top-voted questions will be raised and discussed in class, and many more will be discussed in the relevant discussion session.

**Memos:** Every week students will post one memo in response to the readings and associated topic relevant to an empirical case regarding artificial intelligence, innovation, and/or growth to our [course GitHub site](https://github.com/KnowledgeLab/AI_Innovation_Growth_2025) (also accessible through [Canvas](https://canvas.uchicago.edu/courses/62081)) by Thursday @ midnight prior to our class session. By 12pm Friday, each student will up-vote (“thumbs up”) what they think are the five most interesting memos for that session. The memo should be 300–500 words + 1 custom analytical element (e.g., equation, graphical figure, image, etc.) that supports or complements your argument. These memos should: 1) test out ideas and analyses you expect to become part of your final projects; and 2) involve a custom (non-hallucinated) theoretical and/or empirical demonstration that will result in the relevant analytical element. Because these memos relate to an empirical case students hope to further develop into a substantial final project and because they involve original analytical work, they will be *very* difficult to produce with generative AI and we strongly discourage you from attempting it. Some of the top-voted memos will form the backbone of discussion in our full class discussion and break-out room sessions.

**Question/Memo deadlines and grading:** Questions and memos will be evaluated based on the depth of the analysis and effectiveness of the contribution on a scale from 3 to 0, with: 3 (superb); 2 (good); 1 (adequate); 0 (nothing turned in), which will roughly translate to the following emojis (grades): **😃**(~A), 😐(~B+), **😕** (~B-), **💩** (~F). We will drop the three lowest question and memo scores; no late questions or memos will be accepted.

**Homework:** One extended homework assignment will be required in advance of the Mid-term Test to serve as preparation. It will be distributed on Thursday, Feb. 6 @ 5pm, and will be due Thursday, Feb. 13 @ 11:59pm. Feb. 14 (Valentine’s Day), we will distribute the answers so that students can study for the in-class exam on Feb. 20. It will involve a mixture of model derivation, calculation, computation, and interpretation. Homework will be evaluated in advance of the mid-term to provide effective feedback.

**Mid-term Test:** The mid-term will be an in-person, hand-written test that involves critical evaluation of a policy that has the potential to increase or decrease innovation and growth within an organization, region, or country. The test will be in response to a detailed scenario and will reflect skills evaluated in the homework.

**Final Project:** Students will perform a substantial, empirical case study associated with at least two of the three concepts involved in the course (but ideally all three!): artificial intelligence, innovation, and growth. These projects must validate theory or data-driven inferences with qualitative interpretation and quantitative assessment. Projects may focus on a “positive” assessment of AI, innovation, and/or growth, or a “normative” policy seeking to optimize innovation and growth. The case may involve one or more firms, industries, regions, or national economies. Students will turn in a **2 page proposal** for final projects that details: 1) What? The topic and major argument; 2) Why? Its relevance to the course’s content; 3) Who? The stakeholders who would benefit from the insights of your project and promises; 4) How? What is your proposed method for producing or gathering and analyzing the data related to your case? These proposals will be due Wednesday, Feb. 19 @ 11:59pm and be graded and returned with feedback providing direction on how they can be improved to ensure a strong final project.

Proposals and final projects may be performed “solo” by a single student or in “duets” of two, with expectations that the work should be proportional to the students. The motivation, process and findings from this project will be presented in a 5-minute Ignite style talk—5 minutes, 20 PDF slides, auto-advancing every 15 seconds (see a description and example [**here**](https://en.wikipedia.org/wiki/Ignite_(event)))—on Thursday, March 13 from 4:30pm, to be presented in the classroom. Students will submit (1) final presentation slides by Thursday, March 13 @ 4:00pm (for presentations beginning @ 4:30pm to be signed up [here](https://docs.google.com/spreadsheets/d/1bi45HS39BRx_x2tltwWfBwakbioc4pXnO_2uKqlgTVA/edit#gid=501797073)—with length and slides log-proportional to group size: 5 minutes/20 slides for 1-person teams and 6.5 minutes/26 slides for two person teams); (2) a detailed 20 page case report that contains a detailed description of the background; explanation for the dynamics surrounding AI, innovation, and/or growth within the case, and either predictions of empirical futures or counterfactual projections of futures contingent on policies. These reports may contain up to 10 pages of data-relevant conceptual figures, data-driven graphs, case examples, or tables of results, and are due Friday, March 14 @ 5pm. We will create and circulate a rubric for how these projects will be graded by week 3.

**Grades & Logistics**: Grades will be based on weekly questions (10%), memos (20%), participation in discussion sessions, homework (10%), mid-term (20%), proposal for the final project (5%), and final project (35%).

### **IV. Calendar of Reading Assignments.**

**Week 1. Introduction to Artificial Intelligence, Innovation, and Growth**

We introduce the phenomena of artificial intelligence, innovation, and growth that will animate the class and motivate the problems and solutions we discuss throughout the quarter. We will explore their character and key conceptual and technical milestones that have marked their progress.

**Jan. 7 (Tuesday): *Introduction to Artificial Intelligence and Innovation [J]***

***Readings:***

1. [“Deep learning.”](https://www.nature.com/articles/nature14539) 2015. Yann LeCun, Yoshua Bengio, and Geoffrey Hinton. *Nature* 521(7553): 436-444.
2. [“Prediction policy problems.”](https://www.aeaweb.org/articles?id=10.1257/aer.p20151023) 2015. Kleinberg, Jon, Jens Ludwig, Sendhil Mullainathan, and Ziad Obermeyer. *American Economic Review* 105(5): 491-495.
3. *Power and Prediction: The Disruptive Economics of Artificial Intelligence*, Preface and Chapters 1-3 (pp. ix-41). 2022. Ajay Agrawal, Joshua Gans, Avi Goldfarb. Harvard Business Review Press.

***Supplementary:***

1. “Preface: How to Think with Deep Learning”, “Deep Learning?”, “Taming and Training Deep Models”, Preface & Chapters 1 & 3.
2. “Introduction” and “Deep Neural Networks” [*Deep Learning: Foundations and Concepts*](https://www.bishopbook.com/), chapters 1, 6.
3. [“The unreasonable effectiveness of deep learning in artificial intelligence”](https://www.pnas.org/doi/pdf/10.1073/pnas.1907373117). 2020. Terrence J. Sejnowskia. *Proceedings of the National Academy of Sciences.*

**Jan. 9 (Thursday): *Introduction to Innovation and Growth [U]***

***Readings:***

1. [“The Rise of American Ingenuity: Innovation and Inventors of the Golden Age”](https://static1.squarespace.com/static/57fa873e8419c230ca01eb5f/t/59381f56893fc0b465bc395a/1496850276932/AGN_20170607_post.pdf). 2017. Ufuk Akcigit, John Grigsby, and Tom Nicholas.
2. “[World Development Report 2024: Middle Income Trap](https://www.worldbank.org/en/publication/wdr2024#Chapters)”. The World Bank Group.

**Week 2. Models of Innovation and Growth**

**Jan. 14 (Tuesday): *Schumpeterian Theory and Creative Destruction [U]***

***Readings:***

1. “Chapter 4: Creation, in the [World Development Report 2024: Middle Income Trap](https://www.worldbank.org/en/publication/wdr2024#Chapters)”. The World Bank Group.
2. “[What Do We Learn from Schumpeterian Growth Theory,](https://www.nber.org/papers/w18824.pdf)” Philippe Aghion, Ufuk Akcigit, and Peter Howitt, Handbook of Economic Growth, ed. by P. Aghion, and S. N. Durlauf, 2014, Vol 2B: 515-563.
3. “Creative Destruction and Economic Growth,” 2023. Ufuk Akcigit, in *The Economics of Creative Destruction: New Research on Themes from Aghion and Howitt,* ed. byUfuk Akcigit and John Van Reenen: 21-42.

**Jan. 16 (Thursday): *Political Economy of Creative Destruction [U]***

***Readings:***

1. “[Connecting to Power: Political Connections, Innovation, and Firm Dynamics](http://www.ufukakcigit.com/s/ABL_WP_full.pdf)” Ufuk Akcigit, Salome Baslandze, and Francesca Lotti. *Econometrica*, 2023, 91(2): 529-564.
2. “[Barriers to Creative Destruction: Large Firms and Non-Productive Strategies](https://www.dropbox.com/s/1is1kdggurm1b9e/Barriers%20to%20creative%20destruction_Baslandze_V2final.pdf?dl=0)” 2023. Salome Baslandze, in *The Economics of Creative Destruction: New Research on Themes from Aghion and Howitt*.

**Week 3. Measurement and the Nature of Innovation**

**Jan. 21 (Tuesday): *Artificial Intelligence Allows us to Measure Innovation as Surprise [J]***

***Readings:***

1. [“Surprising combinations of research contents and contexts are related to impact and emerge with scientific outsiders from distant disciplines.”](https://www.nature.com/articles/s41467-023-36741-4) 2023. Feng Shi & James Evans. *Nature Communications.*
2. “Simulating Subjects: The Promise and Peril of AI Stand-ins for Social Agents and Interactions.” 2025. James Evans and Austin Kozlowski (on Canvas site).
3. [“Surprise! Measuring Novelty by Simulating Discovery.”](https://osf.io/preprints/socarxiv/2t46f) 2020. Jacob Foster, Feng Shi and James Evans.

***Supplementary:***

1. [“The historical structure of scientific discovery,”](https://www.science.org/doi/abs/10.1126/science.136.3518.760) 1962. Thomas S. Kuhn. *Science*.

**Jan. 23 (Thursday): *Evolution,* *Complexity, & the Process of Innovation [J]***

***Readings:***

1. “Combination and Structure” and “Mechanisms of Evolution”, Chapters 2 (27-43) and 3 (167-189) from *The Nature of Technology: What it is and How it Evolves*. 2009. Brian Arthur. Free Press: New York.
2. [“Assembly theory explains and quantifies selection and evolution”](https://www.nature.com/articles/s41586-023-06600-9). 2023. Abhishek Sharma, Dániel Czégel, Michael Lachmann, Christopher P. Kempes, Sara I. Walker & Leroy Cronin. *Nature.*
3. “[Modularity, Higher-Order Recombination, and New Venture Success](http://arxiv.org/abs/2405.15042)”. Likun Cao, Ziwen Chen, and James Evans. Preprint.

***Supplementary:***

1. “The Nonergodic Universe: The Possibilities of New Laws”, Chapter 7 in *Investigations*. 2000. Stuart Kauffman. Oxford University Press: 141-148.
2. “The Architecture of Complexity”. 1962. *Proceedings of the American Philosophical Society* 106(6): 467-482.
3. [“Role of design complexity in technology improvement.”](https://www.pnas.org/doi/epdf/10.1073/pnas.1017298108) 2011. James McNerney, J. Doyne Farmer, Sidney Rednera, and Jessika E. Trancik. *Proceedings of the National Academy of Science.*
4. [“The dynamics of correlated novelties.”](https://www.nature.com/articles/srep05890) 2014. Francesca Tria, Vittorio Loreto, Vito Domenico Pietro Servedio, and Steven H. Strogatz. *Scientific reports* 4(1):5890.
5. “[Dropout: A Simple Way to Prevent Neural Networks from Overfitting](https://www.jmlr.org/papers/volume15/srivastava14a/srivastava14a.pdf?utm_campaign=buffer&utm_content=buffer79b43&utm_medium=social&utm_source=twitter.com)”. 2014. N. Srivastava, G. Hinton, A. Krizhevsky, I. Sutskever, R. Salakhutdinov. *Journal of Machine Learning Research* 15: 1929-1958.

**Week 4: Who Invents and Innovates?**

**Jan. 28 (Tuesday): *Who becomes an inventor, scientist, or an entrepreneur? [U]***

***Readings:***

1. “[Tapping into Talent: Coupling Education and Innovation Policies for Economic Growth,](http://www.ufukakcigit.com/s/w27862.pdf)” 2024. Ufuk Akcigit, Jeremy Pearce, and Marta Prato. *Review of Economic Studies,* forthcoming.
2. “Brains and Business: How Inventors and Entrepreneurs Shape Economic Progress,” 2025. Ufuk Akcigit, Harun Alp, Jeremy Pearce, and Marta Prato. Working Paper.
3. “[Measuring the Characteristics and Employment Dynamics of U.S. Inventors,](http://www.ufukakcigit.com/s/Akcigit_Goldschlag_Descriptive_NBER.pdf)” Ufuk Akcigit and Nathan Goldschlag, *Journal of Economic Growth*, forthcoming.

**Jan. 30 (Thursday): *How does experience and environment shape innovative activity? [J]***

***Readings:***

1. “The Nostalgia Effect in Science”. 2025. Haochuan Cui, Yiling Lin, Lingfei Wu, James Evans. Preprint.
2. “[Large teams develop and small teams disrupt science and technology](https://www.nature.com/articles/s41586-019-0941-9?wpisrc=).” 2019. Lingfei Wu, Dashun Wang, and James A. Evans. 2019. *Nature* 566(7744): 378-382.
3. “[Flat Teams Drive Scientific Innovation](https://www.pnas.org/doi/full/10.1073/pnas.2200927119).” 2022. Fengli Xu, Lingfei Wu, James Evans. *Proceedings of the National Academy of Sciences.*
4. [“Remote collaboration fuses fewer breakthrough ideas”](https://www.nature.com/articles/s41586-023-06767-1). 2023. Yiling Lin, Carl Benedikt Frey & Lingfei Wu. *Nature* 623: 987–991.
5. [“Who do we invent for? Patents by women focus more on women’s health, but few women get to invent.”](https://www.science.org/doi/full/10.1126/science.aba6990) 2021. Koning, Rembrand, Sampsa Samila, and John-Paul Ferguson. *Science* 372(6548): 1345-1348.

***Supplementary***:

1. “[Being Together in Place as a Catalyst for Scientific Advance](https://www.sciencedirect.com/science/article/pii/S0048733323001956)”. 2023. Eamon Duede, Misha Teplitskiy, Karim Lakhani and James Evans. *Research Policy* 53(2): 104911.
2. “[Too many papers? Slowed canonical progress in large fields of science](https://www.pnas.org/doi/full/10.1073/pnas.2021636118).” 2021. Johan SG Chu and James Evans. *Proceedings of the National Academy of Sciences*.
3. “[Tradition and innovation in scientists’ research strategies](https://journals.sagepub.com/doi/full/10.1177/0003122415601618).” 2015. Jacob G. Foster, Andrey Rzhetsky, and James A. Evans. *American Sociological Review* 80(5): 875-908.

**Week 5: Fostering Inventions and Innovations**

**Feb. 4 (Tuesday): *Market Failure and Innovation Policy [U]***

***Readings:***

# “Innovation Paradox” 2024. Ufuk Akcigit and Nathan Goldschlag, Working Paper.

# “[Taxation and Innovation: What Do We Know?](http://www.ufukakcigit.com/s/AS_Innovation_Taxation_v9.pdf)” 2022. Ufuk Akcigit and Stefanie Stantcheva. *NBER Innovation and Public Policy*, edited by Austan Goolsbee and Ben Jones, University of Chicago Press.

# “[A Toolkit of Policies to Promote Innovation,”](https://www.aeaweb.org/articles?id=10.1257/jep.33.3.163) 2019. Nicholas Bloom, John Van Reenen, and Heidi Williams. *Journal of Economic Perspectives,* 33(3), 163–84.

1. “[Taxation and Innovation in the 20th Century](https://www.dropbox.com/s/yurdm4qgwf46w2k/AGNS_Taxation_Innovation.pdf?dl=0),” 2022. Ufuk Akcigit, John Grigsby, Tom Nicholas, and Stefanie Stantcheva). *Quarterly Journal of Economics*, 137(1): 329–385.

**Feb. 6 (Thursday): *Separation & Conflict in Innovation [J]***

***Readings:***

1. [“Abduction and the Logic of Scientific Advance.”](https://arxiv.org/pdf/2111.13251) 2021. Eamon Duede and James Evans.
2. [“The Paradox of Collective Certainty in Science.”](https://arxiv.org/pdf/2406.05809) 2024. Eamon Duede and James A. Evans. *Philosophy of Science*. Alan Love, Ed. University of Minnesota Press.
3. [“Destructive creation, creative destruction, and the paradox of innovation science”](https://doi.org/10.1111/soc4.13043). 2022. Likun Cao, Ziwen Chen, and James Evans. *Sociology Compass.*
4. “The Geometry of Perspective”. Likun Cao, Rui Pan, James Evans

***Supplementary:***

1. [“Limited Diffusion of Scientific Knowledge Forecasts Collapse.”](https://arxiv.org/pdf/2304.07468) 2024. Dongyhun Kang, Donghyun, Robert S. Danziger, Jalees Rehman, James A. Evans. *Nature Human Behaviour.*
2. “Meta-Research: [Centralized scientific communities are less likely to generate replicable results](https://elifesciences.org/articles/43094).” 2019. Valentin Danchev, Andrey Rzhetsky, and James A. Evans. *Elife* 8: e43094.
3. “[Prediction of robust scientific facts from literature](https://www.nature.com/articles/s42256-022-00474-8#:~:text=To%20predict%20robust%20facts%20from,GeneWays7%20and%20Literome8.)” 2022. Belikov, Alexander V., Andrey Rzhetsky, James Evans. *Nature Machine Intelligence*.

***Homework Assigned TODAY***

**Week 6: Constrained Innovation and its Avoidance**

**Feb. 11 (Tuesday): *Diversity in AI [J]***

***Readings:***

1. “[Accelerating Science though Human-Aware Artificial Intelligence](https://www.nature.com/articles/s41562-023-01648-z)”. 2023. Jamshid Sourati and James Evans. *Nature Human Behaviour.*
2. [“The Turing Trap: The Promise & Peril of Human-like Artificial Intelligence”](https://arxiv.org/pdf/2201.04200). 2022. Erik Brynjolfsson. *Daedalus*.
3. [“Superhuman artificial intelligence can improve human decision-making by increasing novelty”](https://www.pnas.org/doi/10.1073/pnas.2214840120). 2023. Minkyu Shin, Jin Kim, Bas van Opheusden, and Thomas L. Griffiths. *PNAS.*
4. “[Evolving AI Collectives to Enhance Human Diversity and Enable Self-Regulation](https://arxiv.org/pdf/2402.12590).” 2024. Shiyang Lai, Yujin Potter, Junsol Kim, Richard Zhuang, Dawn Song, James Evans. *International Conference on Machine Learning* (*ICML*).

***Supplementary:***

1. “[How AI Fails Us](https://www.ethics.harvard.edu/files/center-for-ethics/files/howai_fails_us_2.pdf)”. 2021. Siddarth, Divya, Daron Acemoglu, Danielle Allen, Kate Crawford, James Evans, Michael Jordan, E. Glen Weyl. 2021. *Harvard Justice, Health, and Democracy Impact Initiative.*
2. [“Linear Representations of Political Perspective Emerge in Large Language Models.”](https://openreview.net/pdf?id=rwqShzb9li) 2025. Kim, Junsol, James Evans, Aaron Schein.
3. “Complementary Intelligence”. 2025. James Evans and Chenhao Tan. Preprint.

**Feb. 13 (Thursday): *Business Dynamism in the US [U]***

***Readings:***

1. “[Ten Facts on Declining Business Dynamism and Lessons from Endogenous Growth Theory,](http://www.ufukakcigit.com/s/mac20180449.pdf)” 2021. Ufuk Akcigit and Sina Ates. *American Economic Journal: Macroeconomics,* 13(1): 257–298.
2. “[What Happened to U.S. Business Dynamism?](http://www.ufukakcigit.com/s/AA_fin.pdf)” 2023. Ufuk Akcigit and Sina Ates. *Journal of Political Economy,* 131(8): 2059–2124.

***Homework Due TODAY by 11:59pm***

**Week 7: What Kinds of Innovation occurs Where?**

**Feb. 18 (Tuesday): *Innovation in Small vs. Large Companies; in Market vs. Planned Economies [J/U]***

***Readings:***

1. [“The Rigid Disk Drive Industry: A History of Commercial and Technological Turbulence](https://www.cambridge.org/core/journals/business-history-review/article/abs/rigid-disk-drive-industry-a-history-of-commercial-and-technological-turbulence/CF54257C79F0FC3F34D2A7104F640A84)”. 1993. Clayton M. Christensen. *Business History Review.* [Or something from his 1997 book *The Innovator’s Dilemma*]
2. [“Dynamic capabilities and strategic management”](https://onlinelibrary.wiley.com/doi/abs/10.1002/(SICI)1097-0266(199708)18:7%3C509::AID-SMJ882%3E3.0.CO;2-Z). 1997. David J Teece, Gary Pisano, Amy Shuen. *Strategic Management Journal* 18(7):509-533.
3. “Battle of Ideologies: Firm Dynamics and Productivity in Planned Versus Market Economies,” Ufuk Akcigit, Richard Bräuer, Andrei Markevich, Javier Miranda, and Anna Zherdeva, Working Paper.

**Feb. 20 (Thursday): *In-Class Mid-term***

**Week 8: Fostering Innovation**

**Feb. 25 (Tuesday): *Innovation and Firm Dynamics in Developing Countries [U]***

***Readings:***

1. “[Lack of Selection and Limits to Delegation: Firm Dynamics in Developing Countries,](http://www.ufukakcigit.com/s/aer20180555.pdf)” 2021. Ufuk Akcigit, Harun Alp and Michael Peters. *American Economic Review*, 111(1): 231–275.
2. “[The Life Cycle Of Plants In India And Mexico,](http://klenow.com/HsiehKlenow_LifeCycle.pdf)” 2014. Chang-Tai Hsieh and Peter J. Klenow, *Quarterly Journal of Economics*, 129(3): 1035-1084.

**Feb. 27 (Thursday): *Building a Science of Innovation [J]***

***Readings:***

1. “[Metaknowledge](https://www.science.org/doi/full/10.1126/science.1201765).” 2011. Evans, James A., and Jacob G. Foster. *Science* 331(6018): 721-725.
2. “[Science of science](https://www.science.org/doi/10.1126/science.aao0185).” 2018. Santo Fortunato, Carl T. Bergstrom, Katy Börner, James A. Evans, Dirk Helbing, Staša Milojević, Alexander M. Petersen et al. 2018. *Science* 359(6379).
3. “[Toward a more scientific science](https://www.science.org/doi/full/10.1126/science.aav2484).” 2018. Pierre Azoulay, Joshua Graff-Zivin, Brian Uzzi, Dashun Wang, Heidi Williams, James A. Evans, Ginger Zhe Jin et al. *Science* 361(6408): 1194-1197.
4. [“The diversity–innovation paradox in science.](https://www.pnas.org/doi/abs/10.1073/pnas.1915378117)” 2020. Bas Hofstra, Vivek V. Kulkarni, Sebastian Munoz-Najar Galvez, Bryan He, Dan Jurafsky, and Daniel A. McFarland. *Proceedings of the National Academy of Sciences* 117(17): 9284-9291.

**Week 9: The Ends of Innovation**

**March 4 (Tuesday): *Creative Destruction, Inequality, and Happiness [U]***

***Readings:***

# “[Innovation and Top Income Inequality,](http://www.ufukakcigit.com/s/AABBH.pdf)” 2019. Philippe Aghion, Ufuk Akcigit, Antonin Bergeaud Richard Blundell, and David Hemous), *Review of Economic Studies,* 2019, 86(1): 1-45.

1. “[Creative Destruction and Subjective Well-Being,](http://www.ufukakcigit.com/s/AADR_aer_fin.pdf)” 2016. Philippe Aghion, Ufuk Akcigit, Angus Deaton and Alexandra Roulet, *American Economic Review*, 106(12): 3869-3897.

**March 6 (Thursday): *Automating Innovation with AI? [J]***

***Readings:***

1. “[Machine science](https://www.science.org/doi/full/10.1126/science.1189416).” 2010. James Evans and Andrey Rzhetsky. *Science* 329(5990): 399-400.
2. “[Catching crumbs from the table](https://www.nature.com/articles/35014679#citeas).” 2000. Ted Chiang. *Nature* 405(517).
3. “[Machine learning as a tool for hypothesis generation](https://academic.oup.com/qje/article/139/2/751/7515309).” 2023. Jens Ludwig, Sendhil Mullainathan. *The Quarterly Journal of Economics* 139 (2): 751-827.
4. [“AI Expands Scientists’ Impact but Contracts Science’s Focus.”](https://arxiv.org/abs/2412.07727) 2025. Hao, Qianyue, Fengli Xu, Yong Li, James Evans.
5. [“AI Scientist: Towards Fully Automated Open-Ended Scientific Discovery.”](https://arxiv.org/abs/2408.06292) 2023. Chris Lu, Cong Lu, Robert Tjarko Lange, Jakob Foerster, Jeff Clune, David Ha

**Week 10: Finals**

**March 13 (Thursday @ 4pm): Final Presentation of Projects**

**\*\*Turn in Final Project by Friday, March 14 by 5pm\*\***