

# Daniel Rock

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## Employment

**Wharton School, University of Pennsylvania**, Assistant Professor  
Operations, Information, and Decisions Department, July 2020 - present

**Massachusetts Institute of Technology**, Postdoctoral Associate  
Initiative on the Digital Economy, June 2019 - June 2020

## Education

**Ph.D., Massachusetts Institute of Technology**, 2019

*Sloan School of Management*

Dissertation: *Essays on Information Technology, Intangible Capital, and the Economics of Artificial Intelligence*

**S.M., Massachusetts Institute of Technology**, 2016

*Sloan School of Management*

Thesis: *Estimating Peer Effects in Networked Panel Data*

**B.S., University of Pennsylvania**, *summa cum laude*, 2010

*Wharton School*

Concentrations: Finance, Operations and Information Management

Minors: Mathematics, Economics

## Refereed Journal Publications

- *The Productivity J-Curve: How Intangibles Complement General Purpose Technologies* (with Erik Brynjolfsson and Chad Syverson) (published in *American Economic Journal: Macroeconomics*, formerly NBER Working Paper No. 25148)

## Working Papers

- *Engineering Value: The Returns to Technological Talent and Investments in Artificial Intelligence*
  - Commissioned as a Brookings Institution Working Paper
  - Under review (second round) at *Management Science*
- *Digital Capital and Superstar Firms* (NBER Working Paper No.w28285) (with Prasanna Tambe, Lorin Hitt, and Erik Brynjolfsson)
  - Part of the *Productivity Measurement Initiative Paper Series* hosted by the *Hutchins Center on Fiscal and Monetary Policy* at the *Brookings Institute* in 2019-2020
  - *Best Paper Runner-Up* at *CIST 2019*
  - In preparation for revise-and-resubmit at *Management Science*
- *An Early Look at the Labor Market Impact Potential of Large Language Models: GPTs are GPTs* (with Tyna Eloundou, Sam Manning, and Pamela Mishkin)

- *In preparation for revise-and-resubmit (second round) at Science*
- *Estimating the Distribution of the Impact of Machine Learning on Work* (with Erik Brynjolfsson, Morgan Frank, Tom Mitchell, and Iyad Rahwan)
- *Deep Capital for Deep Learning* (with Prasanna Tambe and Zhiwei Wang)
  - *Best Student Paper at WISE 2021*
- *The Perils of Peer Effects in Networked Observational Panel Data* (with Sinan Aral and Sean J. Taylor)
- *COVID-19 and Remote Work: An Early Look at U.S. Data* (NBER Working Paper No.w27344) (with Erik Brynjolfsson, John Horton, Adam Ozimek, Garima Sharma, and Hong-Yi Tu Ye)
- *Work2Vec* (with Sarah Bana, Erik Brynjolfsson, and Sebastian Steffen)
- *How Many Americans Work Remotely?* (with Erik Brynjolfsson, John J. Horton, Christos Makridis, Alex Mas, Adam Ozimek, and Hong-Yi TuYe)
- *Implications of Machine Learning for Labor Markets: Evidence from Europe* (with Erik Brynjolfsson and Georgios Petropoulos)
  - Nominated for Best Paper at WISE 2022
- *Skill-Biased Technological Change Within and Between Firms: 2000-2016* (with Seth Benzell and Guillermo Lagarda)

## Conference Publications, Book Chapters, and Other Writing

- McAfee, Andy, Daniel Rock, and Erik Brynjolfsson. “How to Capitalize on Generative AI: A Guide to Realizing its Benefits while Limiting its Risks”. *Harvard Business Review*. 2023.
- Rock, Daniel. “AI and Productivity”. *Royal Economic Society Newsletter*. 2023.
- Brynjolfsson, Erik, Seth Benzell, and Daniel Rock. “Understanding and Addressing the Modern Productivity Paradox”. *Research Brief for the MIT Work of the Future Task Force*. 2020.
- Rock, Daniel. “How Managers Can Enable AI Talent in Organizations”. *MIT Sloan Management Review* (part of the AI and Machine Learning Imperative Series). 8/5/2020. Available: <https://sloanreview.mit.edu/article/how-managers-can-enable-ai-talent-in-organizations/>
- Brynjolfsson, Erik, Daniel Rock, and Prasanna Tambe. “How Will Machine Learning Transform the Labor Market” In *Governance in An Emerging New World*, Spring Series, Issue 619. Hoover Institution. 2019.
- Brynjolfsson, Erik, Tom Mitchell, and Daniel Rock. “What Can Machines Learn, and What Does It Mean for Occupations and the Economy?” In *AEA Papers and Proceedings*, vol. 108, pp. 43-47. 2018.
- Brynjolfsson, Erik, Daniel Rock, and Chad Syverson. *Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics*. In *Economics of Artificial Intelligence*. University of Chicago Press, 2018. (NBER Working Paper No. 24001)
- Rock, Daniel, Aral, Sinan and Taylor, Sean. Identification of peer effects in networked panel data. In: *International Conference on Information Systems*. Dublin, Ireland. 2018.
  - International Conference on Information Systems: Best Paper (2nd Runner-Up), 2016

## Research Affiliations

*MIT Initiative on the Digital Economy*

*Stanford Digital Economy Lab*

*LinkedIn* - Economic Graph Challenge Affiliate Researcher

## Grants, Honors, and Awards

- *Schmidt Sciences AI2050 Early Career Fellowship*, 2024
- *Wharton Mack Center for Innovation Grant*, 2023 (with Tristan Botelho)
- *Grant from Wells Fargo to study cryptocurrency regulation*, 2023 (with Jillian Grennan)
- *Yale SOM Research Grant*, 2023 (with Tristan Botelho)
- *Wharton Dean's Research Fund Grant*, 2021
- *Google-Stanford HAI Academic Compute Grant* (for Work2Vec with Sarah Bana, Erik Brynjolfsson, and Sebastian Steffen), 2021 and 2022
- *Google Academic Cloud Grant* (for Work2Vec with Sarah Bana and Sebastian Steffen), 2020
- *MIT-IBM Watson AI Lab Grant*, 2018
- *MIT Translational Innovation Alliance Grant*, 2018
- *International Conference on Information Systems*: Best Reviewer 2017, 2019
- *Major U.S. Stock Exchange: Market Structure and Integrity Research Data Grant*, 2017-Present
  - Data grant to design and run experiments on U.S. equity markets
- *LinkedIn Economic Graph Research Collaboration*, 2016-Present
- *MIT Sloan Doctoral Fellowship*, 2013-2018
- *Beta Gamma Sigma Business Honors Society*, University of Pennsylvania Chapter, 2010
- *Dean's List*, University of Pennsylvania, 2006-2010

## Teaching

*Assistant Professor*, University of Pennsylvania Wharton School

- Spring 2024: OIDD 101 (undergraduate) (An Introduction to Operations, Information, and Decisions), OIDD 613 (MBA) (Online Business Models)
- Spring 2023: OIDD 101 (undergraduate) (An Introduction to Operations, Information, and Decisions), OIDD 613 (MBA) (Online Business Models)
- Spring 2022: OIDD 101 (undergraduate) (An Introduction to Operations, Information, and Decisions), OIDD 613 (MBA) (Online Business Models)
- Spring 2021: OIDD 101 (undergraduate) (An Introduction to Operations, Information, and Decisions), OIDD 469 (undergraduate) (Information Strategy and Economics)

*Course Developer and Instructor*, Propulsion Academy for Data Science, Zurich, Switzerland 2017

- Designed and taught 2 week intensive module on machine learning for Propulsion Academy (first data science bootcamp in Switzerland)

## Invited Academic Seminars

- 2024: UPitt (scheduled), Philadelphia Federal Reserve (scheduled), UC Irvine (scheduled)
- 2023: CMU Heinz, University of Virginia, Boston University
- 2022: Stanford HAI, HKUST, CUHK, MIT Sloan, University of Utah Eccles, Temple, University of Minnesota Carlson
- 2021: USC Marshall, MSU Broad
- 2020: CMU Tepper

- 2019: Harvard Business School, Stanford GSB, Michigan Ross, Chapman University, UC Irvine
- 2018: MIT Sloan, Cornell SC Johnson, USC Marshall, University of Pennsylvania, Boston College, University of Washington Foster, University of Texas-Austin McCombs, Tel Aviv University, HBS Digital
- 2017: MIT Sloan, MIT Economics (Organizational Economics Lunch)

## Invited Presentations and Attended Workshops

2023-2024 Academic Year:

- *New York Federal Reserve AMEC Symposium on U.S. Productivity Growth*, New York, NY
- *Workshop for Information Systems and Economics (WISE)*, Hyderabad, India
- *Federal Reserve Board of Governors*, Washington, D.C.
- *Temple Conference on Artificial Intelligence, Machine Learning, and Digital Analytics*, Philadelphia, PA
- *UC Irvine Digital Leadership Agenda 2024 Conference*, Irvine, CA
- *NBER Economics of AI Conference*, Toronto, CA
- *Applied Machine Learning Days Generative AI at EPFL*, Lausanne, Switzerland (Keynote)
- *AI & Big Data in Finance Research Forum*, Virtual
- *NABE Consumer/Retail Webinar*, Virtual
- *Absolutely Interdisciplinary at the Schwarz Reisman Institute at UToronto*, Toronto, CA
- *Global Partnership on Artificial Intelligence - Future of Work Plenary*, Virtual
- *Communications Research Associates*, Radnor, PA

2022-2023 Academic Year:

- *Management, Analytics, and Data Conference at Columbia University*, New York, NY
- *TD Cowen TMT Equity Research Conference*, New York, NY
- *American Economic Association*, New Orleans, LA
- *HBS Conference on Artificial Intelligence, Machine Learning, and Digital Analytics*, Cambridge, MA
- *ADP Research*, Virtual
- *Amazon, Inc.*, Seattle, WA
- *National Association of Business Economists Annual Conference*, Seattle, WA
- *ERC TechEvo UCD CSH workshop âMapping the Evolution and Geography of Collective Knowledgeâ*, Vienna, Austria
- *ESCoE Modeling an Evolving Economy Workshop*, London, UK
- *U.S. Dept of Labor*, Virtual
- *Conference on Information Systems and Technology*, Indianapolis, IN
- *INFORMS*, Indianapolis, IN
- *NBER Economics of Artificial Intelligence Conference*, Toronto, Canada
- *Academy of Management Annual Conference*, Seattle, WA
- *Wharton-Columbia MAD Conference*, NYC, NY

- *SCECR*, Madrid, Spain

2021-2022 Academic Year:

- *NYU-HBS AI in Strategic Management Conference*, Virtual
- *Economic Statistics Centre of Excellence Seminar*, Virtual
- *NYU Data Science Course Guest Lecture*, Virtual
- *Pitt Computational Social Science Seminar*, Virtual
- *Workshop for Information Systems and Economics*, Austin, TX
- *PwC Workshop on Future Labour Market Trends*, Virtual
- *Stanford HAI Fall Conference*, Virtual
- *Complex Networks in Economics and Innovation Satellite of Networks 2021*, Virtual
- *OECD Global Forum on Productivity Annual Conference*, Venice, Italy
- *Machine Learning for Consumers and Markets KDD 2021 Workshop*, Virtual
- *Academy of Management Annual Conference*, Virtual

2020-2021 Academic Year (Remote):

- *Brookings Institution Center on Regulation and Markets: AI Conference*, Washington, D.C.
- *Stanford HAI Digital Economy Lab*, Stanford, CA
- *Workshop on Information Systems and Economics (WISE)*, Hyderabad, India
- *American Economic Association Annual Conference*, Chicago, IL

2019-2020 Academic Year (2020 Remote):

- *NBER Economics of Artificial Intelligence Conference*, Toronto, Canada
- *Wharton People and Organizations Conference*, Philadelphia, PA
- *Brookings Institution Productivity Measurement Initiative*, Washington, D.C.
- *Conference for Information Systems and Technology*, Seattle, WA
- *Stanford HAI Conference on AI Measurement*, Stanford, CA
- *Center for Global Enterprise CEO Summit*, Boston, MA
- *Workshop on Information Systems and Economics (WISE)*, Munich, Germany
- *American Economic Association Annual Conference*, San Diego, CA
- *Organization Science Winter Conference*, Monterey, CA (postponed due to COVID-19)
- *MIT EmTech Next*, Boston, MA

2018-2019 Academic Year:

- *Munich Summer Institute*, Munich, Germany
- *Center for Global Enterprise CEO Summit*, Hong Kong, China
- *LinkedIn*, San Francisco, CA
- *Workshop on Information Systems and Economics (WISE)*, San Francisco, CA
- *ICIS 2018 Doctoral Consortium*, San Francisco, CA
- *Joint ECB/CEPR Labour Market Workshop*, Frankfurt, Germany

- *Conference on Information Systems and Technology*, Phoenix, AZ
- *SPRINGBOARD Conference*, Research Triangle Park, NC
- *MIT Initiative on the Digital Economy Seminar*, Cambridge, MA
- *NBER Economics of Artificial Intelligence Conference*, Toronto, Canada
- *European Network on the Economics of the Firm (ENEF) Meeting*, Falmer, Brighton, UK

2017-2018 Academic Year:

- *Academy of Management - Technology and Innovation Management Doctoral Consortium\**, Chicago, IL
- *MIT Initiative on the Digital Economy (IDE) Annual Conference*, Cambridge, MA
- *Harvard Business School Digital Initiative Doctoral Student Workshop*, Cambridge, MA
- *Consortium for Competitiveness and Cooperation (CCC)*, Berkeley, CA
- *LinkedIn Economic Graph Research Seminar*, San Francisco, CA
- *Wharton People Analytics*, Philadelphia, PA
- *Burning Glass Technologies Research Seminar*, Boston, MA
- *American Economic Association Annual Conference*, Philadelphia, PA
- *Mitra Biotech*, Woburn, MA
- *MIT Social Analytics Lab Seminar*, Cambridge, MA
- *MIT Organizational Economics Lunch*, Cambridge, MA
- *INFORMS Annual Conference*, Houston, TX
- *NBER Productivity Lunch Seminar*, Cambridge, MA
- *Wharton People and Organizations Conference*, Philadelphia, PA
- *NBER Economics of Artificial Intelligence Conference*, Toronto, Canada
- *UC Berkeley Deep Reinforcement Learning Bootcamp\**, Berkeley, CA

\*denotes invited attendee

2016-2017 Academic Year:

- *MIT Initiative on the Digital Economy (IDE) Annual Conference*, Cambridge, MA
- *NBER Digitization Winter Meeting Graduate Student Tutorial\**, Palo Alto, CA
- *LinkedIn Data All Hands Meeting*, Mountain View, CA Talk: *Building Human Capital Measures with LinkedIn Data*
- *Workshop on Information Systems and Economics (WISE)*, Dublin, Ireland
- *International Conference for Information Systems (ICIS)*, Dublin, Ireland
- *INFORMS Annual Conference*, Nashville, TN
- *MIT Social Analytics Lab Seminar*, Cambridge, MA
- *MIT Innovation Lab Lunch*, Cambridge, MA

2015-2016 Academic Year:

- *MIT Initiative on the Digital Economy (IDE) Annual Conference*, Cambridge, MA
- *MIT Initiative on the Digital Economy (IDE) Seminar*, Cambridge, MA
- *NBER Digitization Winter Meeting Graduate Student Tutorial\**, Palo Alto, CA

- *INFORMS Annual Conference*, Philadelphia, PA

## Professional Service

Reviewer:

*Management Science, Information Systems Research, MIS Quarterly, American Economic Journal: Economic Policy, American Economic Journal: Macroeconomics, American Economic Review: Insights, Applied Economics, Econometrica, Economica, Journal of the European Economic Association, Journal of Political Economy, Labour Economics, Quarterly Journal of Economics, Review of Economics and Statistics, Review of Income and Wealth, Proceedings of the National Academy of Sciences, Research Policy, Organization Science, Strategic Management Journal, Harvard Data Science Review, National Science Foundation, Israel Science Foundation, International Conference on Information Systems, International Conference on Computational Social Science, MIT Sloan Sports Analytics Conference*

Program Committee:

*Conference on Information Systems and Technology (CIST), 2018-23*  
*Associate Editor, International Conference for Information Systems, 2020*

## Other Experience

- Member, MIT Sloan Management Review Future of the Workforce Advisory Panel
- DRW Trading, LLC, Chicago, IL  
*Algorithmic Trader - Fixed Income, Currencies, and Commodities, 2011-2013*  
*U.S. Treasury Options Trading Analyst, 2010-2011*

## Additional

Technical: Python, R, TensorFlow, Keras, PyTorch, SQL, Pig, Spark, Hive, STATA, VBA, MATLAB

Other Personal: Proficient in Spanish, Lifelong Chicago Cubs Fan