From: John Horton and Andrey Fradkin
To: NBER Digitization Grant Committee
Re: Grant Proposal “Digitization and the Granularity of Labor Supply”

Introduction

Most research on the effects of digitization on the labor market has focused on changes in demand for specific skills and the complementarities (or lackthereof) between digital technology and labor supply (Brynjolfsson and McAfee, 2015; David et al., 2003). However, another way in which digitization has affected the labor market is by reducing the transaction costs of contracting for labor. Digital technology makes it easier to communicate, monitor counterparties, and transfer payments. This fall in transaction costs has made it easier to contract for work delivered in small chunks. Often, the timing of the delivery of that labor is at the individual worker’s discretion.

The paradigmatic example of labor granularity affected by technology comes from the for-hire ride industry. Passengers demand rides and one of many potential drivers can give the ride. Before the smart-phone era and the rise of transportation network companies (e.g. Uber and Lyft), most taxi drivers worked standardized shifts. In contrast, the median driver on Uber works less than 10 hours a week, and hours fluctuate greatly week to week (Hall and Krueger (2015)). This labor provision is made possible by smart phones, GPS, and a platform technology that matches supply to demand. Horton and Zeckhauser (2016) provide a model of how lowered transaction costs can bring previously missings markets into existence.

A similar transformation has occurred across many markets both offline and online. For example, Katz and Krueger (2016) found that contract work (independent and agency provided) has increased by an amount equal to 4% of the workforce from 2005 - 2015. Furthermore, online platforms for tasks such as design (99designs), programming (Upwork), local services (Handy, Thumbtack, and Taskrabbit) and hospitality (Airbnb) have been growing rapidly.

Granular labor has implications for both production efficiency and labor supply. On the production side, hiring in chunks allows employers to avoid paying workers when they are idle (e.g. when a store has no customers). This should make production more efficient. On the labor supply side, granular labor arrangements give workers additional flexibility (both in terms of time of work and amount of work). Indeed, Krueger and Katz (2016) find the largest increases in alternative labor arrangements for women and those over 55, workers who are considered to have stronger preferences for flexibility. However, chunking may also affect the relative wages of full-time and part-time labor in equilibrium, hurting workers who strongly prefer full-time work arrangements. If there is a large latent pool of people wishing to provide labor is small chunks but were previously unable to do so, technology could create a substantial labor supply shock.

Research Questions

In this research, we hope to answer several research questions related to labor granularity. Our initial questions of interest focus on both the supply and demand sides. We are interested in:

(1) How much do workers value flexibility, and to what extent that preference varies in the population by dimensions such as age, experience, gender and family situation?; (2) How do firms decide how to structure work?; and (3) What are the relative contributions of supply explanations and demand explanations for the rise of alternative work arrangements?

Methodology

We propose to address these questions through a combination of three empirical approaches: (1) platform observational, (2) nationally representative survey data and (3) experimentation.

For (1), we (Horton and Fradkin) have broad data sharing agreements with Upwork, Airbnb and Uber. All of them have observational data that could credibly speak to questions about the worker preference for flexibility, by age, gender, nationality and experience. Specifically, by studying workers' choices about hours worked, the stability of those hours, and how they relate to wages, we can estimate preferences for differing work arrangements.

On (2), we propose to use the American Time Use Survey to study whether hours worked and their variability have changed over time for a more representative set of workers.

On (3), we have several ideas for experiments that we believe would allow us to credibly measure preference for flexibility.

The basic idea is to hire workers in an online labor market to interview them, but then offer them various options about when to schedule an interview. For example, we could elicit reservation prices for the following scheduling options:

- "We will call you sometime between 9am and 5pm tomorrow"
- "We will call you at the time of your choosing, between 9am and 5pm"
- "We will call you at 4pm tomorrow"
- "We will call you at 4pm one week from today"

Space does not allow us to explore what different hypotheses these questions would test, but the basic idea is that we could probe how preference for flexibility "work" through revealed preference experiments.

We think the capstone to our empirical work is likely to be some applied theory models about how technology and labor granularity that is grounded in our empirical work.

References:

1. Brynjolfsson, Erik, and Andrew McAfee. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. WW Norton & Company, 2014.
2. David, H., Frank, L. and Richard, J.M. *The Skill Content of Recent Technological change: An Empirical Exploration*. Quarterly Journal of Economics, 118, p.4. 2003.

3. Katz, Larry and Alan Krueger. *The Rise and Nature of Alternative Work Arrangements in the United States, 1995 - 2015*, Working Paper, 2016.
4. Horton, John J. and Zeckhauser, Richard J. “Owning, Using and Renting: Some Simple Economics of the Sharing Economy” NBER Working Paper

JOHN J. HORTON

Kaufman Management Center, 44 West Fourth Street, New York, NY, 10012
website: www.john-joseph-horton.com · email: john.joseph.horton@gmail.com · twitter: @johnjhorton
Google Scholar Profile: http://goo.gl/buQYm

Current Position:
Assistant Professor of Information Systems, Stern School of Business, New York University, 2013-Present

Graduate Studies:
Ph.D. Public Policy, Harvard University, 2011
Thesis: *Online Labor Markets*
Committee: Richard Zeckhauser (chair), Lawrence Katz and Jeffrey Liebman

Undergraduate Studies:
B.S. Mathematics, Computer Science (minor), United States Military Academy at West Point, 2001

Research Experience & Other Employment:
Visiting Economist, Airbnb, Summer 2016
Visiting Economist, Uber Technologies, Summer 2015
Staff Economist, oDesk Corporation, 2011 - 2013
Research Associate, Harvard Kennedy School, 2012 - 2013
Research Intern, London School of Economics, Centre for Economic Performance, Summer 2010
Resident Tutor, Pforzheimer House, Harvard College, 2007 - 2011
Tank Platoon Leader & Executive Officer, US Army, 2001 - 2006

Teaching Experience:
Introduction to Technology in Business & Society, NYU Stern
Tutorial Leader, Harvard College, EC970: "Online Work," Spring 2010
Teaching Fellow, Harvard Kennedy School, API-302: "Analytic Frameworks for Public Policy," Fall 2007 - 2010
Teaching Fellow, Harvard Kennedy School, API-102, "Economic Analysis of Public Policy," Spring 2008
Instructor, Harvard Kennedy School, Math Camp for incoming PhD/DBA candidates, Fall 2008
Instructor, United States Military Academy at West Point, MA206, Probability and Statistics, Summer 2008

Academic Affiliations:
Affiliate, Berkman Center for Internet and Society, 2012 - 2013
Research Associate, Harvard Kennedy School, 2012 - 2013
Institute for Quantitative Social Science, 2009 - 2011

Honors, Scholarships & Fellowships:
Experimental Economics, Editor's Award Winner for 2011
Becker-Friedman Center on Price Theory, Summer Camp, University of Chicago, 2010
NSF-IGERT Multidisciplinary Fellowship in Inequality and Social Policy, 2008 - 2010
Institute for Humane Studies Graduate Fellowship, 2009
National Science Foundation Graduate Research Fellowship, Honorable Mention, 2008
Outstanding Winner, Mathematical Contest in Modeling and SIAM Prize Winner (with J. Gibbs and K. Arnett), 2000

Grants:
Upjohn Institute, Early Career Award Grant, 2016
Lab for Economic Applications and Policy, Harvard University, Research Grant, 2010
Institute for Quantitative Social Science, Harvard University, Travel Grant, 2010
Amazon Research Grant, Web Services, 2010

Berkman Center for Internet and Society, Harvard Law School, Research Grant, 2009

Professional Service
Departmental: Organizer of IS Faculty Seminar; PhD recruiting committee

Reviewer for: The Quarterly Journal of Economics, Journal of Labor Economics, Journal of Political Economy, Management Science, Information Systems Review, Judgement & Decision Making, Clinical Psychological Science, ACM-Electronic Commerce, ACM-Computer Human Interaction

Editing: Guest Associate Editor for Information Systems Review, Special Issue on Digital Platforms

Working Papers
Is Technology Entrepreneurship Efficient? The Social Value of the Marginal Startup
- **Status:** Draft available.

Supply Constraints as a Market Friction: Evidence from an Online Labor Market
- **Status:** working on invited 2nd round invited revision at *Management Science*

Owning, Using and Renting: Some Simple Economics of the "Sharing Economy (John Horton and Richard Zeckhauser)
- **Status**: Submitted to the Journal of Political Economy

Peer Effects in Production: Evidence from a Series of Field Experiments (John Horton and Richard Zeckhauser)
- **Status**: Draft available.

Work in Progress
At What Quality and What Price? Preference Elicitation as a Market Design Problem (John Horton and Ramesh Johari)
Price Floor and Preferences: Evidence from a Minimum Wage Experiment
Reputation Inflation (John Horton and Joe Golden)

Published Papers in Peer-Reviewed Journals or Conference Proceedings

The Effects of Algorithmic Labor Market Recommendations: Evidence from a Field Experiment
- **Status:** Forthcoming at *The Journal of Labor Economics*

Are Online Labor Markets Spot Markets for Tasks: A Field Experiment on the Behavioral Response to Wage Cuts (John Horton and Daniel Chen)
- **Status**: Forthcoming at *Information Systems Research*

The Online Laboratory: Conducting Experiments in a Real Labor Market (John Horton, David Rand and Richard Zeckhauser) *Experimental Economics*, 14:3 (2011), 399-425.
- Editor's Award Winner for 2011 (selected as the best paper published in the 2011 volumes of Experimental Economics).

The Condition of the Turking Class: Are Online Employers Fair and Honest?" *Economics Letters*, 111:1 (April 2011), 10-12.

The Future of Crowd Work (Aniket Kittur, Jeffrey V. Nickerson, Michael S. Bernstein, Elizabeth M. Gerber, Aaron Shaw, John Zimmerman, Matthew Lease and John Horton), *Conference on Computer-Supported Cooperative Work (ACM-CSCW)*, February 2013.
- The most heavily-cited paper from the 2013 ACM-CSCW proceedings (as of August 18, 2014), according to Google Scholar.

Labor Allocation in Paid Crowdsourcing: Experimental Evidence on Positioning, Nudges and Prices (Dana Chandler and John Horton), *Proceedings of the 25th Conference on Artificial Intelligence (AAAI), Human Computation Workshop (HCOMP)*, August 2011.

Designing Incentives for Inexpert Human Raters (Aaron Shaw, John Horton and Daniel Chen), *Proceedings of the ACM Conference of Computer Supported Cooperative Work (ACM-CSCW)*, Best Paper Nominee, March 2011.

- The most heavily-cited paper from the 2011 ACM-CSCW proceedings (as of November 27th, 2013), according to Google Scholar.

Online Labor Markets, *Proceedings of the 6th Workshop on Internet and Network Economics (WINE)*, December 2010.

Algorithmic Wage Negotiations: Applications to Paid Crowdsourcing (John Horton and Richard Zeckhauser), *Proceedings of CrowdConf*, 2010.

Task Search in a Human Computation Market (Lydia Chilton, John Horton, Rob Miller and Shiri Azenkot), *Proceedings of the ACM Conference on Knowledge Discovery and Data Mining/Human Computation (ACMKDD/HCOMP)*, 2010.

The Labor Economics of Paid Crowdsourcing (John Horton and Lydia Chilton), *Proceedings of the 11th ACM Conference on Electronic Commerce (ACM-EC)*, 2010.

- The most heavily-cited paper in the last 5 years of ACM-EC proceedings (as of August 10th, 2013), according to Google Scholar.

Book Chapters

Digitization and the Contract Labor Market: A Research Agenda (2015) (with Ajay Agrawal, Nicola Lacetera and Elizabeth Lyons). Appeared in "The Economic Analysis of the Digital Economy" edited by Avi Goldfarb, Shane Greenstein and Catherine Tucker

Other Publications

Labor Economists Get Their Microscope: Big Data and Labor Market Analysis (Horton, John J. and Sonny Tambe) Big Data, 2016.

"The Need for Standardization in Crowdsourcing" (Horton, John J. and Ipeirotis, Panagiotis), presented at the Crowdsourcing Workshop, ACM-CHI 2011 (Vancouver, BC), May 2011.

"Heads in the Cloud: Challenges and Opportunities in Human Computation" (with Robert C. Miller, Greg Little, Michael Bernstein, Jeffrey P. Bigham, Lydia B. Chilton, Max Goldman and Rajeev Nayak), XRDS: Crossroads, the ACM Magazine for Students, December 2010.

Select Invited Academic Presentations & Panels

Scheduled:

Speaker, Collective Intelligence, NYU Stern (conference presentation)
Sharing Economy Symposium, Keynote Speaker, University of Minnesota (conference presentation)
SOLE/EALE Conference, Seattle (conference presentation)

2016:

Creativity and Innovation Research Initiative (CIRI) (invited seminar), NYU Stern
The On-Demand Economy Conference, MIT Sloan (panel)
Frontiers in Digital Data, HBS (invited presentation)
AEA Annual Meeting, Organizer: "The Economics of Peer-to-Peer Markets"

2015:

WIN Conference (conference presentation)

INFORMS, "Empirical Market Design" (conference presentation)
NBER Productivity & Innovation (invited seminar)
CMU, Tepper School of Business, Business and Technology, Bus. & Society (invited seminar)
eBay Research (invited seminar)
Facebook Data Science (invited seminar)
Uber Technologies (invited seminar)
NBER Summer Institute, Economics of IT and Digitization (conference presentation)
ACM-Electronic Commerce, Portland (conference presentation & panel)
SOLE/EALE Conference, Montreal (conference presentation)
13th ZEW Conference on the Economics of Information & Communications Technology (presentation)
Chapman University, ESI/IFREE Lecture (invited seminar)
CODE (Conference on Digital Experimentation), (conference presentation)
Microsoft Research, NYC invited seminar)
Texas A&M - MEER Conference (conference presentation)
Carnegie Mellon University, School of Computing (invited seminar)
Texas A&M University, Economics Dept, Economic Theory & Experimentation Seminar (invited seminar)
UMN, Carlson School of Management, Work & Organizations Dept. Seminar (invited seminar)
AEA Annual Meeting, "Empirical Market Design"

2014:

MIT Sloan, Operations Management Seminar (invited seminar)
NBER Summer Institute 2014, Economics of IT and Digitization (conference presentation)
University of Chicago, Harris School, Public Policy and Economics Seminar (invited seminar)
University of Nuremburg (invited seminar)

2013:

Xiamen University, International Symposium on Contemporary Labor Economics
INSEAD, Technology and Operations Management Seminar, October 2013 (invited seminar)
MIT Roundtable on the Digital Economy (keynote speaker)
SOLE/EALE, Society of Labor Economics Annual Meeting (conference presentation)

2012

The Bernard L. Schwartz Globalization Initiative at SAIS Distinguished Lecture Series, Johns Hopkins University, November 2012

2011

Experimental Economics Lunch Seminar, University of Chicago
Networked Business Seminar, Harvard Business School, November 2011

2010

Neural Information Processing Systems (NIPS) 24th Annual Conference, Vancouver, British Columbia, Invited Speaker on "Social Science and the Wisdom of Crowds," December 2010
The 6th Workshop on Internet and Network Economics (WINE 2010), Stanford University
Christakis Lab Group Seminar Series, Harvard Medical School, November 2010
CrowdConf 2010, San Francisco, CA, October 2010
Advances with Field Experiments, Wharton School of Business, University of Pennsylvania,
Crowdsourcing Applications Seminar, University of Massachusetts, Amherst, October 2010
European Association of Labour Economists (EALE) / Society of Labor Economists (SOLE) 3rd International Conference, University College London, June 2010
ACM-Conference on Electronic Commerce (ACM-EC), Cambridge, MA, June 2010
EconCS Seminar, Harvard School of Engineering and Applied Science, March 2010

2009

SJDM Annual Conference, Boston, MA, November 2009

Selected Media Mentions

Washington Post, January 6, 2016
https://www.washingtonpost.com/news/wonk/wp/2016/01/06/sorry-you-wont-be-sharing-your-toothbrush-for-money/

Wall Street Journal, March 8, 2015
http://www.wsj.com/articles/at-startups-people-are-new-infrastructure-1425858978

The New Yorker, July 22nd, 2014
http://www.newyorker.com/business/currency/taskrabbit-redux

New York Times, February 15th, 2014
http://www.stern.nyu.edu/experience-stern/faculty-research/horton-outsourcing-digital

Financial Times, May 23, 2012
http://blogs.ft.com/beyond-brics/2012/05/23/virtual-working-takes-off-in-ems/

Wall Street Journal, September 29, 2011
http://online.wsj.com/article/SB10001424052970204422404576595171427035258.html

NPR, April 3, 2012
http://onpoint.wbur.org/2012/04/03/micro-labor-websites

GigaOm, October 18th, 2011
http://gigaom.com/collaboration/solvate-ceo-most-labor-platforms-undermine-american-workers/

Andrey Fradkin

CONTACT INFORMATION

MIT Sloan School of Management
245 1st Street, Room E94-1512, Cambridge, MA 02142

Voice: (201) 921-6279
E-mail: afradkin@mit.edu
Web: www.andreyfradkin.com
Google Scholar: goo.gl/pTiQBU

POSITIONS

2015 - ongoing: Postdoctoral Associate, MIT Sloan School of Management
2012 - ongoing: Part-time Data Scientist, Airbnb Inc.
2014 - 2015: Postdoctoral Fellow, National Bureau of Economic Research

EDUCATION

Stanford University, Stanford, California — September, 2008 - June, 2014
Ph.D. in Economics
Committee: Jonathan Levin, Liran Einav, Caroline Hoxby, Luigi Pistaferri

Duke University, Durham, North Carolina — August, 2004 - May, 2008
B.S. with High Distinction in Economics and Mathematics w/ minor in Political Science

RESEARCH FIELDS

Industrial Organization, Economics of Digitization, Labor Economics

PUBLICATIONS

The Welfare Economics of Default Options in 401(k) Plans (with Douglas Bernheim and Igor Popov)
American Economic Review, September 2015
Default contribution rates for 401(k) pension plans powerfully influence workers' choices. Potential causes include opt-out costs, procrastination, inattention, and psychological anchoring. We examine the welfare implications of defaults under each of these theories. We show how the optimal default, the magnitude of the welfare effects, and the degree of normative ambiguity depend on the behavioral model, the scope of the choice domain deemed welfare-relevant, the use of penalties for passive choice, and other 401(k) plan features. Depending on which theory and welfare perspective one adopts, virtually any default contribution rate may be optimal. Still, our analysis provides reasonably robust justifications for setting the default either at the highest contribution rate matched by the employer or – contrary to common wisdom – at zero. We also identify the types of empirical evidence needed to determine which case is applicable.

WORKING PAPERS

Search Frictions and the Design of Online Marketplaces
Online marketplaces increasingly act as intermediaries in labor, housing, dating, and other matching markets. These marketplaces collect novel data generated by users' search and communications activity. I study how this data can be used to inform marketplace design and to diagnose inefficiencies on Airbnb, a prominent online marketplace for short-term housing rentals. I show that potential guests engage in limited search, are frequently rejected by hosts, and match at lower rates as a result. I then estimate a micro-founded model of search and matching and use it to show that if frictions were removed, there would be 102% more matches in the marketplace. I propose and evaluate several search ranking algorithms and show that a personalized algorithm would increase the matching rate by 10% over the status quo. However, due to equilibrium effects, an A/B experiment of the type commonly used by internet companies can overstate the true treatment effect of an algorithm by over 100% in some cases.

Bias and Reciprocity in Online Reviews: Evidence from Experiments on Airbnb (with Elena Grewal, David Holtz, and Matthew Pearson)
Reviews and other evaluations are used by consumers to decide what goods to buy and by firms to choose whom to trade with, hire, or promote. However, because potential reviewers are not compensated for submitting reviews and may have reasons to omit relevant information in their

reviews, reviews may be biased. We use the setting of Airbnb to study the determinants of reviewing behavior, the extent to which reviews are biased, and whether changes in the design of reputation systems can reduce that bias. We find that reviews on Airbnb are generally informative and 97% of guests privately report having positive experiences. Using two field experiments intended to reduce bias, we show that non-reviewers tend to have worse experiences than reviewers and that strategic reviewing behavior occurred on the site, although the aggregate effect of the strategic behavior was relatively small. We use a quantitative exercise to show that the mechanisms for bias that we document decrease the rate of reviews with negative text and a non-recommendation by .86 percentage points. Lastly, we discuss how online marketplaces can design more informative review systems.

The Impact of Unemployment Insurance on Job Search: Evidence from Google Search Data (with Scott Baker)
Submitted
Job search is a key choice variable in theories of labor markets but has proven difficult to measure directly. We develop a new measure of job search activity based on Google search data, the Google Job Search Index (GJSI). We validate the GJSI by showing that it displays similar behavior to both survey and web browsing based measures of job search. Unlike those measures of job search, the GJSI is high-frequency, geographically precise, and available in real time.We demonstrate the utility of the GJSI by using it to study the effects of the unemployment insurance (UI) expansions between 2008 and 2011 on job search. We find no evidence of economically meaningful decreases in aggregate search activity due to these UI expansions.

Blame the Parents? How Financial Incentives Affect Labor Supply and Job Quality for Young Adults (with Frederic Panier and Ilan Tojerow)
Submitted
Young adults entering the labor force typically have little access to unemployment insurance or other formal insurance mechanisms. Instead, they rely on family insurance in the form of parental support to smooth consumption. We study the labor supply and job quality responses of Belgian young adults to decreases in parental support caused by parental job displacements. Our estimates correct for unobserved heterogeneity by using the timing of parental shocks before and after labor market entry. We find that a child whose parent loses a job prior to the child's labor market entry is, on average, induced to work 6% more in the 3 years following labor market entry than a child whose parents lose a job after the child's entry (where labor market entry is defined as the end of the childs full-time education). This effect is concentrated on the extensive margin, meaning that the child finds a job faster, and disappears within four years of entry. We find no evidence that parental support affects the quality of the initial job that entrants find.

In Progress:

Market Structure with the Entry of Peer-to-Peer Platforms: The Case of Hotels and Airbnb (with Chiara Farronato)
Online marketplaces have reduced entry costs across a variety of industries. These marketplaces allow small and part-time service providers (peers) to participate in economic exchange, often in competition with more traditional suppliers. For example, Airbnb and Uber allow almost anyone to become a hotelier or a cab driver. We first characterize market conditions favoring the entry of peer producers. In the context of the accommodation industry, we verify that across US major cities larger Airbnb presence is associated with low opportunity costs of renting out spare rooms, high investment costs of building hotels, and high demand volatility. We then provide reduced form evidence on the effect of Airbnb entry on hotels revenue, and highlight important city heterogeneity. We then derive and estimate a simple model of competition between a peer-to-peer marketplace and hotels to explain our reduced form findings. This model allows us to determine the efficient market structure conditional on the level and variability of demand, and to quantify the welfare gains from peer-to-peer entry in the accommodation industry.

Do Occupational Licenses Matter in a Digitized World? Evidence from an Online Ser-

vices Marketplace (with Erik Brynjolfsson, Chiara Farronato, and Brad Larsen)

Search, Matching, and Frictions in a Peer-to-Peer Market: Experimental and Model Based Evidence (This paper is a major revision of the first part of my thesis: "Search Frictions and the Design of Online Marketplaces.")

Micro versus Macro Approaches to Modeling Matching Outcomes in Online Platforms (This paper is a major revision of the second part of my thesis: "Search Frictions and the Design of Online Marketplaces.")

The Economics of Peer-to-Peer Markets
Invited Submission to the New Palgrave Dictionary of Economics

Refereed Conference Presentations:

Search, Matching, and the Role of Digital Marketplace Design in Enabling Trade, The Second International Conference on Computational Social Science
Search Frictions and the Design of Online Marketplaces, The Third Conference on Auctions, Market Mechanisms, and Their Applications (AMMA'15)
Bias and Reciprocity in Online Reviews: Evidence from Field Experiments on Airbnb. The Sixteenth ACM Conference on Economics and Computation (EC'15).

Presentations / Conferences

2016: ASSA 2016, Boston College, Searle Conference on Internet and Innovation, Summer Institute in Competitive Strategy
2015: Toulouse Network on Information Technology, MIT, Berkeley Crowdfunding Conference, NBER Summer Institute (Digitization, Labor Studies), FTC Sharing Economy Workshop, Presidents Council of Advisors on Science and Technology - Technology and the Future of Cities, Wharton, U. Chicago Harris School, U. Rochester Business School, Cornell School of Hotel Administration, Sciences Po, UCLA Anderson, Harvard (EconCS), Ebay Data Labs, NBER Productivity Seminar, Society of Labor Economists Conference (SOLE)
2014: Harvard Business School, Columbia Business School, NBER Summer Institute (Digitization), University of Illinois - Urbana Champaign, Microsoft Research, Airbnb Tech Talk, Square Inc., Conference on Digital Experimentation at MIT, Northeastern University
2013: NET Institute Conference, ASSA 2013
2011: Google Economics Group

Refeering and Service

Econometrica, Quarterly Journal of Economics, Journal of Economics and Management Strategy, Journal of Applied Econometrics, Program Committee of the 25th World Wide Web Conference (WWW'16).
Economic Frontiers Podcast - Economic Frontiers is a podcast about the frontier of economics research regarding technology, innovation, and digitization. Each episode brings in a leading researcher or research team for a discussion of their work and its broader implications.
MIT On-Demand Economy Workshop and Conference - Co-organized conference bringing together academics, technology leaders, and policy makers to discuss how technology is changing matching in the labor market.

Scholarships, Honors and Awards

Scholarships: NET Institute Fellowship, Shultz Fellowship Award, George P. Shultz Scholar, Haley-Shaw Fellowship Scholar
Awards: Allen Starling Johnson, Jr. Best Undergraduate Thesis in Economics Prize

Teaching Experience (as a TA)

2011 - 2012: Advanced Topics in Econometrics (Prof. DeGiorgi), Introduction to Econometrics (Prof. Harding and Prof. Mahajan), Market Design (Prof. Levin).
2007 - 2008: Intermediate Microeconomics (Prof. Yildirim and Prof. Taylor), Financial Markets and Investment (Prof. Eraker), Junior Honors Thesis Seminar (Prof. Tauchen and Prof. Bollerslev).

Data Science / Other

A National Survey of the Peer-to-Peer Economy (with Chiara Farronato and Rover.com)
Designed a quarterly national survey to measure the current and expected size of the peer-to-peer economy. The survey also quantifies the importance of barriers to the consumption of peer-to-peer services in the labor, hospitality, transportation, and pets markets.

Ranking Algorithm Design:
Co-designed a proprietary algorithm that uses discrete choice models to rank the listings displayed to Airbnb searchers. The algorithm creates an ordering according to a listing's perceived quality and probability of converting to a booking after communication.

Search Experimentation Framework:
Co-designed a system that tracks the actions of searchers and evaluates search experiments.

Operations Experiments:
Designed experiments to evaluate the effectiveness of customer support and platform pricing.

Media:
Co-created the Airbnb Hospitality Index and the Airbnb Global Citizenship Index. This work was covered in Le Monde, El Pais, the Telegraph, and other media outlets.

Consulting:
Advised on the design of Airbnb's reputation system and pricing recommendations.