Dennis Shen

Academic Positions

2023– **Assistant Professor**, Department of Data Sciences and Operations, USC

2021–2023 **Foundations of Data Science Institute Postdoc Fellow**, UC Berkeley
Advisors: Peng Ding, Jasjeet Sekhon, Bin Yu

Education

2017–2020 **PhD Electrical Engineering and Computer Science**, MIT
Thesis: "Causal Inference: a Tensor's Perspective"
Advisor: Devavrat Shah

2015–2017 **MS Electrical Engineering and Computer Science**, MIT
Thesis: "Robust Synthetic Control"
Advisor: Devavrat Shah

2011–2015 **BS Electrical and Computer Engineering**, UC San Diego
Advisors: Sujit Dey, Mohan Trivedi

Research Interests

Causal inference, high-dimensional statistics, machine learning

Industry Experience

2021–2022 **Uber Technologies**
Technical Consultant

2020–2021 **TauRx Therapeutics**
Technical Consultant

2018 **Facebook**
Core Data Science Research intern

Selected Awards

2021 INFORMS George B. Dantzig Dissertation Award, 2nd place

2021 MIT George Sprowls PhD Thesis Award in Artificial Intelligence & Decision-making, 1st place

2021 NSF I-Corps Grant, $50k

2017–2020 Draper Fellowship

2015–2018 National Physical Science Consortium Fellowship (funded by National Security Agency)

2015–2016 MIT EECS Advanced Television and Signal Processing Fellowship

Publications

Note: "♣" denotes alphabetical ordering by last name. "⋆" denotes equal contribution.

10. "Same Root Different Leaves: Time Series and Cross-Sectional Methods in Panel Data"
DS, Peng Ding, Jasjeet Sekhon, Bin Yu
- Journal: *Econometrica*, 2023
- Software: https://github.com/deshen24/panel-data-regressions

9. "Causal Matrix Completion"
♣ Anish Agarwal, Munther Dahleh, Devavrat Shah, **DS**
- Conference: *Conference on Learning Theory (COLT)*, 2023
- Software: https://github.com/deshen24/syntheticNN

Bridge Hall 307H – Los Angeles, CA 94720
dennis.shen@marshall.usc.edu • deshen24.github.io

8. "Public Health Implications of Opening NFL Stadiums during the COVID-19 Pandemic"
   Anette Peko Hosoi, Bernardo Garcia Bulle Bueno, **DS**, Devavrat Shah
   - Journal: *Proceedings of the National Academy of Sciences (PNAS)*, 2022

7. "Causal Imputation via Synthetic Interventions"
   Chandler Squires*, **DS***, Anish Agarwal, Devavrat Shah, Caroline Uhler
   - Conference: *Causal Learning and Reasoning (CLeaR)*, 2022

6. "PerSim: Data-efficient Offline Reinforcement Learning with Heterogeneous Agents via Personalized Simulators"
   ♣ Anish Agarwal, Abdullah Alomar, Varkey Alumootil, Devavrat Shah, **DS**, Zhi Xu, Cindy Yang
   - Conference: *Neural Information Processing Systems (NeurIPS)*, 2021

5. "Synthetic Interventions"
   ♣ Anish Agarwal, Devavrat Shah, **DS**
   - Workshop: *Neural Information Processing Systems (NeurIPS) Workshop on Causal Inference & Machine Learning*, 2019

4. "On Robustness of Principal Component Regression"
   ♣ Anish Agarwal, Devavrat Shah, **DS**, Dogyoon Song
   - Journal: *Journal of the American Statistical Association (JASA)*, 2021
   - Conference: *Neural Information Processing Systems (NeurIPS)*, 2019
     [**oral presentation: top 0.5% of total submissions**]

3. "Multi-dimensional Robust Synthetic Control"
   ♣ Jehangir Amjad, Vishal Misra, Devavrat Shah, **DS**
   - Journal: *Proceedings of the ACM on Measurement and Analysis of Computing Systems (POMACS)*, 2019
   - Conference: *Sigmetrics*, 2019

2. "Model Agnostic Time Series Analysis via Matrix Estimation"
   ♣ Anish Agarwal, Jehangir Amjad, Devavrat Shah, **DS**
   - Journal: *Proceedings of the ACM on Measurement and Analysis of Computing Systems (POMACS)*, 2018
   - Conference: *Sigmetrics*, 2019
   - Workshop: *Neural Information Processing Systems (NeurIPS) Workshop on Time Series*, 2017
     [**best poster award**]

1. "Robust Synthetic Control"
   ♣ Jehangir Amjad, Devavrat Shah, **DS**
   - Journal: *Journal of Machine Learning Research (JMLR)*, 2018
   - Workshop: *INFORMS*, 2017
     [**best poster runner-up award**]

Technical Report

1. "Two Burning Questions on COVID-19"
   ♣ Anish Agarwal, Abdullah Alomar, Arnab Sarker, Devavrat Shah, **DS**, Cindy Yang, 2020
   - MIT News

Under Review

3. "Algebraic and Statistical Properties of the Ordinary Least Squares Interpolator"
   DS*, Dogyoon Song*, Peng Ding, Jasjeet Sekhon

2. "Personalized Predictions from Population-level Experiments: A Study on Alzheimer's Disease"
   DS, Anish Agarwal, Vishal Misra, Bjoern Schelter, Devavrat Shah, Helen Shiells, Claude Wischik

1. "On Model Identification and Out-of-Sample Prediction of Principal Component Regression: Applications to Synthetic Controls"
   ♣ Anish Agarwal, Devavrat Shah, **DS**

Selected Talks

2024
- IMS International Conference on Statistics and Data Science (Nice, France)
- The Conference on Statistical Learning and Data Science (Newport Beach)
- IMS New Researchers Conference (Portland)
- The Institute of Statistical Mathematics (Tachikawa, Japan)

2023
- INFORMS (Phoenix)
- Joint Statistical Meeting (Toronto)
- ACM FCRC (Orlando)
- ICSA Applied Statistics Symposium (Michigan)

2022
- American Causal Inference Conference (UC Berkeley)
- Synthetic Controls Methods Workshop (Princeton)
- Tutorial at International Symposium for Information Theory (Helsinki, Finland)
- Purdue University's Causal Machine Learning for Novel Settings Boot Camp
- INFORMS (Indianapolis)
- UC Berkeley Econometrics Seminar
- Stanford Econometrics Seminar
- UCLA Information Theory and Systems Laboratory Group Meeting
- Stanford Data-Driven Decisions and Inference Group Meeting
- IMS International Conference on Statistics and Data Science (Florence, Italy)
- Computational and Methodological Statistics (King's College London, UK)

2021
- Simons Institute (UC Berkeley)
- Uber Marketplace
- Online Causal Inference Seminar (Stanford)
- INFORMS (Anaheim)

Teaching

2024 USC BUAD 310: Applied Business Statistics

2019 MIT EECS 6.s077: Introduction to Data Science and Statistics

2014-2015 UC San Diego ECE 35: Introduction to Analog Circuit Design

2014-2015 UC San Diego ECE 25: Introduction to Digital Circuit Design

Refereeing Service

Algorithmic Learning Theory, Annals of Statistics, Biometrika, Econometrica, Journal of American Statistical Association, Journal of Applied Econometrics, Journal of Machine Learning Research, Management Science, NeurIPS, Quantitative Economics

Academic References

Devavrat Shah
Department of EECS
MIT
devavrat@mit.edu

Peng Ding
Department of Statistics
UC Berkeley
pengdingpku@berkeley.edu

Jasjeet Sekhon
Department of Statistics & Data Science
Yale University
jasjeet.sekhon@yale.edu

Bin Yu
Departments of EECS and Statistics
UC Berkeley
binyu@berkeley.edu