Dennis Shen

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 Engineering**, UC San Diego.
Advisors: Sujit Dey, Mohan Trivedi

Research Interests

Causal inference, high-dimensional statistics, machine learning

Academic Positions

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

Industry Experience

2021–2022 **Uber Technologies**.
Consultant

2020–2021 **TauRx Therapeutics**.
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.

9. "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

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

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7. "Causal Matrix Completion"
   ♣ Anish Agarwal, Munther Dahleh, Devavrat Shah, **DS**
   - Workshop: *Neural Information Processing Systems (NeurIPS) Workshop on Machine Learning Meets Econometrics (MLEcon)*, 2021
   - Conference: *American Causal Inference Conference (ACIC)*, 2022
     [**oral presentation**]
   - Software: https://github.com/deshen24/syntheticNN

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. "Same Root Different Leaves: Time Series and Cross-Sectional Methods in Panel Data"
   DS, Peng Ding, Jasjeet Sekhon, Bin Yu, 2022
   - Software: https://github.com/deshen24/panel-data-regressions

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, 2022

1. "On Model Identification and Out-of-Sample Prediction of Principal Component Regression: Applications to Synthetic Controls"
   ♣ Anish Agarwal, Devavrat Shah, **DS**, 2022

Selected Talks

2023
- INFORMS (Phoenix)
- Joint Statistical Meeting (Toronto)
- 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

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

Academic References

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