

## Education

*August 2019—*      **Doctorate of Philosophy** in Electrical Engineering  
*May 2025(expected)*    University of Southern California, Los Angeles, CA  
GPA:      3.92 of 4.0

## Education

*January 2017—*      **Bachelor of Engineering** in Electrical Engineering  
*May 2019*      University of Michigan, Ann Arbor, MI  
GPA:      3.83 of 4.0  
Summa cum laude

## Honors and Awards

- University of Southern California Annenberg Fellowship (2019)
- University of Michigan Dean's List (January 2017 - April 2019)
- Michigan State Dean's List (December 2016 - December 2017)

## Key Courses

- **University of Southern California:** Stochastic Processes for Engineers, Information Theory and Its Application to (Big) Data Science, Detection and Estimation Theory, Data Networks: Design and Analysis, Optimization for the Information and Data Sciences, Non-linear Dynamics and Transitions to Chaos, Real Analysis, Complex Analysis, Machine Learning: Supervised Methods, Causal Learning, Computational Deep Learning, Stochastic Processes for Financial Engineering, Reinforcement Learning, Machine Learning II: Unsupervised methods and generative models.
- **University of Michigan:** Programming and Data Structures, Digital Signal Processing, Control Systems Design and Analysis, Probability and Stochastic Processes for Engineers\*\*, Linear System Theory\*\*, Numerical Methods for Engineers, Advanced Calculus, Digital Communication and Codes\*\*, Introduction to Modern Algebra.

\*\*-graduate level course taken as undergraduate

## Research Summary

My research is focused on quantifying confidence in causal discovery and inference algorithms. Specifically, my research focuses on providing theoretical guarantees on discovered edges given by

causal discovery algorithms. This work has seen a number of applications. In particular, I have collaborated with microbiologists to help uncover gene network structures in microbial communities and to uncover consumer behavior in large-scale economic environments during a previous internship.

## Experience and Research

*August 2019—*

*Present*

**Project:** Understanding Gene Networks in Microbial Systems (PhD)  
University of Southern California

**Advisor:** Urbashi Mitra

**Contributions:**

- Using elements of information and learning theory to quantify and enforce confidence constraints on causal discovery algorithms and find fundamental performance limits and optimal discovery methods.
- Designing algorithms that provide finite-sample theoretical guarantees on discovered edges that are also competitive with state-of-the-art causal discovery algorithms.
- Using causal discovery methods and Bayesian network inference to develop software aimed at helping biologists uncover gene networks in model microbial communities and design experiments for A/B testing.

*June 2023—*

*August 2023*

**Project:** Causal Inference in Large-Scale Consumer Environments  
Disney Research

**Advisor:** Erick Moen

**Contributions:**

- Used state-of-the-art causal discovery methods for time-series data from both structured and unstructured data to understand human decision-making in large-scale consumer environments using Bayesian networks and graphical models.
- Developed, updated, and deployed software using Python and Docker to aid in the causal discovery process of specific target variables in consumer environments of interest and assist leadership in making forward-thinking decisions.
- Constantly presented technical work and results to lab directors and executives.

*April 2018—*

*August 2018*

**Project:** Low-Complexity Decoding with Feedback  
University of Michigan

**Advisor:** Achilleas Anastasopoulos

**Contributions:**

- Designed and analyzed decoding schemes over discrete memoryless channels with feedback using communication and information theory.
- Wrote code in C++ to simulate and verify theoretical results.

*December 2016—  
May 2016*

**Project:** Extension of the Merton Model  
Michigan State University

**Advisor:** Albert Cohen

**Contributions:**

- Used stochastic calculus to model financial systems.
- Wrote code to implement both the Merton model and our extension to the model in Python and Mathematica.
- Performed statistical analysis on stock and bond data received from a Bloomberg terminal.

**Teaching Experience**

*August 2021—  
December 2021*

**Course:** EE 550: Data Networks: Design and Analysis  
University of Southern California

Assisted Professor Michael Neely in EE 550. Responsibilities include holding discussion sessions, office hours, and grading. Main systems and techniques of discussion includes the multiple access channel, ad-hoc networks, queuing theory, Markov processes, and convex optimization.

**Other Projects**

*January 2022—  
May 2022*

**Project:** Machine Learning: Student Score Prediction  
University of Southern California

Developed and tested several machine learning algorithms for the propose of student score prediction. Algorithms included perceptron learning, Bayesian methods with kernel density estimation, k-nearest neighbors, and a neural network. All algorithms and methods were coded from scratch using Python and Numpy.

*January 2019—  
April 2019*

**Project:** Machine Learning: Facial Recognition Software  
University of Michigan

Developed a facial recognition software. Designed, wrote, trained, and implemented a neural network in Python. The software recognized classmates in real time that the neural network had used for training.

*September 2017—  
December 2017*

**Project:** DSP Project: Tracking Finger Position  
University of Michigan

Wrote and implemented a Kalman filter in MATLAB. Applied the filter to down-sampled neural data and finger kinetics collected from

Chestek labs at the University of Michigan. Achieved a correlation of .97 between actual and predicted position.

## Journal Publications

- J1 J. Shaska and U. Mitra, **A Generalized Framework for Social Learning Over State-Dependent Networks**, in *IEEE Transactions on Signal Processing*, 2024, doi: 10.1109/TSP.2024.3460741.
- J2 J. Shaska and U. Mitra, **Joint Detection and Communication over Type-Sensitive Networks** *Entropy* 25, no. 9: 1313, 2023, <https://doi.org/10.3390/e25091313>
- J3 J. Shaska and U. Mitra, **Causal Link Discovery with Unequal Edge Error Tolerance**, *in preparation*.

## Conference Publications

- C1 J. Shaska and U. Mitra, **Causal Discovery with Unequal Edge Error Tolerance**, *Presented at Asilomar*, October 2024.
- C2 J. Shaska and U. Mitra, **Neyman-Pearson Causal Inference**, *2024 IEEE International Symposium on Information Theory (ISIT)*, Athens, Greece, 2024, pp. 1269-1274, doi: 10.1109/ISIT57864.2024.10619696.
- C3 J. Shaska and U. Mitra, **Type-Sensitive Social Learning**, *ICC 2023 - IEEE International Conference on Communications*, Rome, Italy, 2023, pp. 4634-4639, doi: 10.1109/ICC45041.2023.10279147.
- C4 J. Shaska and U. Mitra, **Information Structures for State-Dependent Decentralized Detection**, *2022 IEEE International Symposium on Information Theory (ISIT)*, Espoo, Finland, 2022, pp. 2702-2707, doi: 10.1109/ISIT50566.2022.9834384.
- C5 J. Shaska and U. Mitra, **Decentralized Decision-Making for Multi-Agent Networks: the State-Dependent Case**, *2021 IEEE Global Communications Conference (GLOBECOM)*, Madrid, Spain, 2021, pp. 01-06, doi: 10.1109/GLOBECOM46510.2021.9685149.

## Magazine Publications

- M1 J. Shaska et al., **Microbes as Communication and Decision-Making Networked Communities**, in *IEEE Nanotechnology Magazine*, vol. 17, no. 3, pp. 32-41, June 2023, doi: 10.1109/MNANO.2023.3262431.

## Technical experience

Mathematical modeling, Python, PyTorch, Docker, Numpy, C++, MATLAB/Simulink, Mathematica, Pandas, SciPy, scikit-learn, matplotlib, causal inference/discovery, causal analysis, statistical analysis, software development, software version control, Git, presenting and working on interdisciplinary projects, presenting to executive audiences.

## Languages

- English (native)
- Albanian (understand fluently, speak and read with basic competence)

## References

### **Urbashi Mitra** (PhD advisor)

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### **Albert Cohen**

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