

Curriculum Vitae

Joni Shaska

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Education

August 2019—

Present

Doctorate of Philosophy in Electrical Engineering

University of Southern California, Los Angeles, CA

GPA: 3.96 of 4.0

Education

January 2017—

May 2019

Bachelor of Engineering in Electrical Engineering

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,
- **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

Primary research interests include distributed learning, distributed inference, and causal learning. Using asymptotic optimality theory and information theory to analyze and design optimal inference algorithms for distributed learning environments, as well as measure information flow in sensor

networks and distributed learning environments. Using causal learning to develop models for understanding genetic expression in microbial communities.

Experience and Research

*August 2019—
Present*

Project: Distributed Learning in Microbial Systems (PhD)
University of Southern California

Advisor: Urbashi Mitra

Contributions:

- Using a decentralized learning and inference framework to model decision making capabilities and information gathering in microbial colonies.
- Rely on elements from machine learning, decentralized hypothesis testing, information theory, convex optimization, and measure theory.
- Currently attempting to use elements of causal learning and graph learning to better understand genetic expressions and interactions in microbial communities.

*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 data consisting of 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, **Decentralized Detection with State: Error Exponents for Informed and Uninformed Fusion Centers**, *submitted to IEEE Transactions on Information Theory*.

Conference Publications

- C1 J. Shaska and U. Mitra, **Decentralized Decision Making in Multi-Agent Networks: the State-Dependent Case**, *presented at the Global Communications Conference(GLOBECOM)*, Madrid, Spain, December 2021.
- C2 J. Shaska and U. Mitra, **Information Structures for State-Dependent Decentralized Detection**, *presented at the IEEE International Symposium on Information Theory (ISIT)*, Espoo, Finland, July 2022.

Technical experience

Mathematical modelling, Python, PyTorch, Numpy, Sklearn, C++, MATLAB/Simulink, Mathematica, statistical data analysis, public speaking.

Languages

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

References

Urbashi Mitra (PhD advisor)

Professor

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Albert Cohen

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