

SAMBIT MISHRA

PhD Student, Electrical & Computer Engineering | University of Southern California

✉ sambitmi@usc.edu

Research Focus

Causal inference and probabilistic graphical models, with emphasis on scalable continuous optimization methods for causal discovery in high-dimensional data. Focused on reliable structure learning under distribution shift, with applications to fraud detection and decision systems.

Education

University of Southern California (USC)

Ph.D. in Electrical and Computer Engineering; Advisor: Prof. Urbashi Mitra

GPA: 4.00/4.00

Coursework Taken: Probability Theory (EE 503 - Fall 2025, Grade: A), Linear Algebra (EE 510 - Fall 2025, Grade: A), Supervised Machine Learning (EE 559 - Spring 2026, Ongoing), Inference & Estimation Theory (EE 563 - Spring 2026, Ongoing).

Los Angeles, CA, USA

Aug 2025 – Present

Indian Institute of Technology (IIT) Bhubaneswar

B.Tech. (Hons.) in Electronics and Communication Engineering; Advisor: Dr. Soumya P. Dash

GPA: 9.14/10.00

Bhubaneswar, Odisha, India

2021 – 2025

Research Experience

Graduate Research Assistant

Ming Hsieh Department of Electrical and Computer Engineering, USC

- Developing continuous optimization methods for scalable DAG estimation using differentiable constraints to reduce iterations and enable large-scale batching.
- Designed a soft-intervention selection framework to improve causal discovery efficiency and lower experimental costs.
- Studying identifiability of causal graphs under finite samples and latent variable settings.
- Built GPU-accelerated structure learning pipelines in PyTorch using Adam and L-BFGS for non-convex optimization.

Los Angeles, CA, USA

Aug 2025 – Present

Undergraduate Researcher

School of Electrical and Computer Sciences, IIT Bhubaneswar

- Developed SER-optimized modulation schemes for RIS-assisted non-coherent communication systems.
- Conducted error analysis for multi-level ASK modulations, optimizing energy efficiency.

Bhubaneswar, Odisha, India

Aug 2024 – May 2025

Publications

- C. Peng, **S. Mishra**, U. Mitra, “Learning to Intervene: Optimized Soft Intervention Selection for Causal Discovery,” *IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, accepted, 2026.
- S. Mishra**, S. P. Dash and G. C. Alexandropoulos, “SER-Optimized Multi-Level ASK Modulations for RIS-Assisted Communications With Energy- and Sign-Based Noncoherent Reception,” in *IEEE Transactions on Green Communications and Networking*, vol. 10, pp. 1433-1445, 2026, doi: 10.1109/TGCN.2025.3633182.
- S. Mishra** and S. P. Dash, “Error Analysis With Optimal Receiver and Multi-Level ASK for RIS-Assisted Noncoherent Wireless System,” in *IEEE Wireless Communications Letters*, vol. 15, pp. 300-304, 2026, doi: 10.1109/LWC.2025.3624154.

Awards & Academic Distinctions

- Secured All India Rank 4000 among ~1,000,000 candidates in JEE Advanced 2021, India
- Awarded National Talent Search Scholarship by achieving a rank among the top 2000 students among ~1,200,000 candidates in National Talent Search Examination (NTSE) 2019, Government of India
- Qualified Regional Mathematical Olympiad (RMO) 2019; Selected participant, Indian National Mathematical Olympiad (INMO) 2020

Technical Skills

- Causal Inference:** Causal Discovery, Bayesian Networks, Structural Equation Models
- Optimization:** Gradient-based solvers (Adam, RMSProp, L-BFGS), Convex Optimization, Bilevel Optimization.
- Programming & Tools:** Python (PyTorch, NumPy, SciPy), C++, CUDA, MATLAB, Git, LaTeX.

Industry Experience

NVIDIA Corporation

ASIC Engineering Intern, CHI VIP Team

Verified CHI protocol compliance for CPU/GPU IPs using SystemVerilog and Perl automation; ensured interoperability between internal and external verification IPs.

Bengaluru, Karnataka, India

May 2024 – July 2024