Sourbh Bhadane

CONTACT INFORMATION

Email: s.n.bhadane@uva.nl
Website: https://sourbhbh.github.io
Scholar, GitHub

RESEARCH INTERESTS

Causal Inference, Machine Learning, Information Theory, Statistical Inference.

EDUCATION

Cornell University, Ithaca, USA
Ph.D. in Electrical and Computer Engineering Aug 2017 – Aug 2023

- Thesis: "An Information-Theoretic Approach to Optimal Neural-Network-Based Compression".
- Advisors: Aaron B. Wagner and Jayadev Acharya.
- Thesis Committee: Aaron B. Wagner, Jayadev Acharya, Kilian Weinberger, Ziv Goldfeld.

Indian Institute of Technology Madras
B.Tech. and M.Tech in Electrical Engineering Aug 2012 – Jul 2017

- Thesis: "Locally Recoverable Codes With Availability".
- Advisor: Andrew Thangaraj.

EMPLOYMENT

Postdoctoral Researcher
University of Amsterdam (UvA), Mercury Machine Learning Lab Sep 2023 – Present

- Supervisor: Joris M. Mooij.

PUBLICATIONS AND PREPRINTS

- **S. Bhadane**, J.M. Mooij, P. Boeken, O. Zoeter.
  TESTING PARTIALLY-IDENTIFIABLE CAUSAL QUERIES USING TERNARY TESTS
  In Preparation, ***2025***.

- **S. Bhadane**, J.M. Mooij, P. Boeken, O. Zoeter.
  REVISITING THE BERKELEY ADMISSIONS DATA: STATISTICAL TESTS FOR CAUSAL HYPOTHESES
  Uncertainty and Artificial Intelligence, ***UAI 2025***.

- E. Ozyilkan, J. Ballé, **S. Bhadane**, A. B. Wagner, E. Erkip.
  BREAKING SMOOTHNESS: THE STRUGGLES OF NEURAL COMPRESSORS WITH DISCONTINUOUS MAPPINGS
  Workshop on Machine Learning and Compression, NeurIPS 2024.

- J. Acharya, **S. Bhadane**, A. Bhattacharya, S. Kandasamy, Z. Sun.
  SAMPLE COMPLEXITY OF DISTINGUISHING CAUSE FROM EFFECT.
  Aritificial Intelligence and Statistics, ***AISTATS 2023***.

- **S. Bhadane**, A.B. Wagner, J. Ballé.
  DO NEURAL NETWORKS COMPRESS MANIFOLDS OPTIMALLY?
  Information Theory Workshop, ***ITW 2022***. arXiv

- **S. Bhadane**, A.B. Wagner.
  ON ONE-BIT QUANTIZATION.
  International Symposium on Information Theory, ***ISIT 2022***. arXiv

- **S. Bhadane**, A.B. Wagner, J. Acharya.
  PRINCIPAL BIT ANALYSIS: AUTOENCODING WITH SCHUR-CONCAVE LOSS.
  International Conference on Machine Learning, ***ICML 2021***. arXiv

- A.B. Wagner, E.L. Hill, S.E. Ryan, Z. Sun, G. Deng, **S. Bhadane**, V.H. Martinez, P. Wu, D. Li, A. Anand, J. Acharya, D.S. Matteson.
  Social Distancing merely stabilized COVID-19 in the United States.
  Stat 2020.

- J. Acharya, **S. Bhadane**, P. Indyk, Z. Sun.
  Entropy Estimation of Distributions in Constant Space.
  Conference on Neural Information Processing Systems, ***NeurIPS 2019***. arXiv

- **S. Bhadane**, A. Thangaraj.
  Unequal Locality and Recovery for Locally Recoverable Codes with Availability.
  National Conference on Communications, ***NCC 2017***. arXiv

- A.K. Gulati, **S. Bhadane**, J. Samuel, H. Ramachandran, R.D. Koilpillai.
  IITMSAT: Innovative Packet Protocol and Concept of Operations.
  AIAA/USU Conference on Small Satellites, ***SmallSat 2016***.

- J. Mevada, J. Samuel, **S. Bhadane**, A.K. Gulati, R.D. Koilpillai.
  Design and Implementation of a Robust Downlink Communication System for Nanosatellites.
  IEEE International Conference on Space Science and Communications, ***IconSpace 2015***.

Talks and Posters

- Invited Talk: Machine Learning Group, Universität des Saarlandes 2025
- Invited Talk: Amsterdam Causality Meeting 2025
- Invited Talk: Statistics Seminar, University of Amsterdam 2023
- Invited Talk: CCSP Seminar, University of Maryland, online 2023
- Invited Talk: Information Theory and Applications (ITA), San Diego 2023
- Talk: ITW, Mumbai 2022
- Talk: ISIT, Finland 2022
- Talk: (recording) ICML (virtual) 2021
- Poster: Stanford Compression Workshop (virtual) 2021
- Talk: (recording) Workshop on Local Algorithms (virtual) 2020
- Poster: ITA, San Diego 2019

Teaching Experience

Instructor

Statistics for Sciences, Amsterdam University College Spring 2024, 2025
- Co-instructor for course geared at BSc. Liberal Arts & Sciences

Calculus, Amsterdam University College Fall 2024
- Co-instructor for course geared at BSc. Liberal Arts & Sciences

Mathematics I For Chemical Sciences, University of Amsterdam Fall 2023
- Instructor for course geared at first-year BSc. Chemistry students.

Cornell Prison Education Program, Cornell Spring, Fall 2022
- Independent instructor of a community college mathematics course for incarcerated students at the Auburn and Five Points Correctional Facilities via the Cornell Prison Education Program.
- Designed course content including lectures, homeworks and exams.

Teaching Assistant

ECE 2720: Data Science for Engineers, Cornell Spring 2022, Fall 2019
- Was an early-stage TA during Fall 2019 and one of the Head TAs for Spring 2022.
- Produced course content including extensive lecture notes amounting to around 150 pages used as primary reference for the course.

- Led discussion sections, conducted office hours and graded exams.

Grader

ECE 5620: Fundamentals of Data Compression, Cornell — Spring 2021
ECE 4200 (4950): Fundamentals of Machine Learning, Cornell — Spring 2018-20, Fall 2020-21

- Designed four in-class Kaggle competitions:
  Spoken Digit-Pair Recognition,
  Font Recognition,
  Modulation Prediction,
  Guilty or Not Guilty?.

Professional Service

Reviewer

- Association for the Advancement of Artificial Intelligence (AAAI) 2026.
- Uncertainty and Artificial Intelligence (UAI) 2025.
- Conference on Neural Information Processing Systems (NeurIPS) 2021, 2022, 2023, 2024.
- International Conference on Machine Learning (ICML) 2022, 2025.
- International Conference on Learning Representations (ICLR) 2022, 2023, 2024, 2025.
- Artificial Intelligence and Statistics (AISTATS) 2023, 2025, 2026.
- International Symposium on Information Theory (ISIT) 2019-2022.
- Information Theory Workshop (ITW) 2021, 2022.
- Data Compression Conference (DCC) 2019, 2021, 2023.

Technical Skills

- **Programming Languages** - Python, R, C, C++.
- **Machine Learning Frameworks** - Tensorflow, PyTorch.

References

Up to 4 references available upon request.