

Siddharth Vishwanath

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Employment

University of California, San Diego 2023–Present
Stefan E. Warschawski Visiting Assistant Professor
Department of Mathematics

Education

Penn State University 2023
Ph.D., Statistics
Advisor: Dr. Bharath Sriperumbudur
Dissertation: “Statistical Learning for Efficient and Robust Topological Inference”

Indian Institute of Technology, Kanpur 2015
M.Sc. (Integrated), Mathematics & Scientific Computing
Advisor: Prof. Debasis Kundu
M.Sc. Thesis: “Bayesian Inference and Optimal Schemes for Progressive Censoring”

Honors & Awards

Alumni Association Dissertation Award. Penn State University 2023
Mu Sigma Rho (Inductee). The National Statistics Honorary Society 2018
Proficiency Medal. Indian Institute of Technology, Kanpur 2015
Academic Excellence Award. Indian Institute of Technology, Kanpur 2015
KVPY Fellowship. Department of Science & Technology (Government of India) 2010–2015

Previous Positions

Instructor, Penn State University 2022–2023
Research Intern, IBM Research: Artificial Intelligence 2022
Research Assistant & Consultant, Statistical Consulting Center, Penn State University 2019–2022
Research Assistant, Department of Statistics, Penn State University 2019
Visiting Research Student, Institute of Statistical Mathematics, Tokyo 2018, 2019
Teaching Assistant, Department of Statistics, Penn State University 2017–2018
Senior Quantitative Analyst, Goldman Sachs 2016–2017
Quantitative Analyst, Nomura 2015–2016

Research

🎓 Google Scholar ID : [7TQaHEEAAAAJ](https://scholar.google.com/citations?user=7TQaHEEAAAAJ)

Publications

Siddharth Vishwanath and Jonathan Hehir. The shape of edge differential privacy. *Theory and Practice of Differential Privacy Workshop, International Conference on Machine Learning*, 2021

Siddharth Vishwanath, Kenji Fukumizu, Satoshi Kuriki, and Bharath K Sriperumbudur. Robust persistence diagrams using reproducing kernels. *Advances in Neural Information Processing Systems*, 33:21900–21911, 2020

Siddharth Vishwanath and Debasis Kundu. Bayesian inference and optimal censoring scheme under progressive censoring. *Advances in Reliability and System Engineering*, pages 239–253, 2017

Robert J Meinen, Douglas B Beegle, Siddharth Vishwanath, Peter J Kleinman, Louis S Saporito, et al. Monolith soil core sampling to develop nitrate testing protocol for manure injection. *Soil Science Society of America Journal*, 2022

..... [Preprints](#)

Siddharth Vishwanath and Hyungsuk Tak. Repelling-attracting Hamiltonian Monte Carlo. *arXiv preprint arXiv:2403.04607*, 2024

Siddharth Vishwanath and Jonathan Hehir. Topological inference for random dot-product graphs under local differential privacy. *Submitted*, 2024+

Siddharth Vishwanath, Bharath K Sriperumbudur, Kenji Fukumizu, and Satoshi Kuriki. Robust topological inference in the presence of outliers. *arXiv preprint arXiv:2206.01795*, 2022

Siddharth Vishwanath, Kenji Fukumizu, Satoshi Kuriki, and Bharath Sriperumbudur. On the limits of topological data analysis for statistical inference. *arXiv preprint arXiv:2001.00220*, 2020

Selected Talks & Presentations

..... [Invited Talks](#)

Stochastic Modeling and Computational Statistics Talks, Penn State 2022
Hamiltonian Repelling Attracting Metropolis Algorithm for High Dimensional Multimodality

Center for Astrostatistics (CAst) Seminar, Penn State 2022
Hamiltonian Repelling Attracting Metropolis Algorithm for High Dimensional Multimodality

Conference on Neural Information Processing Systems, NeurIPS 2020
Robust Persistence Diagrams using Reproducing Kernels

Stochastic Modeling and Computational Statistics Talks, Penn State 2020
Statistical Inference for Topological Data Analysis

Geometric and Topological Data Analysis Group, University of California, Davis 2020
Limitations of Topological Data Analysis for Statistical Inference

..... [Contributed Presentations](#)

Joint Statistical Meetings (JSM) 2021
Efficient and Robust Topological Inference with Kernels

Theory & Practice of Differential Privacy, International Conference on Machine Learning 2021
The Shape of Edge Differential Privacy

IMSI Workshop on Topological Data Analysis 2021
Robust Persistence Diagrams using Reproducing Kernels

Joint Statistical Meetings (JSM) 2020
Statistical Invariance of Betti Numbers in the Thermodynamic Regime

Applied Topology: Methods, Computation, and Sciences (ATMCS) Conference 2020
Statistical Invariance of Betti Numbers in the Thermodynamic Regime

Geometric Data Analysis Conference, University of Chicago 2019
Statistical Invariance of Betti Numbers in the Thermodynamic Regime

Teaching

Data Analysis and Inference (Math 189; UC San Diego)	Winter, Spring 2024
Statistical Methods (Math 189; UC San Diego)	Fall, Winter 2023
Data Science through Statistical Reasoning (Stat 380; Penn State)	Spring 2023
Foundations of Mathematical Statistics (Math/Stat 319; Penn State)	Fall 2022

Service & Leadership

Professional Activities

Statistical Learning Theory Working Group @ Penn State 2018–2020
Co-organizer

Reviewing 2019–Present

- ▶ Journal of Machine Learning Research (JMLR)
- ▶ Neural Information Processing Systems (NeurIPS)
- ▶ International Conference on Machine Learning (ICML)
- ▶ International Conference on Learning Representations (ICLR)
- ▶ Conference on Artificial Intelligence and Statistics (AISTATS)

Workshop Organizer 2016

- ▶ Organized a biostatistics workshop at Maharani Laxmi Ammanni College for Women, India
- ▶ Conducted a three day session on statistical analysis for bioinformatics, with hands-on experience using R

Mentoring & Student Activities

Statistics Graduate Students' Association, Penn State 2017–Present
Graduate Mentor





- ▶ Research and professional mentoring for incoming PhD students, and served on student discussion panels
- ▶ Organized workshops on Git & version control (2022), Topological Data Analysis (2020), Tidyverse and Functional Programming in R (2018, 2019, 2020, 2021)

Students' Senate, IIT Kanpur 2013–2015
Finance Convener & Undergraduate Senator

- ▶ Managed a budget of INR 20 million which encompasses activities of all student bodies, clubs & hobby groups
- ▶ Served on the anti-ragging committee, and mentored incoming first-year students

Skills

Open source projects

- ▶  TDAOpt.jl. A Julia package for automatic-differentiation of statistical & topological loss functions
- ▶  RobustTDA.jl. A Julia package for flexible & robust computation of persistent homology in the presence of noise
- ▶  RA-HMC.jl. A Julia package for sampling from high-dimensional multimodal distributions using RA-HMC
- ▶  Robust PDs. R codebase for computing robust persistence diagrams using reproducing kernels

Programming

- ▶ Julia, R, Python, C/C++, Matlab, SQL, HTML, CSS, \LaTeX

Frameworks

- ▶ Flux.jl, Turing.jl, SciML.jl, Data.Table, Tidyverse, Pandas, NumPy, SciPy, JAX, PyTorch