Siddharth Vishwanath

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Education

Penn State University   2017 – Present
Ph.D. Candidate, Department of Statistics (3.95/4.00)

Indian Institute of Technology, Kanpur   2010 – 2015
M.Sc.(Integrated), Mathematics and Statistics (8.0/10.0)

Honors & Awards

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

Professional Experience

Goldman Sachs   2016 – 2017
Senior Quantitative Analyst: Market Risk
▶ Enhanced the methodology for estimating the liquidity risk in Margin Loan models using a Monte-Carlo framework
▶ Developed an automated risk-validation platform for regulatory submissions – saving over 30 hours of work per quarter
▶ Automation strategy employed machine learning models to identify and classify anomalies in regulatory stress-tests

Nomura   2015 – 2016
Quantitative Analyst: Model Validation
▶ Reviewed theoretical assumptions, set up benchmarking tools & assessed performance for various in-house risk models
▶ Developed an alternative framework for estimating specific counterparty credit risk in a Gaussian two-factor copula
▶ Enhanced methodology for computing counterparty exposure from Credit Default Swaps using a CIR++ model
▶ Developed an efficient method to estimate Marginal VaR for portfolios using nonparametric regression & kernel smoothing

American Express   2015
Customer Marketing Analytics
▶ Combined social-media data with AmEx closed-loop data to increase the efficiency of the merchant recommender engine
▶ Integrated interest-based Graph analysis with recommendations in a Bayesian framework to enhance the efficiency
▶ Enhanced the F_1-score of the recommender engine by 19%. Captured 30% more customer enrollments for online offers

Academic Experience

Statistical Consulting Center, Penn State   2019 – Present
Research Assistant & Consultant
▶ Conducted consultations with faculty, graduate students, and industry clients with research-related statistical problems
▶ Worked on long-term projects with Penn State faculty on a contractual basis

Department of Statistics, Penn State   2021
Research Assistant
▶ **Advisor**: Dr. Bharath Sriperumbudur
▶ Using reproducing kernel Hilbert space methods for *efficient & robust* geometric and topological inference

Department of Statistics, Penn State   2020
Research Assistant
▶ **Advisor**: Dr. Hyungsuk Tak
▶ Using tools from differential geometry to enhance Langevin & Hamiltonian Monte-Carlo methods for multimodal distributions

Center for Statistical Machine Learning, Insititue of Statistical Mathematics, Tokyo   2019, 2018
Visiting Research Student
▶ **Advisor**: Dr. Kenji Fukumizu and Dr. Satoshi Kuriki
▶ *Second research visit*: Studying robust persistence diagrams using reproducing kernel Hilbert spaces and metric geometry
▶ *First research visit*: Understanding the statistical behavior of topological summaries arising from random point processes

Research

Repelling-Attracting Hamiltonian Monte Carlo for Multimodal Sampling*
Siddharth Vishwanath, Hyungsuk Tak
In Preparation. (2021)

Efficient and Outlier Robust Topological Inference*
Siddharth Vishwanath, Bharath Sriperumbudur, Kenji Fukumizu & Satoshi Kuriki
In Preparation. (2021)

Topological Inference for Random Dot-Product Graphs under Local Differential Privacy*
Siddharth Vishwanath, Jonathan Hehir
Under review. (2021)

The Shape of Edge Differential Privacy [Link]
Siddharth Vishwanath, Jonathan Hehir
Theory and Practice of Differential Privacy. ICML (2021)

Robust Persistence Diagrams using Reproducing Kernels [Link], [Slides], [Code]
Siddharth Vishwanath, Kenji Fukumizu, Satoshi Kuriki & Bharath Sriperumbudur
Advances in Neural Information Processing Systems. NeurIPS. (2020)

Statistical Invariance of Betti Numbers in the Thermodynamic Regime [Link], [Slides]
Siddharth Vishwanath, Kenji Fukumizu, Satoshi Kuriki & Bharath Sriperumbudur
arχiv. (2020)

Bayesian Inference and Optimal Censoring Scheme under Progressive Censoring [Link]
Siddharth Vishwanath, Debasis Kundu
Advances in Reliability and System Engineering. Springer. (2017)

Talks & Presentations

Joint Statistical Meetings (JSM) [Slides]   2021
Theory & Practice of Differential Privacy @ ICML [Poster]   2021
IMSI Workshop on Topological Data Analysis [Poster]   2020
34th Conference on Neural Information Processing Systems, NeurIPS [Slides] [Talk]   2020
Stochastic Modeling and Computational Statistics Talks, Penn State [Slides]   2020
Geometric and Topological Data Analysis Group, University of California, Davis   2020
Applied Topology: Methods, Computation,and Sciences (ATMCS) [Slides] [Talk]   2020
Geometric Data Analysis Conference, University of Chicago [Poster]   2019
Rao Prize Conference, Penn State [Poster]   2019

Service & Leadership

Reviewer: AISTATS, ICML, NeurIPS   2020 – Present
Co-organizer, Statistical Learning Theory Working Group @ Penn State [Website]   2019 – 2020
Statistics Graduate Student Association, Penn State   2020
▶ Workshops on Tidyverse and Functional Programming in R (2018, 2019), Topological Data Analysis (2020)
Bioinformatics Workshop, Maharani Laxmi Ammanni College, India   2016
▶ Three day session on introduction to statistical analysis using R
Finance Convener, Students' Senate, IIT Kanpur   2013 – 2014
▶ Managed a budget of INR 20 million which encompasses activities of all student bodies, clubs and hobby groups
Undergraduate Senator, Students' Senate, IIT Kanpur   2013 – 2014

Skills

Programming	Julia, R, Python, C/C++, Matlab, SQL, HTML, CSS, LaTeX
Frameworks	Flux.jl, Turing.jl, Data.Table, Tidyverse, Tensorflow, PyTorch, Gudhi, Giotto-TDA
Languages	Native – English, Kannada, Hindi. Proficient – French