Dootika Vats

Curriculum Vitae
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Date of Birth: February 1990

Academic Positions

July '19 -	**Assistant Professor**, Department of Mathematics and Statistics, IIT Kanpur.
Mar 2017 - Jul 2019	**NSF Postdoctoral Fellow**, University of Warwick, England (mentor: Professor Gareth Roberts) University of California, Riverside (mentor: Professor James Flegal; May - July 2019).

Education

Feb 2017	**PhD, Statistics**, The University of Minnesota, Twin-Cities, USA. Advisor: Professor Galin Jones
Nov 2016	**MS, Statistics**, The University of Minnesota, Twin-Cities, USA.
May 2012	**MS, Statistics**, Rutgers University, New Brunswick, USA.
May 2010	**BA(honors), Mathematics**, University of Delhi, Lady Shri Ram College, India.

Research Interests

Markov chain Monte Carlo, Importance Sampling, Bayesian computation, variable selection, Bernoulli factories.

Publications

2023

15. Agrawal, S.[s], **Vats, D.,** Łatusyński, K., Roberts, G. O., Optimal Scaling of MCMC Beyond Metropolis, *Advances in Applied Probability*, 55:492-509.

2022

14. Agarwal, M.[s], **Vats, D.,** Elvira, V., A principled stopping rule for importance sampling, *Electronic Journal of Statistics*, 16:5570-5590.

13. Zhou, Q., Yang, J., **Vats, D.**, Roberts, G. O., Rosenthal, J. S., Dimension-free mixing for high-dimensional Bayesian variable selection, *Journal of the Royal Statistical Society: Series B*, 84:1751-1784.

12. Agarwal, M.[s], **Vats, D.**, Globally-centered autocovariances in MCMC , *Journal of Computational and Graphical Statistics*, 31:629-638.

11. **Vats, D.**, Flegal, J.M., Lugsail lag windows for estimating time-average covariance matrices, *Biometrika*, 109:735-750.

10. **Vats, D.**, Gonçalves, F., Łatusyński, K., Roberts, G. O., Efficient Bernoulli Factory MCMC for intractable posteriors, *Biometrika*, 109:369-385.

9. Liu, Y., **Vats, D.**, Flegal, J.M., Batch size selection for variance estimators in MCMC, *Methodology and Computing in Applied Probability*, 24:65-93.

2021

8. **Vats, D.,** Jones, G.L., Invited Discussion:"Rank-Normalization, Folding, and Localization: An Improved $\hat{R}$ for Assessing Convergence of MCMC by Vehtari et al.", *Bayesian Analysis*, (link), 2021.

7. **Vats, D.**, Knudson, C., Revisiting the Gelman-Rubin Diagnostic, *Statistical Science*, 36:518-529, 2021.

2020

6. Robertson, N., Flegal, J.M., **Vats, D.**, Jones, G.L.,, Assessing and visualizing simultaneous simulation error, *Journal of Computational and Graphical Statistics*, 30:324-334, 2020.

5. **Vats, D.,** Jones, G.L., Comment: "Unbiased Markov chain Monte Carlo with couplings", *Journal of the Royal Society Statistical Society, Series B*, (link), 2020.

4. **Vats, D.,** Robertson, N., Flegal, J.M., Jones, G.L., Analyzing Markov Chain Monte Carlo Output, *WIREs Computational Statistics*, 12:e1501, 2020.

2017-2019

3. **Vats, D.**, Flegal, J.M., Jones, G.L., Multivariate Output Analysis for Markov Chain Monte Carlo, *Biometrika*, 106:321-337, 2019.

2. **Vats, D.**, Flegal, J.M., Jones, G.L., Strong Consistency of Multivariate Spectral Variance Estimators in Markov Chain Monte Carlo, *Bernoulli*, 24:1860-1909, 2018.

1. **Vats, D.**, Geometric Ergodicity of Gibbs Samplers in Bayesian Penalized Regression Models, *Electronic Journal of Statistics*, 11:4033-4064, 2017.

Preprints

Submitted   Singh R.[s], Shukla A.[s], **Vats, D.**, On the Utility of Equal Batch Sizes for Inference in Stochastic Gradient Descent, arXiv.

Submitted   Banerjee, A.[s], **Vats, D.**, Multivariate strong invariance principles in Markov chain Monte Carlo, arXiv.

Submitted   **Vats, D.,** Acosta F., Huber, Mark L., Jones, Galin L., Understanding Linchpin Variables in Markov Chain Monte Carlo, arXiv.

Preprint   Douc, R., Jacob, P. E., Lee, A., **Vats, D.**, Solving the Poisson equation using coupled Markov chains, arXiv.

Submitted   Gupta, K.[s], **Vats, D.,** Chatterjee, C., Bayesian equation selection on sparse data for discovery of stochastic dynamical systems, arXiv.

Submitted   Gupta, K.[s], **Vats, D.**, Estimating Monte Carlo variance from multiple Markov chains, arXiv.

Book Chapters

2020   **Vats, D.** Flegal, J.M., Jones, G.L., Monte Carlo simulation: Are we there yet?, *Handbook of Computational Statistics and Data Science*, Wiley.

Book Reviews

2019   **Vats, D.**, *Simulation and the Monte Carlo Method, 3rd ed. by Reuven Y. Rubinstein and Dirk P. Kroese*, Journal of the American Statistical Association, DOI.

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PhD Supervision

2020 -   Arka Banerjee.

2021 -   Apratim Shukla.

2022 -   Arghya Mukherjee, *co-supervised with Arnab Hazra*.

Grants

2023-2024   Rice-IITK Strategic Collaborative Grant, *INR 15,00,000, Uncertainty Quantification: Leveraging Synergy between Optimization and Sampling*, Co-PI: Eric Chi, Rice University.

2023-2024   NBHM Department of Atomic Energy, *INR 2,75,000*, Attending ICIAM 2023.

2022   Google India Research Award, ≈ *INR 16,00,000*, "Towards reliable and robust ML: Estimating Variability in Stochastic Gradient Descent".

2021-2024   SERB POWER Grant, *INR 28,17,892*, "Estimating high-dimensional covariance matrices in Markov chain Monte Carlo".

2020-2021   SERB MATRICS Special call, *INR 5,50,000*, "Simulating with confidence: Accurate estimation in the study of COVID-19".

Awards and Honors

2024   Speaker, Indian Women and Mathematics' Visitor Programme, *giving semi-popular talks on topics building on undergraduate mathematics in non-metro areas*

2023   Sushila and Kantilal Mehta Award, IIT Kanpur, *for motivating and encouraging students to pursue pure mathematics through their teaching and research*

2023-26   Prof. R. N. Biswas Young Faculty Fellowship in Teaching Excellence, *IIT Kanpur.*

2022   Google India Research Award.

2022   Sushila and Kantilal Mehta Award, IIT Kanpur, *for motivating and encouraging students to pursue pure mathematics through their teaching and research*

2021   Blackwell-Rosenbluth Award, j-ISBA *recognizing outstanding junior Bayesian researchers for the overall contribution to the field and to the community*

2016   Student Paper Competition Winner, ASA's Section on Bayesian Statistical Science

2015   Student Paper Competition Winner, International Indian Statistical Association

2016   Director's Award, *awarded for outstanding service to the School of Statistics*

2016–2017   Louise T. Dosdall Fellowship, Minnesota *endowed fellowship for women in STEM*

2015–2016   School of Statistics Alumni Fellowship, Minnesota *awarded to an outstanding student*

2014   Bernard W. Lindgren Graduate Student Teaching Award, Minnesota *for excellence in teaching*

Invited Talks

Please find a list of talks here.

R Software

Maintainer   `SimTools`, **Vats, D.**, Flegal, J. M., Jones, G. L., Jalori, G..

Maintainer   `mcmcse`, Flegal, J.M., Hughes, J., **Vats, D.**, Dai, N..
supported by Google Summer of Code 2015

Contributor   `stableGR`, Knudson, C., **Vats, D.**.

Contributor   `multichainACF`, Agarwal, M., **Vats, D.**.

Contributor   `qbld`, Agarwal, A., **Vats, D.**.
supported by Google Summer of Code 2020

Teaching

Indian Institute of Technology Kanpur

MTH210a - Statistical Computing.

MTH208a - Data Science Lab 1.

MTH516a - Nonparametric Statistics.

MTH707a - Markov Chain Monte Carlo.

MTH511a - Statistical Simulation and Data Analysis.

University of Minnesota

Spring 2015	Lead instructor, STAT 3011 - Introduction to Statistical Analysis.
2012–2015	Teaching Assistant, *for undergrad and grad statistics courses*.
Sum 2013	Resource Instructor, College of Science and Engineering, New Grad Student Orientation.

Rutgers University

2011–2012	Part Time Lecturer, *Calculus and pre-calculus*.
Fall 2010	Grader, *Introduction to Mathematical Reasoning*.

Professional Service

IIT Kanpur

2022-	Senate Nominee, *Senate Library Committee*.
2020-22	Mess Warden, *Hall 6*.
2020-22	Senate Nominee, *Senate Undergraduate Committee*.
2020-21	Member, *Core Curriculum Committee*.

Editorial Service

Aug 2022 -	Associate Editor, *Journal of Computational and Graphical Statistics*.
May 2022 -	Associate Editor, *Sankhya Series B*.

Statistical Associations

Jan 2022 -	Program chair, *Section on Bayesian Computing, ISBA*.
2021-2022	Elected Member of Program Committee-Asia Representative, *Caucus for Women in Statistics*.
Summer	Mentor, *R Project for Statistical Computing*, Google Summer of Code, 2020,2021.
2018,19	Member of Review Panel, *American Statistical Association's Section on Bayesian Statistical Sciences' (SBSS) Student paper competition*.

Workshops and Conferences

Mar 2023	Scientific Program Committee member, *BayesComp 2023*, Levi, Finland.
Dec 2022	Scientific Program Committee member, *2022 IISA International Conference on Statistics*, Bangalore, India.
July 2021	Program committee member, *useR! 2021*, Virtual.
2021,22,23	Co-organizer, *Summer School for Women in Mathematics and Statistics*, ICTS.
Dec 2017	Scientific Program Committee member, *2017 IISA International Conference on Statistics*, Hyderabad, India.

University of Warwick

2017-2019	Co-organizer, *Algorithms & Computationally Intensive Inference Seminar Series*.

School of Statistics, University of Minnesota

Sum 2016	Curriculum Co-organizer and Convener, *Teaching Assistant Training*.
Spring 2016	Graduate Student Representative, *Search Committee for New Faculty*.

Spring 2016   Organizer, *Student Talks Seminar Series.*