Sandipan Pramanik

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Contact information

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Research interests

- **Machine learning/AI:** Normalizing Flows; Neural Networks; Universal approximation rates
- **Model Misspecification/Data Privacy:** Cutting Feedback; Modular Inference; Misclassification matrix modeling; Calibration; Bayesian transfer learning; Systematic preference
- **Statistical Decision Making:** Bayesian hypothesis test; Sequential test; Non-local prior (NAP); Bayes factor function (BFF); Clinical trials; Replication crisis
- **Efficient Modeling of Structures in Complex Data:** Dynamic network; Latent structure; High dimension; Efficiently incorporating structural information; Approximate message passing; Scalable computation; High dimension; large data; Variational Inference
- **Global Health Research:** Multi-source data integration; Limited sample setting; Mortality estimation; Verbal autopsy (VA); VA-calibration; Data science for global health

Professional Experience

Aug 2022 – present — Postdoctoral Fellow, Department of Biostatistics
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, USA

- Mentor: Abhirup Datta, Co-Mentor: Scott Zeger

Education

Aug 2016 – Aug 2022 — Ph.D., Department of Statistics, Texas A&M University
College Station, Texas, USA

- Advisor: Valen Johnson, Co-Advisor: Yang Ni
- GPA: 4.0

July 2014 – June 2016 — Master of Statistics, Indian Statistical Institute
Kolkata, West Bengal, India

- First Division with Distinction
- Specialization: Applied Statistics and Data Analysis
- Aggregate Marks (%): 76.7

July 2011 – June 2014 — Bachelor of Science, Department of Statistics
Ramakrishna Mission Residential College
Narendrapur, Kolkata, West Bengal, India
Affiliated to the University of Calcutta

- First Class First in the college
- Aggregate Marks (%): 93.87

Research Grant

- 2025 K99/R00 NIH Pathway to Independence Award (PI). NICHD, NIH
  1K99HD114884-01A1
  Objective: Country-Specific Modeling of Verbal Autopsy Misclassification for Improved Child and Neonatal Cause-Specific Mortality Estimates at Low- and High-Resolution Cause
- 2024 Johns Hopkins Data Science and AI Institute Demonstration Projects Award (Co-I)
  Co-sponsored with Johns Hopkins Malone Center for Engineering in Healthcare
  Objective: Utilizing data science and AI to improve mortality surveillance in Mozambique

Publications

- ***Published/In revision/Submitted:*** (*: co-first authors, †: equal contribution)
  - Perin, J., Prieto-Merino, D., Wahi, A., **Pramanik, S.**, Eilerts-Spinelli, H., Villavicencio, F., McCormick, T. H., You, D., Datta, A., Strong, K., Black, R., Liu, L. (2025+). Systematic estimates of the global causes of neonatal and under five mortality in 2000-2024. Submitted.
  - Song†, J., **Pramanik†, S.**, Datta, A. (2025+). Neural variational inference for cutting feedback during uncertainty propagation. Submitted.
    International Biometric Society ENAR 2026 Distinguished Student Paper Award
    [Arxiv] [GitHub]
  - Wilson, E. B., **Pramanik, S.**, Black, R., Datta, A., Kalter, H. (2025+). EAVA: An R package for Expert Algorithm Verbal Autopsy (EAVA) cause of death assignment. *Journal of Open Source Software*. Under review.
    [R package]
  - **Pramanik, S.**, Wilson, E. B., Kalter, H., Akelo, V., Amouzou, A., Black, R., Blau, D., Macicame, I., Muir, J., Lee, K., Liu, L., Whitney, C., Zeger, S., Datta, A. (2025+). Country-Specific Estimates of Misclassification Rates of Computer-Coded Verbal Autopsy Algorithms. In revision.
    [medRxiv] [R package] [GitHub] [Arxiv] [GitHub]
  - **Pramanik, S.**, Zeger, S., Blau, D., Datta, A. (2025). Modeling Structure and Country-Specific Heterogeneity in Misclassification Matrices of Verbal Autopsy (VA)-based Cause of Death Classifiers. *Annals of Applied Statistics.* 19(2):1214–1239. ISSN 1932-6157.
    [Article] [GitHub]
  - Tang*, B., **Pramanik*, S.**, Zhao, Y., Caffo, B., Datta, A. (2024). Direct Bayesian Regression for Distribution-valued Covariates. *Electronic Journal of Statistics.* 18(2): 3327-3375.
    [Article] [GitHub]
  - Johnson, V. E., **Pramanik, S.**, Shudde, R. (2023). Bayes factor functions for reporting outcomes of hypothesis tests. *Proceedings of the National Academy of Sciences (PNAS).* **120** (8): e2217331120.
    [Article] [R package]
  - **Pramanik, S.**, Johnson, V. E. (2024). Efficient Alternatives for Bayesian Hypothesis Tests in Psychology. *Psychological Methods.* **29**(2), 243–261. (Published online in 2022)
    [Article] [R package] [GitHub]
  - **Pramanik, S.**, Johnson, V. E., Bhattacharya, A. (2021). A Modified Sequential Probability Ratio Test. *Journal of Mathematical Psychology.* **101**:102505.
    [Article] [R package] [GitHub]

- ***Manuscripts available/To be submitted or resubmitted:***
  - **Pramanik, S.**, Ni, Y., Robertson, R. (2025+). Hurdle Network Model With Latent Dynamic Shrinkage For Enhanced Edge Prediction in Zero-Inflated Directed Network Time Series. Under review.
  - **Pramanik, S.**, Johnson, V. E. (2025+). Robust Bayesian Proportions Tests.
  - **Pramanik, S.**, Zhang, X. (2023+). Structure Adaptive Elastic-Net. To be resubmitted. [Arxiv] [GitHub (Latest)] [GitHub (Old)]
- ***In preparation:***
  - Multi-country Verbal Autopsy calibration (partnering with CA CODE and UN-IGME)
  - Modifying Bayesian inference for misspecified models
  - A unified approach to robust calibration

Published Open-access Software

- ***Published:***
  - **codalm** [2025, R package, GitHub]
    Implements the expectation-maximization (EM) algorithm as described in Fiksel et al. (2022) for transformation-free linear regression for compositional outcomes and predictors.
  - **NeVI-Cut** [2025, GitHub]
    Implements NeVI-Cut, a provably accurate and modular neural network-based variational inference method. It propagates uncertainty from an upstream analysis to a downstream analysis without feedback. Also, NeVI-Cut directly uses samples from the upstream analysis and requires no access to the upstream data or model, preserving modularity.
  - Integration of vacalibration with openVA [2025, R package]
  - **vacalibration** [2025, R package, GitHub]
    Calibrates cause-specific mortality fractions (CSMFs) generated by computer-coded verbal autopsy (CCVA) algorithms from WHO-standardized verbal autopsy (VA) survey data. The package includes an inventory of uncertainty-quantified misclassification matrices. They are derived using the framework in Pramanik et al. (2025) and the data collected in the (CHAMPS) project. More generally, the package can calibrate single-class predictions from discrete classifiers or their ensemble.
  - **EAVA** [2025, R package, (600+ downloads as of June 20, 2025)]
    The Expert Algorithm for Verbal Autopsy is a deterministic method that assigns a single cause of death to each 2016 WHO verbal autopsy record, using a hierarchical list of common causes specific to neonates (0-59 days) or children (1-59 months).
  - **hurdlenet** [2025, GitHub]
    This software models and predicts sparse, time-varying interactions among individuals using the Dynamic Hurdle Network (Hurdle-Net) model (Pramanik et al., 2025+). It incorporates temporal and network dependencies via latent dynamic shrinkage on node-specific variables, and supports both node- and edge-level covariates.

- **vamiss** [2024, GitHub]
  This software estimates country-specific misclassification matrices for calibrating verbal autopsy (VA) algorithms using paired top-cause estimates and gold-standard diagnoses (Pramanik et al., 2025). It adjusts for systematic bias and cross-country heterogeneity, and provides estimates of intrinsic accuracy to provide insights into algorithms' functioning.

- **GPDR** [2024, GitHub]
  Suppose a scalar response and multiple repeated measures are observed from individuals. Assuming the repeated measures from each individual are random samples from a covariate distribution, the software regresses the scalar response on distribution-valued covariates (Tang and Pramanik et al. 2024). It assumes a Gaussian process prior on the regression function and is invariant to any transformation or ordering of the repeated measures.

- **BFF** [2023, R package (10k+ downloads as of June 20, 2025)]
  This software computes Bayes Factor Functions (BFFs) based on common test statistics—z, t, χ^2, and F—as described in (Johnson et al., 2023). BFFs use non-local priors "centered" on standardized effect sizes, providing a continuous summary of evidence across scientifically meaningful alternatives. The functions are available in closed form and depend on hyperparameters r and τ^2, which control the shape and scale of the prior distributions under the alternative hypothesis.

- **NAP** [2022, R package (7k+ downloads as of June 20, 2025), GitHub]
  This software performs one- and two-sample Bayesian z and t tests for a point null versus a two-sided alternative using non-local priors (NAPs; Pramanik and Johnson, 2022). It supports normal moment and composite priors, computes Bayes factors and expected weight of evidence, and evaluates performance across effect sizes and sample sizes. It can also conduct sequential tests and calculate operating characteristics and average sample number.

- **MSPRT** [2021, R package (24k+ downloads as of June 20, 2025), GitHub]
  Given the maximum available sample size (N) and the target levels of Type I and II error probabilities, the software designs MSPRT for conducting one-sample proportion tests, and one and two-sample z and t tests (Pramanik et al., 2021). It exactly maintains the Type I error and outputs the operating characteristics. The supplement provides a user's guide.

- ***In preparation:***
  - Dashboard for vacalibration

Mentoring

- Diversity Summer Internship Program, Johns Hopkins

  An 8-week summer program that provides highly qualified undergraduates from underrepresented groups and economically disadvantaged backgrounds with a graduate-level research experience in the biomedical or public health field.

  - Byron Hall (2024). Mentor: **Sandipan Pramanik**, Co-Mentor: Abhirup Datta. Designed R-shiny application skeleton for country-specific VA-calibration.
  - Bella Grace (2023). Mentor: Abhirup Datta, Co-Mentor: **Sandipan Pramanik**. Designed automated cause mapping system to broaden the applicability of misclassification estimates from the CHAMPS Network data.

Awards

- ***Department/University:***
  - 2022 Emanuel Parzen Graduate Research Fellowship Award
  - 2021 Dr. Joseph Newton Graduate Student Service Award in recognition of service to the A&M (university, college, department, profession, or community) as a graduate student and maintaining high academic achievement
  - 2020 Dr. Anant Kshirsagar Graduate Fellowship for demonstrating outstanding potential through research during the doctoral program
  - 2014 Mrinal Kanti Basu Memorial Prize for securing First Class First position in Statistics during the undergraduate program
  - 2014 Swami Asaktananda Award for Best Performance in Degree Courses (Science Group) during the undergraduate program
  - 2014 Prof. Anil Bhattacharya Award for Best Performance in Degree Courses (Science Group) during the undergraduate program
- ***Presentation:***
  - Higher significance with smaller samples: A modified Sequential Probability Ratio Test
    * 2018 Bioinformatics and Cancer Symposium. *First Prize.*
    * 2018 Southeastern Texas Chapter of the American Statistical Association (SETCASA) Poster Competition. *Silver Prize.*
- ***Others:***
  - Prizes for good performances across semesters during Bachelor of Science in Statistics
  - All India Rank 1 in 2014 IIT-JAM (Indian Institute of Technology Joint Admission Test for Masters) examination (Mathematical Statistics)
  - Inspire Scholarship from the Department of Science & Technology, Government of India, during undergraduate and Master's (July 2011–June 2016)
  - Among top 1% in India and top 20 in West Bengal in Higher Secondary (10+2) examination

Teaching

- STAT 302, Statistical Methods, Texas A&M (Spring 2021) [Student rating: 4.56/5]
  - For undergraduates in biological sciences. Introduction to random sampling, estimation and testing hypotheses of means and variances, analysis of variance, regression analysis.

Teaching Assistant

- STAT 211, Principles of Statistics I, Texas A&M (Fall 2016, Spring 2017)
- STAT 642, The Methods of Statistics II, Texas A&M (Summer 2017)
- STAT 652, Statistics in Research II, Texas A&M (Summer 2017)

Technical Teaching Assistant

- STAT 642, The Methods of Statistics II, Texas A&M (Summer 2018)
- STAT 652, Statistics in Research II, Texas A&M (Summer 2018)

Presentations

- ***Invited:***
  - August 2025, Joint Statistical Meetings (JSM), Nashville, Tennessee. Recent advances in Bayesian transfer learning.
  - June 2025, International Indian Statistical Association conference (IISA), Lincoln, Nebraska. Bayesian transfer learning in global health applications.
  - Oct., 2024, Child and Adolescent Cause of Death Estimation Meeting, Barcelona, Spain
  - June 2023, IISA, Golden, Colorado. Correcting for Verbal Autopsy (VA) Misclassification Rates in Improving Cause-Specific Mortality Estimation.
- ***Contributed:***
  - Mar. 2024, Eastern North American Region (ENAR), Baltimore, Maryland. Modeling Structure and Country-specific Heterogeneity in Misclassification Matrices of Verbal Autopsy-based Cause of Death Classifiers.
  - Aug. 2020, JSM, Virtual. Structure Adaptive Lasso.
  - July 2019, JSM, Denver, Colorado. Higher significance with smaller samples: A modified Sequential Probability Ratio Test.

Professional Service

- Treasurer, Statistics Graduate Student Association (SGSA), 2021–22, Department of Statistics, Texas A&M University, USA
- Web developer, Statistics Graduate Student Association (SGSA), 2018–19, Department of Statistics, Texas A&M University, USA
- Treasurer, Statistics Graduate Student Association (SGSA), 2017–18, Department of Statistics, Texas A&M University, USA
- Trainee at Central Statistical Office, Ministry of Home Affairs, India, (Summer, 2015).

Journal Peer Review Activities

Annals of Applied Statistics, Journal of Computational and Graphical Statistics, Biometrics

Programming Skills

Advanced:	R, Stan, Rshiny
Intermediate:	Python, Rcpp, SQL

Languages

Fluent:	English, Bengali
Mothertongue:	Bengali
Working Knowledge:	Hindi

Hobbies

Photography, Painting, Cooking, Traveling

References

Dr. Abhirup Datta — Postdoc and K99/R00 Mentor (Current employer)
Associate Professor
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Dr. Scott Zeger — Postdoc and K99/R00 Co-Mentor
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Dr. Valen Johnson — Ph.D. Mentor
University Distinguished Professor
Department of Statistics
Texas A&M University
Email: vejohnson@tamu.edu

Dr. Li Liu — Collaborator, K99/R00 Co-Mentor
Associate Professor
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Dr. Anirban Bhattacharya — Collaborator, PhD Thesis Committee Member
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Dr. Alan Dabney — Teaching Mentor
Associate Head for Teaching Excellence
Professor
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Texas A&M University
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