

Soham Bonnerjee

University of Chicago, Department of Statistics

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RESEARCH INTERESTS

Time Series and Spatial Data, Statistical Learning Theory, Stochastic Optimization, Theory of Large Language Models.

EDUCATION

- **2021–Present:** PhD in Statistics, University of Chicago, Chicago, IL, USA. *Thesis Advisor:* [Wei Biao Wu](#).
- **2019–2021:** Master of Statistics, Indian Statistical Institute, Kolkata, India. *Thesis Advisor:* Anil K. Ghosh.
- **2016–2019:** Bachelor of Statistics (Hons.), Indian Statistical Institute, Kolkata, India.

PREPRINTS

- **Bonnerjee S.**, Karmakar S., Roy S. (2026) “Fast segmentation of watermarked texts from large language models through epidemic change-points framework.”
Major Revision at *Journal of American Statistical Association*. [[Preprint](#)].
- Lei Q., **Bonnerjee S.**, Han Y., Wei W.B. (2026) “Stability beyond bounded differences: sharp generalization bounds under finite L_p moments.” [[Preprint](#)]. *Under review at ICML*.
- Goldreich O., Lei Q., **Bonnerjee S.**, Li J., Wu W.B. (2026) “Identifying stability regions of SGD with constant learning rates.” [[Preprint](#)] *Under review at ICML*.
- **Bonnerjee S.**, Karmakar S., Cheng M., Wu W.B. (2025) “Testing synchronization of change-points for multiple time series.”
Major Revision at *Biometrika*. [[Preprint](#)]
- **Bonnerjee S.**, Wei Y.Z., Asch A., Nandy S., Ghosal P. (2025) “How Private is Your Attention? Bridging Privacy with In-Context Learning.” [[ArXiv](#)]. *Under review at TMLR*.

JOURNAL ARTICLES (PUBLISHED)

- AoS **Bonnerjee S.**, Karmakar S., Wu W.B. (2024). “Gaussian Approximation For Non-stationary Time Series with Optimal Rate and Explicit Construction.”
Annals of Statistics, 52(5): 2293–2317. [[Journal](#)][[ArXiv](#)]
- SMMR Ghatak A., Patel S.S., **Bonnerjee S.**, Roy S. (2022). “A Generalized Epidemiological Model with Dynamic and Asymptomatic Population.”
Statistical Methods in Medical Research, 31(11): 2137–2163. [[Journal](#)][[ArXiv](#)]

CONFERENCE ARTICLES (PUBLISHED)

- ICLR **Bonnerjee S.**, Lou Z., Wu W.B. (2025) “Sharp asymptotic theory for Q-learning with LD2Z learning rate and its generalization.” [[Preprint](#)].
Accepted at *International Conference on Learning Representations*, 2026
- NeurIPS (Spotlight) **Bonnerjee S.**, Karmakar S., Wu W.B. (2025). “Sharp Gaussian approximations for Decentralized Federated Learning.”
Conference on Neural Information Processing Systems, Main Conference Track, 2025. [[NeurIPS](#)] [[ArXiv](#)]

NeurIPS Goldreich O., Wei Z., **Bonnerjee S.**, Li J., Wu W.B. (2025) “Asymptotic theory of SGD with a general learning-rate.”

Conference on Neural Information Processing Systems, Main Conference Track, 2025. [[NeurIPS](#)] [[Preprint](#)]

PRESENTATIONS AND TALKS

1. **Invited:** (Virtual) Sharp Gaussian approximations for iterative algorithms , Dept of Statistics & Data Science, National University of Singapore, Singapore, December 2025.
2. **Invited:** Sharp Gaussian approximations for iterative algorithms , Dept of Statistics, University of Florida, Gainesville, USA, December 2025.
3. **Invited:** Spatial Change-point detection , *EcoSta 2025*, Waseda University, Tokyo, Japan, August 2025.
4. **Contributed:** Sharp Gaussian approximations in decentralized federated learning, *IISA 2025*, University of Nebraska-Lincoln, Lincoln, NE, USA, June 2025.
5. **Invited:** Gaussian Approximation For Non-stationary Time Series with Optimal Rate and Explicit Construction, *Stat-Math Unit Weekly Seminar, ISI Kolkata*, WB, India, September 2024.
6. **Contributed:** Strong Invariance Principle and its application in Synchronization Testing in Multiple Time-Series; *Bernoulli-IMS 11th World Congress in Probability and Statistics 2024*, Bochum, Germany, August 2024.
7. **Invited:** Change-Point Synchronization Testing in Multiple Time-Series, *SMSA 2024*, TU Delft, Delft, Netherlands, March 2024.
8. **Invited:** Optimal Gaussian Approximation for Stationary Spatial Field, *WSARFA*, Michigan State University, East Lansing, MI, USA, August 2023.
9. **Contributed:** Gaussian Approximation For Non-stationary Time Series with Optimal Rate and Explicit Construction, *JSM 2023*, Toronto, Ontario, Canada, August 2023.
10. **Invited:** A Statistical Pursuit of the Debate over Authorship of *Tirant Lo Blanc*, *PCM Memorial Lectures, Indian Statistical Institute*, Kolkata, WB, India, July 2021.

TEACHING EXPERIENCE

2021-2025: Teaching Assistant, *Dept. of Statistics, University of Chicago*

Courses: (STAT 24400) Statistical Theory and Methods I; (STAT 24500) Statistical Theory and Methods II; (STAT 33910) Financial Statistics: Time Series, Forecasting, Mean Reversion, and High Frequency Data; (STAT 22000) Statistical Methods and Applications.

SERVICES

- **Reviewing:** Journal of Machine Learning Research (JMLR), Annals of Statistics (AoS), Sankhya A, Journal of Statistical Computation and Simulation (JSCS). International Conference on Machine Learning (ICML).

ACHIEVEMENTS

- **2025: NeurIPS Travel Award**, NeurIPS 2025, San Diego, USA.
- **2025: IMS Hannan Graduate Student Travel Award**, Institute of Mathematical Statistics
- **2022, 2023: Senior Consultant Award**, University of Chicago, IL, USA
- **2016–2021: Deans list for Prize Money**, Indian Statistical Institute, Kolkata, India