Soham Bonnerjee

University of Chicago, Department of Statistics

5747 S Ellis Ave, Chicago, IL 60637

sohambonnerjee@uchicago.edu | sohamb01.github.io

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.

Journal Articles

1. **Bonnerjee S.**, Karmakar S., Cheng M., Wu W.B. (2025) "Testing synchronization of change-points for multiple time series." *Major Revision* at *Biometrika*. [Preprint]
2. **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]
3. 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

1. **Bonnerjee S.**, Karmakar S., Wu W.B. (2025) "Sharp Gaussian approximations for Decentralized Federated Learning." *Accepted* at *NeurIPS 2025*, *Spotlight*. [ArXiv]
2. Goldreich O., Wei Z., **Bonnerjee S.**, Li J., Wu W.B. (2025) "Asymptotic theory of SGD with a general learning-rate." *Accepted* at *NeurIPS 2025*, *Poster*. [Preprint]

Preprints

1. **Bonnerjee S.**, Karmakar S., Roy S. (2025) "WISER: Segmenting watermarked region - an epidemic change-point perspective." [ArXiv]
2. **Bonnerjee S.**, Lou Z., Wu W.B. (2025) "Sharp asymptotic theory for Q-learning with `LD2Z` learning rate and its generalization."
3. Goldreich O., Lei Q., **Bonnerjee S.**, Li J., Wu W.B. (2025) "Identifying stability regions of SGD with constant learning rates."
4. **Bonnerjee S.**, Wei Y.Z., Asch A., Nandy S., Ghosal P. (2025) "How Private is Your Attention? Bridging Privacy with In-Context Learning." [ArXiv]
5. **Bonnerjee S.**, Han Y., Wu W.B. (2025) "Stable convergence of Stochastic Gradient Descent for non-convex objectives." [Preprint]

In Preparation

1. **Bonnerjee S.**, Deb S., Wu W.B."Inference for spatial random effects model under dependence."

2. **Bonnerjee S.**, Karmakar S., Michailidis G. "Fast detection of anomalous patches for spatial data."
3. **Bonnerjee S.**, Bhattacharjee S., Karmakar S. "Multiple change point detection in dependent object-valued data."

PRESENTATIONS AND TALKS

1. **Invited:** Spatial Change-point detection *EcoSta 2025*, Waseda University, Tokyo, Japan, August 2025.
2. **Contributed:** Sharp Gaussian approximations in decentralized federated learning, *IISA 2025*, University of Nebraska-Lincoln, Lincoln, NE, USA, June 2025.
3. **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.
4. **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.
5. **Invited:** Change-Point Synchronization Testing in Multiple Time-Series, *SMSA 2024*, TU Delft, Delft, Netherlands, March 2024.
6. **Invited:** Optimal Gaussian Approximation for Stationary Spatial Field, *WSARFA*, Michigan State University, East Lansing, MI, USA, August 2023.
7. **Contributed:** Gaussian Approximation For Non-stationary Time Series with Optimal Rate and Explicit Construction, *JSM 2023*, Toronto, Ontario, Canada, August 2023.
8. **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:** Sankhya A, Journal of Statistical Computation and Simulation (JSCS), Journal of Machine Learning Research (JMLR), Annals of Statistics (AoS).

ACHIEVEMENTS

- **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