Soudeep Deb

Assistant Professor
Decision Sciences Area
Indian Institute of Management Bangalore, India.

Webpage: soudeepd.github.io
Phone: +91 80-26993387
E-mail: soudeep@iimb.ac.in

Current position

Research Interests
Time series, Spatio-temporal modeling, Environmental data analysis, Clustering and classification, Nonparametric methods, Sports analytics, Applications of statistics in finance and other disciplines.

Experience

Indian Institute of Management Bangalore, Bengaluru, KA, India. Mar 2020 - Present

- Assistant Professor (tenured since Oct 2023), Decision Sciences Area.

NBC Universal Media, LLC., New York, NY, USA. Sep 2018 - Feb 2020

- Senior Lead Data Scientist, Decision Sciences Division.

Education

University of Chicago, Chicago, IL, USA.

Ph.D., Statistics Aug 2018

- Thesis: Irregular spaced random field, Spatio-temporal data and Clustering of time series
- Advisory committee: Dr. Wei Biao Wu, Dr. Ruey S. Tsay, Dr. Michael L. Stein

Indian Statistical Institute, Kolkata, WB, India.

Master of Statistics (M. Stat.) May 2013

- First Division with Distinction, Specialization: Mathematical Statistics and Probability
- Thesis: Association analysis for identifying rare genetic variants, Advisor: Dr. Saurabh Ghosh

Bachelor of Statistics (B. Stat.) May 2011

- First Division with Distinction

Consulting services

DBS Bank, Singapore 2023

- Topic: Value of data joint study.

Real Estate Research Initiative (IIMB-RERI), Bengaluru, India Since 2023

- Topic: Developing a commercial rental index through spatial modeling.

SportsKPI, Bengaluru, India 2022-23

- Topic: Valuation of a Kabaddi player and its use in building strategies.

Doctoral students

PhD thesis advisor:

- Anchal Soni, Decision Sciences, Indian Institute of Management Bangalore. Feb 2023
  Thesis: Methods of analyzing structural breaks in multivariate time series: Applications to financial data.
- Siddharth Rawat, Decision Sciences, Indian Institute of Management Bangalore. May 2023
  Thesis: Spatio-temporal models in epidemiology and climate change.
- Kapil Gupta, Decision Sciences, Indian Institute of Management Bangalore. (Exp) 2025
  Thesis: Analyzing house price dynamics using novel spatio-temporal methods.
- Kunal Rai, Decision Sciences, Indian Institute of Management Bangalore. (Exp) 2026
  Thesis: Nonparametric methods and PINN in quantile regression for time series data.

PhD thesis co-advisor:

- Archi Roy, Dept of Mathematics, Indian Institute of Science Education & Research Pune. (Exp) 2025
- Chinmay Divekar, Decision Sciences, Indian Institute of Management Bangalore. (Exp) 2026

Doctoral committee member:

- Sajad S Santhosh, Public Policy, Indian Institute of Management Bangalore. (Exp) 2024
- M Mareeswaran, Finance & Accounting, Indian Institute of Management Bangalore. (Exp) 2025

Teaching

Course instructor, at Indian Institute of Management Bangalore:

- Multivariate Statistics (Core for PhD students) — Spring, 2021 - 2024
- Sports Analytics (Elective for MBA students) — Fall, 2023
- Decision Sciences I (Core for MBA students) — Fall, 2020 - 2023
- Statistical Inference (Core for PhD students) — Winter, 2020

Executive Education Programme, at Indian Institute of Management Bangalore:

- Predictive Analytics for Business Forecasting (10 sessions) — Winter, 2024
- Business Analytics and Intelligence (3 sessions) — Fall, 2022 & 2023

Course instructor, at University of Chicago:

- Introductory Statistics, Chicago Academic Achievement Program (UG) — Summer, 2015 & 2017
- Statistical Models and Methods I (UG) — Winter, 2015

Journal publications

- **Deb, S.**, Jana, K. (2023) Nonparametric quantile regression for time series with replications and its application to climate data. Accepted in Statistical Science. [preprint]
- Divekar, C., **Deb, S.**, Roy, R. (2023) Real-time forecasting within soccer matches through a Bayesian lens. Accepted in the Journal of the Royal Statistical Society Series A. [preprint]
- Roy, A., Soni, A., **Deb, S.** (2023) A wavelet-based methodology to compare the impact of pandemic versus Russia-Ukraine conflict on crude oil sector and its interconnectedness with other energy and non-energy markets. Energy Economics, 124, 106830. [publication]
- **Deb, S.**, Karmakar, S. (2023) A novel spatio-temporal clustering algorithm with applications on COVID-19 data from the United States. Computational Statistics & Data Analysis, 107810. [publication]
- Mareeswaran, M., Sen, S., **Deb, S.** (2023). New methods of structural break detection and an ensemble approach to analyze exchange rate volatility of Indian rupee during COVID-19. Journal of the Royal Statistical Society Series A: Statistics in Society, qnad078. [publication]
- Roy, A., **Deb, S.**, Chakarwarti, D. (2023) Impact of COVID-19 on public social life and mental health: A statistical study of Google Trends data from the USA. Journal of Applied Statistics, 1-25. [publication]
- **Deb, S.** (2023). Analyzing airlines stock price volatility during COVID-19 pandemic through internet search data. International Journal of Finance & Economics, 28(2), 1497-1513. [publication]
- Rawat, S., **Deb, S.** (2023). A spatio-temporal statistical model to analyze COVID-19 spread in the USA. Journal of Applied Statistics, 50(11-12), 2310-2329. [publication]
- **Deb, S.**, Majumdar, M. (2023). A quadratic trend-based time series method to analyze the early incidence pattern of COVID-19. Biostatistics & Epidemiology, 7(1), e2076529. [publication]
- Majumdar, M., Banerjee, M., Sengupta, J., **Deb, S.**, Jana, C. K., Roy, B. K. (2023) Prevalence and spectrum of diabetic peripheral neuropathy and its correlation with insulin resistance – An experience from eastern India. International Journal of Advanced Research, 11(06), 1085-1094. [publication]
- **Deb, S.**, Deb, S. (2022). An ensemble method for early prediction of dengue outbreak. Journal of the Royal Statistical Society Series A, 185(1), 84-101. [publication]
- **Deb, S.** (2022). A goal based index to analyze the competitive balance of a football league. Journal of Quantitative Analysis in Sports, 18(3), 171-186. [publication]
- Nahata, S., **Deb, S.** (2021) A Machine Learning Approach to Analyze the Effect of Situational and Player-Dependent Features on Converting Freekicks in Soccer. In Conference Proceedings 2021 Asia-Singapore Conference on Sport Science (p. 19). [publication]
- **Deb, S.**, Tsay, R. S. (2019). Spatio-temporal Models with Space-time Interaction and Their Applications to Air Pollution Data. Statistica Sinica, 29, 1181-1207. [publication]
- **Deb, S.**, Dey, D. (2019). Spatial Modeling of Shot Conversion in Soccer to Single out Goalscoring Ability. Journal of Sports Analytics, 5(4), 281-297. [publication]
- **Deb, S.** (2019). VAR Model Based Clustering Method for Multivariate Time Series Data. Journal of Mathematical Sciences, 237(6), 754-765. [publication]

- Prickett, K.C., Guiterrez, C., **Deb, S.** (2019). Family Firearm Ownership and Firearm-related Mortality among Young Children: 1976-2016. Pediatrics, 143(2), e20181171. [publication]
- Chazin, H., **Deb, S.**, Falk, J., Srinivasan, A. (2019). New Statistical Approaches to Intra-individual Isotopic Analysis and Modelling of Birth Seasonality in Studies of Herd Animals. Archaeometry, 61(2), 478-493. [publication] [R package]
- **Deb, S.**, Pourahmadi, M., Wu, W. B. (2017). An Asymptotic Theory for Spectral Analysis of Random Fields. Electronic Journal of Statistics, Vol. 11, No. 2, p. 4297-4322. [publication]
- Zechner, C., **Deb, S**., Koeppl, H. (2013). Marginal Dynamics of Stochastic Biochemical Networks in Random Environments. In Control Conference (ECC), 2013 European, p. 4269-4274, IEEE. [publication]

Preprints & submitted articles

- Soni, A., **Deb, S.**, Das, D., Zaremba, A. (2023+). Using t-SNE and KL divergence to identify the effects of structural breaks on Value-at-Risk transmission and information flow among cryptocurrencies. Under review at Annals of Operations Research.
- **Deb, S.**, Das, S. (2023+). Optimal selection of the starting lineup for a football team. Under review at Journal of Quantitative Analysis in Sports. [preprint]
- Chattopadhyay, A., **Deb, S.** (2022+) A spatio-temporal model for binary data and its application in analyzing the levels of COVID-19 spread. Under major revision at AStA Advances in Statistical Analysis.
- Gupta, K., Krishnamurthy, V., **Deb, S.** (2022+). What elements of opening set influence the outcome of a tennis match? In-depth analysis of Wimbledon data. Under major revision at IIMB Management Review.
- Paul, M., Roy, R., **Deb, S.** (2022+). Effect of influence in voter models and its application in detecting frauds in an election. Under major revision at AStA Advances in Statistical Analysis.
- Bag, S., Gupta, K., **Deb, S.** (2022+). A review and recommendations on variable selection methods in regression models for binary data. Under resubmission at International Statistical Review. [preprint]
- **Deb, S.**, Roy, R., Das, S. (2022+). Forecasting elections from partial information using a Bayesian model for a multinomial sequence of data. Under review at Journal of Forecasting. [preprint].
- Rawat, S., Durrant, A., Simpson, A., Nielson, G., Berrett, C, **Deb, S.** (2023+) A Bayesian approach to identify changepoints in spatio-temporal ordered categorical data: An application to COVID-19 data. Currently being prepared for submission. [preprint]

Book

(With D. Dey) Mathematical Techniques for Competitive Examinations. First edition in 2023, published by Orient Blackswan Pvt Ltd. ISBN: 9393330107.

Professional Services

Administrative roles, at Indian Institute of Management Bangalore:

- Doctoral Program Coordinator, Decision Sciences Area. — Since 2023
- Mentor in Pre-doctoral Programme, Decision Sciences Area. — Since 2021

Session chairs, at the following conferences:

- (Upcoming) EcoSta 2024, Beijing, China — Jul 2024
- EcoSta 2023, Tokyo, Japan — Aug 2023
- 14th and 15th CMStatistics, London, UK — Dec, 2021 & 2022
- IISA Conference, Bengaluru, India. — Dec 2022

Reviewer, for the following journals:

- Biometrics
- BMC Public Health
- Electronic Journal of Statistics
- Journal of Behavioral and Experimental Finance
- Journal of Multivariate Analysis
- Journal of the Royal Statistical Society: Series A and Series C
- Sankhya A and Sankhya B
- Scientific Reports
- Statistics and Probability Letters

Grants

Research Seed Grant from IIM Bangalore, India:

- Project: New techniques to analyze categorical and discrete time series data
- Amount: INR 300,000 for two years (August 2021 to December 2023)

Young Faculty Research Chair Grant from IIM Bangalore, India:

- Amount: INR 900,000 for three years (March 2020 to February 2023)

Honors

At Indian Institute of Management Bangalore:

- Excellence in Teaching Award — 2021-22

At University of Chicago:

- International House Ralph W. Nicholas Fellowship — 2017-18
- Graduate Council Travel Fund Award — 2017
- Runner-up for Department of Statistics Consulting Award — 2016
- Nominated for Best Teaching Assistant in Physical Sciences Division — Winter 2014

Earlier awards:

- Kishore Vaigyanik Protsahan Yojana scholarship, Indian Institute of Science — 2007 to 2013
- Selected for International Mathematical Olympiad Training Camp, India — 2007 & 2008

Latest seminars

- (Upcoming) Nonparametric estimation of shape-constrained time series regression model, RMS Annual Conference 2023, Guwahati, India. Dec 2023
- Using t-SNE in analyzing multivariate time series data, EcoSta 2023, Tokyo, Japan. Aug 2023
- Nonparametric methods to deal with quantile regression problems in time series and spatio-temporal settings. Symposium, National University of Singapore, Singapore. May 2023
- New methods of structural break detection in multivariate time series and its use in modeling financial data. Symposium, Indian Statistical Institute, Kolkata, India. Mar 2023
- A Bayesian approach to identify changepoints in spatio-temporal ordered categorical data. IISA 2022 Conference, Bengaluru, India. Dec 2022
- Analyzing count data using a time series model with an exponentially decaying covariance structure. EURO 2022 Conference, Finland. Jul 2022
- A goal based index to analyze the competitive balance of a football league. 8th Western Conference on Football and Finance, Reading, UK. May 2022
- Developing statistical methods in Health (Epidemiological) Data. SERB-AV Workshop 2022, Indian Institute of Information Technology, Dharwad, India. May 2022
- A new classification method for multivariate time series data. 14th International Conference of the ERCIM WG on Computational and Methodological Statistics, London, UK. Dec 2021
- Impact of global warming on rainfall: A Spatio-temporal study. RSS International conference 2021 (virtual), Manchester, UK. Sep 2021
- A Mathematical Take on the Competitive Balance of a Football League. Guest lecture (virtual), Mathematics of Sports, Stanford University, Stanford, USA. May 2021

Skills

Technical strength:

- Proficient: R, MATLAB, LaTeX, Microsoft Office.
- Working knowledge: Python, SQL, C.

Languages:

- Bilingual proficiency: English, Bengali.
- Intermediate proficiency: Hindi.
- Basic proficiency: Portuguese.