Soudeep Deb

CURRENT POSITION	**Associate Professor and Chairperson** Decision Sciences Area Indian Institute of Management Bangalore, India.	Webpage: soudeepd.github.io Phone: +91 80-26993387 E-mail: soudeep@iimb.ac.in

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

- Chairperson, Decision Sciences Area. — Apr 2024 - Present
- Associate Professor, Decision Sciences Area. — Jul 2024 - Present
- Assistant Professor, Decision Sciences Area. — Mar 2020 - Jul 2024

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

RESEARCH GRANTS

India-Israel Joint Research Cooperation (IIJRC) Grant, 10th CFP-2023.
- From Department of Science & Technology, India, and Ministry of Innovation, Science & Technology, Israel.
- Co-PI: Prof. Itai Dattner, University of Haifa, Israel.
- Project: Hybrid-AI Quantile Regression Combining Nonparametric Statistical Methods and Physics-Informed Neural Networks for Analysing Spatio-temporal Climate Data.
- Amount: INR 1.6 million for two years (2024 – 2025).

Research Travel Grant from London Mathematical Society, United Kingdom (UK).
- Offered under Scheme 5 'Collaborations with Developing Countries' Grant
- Co-PI: Prof. Rishideep Roy, University of Essex, UK.
- Amount: GBP 2200 for collaborative research visit to the UK (December 2024)

Research Seed Grant from IIM Bangalore, India.
- Project: Nonparametric methods of structural break detection in time series
- Amount: INR 300,000 for 18 months (July 2024 to December 2025)

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)

Consulting services	**Smart City Mission, Ministry of Housing & Urban Affairs**, India	2024

Smart City Mission, Ministry of Housing & Urban Affairs, India — 2024
- Topic: Improvement in quality of education through smart classrooms.

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) 2025
- M Mareeswaran, Finance & Accounting, Indian Institute of Management Bangalore. — (Exp) 2025
- Sabhya Rai, Economics, Indian Institute of Management Bangalore. — (Exp) 2026

Teaching

Course instructor, at Indian Institute of Management Bangalore:
- Advanced Statistics for Business (Core for BBA students) — Winter, 2025
- Advanced Statistical Methods & Computing (Core for PhD students) — Fall, 2024
- Multivariate Statistics (Core for PhD students) — Spring, 2021 - 2024
- Sports Analytics (Elective for MBA students) — Fall, 2023 - 2024
- Decision Sciences I (Core for MBA students) — Fall, 2020 - 2024
- Statistical Inference (Core for PhD students) — Winter, 2020

Executive Education Programme, at Indian Institute of Management Bangalore:
- Predictive Analytics for Business Forecasting (Programme Director) — Jan 2025
- Data Science & Artificial Intelligence (5 sessions) — Sep 2024
- MDP for Food Corporation of India (8 sessions) — Apr 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

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

Journal & conference publications
- **Deb, S.**, Jana, K. (2024) Nonparametric quantile regression for time series with replicated observations and its application to climate data. Statistical Science, 39(3), 428-448. [publication]
- **Deb, S.**, Roy, R., Das, S. (2024). Forecasting elections from partial information using a Bayesian model for a multinomial sequence of data. Journal of Forecasting, 43(6), 1814-1834. [publication].

- Chattopadhyay, A., **Deb, S.** (2024) A spatio-temporal model for binary data and its application in analyzing the levels of COVID-19 spread. AStA Advances in Statistical Analysis. [publication]

- Lakshmi M.V., **Deb, S.**, Sen, R. (2024) Environmentally Responsible Index Tracking: Maintaining Performance while Reducing Carbon Footprint of the Portfolio. Statistics and Applications (forthcoming).

- Gupta, K., Krishnamurthy, V., **Deb, S.** (2024) What elements of the opening set influence the outcome of a tennis match? An in-depth analysis of Wimbledon data. IIMB Management Review. [publication]

- Divekar, C., **Deb, S.**, Roy, R. (2024) Real-time forecasting within soccer matches through a Bayesian lens. Journal of the Royal Statistical Society Series A: Statistics in Society, 187(2), 513–540. [publication]

- Roy, A., **Deb, S.**, Chakarwarti, D. (2024) Impact of COVID-19 on public social life and mental health: A statistical study of Google Trends data from the USA. J. Appl. Stat., 51(3), 581-605. [publication]

- 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, 187(1), 39-61. [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

- **Deb, S.**, Neves, C., Roy, S. (2024+) Nonparametric quantile regression for spatio-temporal processes. Under review. [preprint]

- Roy, A., Podder, M., **Deb, S.** (2024+) Nonparametric method of structural break detection in stochastic time series regression model. Under review. [preprint]

- Deshmukh, S., **Deb, S.** (2024+) A survey of statistical and machine learning methods of quantile regression in time series and their suitability in predicting dengue outbreaks. Under review. Preprint on request.

- Sen, S., **Deb, S.** (2024+) tSNE-Spec: A new classification method for multivariate time series data. Under review. Preprint available on request.

- **Deb, S.**, Das, S. (2024+). Optimal selection of starting lineup for a football team. Under review. [preprint]

- Gupta, K., **Deb, S.** (2024+) A divide-and-conquer approach for spatio-temporal analysis of large house price data from Greater London. Under review. [preprint]

- Rawat, S., **Deb, S.** (2024+). Impact of rising temperature on rainfall: A spatio-temporal study from Bangladesh. Under review. Preprint available on request.

- Soni, A., **Deb, S.**, Das, D., Zaremba, A. (2023+). Structural Breaks and Value-at-Risk in Multivariate Time Series Data: Implications for Cryptocurrency Investors. Under review. Preprint available on request.

- 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]

- 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. [preprint]

- Bag, S., Gupta, K., **Deb, S.** (2022+). A review and recommendations on variable selection methods in regression models for binary data. Under resubmission. [preprint]

LATEST
SEMINARS

- Nonparametric Regression of Spatio-temporal Data using Infinite-dimensional Covariates. University of Essex, Colchester, UK. Dec 2024

- Analyzing structural breaks in the spatial network of real estate dynamics: A study of UK property transactions. CMStatistics Conference 2024, London, UK. Dec 2024

- Nonparametric changepoint detection in time series data. COMPSTAT 2024, Giessen, Germany. Sep 2024

- A divide-and-conquer approach for spatio-temporal analysis of large house price data from Greater London. EcoSta Conference 2024, Beijing, China. Jul 2024

- A workshop on 'Data summarisation and Visual Storytelling using Statistics', PES University Research Workshop Series, Bengaluru, India. Jul 2024

- Real-time forecasting in sports. AI Frontiers Series, Commonwealth Bank of Australia (virtual). Jun 2024

- A workshop on Sports Analytics. Conference on Excellence in Research & Education, Indian Institute of Management Indore, India. May 2024

- Introduction to Bayesian methods in Econometrics and Statistics. IIMK Skill-Building Series (virtual), Kozhikode, India. Mar 2024

- 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

- A goal based index to analyze the competitive balance of a football league. 8th Western Conference on Football and Finance, Reading, UK. May 2022

HONORS	**At Indian Institute of Management Bangalore:**

At Indian Institute of Management Bangalore:
- Excellence in Teaching Award — 2021-22, 2023-24

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

PROFESSIONAL SERVICES

Administrative roles, at Indian Institute of Management Bangalore:
- Chairperson, Decision Sciences Area. — Apr 2024 - present
- Doctoral Program Coordinator, Decision Sciences Area. — 2023-24
- Mentor in Pre-doctoral Programme, Decision Sciences Area. — 2021 - 2024

Editorial Board member, for the following journal:
- Scientific Reports, Associate Editor in the Climate Change track. — 2024 - present

Session chairs, at the following conferences:
- (Upcoming) IISA Conference, Cochin, India. — Dec 2024
- EcoSta 2024, Beijing, China — Jul 2024
- EcoSta 2023, Tokyo, Japan — Aug 2023
- 14th and 15th CMStatistics, London, UK — Dec, 2021 & 2022

Reviewer, for many journals including the following:
- Biometrics
- Electronic Journal of Statistics
- IIMB Management Review
- Journal of Multivariate Analysis
- Journal of Sports Analytics
- Journal of the Royal Statistical Society: Series A and Series C
- Sankhya A and Sankhya B
- Scientific Reports
- Statistics and Probability Letters

SKILLS

Technical strength:
- Proficient: R, MATLAB, LaTeX, Microsoft Office, Google Suite
- Working knowledge: Python, SQL, C, C++

Languages:
- Bilingual: English, Bengali; Intermediate: Hindi; Basic: Portuguese.