

Tanujit Chakraborty

Date of Birth: January 8, 1993

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Faculty of Mathematics and Artificial Intelligence

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Research Interests

Machine Learning, Time Series Forecasting, Spatial Data Science, Dynamical Systems, Climate Modeling.

Courses Taught (UG and PG Level)

Data Analytics, Machine Learning, Statistical Inference and Computing, Causal Inference, Multivariate Data Analysis, Time Series Analysis.

Experiences

- Sept 2024 onwards **Associate Professor of Statistics and Data Science**, Mathematics and Numerical Sciences Unit, Department of Science and Engineering, Sorbonne University, Abu Dhabi, UAE ([Profile](#)).
- Sep 2021 – Aug 2024 **Assistant Professor of Statistics and Data Science**, Mathematics and Numerical Sciences Unit, Department of Science and Engineering, Sorbonne University, Abu Dhabi, UAE.
- Sept 2021 onwards **Associate Faculty and Doctoral Advisor**, Sorbonne Center for Artificial Intelligence, Sorbonne Université, Paris, France. ([Profile](#)).
- June 2021 onwards **Visiting and Adjunct Position**.
- Visiting Assistant Professor at Duke-NUS Medical School, National University of Singapore, Singapore (July 2023 – Present).
- Jan 2016 onwards **Industry Experience**.
- External Consultant at Forecasting and Data Analytics Unit, PharmaACE Analytics Private Limited, India and USA (Dec 2022 – Nov 2023).
 - Statistical Consultant at Business Intelligence Unit, Bajaj Finserv Limited, Pune, India (Dec 2020 – March 2021).
 - Analytics Consultant (Internship) at ITC Limited, Tribeni Tissue Division, West Bengal, India (Jan 2016 – June 2016).

Education

- Nov 2020 Doctor of Philosophy (Ph.D.), **Indian Statistical Institute**, Kolkata, India.
- Dissertation Title: Some Nonparametric Hybrid Predictive Models: Asymptotic Properties and Applications ([link](#)).
 - Recipient of the *B.G. Raghavendra Memorial Award in Operations Research*, presented by the *Operational Research Society of India (ORSI)*.
- May 2016 Master of Science (with Distinction), **Indian Statistical Institute**, Kolkata, India.
- Specialization: Statistical Quality Control and Operations Research.
- May 2013 Bachelor of Statistics, **Bidhannagar College**, West Bengal State University, India.
- Honors in Statistics and Minors in Mathematics and Physics.

Publications (*Joint First Author)

Journal Publications (Accepted/Published)

- [26] Liu, X., Deliu, N., **Chakraborty, T.**, Bell, L., Chakraborty, B., Thompson sampling for zero-inflated count outcomes with an application to the Drink Less mobile health study, *Annals of Applied Statistics* (Accepted), 2025 ([arXiv](#)).
- [25] Sengupta, S.*, **Chakraborty, T.***, Singh, S.K., Forecasting CPI inflation under economic policy and geo-political uncertainty, *International Journal of Forecasting* (In Press), 2024 ([DOI](#)).
- [24] Borah, J.*, **Chakraborty, T.***, Nadzir, M., Cayetano, M., Benedetto, F., Majumdar, S., A Novel Hybrid Approach For Efficiently Forecasting Air Quality Data, *IEEE Sensor Letters* (In Press), 2024 ([DOI](#)).
- [23] **Chakraborty, T.**, Reddy U., Naik, S.M., Panja, M., Manvitha, B., Ten Years of Generative Adversarial Nets (GANs): A survey of the state-of-the-art, *Machine Learning: Science and Technology*, Vol. 5, pg. 1-35, 2024 ([DOI](#)).
- [22] Jakhmola, Y., Panja, M. Mishra, N.K., Ghosh, K., Kumar, U., **Chakraborty, T.**, Spatiotemporal Forecasting of Traffic Flow using Wavelet-based Temporal Attention, *IEEE Access*, Vol. 12, pg. 188797-188812, 2024 ([DOI](#)).
- [21] Hadid, A.*, **Chakraborty, T.***, Busby, D., When Geoscience Meets Generative AI and Large Language Models: Foundations, Trends, and Future Challenges, *Expert Systems*, Vol. 41, pg. 1-16, 2024 ([DOI](#)).
- [20] **Chakraborty, T.**, Kamat, G., Chakraborty, A. K., Bayesian Neural Tree Models for Nonparametric Regression, *Australian & New Zealand Journal of Statistics*, Vol. 65, 2023 ([DOI](#)).
- [19] Panja, M.*, **Chakraborty, T.***, Kumar, U., Liu, N., Epicasting: An Ensemble Wavelet Neural Network for Forecasting Epidemics, *Neural Networks*, Vol. 165, pg. 185-212, 2023 ([DOI](#)).
- [18] Panja, M.*, **Chakraborty, T.***, Nadim. Sk., Ghosh. I., Kumar, U., Liu, N., An ensemble neural network approach to forecast Dengue outbreak based on climatic condition, *Chaos, Solitons & Fractals*, Vol. 167, pg. 1-14, 2023 ([DOI](#)).
- [17] Thottolil, R., Kumar, U., **Chakraborty, T.**, Prediction of Transportation Index for Urban Patterns in Small and Medium-sized Indian Cities using Hybrid RidgeGAN Model, *Scientific Reports, Nature Portfolio*, Vol. 13, pg. 1-18, 2023 ([DOI](#)).
- [16] Bhattacharyya, A.*, **Chakraborty, T.***, Rai, S. N., Stochastic forecasting of COVID-19 daily new cases across countries with a novel hybrid time series model, *Nonlinear Dynamics*, Vol. 107, pg. 3025-3040, 2022 ([DOI](#)).
- [15] **Chakraborty, T.**, Chattopadhyay, S., Das, S., Kumar, U., Jayavelu, S., Searching for heavy-tailed probability distributions for modeling real-world complex networks, *IEEE Access*, Vol. 10, pg. 115092-115107, 2022 ([DOI](#)).
- [14] **Chakraborty, T.**, Das, S., Chattopadhyay, S., A New Method for Generalizing Burr and Related Distributions, *Mathematica Slovaca*, Vol. 72, pg. 241-264, 2022 ([DOI](#)).
- [13] Ray, A.*, **Chakraborty, T.***, Ghosh, D., Optimized ensemble deep learning framework for scalable forecasting of dynamics containing extreme events, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, Vol. 31, pg. 1-15, 2021 ([DOI](#)).
- [12] **Chakraborty, T.**, Chakraborty, A. K., Biswas, M., Banerjee, S.*, Bhattacharya, S.*, Unemployment Rate Forecasting: A Hybrid Approach, *Computational Economics*, Vol. 57, pg. 183-201, 2021 ([DOI](#)).

- [11] Chattopadhyay, S., **Chakraborty, T.**, Ghosh, K., Das, A. K., Modified Lomax Model: A heavy-tailed distribution for fitting large-scale real-world complex networks, *Social Network Analysis and Mining*, Vol. 11, pg. 11-43, 2021 ([DOI](#)).
- [10] Ghosh, I., **Chakraborty, T.**, An integrated deterministic-stochastic approach for forecasting the long-term trajectories of COVID-19, *International Journal of Modeling, Simulation, and Scientific Computing*, Vol. 12, pg. 1-15, 2021 ([DOI](#)).
- [9] **Chakraborty, T.**, Chakraborty, A. K., Hellinger Net: A Hybrid Imbalance Learning Model to Improve Software Defect Prediction, *IEEE Transactions on Reliability*, Vol. 70, pg. 481-494, 2020 ([DOI](#)).
- [8] **Chakraborty, T.**, Ghosh, I., Real-time forecasts and risk assessment of novel coronavirus (COVID-19) cases: A data-driven analysis, *Chaos, Solitons & Fractals*, Vol. 135, pg. 1-10, 2020 ([DOI](#)).
- [7] **Chakraborty, T.**, Chattopadhyay, S., Chakraborty, A. K., Radial basis neural tree model for improving waste recovery process in a paper industry, *Applied Stochastic Models in Business and Industry*, Vol. 36, pg. 49-61, 2020 ([DOI](#)).
- [6] **Chakraborty, T.**, Chakraborty, A. K., Superensemble classifier for improving predictions in imbalanced data sets, *Communications in Statistics - Case Studies and Data Analysis*, Vol. 6, pg. 123-141, 2020 ([DOI](#)).
- [5] **Chakraborty, T.**, Chakraborty, A. K., Chattopadhyay, S., A novel distribution-free hybrid regression model for manufacturing process efficiency improvement, *Journal of Computational and Applied Mathematics*, Vol. 362, pg. 130-142, 2019 ([DOI](#)).
- [4] **Chakraborty, T.**, Chakraborty, A. K., Murthy, C. A., A nonparametric ensemble binary classifier and its statistical properties, *Statistics & Probability Letters*, Vol. 149, pg. 16-23, 2019 ([DOI](#)).
- [3] **Chakraborty, T.**, Chakraborty, A. K., Mansoor, Z., A hybrid regression model for water quality prediction, *Opsearch: Journal of the Operational Research Society of India*, Vol. 56, pg. 1167-1178, 2019 ([DOI](#)).
- [2] **Chakraborty, T.**, Chattopadhyay, S., Ghosh, I., Forecasting dengue epidemics using a hybrid methodology, *Physica A: Statistical Mechanics and its Applications*, Vol. 527, pg. 1-8, 2019 ([DOI](#)).
- [1] **Chakraborty, T.**, Chattopadhyay, S., Chakraborty, A. K., A novel hybridization of classification trees and artificial neural networks for selection of students in a business school, *Opsearch: Journal of the Operational Research Society of India*, Vol. 55, pg. 434-446, 2018 ([DOI](#)).

Conference Publications

- 2024 Dey, M., Chakraborty, A., Sarkar, D., **Chakraborty, T.**, Do we really need Foundation Models for multi-step-ahead Epidemic Forecasting?, *In Advances in neural information processing systems (NeurIPS) - TSALM Workshop* ([link](#)).
- 2024 Sadhukhan, P., Sengupta, K., Palit, S., **Chakraborty, T.**, Knowing the class distinguishing abilities of the features, to build better decision-making models, *In AMCIS 2024 Proceedings* ([link](#)).
- 2024 Sadhukhan, P., **Chakraborty, T.**, Sengupta, K., Deploying model obfuscation: towards the privacy of decision-making models on shared platforms, *In AMCIS 2024 Proceedings* ([link](#)).
- 2023 Dutta, A., Panja, M., Kumar, U., Hens, C., **Chakraborty, T.**, Van der Pol-informed Neural Networks for Multi-step-ahead Forecasting of Extreme Climatic Events, *In Advances in neural information processing systems (NeurIPS) - AI4Science* ([link](#)).

- 2023 Panja, M., **Chakraborty, T.**, Kumar, U., Hadid, A., PARNN: A Probabilistic Autoregressive Neural Network Framework for Accurate Forecasting, *In International Conference on Neural Information Processing* ([link](#)).
- 2022 Elabid, Z., **Chakraborty, T.**, Hadid, A., Knowledge-based Deep Learning for Modeling Chaotic Systems, *In International Conference on Machine Learning and Applications*, IEEE ([link](#)).
- 2022 Sasal, L., **Chakraborty, T.**, Hadid, A., W-Transformers: A Wavelet-based Transformer Framework for Univariate Time Series Forecasting, *In International Conference on Machine Learning and Applications*, IEEE ([link](#)).
- 2021 Bhattacharyya, A., Pattnaik, M., Chattopadhyay, S., **Chakraborty, T.**, Theta Autoregressive Neural Network: A Hybrid Time Series Model for Pandemic Forecasting, *In International Joint Conference on Neural Networks*, IEEE ([link](#)).
- 2021 Chattopadhyay, S., **Chakraborty, T.**, Ghosh, K., Das, A. K., Uncovering patterns in heavy-tailed networks: A journey beyond scale-free, *In IKDD CODS-COMAD*, ACM ([link](#)).

Book Chapters

- 2022 **Chakraborty, T.**, Ghosh, I., Mahajan, T., Arora, T., Nowcasting of COVID-19 confirmed cases: Foundations, trends, and challenges, *In Modeling, Control and Drug Development for COVID-19 Outbreak Prevention*, Vol. 366, pg. 1023-1064, Springer ([link](#)).
- 2022 **Chakraborty, T.**, Kumar, U., Loss Functions, *In Encyclopedia of Mathematical Geosciences*, Springer (Invited) ([link](#)).

R Software

[countts](#) - Thomson Sampling for Zero-Inflated Count Outcomes ([Link](#))

[hybridts](#) - Hybrid Time Series Forecasting Using Error Remodeling Approach ([Link](#))

[epicasting](#) - Ewnet: An Ensemble Wavelet Neural Network for Forecasting ([Link](#))

Refereed for Journals and Conferences

- 2019 onwards Journal of the American Statistical Association, IEEE Transactions on Neural Networks and Learning Systems, SIAM Journal on Applied Dynamical Systems, Reliability Engineering & System Safety, International Journal of Forecasting, Statistics in Medicine, Journal of Applied Statistics, Journal of Computational and Applied Mathematics, Expert Systems with Applications, Scientific Reports, Stochastic Environmental Research and Risk Assessment, Computational Economics, Engineering Applications of Artificial Intelligence, IEEE Journal of Biomedical and Health Informatics, PLOS Digital Medicine, Tropical Medicine and International Health, Evolutionary Intelligence, Neuroscience Informatics.

Grants

- 2024 – 2025 **SAFIR Research Grant**, offered by Sorbonne University Abu Dhabi, UAE; Role: Principal Investigator (PI) (*Title: Designing Spatio-Temporal Deep Learning Solutions for Climate Data Modeling*); Funding: 100K AED; Duration: 1 year (Oct 2024 - Sept 2025).
- 2024 – 2027 **Mphasis Research Grant** in AI, offered by Mphasis Limited, Bangalore, India; Role: Co-PI (*Title: Deep Learning for Climate Change*); Funding: 30 lakhs INR; Duration: 3 years (July 2024 - June 2027).
- 2021 – 2024 **Young Faculty Research Grant**, offered by Sorbonne University Research Center, Abu Dhabi, UAE; Role: Principal Investigator (PI) (*Title: Forecasting for Social Good and Public Health*); Funding: 200K AED; Duration: 3 years (Oct 2021 - Sept 2024).

2021 – 2024 **Mphasis Research Grant** in Cognitive Computing, offered by Mphasis Limited, Bangalore, India; Role: Co-PI (*Title: Building an interpretable Deep Learning Model for Imbalanced Learning*); Funding: 30 lakhs INR; Duration: 3 years (May 2021 - Apr 2024).

Awards and Fellowships

2017 onwards **Best Paper Awards**

- Best Paper Award Winner in the ACM IKDD CODS-COMAD Conference, 2021.
- Best Student Paper Award (Application Category) in the 52nd Annual Convention & International Conference of ORSI at IIM Ahmedabad, India, 2019.
- Best Student Paper Award (Application Category) in the 50th Annual Convention Conference of ORSI at Heritage Institute of Technology, Kolkata, India, 2017.

2014 onwards **Fellowships**

- Senior Research Fellowship by Indian Statistical Institute, Kolkata, India (2018 – 2020).
- Junior Research Fellowship by Indian Statistical Institute, Kolkata, India (2016 – 2018).
- Postgraduate Fellowship by Indian Statistical Institute, Kolkata, India (2014 – 2016).

Student Supervision (Postdoc, Ph.D., and M.Sc)

Current Students

- May 2024 onwards Mr. Rahul Goswami (Ph.D. student in Statistics) at IIT Guwahati, India (jointly with Dr. Palash Ghosh).
- Sept 2024 onwards Ms. Nourin Jahan (Ph.D. student in Data Science) at VIT Vellore, India (jointly with Dr. Muhammed Navas T).
- Sept 2024 onwards Mr. Saheer Madathil (Ph.D. student in Data Science) at VIT Vellore, India (jointly with Dr. Muhammed Navas T).
- July 2021 onwards Mr. Shovon Sengupta (Ph.D. student in Economics) at the Birla Institute of Technology & Science, Pilani, India (jointly with Dr. Sunny Singh).

Past Students

- 2024 Mr. Agni Rakshit (MTech Thesis in Operations Research) at the National Institute of Technology (NIT) Durgapur, India (jointly with Prof. Gautam Bandyopadhyay).
- 2023 Dr. Shraddha M. Naik (Visiting Researcher) at the Sorbonne Center for Artificial Intelligence, Sorbonne University Abu Dhabi.
- 2021 Ms. Suman Grewal (M.Sc Thesis in Mathematics) at the National Institute of Technology (NIT) Surat, India (jointly with Dr. Indira P Debnath).
- 2020 Mr. Sayak Banerjee (M.Sc Thesis in Biostatistics) at International Institute for Population Sciences (IIPS), Mumbai, India.

Teaching

Sorbonne University, Paris and Abu Dhabi

- 2023, 2024 MATH260 - Multivariate Data Analysis ([Course Webpage](#))
- 2022, 2023 MATH350 - Statistical Inference and Computing ([Course Webpage](#))
- 2023, 2024 MATH370 - Machine Learning ([Course Webpage](#))
- 2022 Executive Program - A Guided Tour of AI ([Course Webpage](#))

Indian Institute of Foreign Trade (IIFT), Kolkata, India

- 2021 Lead Instructor, Data Analytics Course for MBA (IB) students ([Course Webpage](#))

[XIM University, Bhubaneswar, India](#)

2021 Lead Instructor, Causal Inference Course for M.Tech Data Science students.

[Teaching Assistantship \(TA\)](#)

2021 Spatial Computing Course for M.Tech students at IIIT Bangalore ([Course Webpage](#))

2017 Statistical Methodology Course for Medical (MD) students at NIOH, Kolkata, India.

2016 Data Mining Course for M.Phil Students in Statistics at University of Calcutta, India.

[Invited Talks \(Slides\)](#)

- Sept 2024 Invited Talk on “Statistics and Machine Learning as key technologies for society” for Data Insights: Bridging Nature with Data Science Workshop at Azim Premji University, Bhopal, India.
- August 2024 Invited Talk on “Forecasting Techniques and their Applications” for EDP Course at IIT Dhanbad, India.
- July 2024 Invited Talk on “On Class Imbalanced Learning and their Medical Applications” at Duke-NUS Medical School, National University of Singapore, Singapore.
- December 2023 Invited Speaker at POMS India Conference, talk on “Indian Cities of the Future: Use Case of Generative AI”.
- November 2023 Invited Talk on “AI meets Health” at Center for Brain and Health, NYU Abu Dhabi.
- July 2023 Invited Talk on “Epicasting: Forecasting Epidemics with EWNNet” at Duke-NUS Medical School, National University of Singapore, Singapore.
- Aug 2022 Invited Talk on “A Guided Tour to Time Series Forecasting” at Indian Statistical Institute, Bangalore, India.
- May 2022 Invited Talk on “A journey from Linear Algebra to Machine Learning” at Supercomputing Facility, GUJCOST-Gandhinagar, India (Online mode).
- Apr 2022 Invited Talk on “Fooled by Statistics and Machine Learning” at SRCASW, University of Delhi, India (Online mode).
- Mar 2022 Invited Talk on “Past, Present, and Future of Time Series Forecasting” at Khalifa University, Abu Dhabi, UAE.
- Jan 2022 Invited Interview on “COVID-19 Forecasting Models and its shortcomings” at Faculti, London, UK.
- Dec 2021 Keynote Speaker (“Srinivas Ramanujan Meets PC Mahalanobis”) on the National Mathematics Day at Amity University, Mumbai, India.
- Aug 2021 Invited Talk on “Statistics and Machine Learning as Key Technologies for Social Welfare” at Robert Bosch Centre for Data Science and Artificial Intelligence, Indian Institute of Technology (IIT) Madras, Chennai, India.
- Aug 2021 Keynote Speaker (“Recent Trends in Statistics and Machine Learning”) on the National Statistics Day at Sambalpur University, Odisha, India.
- Apr 2021 Invited Talk on “Some Hybrid Predictive Models in the Interface of Statistics & Machine Learning” at City University of Hong Kong, HK (Online mode).
- Feb 2021 Invited Talk on “Hellinger net: A consistent statistical learning model for imbalanced pattern classification” at Chennai Mathematical Institute Data Science Seminar, Chennai, India.
- Aug 2020 Invited Talk on “Forecasting Macroeconomic Time Series” at Indian Institutes of Management, Kolkata, India.
- Dec 2017 Invited Tutorial Session on “Statistical Techniques for Business Analytics” at School of Computer Engineering, KIIT University, Bhubaneswar, India.

Dec 2017 Invited Talk on “Quantitative and Qualitative Economics: A Statistical Perspective” at Centre For Development Studies, Kerala, India.

Organizing Committee Services

- 2024 Organized an invited session on Health Data Sciences at the IISA 2024 Conference held at CUSAT University, Kochi, Kerala.
- 2023 Organizer and Speaker of Executive Workshop on Machine Learning for Abu Dhabi Investment Authority (ADIA), Abu Dhabi, UAE.
- 2022, 2021 Member of the Program Committee for ICMLA 2021 and ICMLA 2022 conference.
- 2022 Organizer and Speaker of One-Week Workshop on Research Methodology at Karnataka Science and Technology Academy (KSTA), Bangalore, India.
- 2021 Organizer and Speaker of One-Week Workshop Faculty Development Program at Bangalore Institute of Technology, Karnataka, India.
- July 2020 Organizer and Speaker of One Week Online Workshop on Statistics and Machine Learning in Practice, Kolkata, India ([link](#))
- Nov 2019 Organizer and Speaker of One-Week Workshop on Machine Learning at Indian Statistical Institute, Kolkata, India.
- Winter, 2017 Local organizer for International Conference on Advancing Frontiers in Operational Research: Towards a Sustainable World (AFOR 2017) at Heritage Institute of Technology, India.

Programming and Software skills

R, Python, Minitab, SPSS, L^AT_EX

References

Prof. Ashis K Chakraborty

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