

Dr. Debashis Chatterjee

University Address:

Assistant Professor (July 2021 till present),
Department of Statistics,
Siksha Bhavana (Institute of Science),
Visva Bharati University,
9A Central University & Institute of National Importance)
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PROFILE

I am currently an assistant professor at the Department of Statistics, Siksha Bhavana (Institute of Science), Visva Bharati University, Santiniketan, West Bengal, India. Currently, I am engaged in some significant projects centered around circular data analysis, Bayesian Inference applied to Geological and astronomical data, Biomedical and also other interdisciplinary subjects etc. I am also interested in Theoretical & Mathematical Statistics.

RESEARCH INTERESTS

- Interdisciplinary Statistical Theory & Applications
- Bayesian Analysis, Directional Statistics, Geo-Statistics, Application of Statistics in Astronomy & Earth Science, Biomedical science
- Geo-statistics, Astro-Geo-Statistics, Bayesian/ Directional Astro/Geo-Statistics (theory, methods, applications, computations).
- Mathematical Statistics and Probability
- Applications of Novel Statistical methodologies to interdisciplinary challenging scientific issues, especially in Earth Science, paleontology, biology, medical science & astronomy.
- Machine intelligence, Computer science, Probabilistic Robotics.
- Bayesian Inference, bayesian inverse Regression
- Mathematical Statistics and Probability, Mathematical Physics, Theoretical Astronomy and Earth Science, Statistical Theory & Applications in Theoretical & Applied Physics, Earth Science & Mathematics.
- Interdisciplinary Bio-statistics and Statistical Application in Medical Sc.
- Statistical Applications in Earth Science, Bayesian Geo-Statistics
- Bayesian Geometric Morphometrics
- Statistical Geophysical process modeling.
- Directional Statistical Applications in Geology, Paleontology and Medical Science
- Machine Learning and Statistical Computation
- Spatio-temporal analysis, Applications of Bayesian and Circular Statistics in Astronomy, Astrophysics, Environmental sciences, Geological and Planetary Sciences, Biostatistics

TEACHING & RESEARCH EXPERIENCE

Assistant Professor at Department of Statistics, Visva Bharati University, India (A Central University & Institute of National Importance)
July 2021 - Present

EDUCATIONAL DEGREE

PhD in Statistics, Indian Statistical Institute	2015 - 2020
M.Stat. in Statistics, Indian Statistical Institute	2013 - 2015
B.Stat.(Hons) in Statistics, Indian Statistical Institute	2010 - 2013

PhD thesis submitted in 2020 December, Degree obtained in 2022 June

Took Longer time for Thesis Evaluation mainly due to Exceptionally Long Thesis & External Reviewer Unavailability in COVID period

Meanwhile, Joined as an Assistant Professor at the Department of Statistics, Visva Bharati University, WB, India
2021 - present

MASTERS & PH.D STUDENTS SUPERVISED/ SUPERVISING

-
1. M.Sc. Students Dissertation Supervision (Completed) Total 08.
 2. Ph.D Student Supervision (Ongoing) Total 01.

PUBLICATIONS

UNDER REVISION

1. Ghosh P, **Chatterjee D***, Banerjee A, Das S, Mukherjee D, Das P. "On Spatio-temporal Dependence of Bird's Migration Path Direction on the change of the Earth's Magnetic field, Sun and the Moon Positions (European Region Study)" To be Submitted to **Nature Scientific Report (Special Edition: Migration)** [* Corresponding Author]
2. Ghosh P, **Chatterjee, D***, Banerjee A, Das S., Mukerjee D, Das P. "On Spatio-temporal Change of Migratory Path of *Larus fuscus* Influenced by Sun, Moon & Earth Magnetic Field (A Directional Statistical Case Study)" Submitted to **Nature Scientific Report (Special Edition: Migration)**. [* Corresponding Author]
3. Ghosh P, **Chatterjee, D***, Das S, Das P. "On Spatio-temporal Directional Association of Blue Whale's Migratory Path Navigation with Ocean Current Direction & Earth's Magnetic Field Change" Submitted to **Nature Scientific Report (Special Edition: Migration)**[* Corresponding Author]
4. **Chatterjee, D.** , Ghosh, P.,(2024). Geomagnetic, Ocean Current and Celestial Cues Shape Migration Patterns of Endangered Blue and Humpback Whales: A Directional Statistical Analysis **PLOS ONE** (Under Revision)[*First author & Generator of Main Idea]
5. **Chatterjee, D.** , Ghosh, P.,(2024). Navigating with Cosmic Compasses? Directional Statistical Remarks on Dependencies of Turtle Migration with Sun, Moon, & Earth's Magnetic Field **Royal Society Open Science**. (Under Revision)[*First author & Generator of Main Idea]

EDITORIAL ACCEPTED PAPERS /INVITED PAPERS

1. **CHATTERJEE D***. Novel Bayesian Regression-based Procrustes Shape Analysis in Geometric Morphometrics (part 1: for 2D landmarks with isotropic variance). **Nature Scientific Report**; ("Methods for ecological and evolutionary data analysis" Collection) Editorial Confirmation Received, confirming to be considered as part of the Collection after final Revision [* First & Corresponding Author (solo)]
2. **CHATTERJEE D***. Novel Bayesian Regression-based Procrustes Shape Analysis in Geometric Morphometrics (part 2: for 3D landmarks with isotropic variance). **Nature Scientific Report**;. [* First & Corresponding Author (solo)]("Methods for ecological and evolutionary data analysis" Collection) Editorial Invitation Received)

3. Ghosh P, **Chatterjee, Debashis***, Banerjee A, Das S. "Comparative Probabilistic Analysis of Earthquake and Volcano Eruption: Novel Empirical Models & Directional Distributional Resemblances." Submitted to **Nature Scientific Report (Special Edition: Machine learning for predicting natural disasters)**. Editorial Confirmation Received, confirming to be considered as part of the Collection after final Revision [* Corresponding Author]
4. Ghosh P, Sanyal S, **CHATTERJEE D.** Revisit to a Prominent Example of The Curse of Dimensionality: Re-investigating Anomaly Behaviour of Monte Carlo Estimate of π in Higher Dimension. 2023. (to be published on 21 December 2023, in the Proceedings of IMBIC Vol. 10 (ISBN 978-81-925832-9-7). Accepted for the Scopus Indexed volume, titled "Mathematical and Statistical Applications in Cyber Security, Life Sciences, and Engineering", Springer Book Series (to be published in 2024). Accepted.

ACCEPTED / PUBLISHED PAPERS

1. **Chatterjee, D.** (2024). "The Impact of Algorithmic Culture on the Construction of Self in a Globalized World". **Journal of Contemporary Philosophical and Anthropological Studies (JCPAS)**, ISSN 2977-5507 (Accepted)[*Solo Author]
2. **Chatterjee, D.**, Ghosh, P., (2024). Do Magnetic murmurs guide birds? A directional statistical investigation for influence of Earth's Magnetic field on bird navigation. **PLOS Water** (Accepted Under Minor Revision) [*First Author]
3. Ghosh, P., **Chatterjee, D.**, Banerjee, A., & Das, S. S. (2024). Do Magnetic murmurs guide birds? A directional statistical investigation for influence of Earth's Magnetic field on bird navigation. **PLOS ONE**, 19(6), e0304279. <https://doi.org/10.1371/journal.pone.0304279> [*Principal Supervisor & Generator of Main Idea]
4. Prithwish Ghosh, **Debashis Chatterjee***, Amlan Banerjee: On the directional nature of celestial object's fall on the earth (Part 1: Distribution of fireball shower, meteor fall & crater on earth's surface), **Monthly Notices of the Royal Astronomical Society**, 2024; stae1066, <https://doi.org/10.1093/mnras/stae1066> [accepted & published early version, * Corresponding Author]
5. **Chatterjee, Debashis**, Trisha Maitra, and Sourabh Bhattacharya. "A short note on almost sure convergence of Bayes factors in the general set-up." **The American Statistician** 74.1 (2020): 17-20. <https://doi.org/10.1080/00031305.2017.1397548> (Journal Print ISSN: 0003-1305, Online ISSN: 1537-2731) [First Author]
6. Sarkar, A., Reiger, R., **Chatterjee, D.**, Patranabis, S., Singh, H., & Mukherjee, P. (2016). Simulation study of a constant time hybrid approach for large scale terrain mapping using satellite stereo imagery. **Robotics and Autonomous Systems**, 79, 132-146. <https://doi.org/10.1016/j.robot.2016.01.004> (Journal Online ISSN: 1872-793X, Print ISSN: 0921-8890)
7. (Book Chapter): Advances in Robotics and Automatic Control: Reviews, Vol. 1. (2018). International Frequency Sensor Association Publishing. ISBN: 978-84-09-02449-0. Yurish S (editor). Chapter 6: (Simulation Study of a Constant Time Hybrid Approach for Large Scale Terrain Mapping Using Satellite Stereo Imagery) Author(s) . Sarkar, R. Reiger, **D. Chatterjee**, S. Patranabis, H. Singh and P. Mukherjee. Available at: http://www.sensorsportal.com/HTML/BOOKSTORE/Advances_in_Robotics_and_Automatic_ControlVol_1.pdf
8. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "A Statistical Perspective on Inverse and Inverse Regression Problems." **RASHI** 2 (1): 67-82 (2017). (Journal ISSN (Online):2581 9755). Available at http://www.sasaa.org/complete_journal/vol2__9.pdf, Latest version available at <https://arxiv.org/abs/1707.06852> [First Author]

9. **Chatterjee, Debashis.** "A Novel Bayes Factor for Inverse Model Selection Problem based on Inverse Reference Distribution. IJMSI, Volume 5 Issue 6 (2017), PP.06-09, available at <https://www.ijmsi.org/Papers/Volume.5.Issue.6/B05060609.pdf>.
(Journal ISSN (Online): 2321 - 4767, ISSN (Print): 2321 - 4759.) [First Author]
10. **Chatterjee, Debashis*.** "On Consistency Issue of the Definition of Mean Free Path on the Basis of Measure Theoretic Probability and Speed of Light Postulate of Relativity." AIJRSTEM (2014), 14-116, available at <http://iasir.net/AIJRSTEMpapers/AIJRSTEM14-116.pdf>
(Journal ISSN (PRINT): 2328-3491 ISSN (ONLINE): 2328-3580) [* First & Corresponding Author]

PUBLISHED CONFERENCE PAPERS

1. Ghosh P, Sanyal S, **CHATTERJEE D.** Revisit to a Prominent Example of The Curse of Dimensionality: Re-investigating Anomaly Behaviour of Monte Carlo Estimate of π in Higher Dimension. Published as conference paper, The 17th International Conference MSAST 2023, December 21 - 23, 2023, Kolkata, Proceedings of IMBIC Vol. 10 (ISBN 978-81-925832-9-7). pp 114-122.

PH.D THESIS

Chatterjee, D (Thesis submitted in Dec 2020, degree obtained in June 2022). A BRIEF TREATISE ON BAYESIAN INVERSE REGRESSION.

Ph.D. Supervisor: Prof. Saurabh Bhattacharya, ISRU, Indian Statistical Institute. The abridged version of the Ph.D. thesis by the Indian Statistical Institute is publicly available in the Thesis Online Repository of the Indian Statistical Institute. (Series/Report no.: ISI, Ph.D Thesis ; **TH471**)

The extended version (As recommended by Thesis Supervisor) is Available at https://www.researchgate.net/publication/360456798_A_BRIEF_TREATISE_ON_BAYESIAN_INVERSE_REGRESSION, and currently under consideration for The publication as a whole book.

PUBLISHED BOOK CHAPTERS

(Book Chapter): Ghosh P, Sanyal S, **CHATTERJEE D.** Revisit to a Prominent Example of The Curse of Dimensionality: Re-investigating Anomaly Behaviour of Monte Carlo Estimate of π in Higher Dimension. Nature Scientific Report; 2023. (Abstracts to be published on 21 December 2023, in the Proceedings of IMBIC Vol. 10 (ISBN 978-81-925832-9-7). Accepted for the Scopus Indexed Springer Book Series (to be published in 2024), only the abstracts will appear in the IMBIC Proceedings.) Accepted.

(Book Chapter): **Advances in Robotics and Automatic Control: Reviews, Vol. 1. (2018). International Frequency Sensor Association Publishing.** Yurish S (editor). **ISBN: 978-84-09-02449-0.** BN-20180530-XX. BIC: TJFM1 Chapter 6: Simulation Study of a Constant Time Hybrid Approach for Large Scale Terrain Mapping Using Satellite Stereo Imagery. Author(s): A Sarkar, R. Reiger, **D. Chatterjee**, S. Patranabis, H. Singh and P. Mukherjee
Available at: http://www.sensorsportal.com/HTML/BOOKSTORE/Advances_in_Robotics_and_Automatic_ControlVol_1.pdf

PUBLISHED SOFTWARE (R PACKAGES)

1. Novel R package BPviGM1 (Part 1) Publicly Available on GitHub repository and on rdrv (A comprehensive index of R packages and documentation from CRAN, Bioconductor, GitHub and R-Forge)
 - (a) <https://rdrv.io/github/debashischatterjee111/BPviGM1/>,
 - (b) also available at <https://github.com/debashischatterjee111/BPviGM1> (NOVEL BAYESIAN PROCRUSTES VARIANCE-BASED INFERENCES IN GEOMETRIC MORPHOMETRICS & NOVEL R PACKAGE: BPviGM1, 2021-22)

Installation: Public Installation of the latest version of this package: Enter the following in R:

```
install.packages("remotes")
remotes::install_github("debashischatterjee111/BPviGM1")
```

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(Final Version is on Progress & Ongoing Communication)

INVITED LECTURE / INVITED PRESENTATIONS IN SEMINARS & WORKSHOP

1. Debashis Chatterjee. 2024. An Invited lecture on using statistics to understand geological problems - on 29th May 2024 and demonstrate hands-on the usage of statistics in deciphering the paleoclimatic condition for the short course (on the quantitative aspect of Geology) as an invited speaker of the workshop on Quantitative Palaeontology conducted by The Geological Studies Unit Indian Statistical Institute, Kolkata.
2. Debashis Chatterjee. 2023. An Invited lecture on Landmark and Shape Analysis in Natural Science Data on 22 August 2023, at the Seminar Room of the Human Genetics Unit (Kolmogorov Building), as an invited speaker of the workshop on Quantitative Palaeontology conducted by The Geological Studies Unit Indian Statistical Institute, Kolkata, from 21 to 24 August 2023.
3. Invited Tutor Instructor: (2022 July) Invited as Tutor Instructor for Tutorial Classes on Unsupervised Learning at Instructional School for Teachers at Indian Statistical Institute
4. Debashis Chatterjee. 2020. An Invited Lecture on Bayesian Inverse Regression application on Geology & paleontology. Organized Seminar: Fossils of Bengal: by Geology Studies Unit, Indian Statistical Institute, Kolkata, India.
5. Debashis Chatterjee, 2020 (postponed due to COVID-19) On Bayesian Inverse Regression at Conference of ISI-ISM-ISSAS Joint Statistical Meeting 2020. Oral presentation, Bayesian Inverse Regression, Poster: Event Presented At Indian Statistical Institute, Kolkata, India.
6. Debashis Chatterjee. 2019. National Seminar on Application of Statistics on Natural Science. (IUCAA Center for Astronomy Research & Development), St Xaviers College (Autonomous), Kolkata
7. Debashis Chatterjee. 2018. Presentation on Bayesian Inverse Regression at CALCUTTA UNIVERSITY (10th ITCS 2018)
8. Debashis Chatterjee. 2017. On Bayesian Inverse Regression. Departmental seminar: Indian Statistical Institute
9. "National and International Statistical Systems": joint group project on data analysis and interpretation of data provided by NSSO.(National Sample Survey Office).

TEACHING EXPERIENCES

1. Full-courses Taught: Teaching full courses in Visva-Bharati (Department of Statistics) regularly from July 2021: Regression Techniques (M. Sc first year), Statistical Computing (B.Sc third year), Statistical Inference 2 [Non-parametric part] (M. Sc first year), Real Analysis (B Sc second year), Sampling Distribution (B Sc second year), Linear Algebra (B Sc first year), Application of Statistics
2. B. Sc. Dissertation Project Supervised: (2023 B.Sc Final Year whole batch).
3. M. Sc. Dissertation Supervised: (M.Sc final year & B Sc Final Year). Total students supervised to date: 4
4. LAB Instructor: 2018 Fall: EM Algorithm Step-by-step (with R) LAB Instructor, under Prof. Arnab Chakraborty, Indian Statistical
5. Invited Instructor: 2022 July: Invited as Tutor Instructor for Tutorial Classes on Unsupervised Learning at Instructional School for Teachers at Indian Statistical Institute

TEACHING SUMMARY

Fall Semester - Visva Bharati University

August 2021 – December 2021

Courses #	Course title	Semester(s) taught
BSC-SEM-6 CC-14	Statistical Computing with R Language	Spring Semester 2024
MSC-SEM-2 CC-9	Regression Analysis	Spring Semester 2024

Spring Semester - Visva Bharati University

January 2022 – July 2022

Courses #	Course title	Semester(s) taught
BSC-SEM-6 CC-14	Statistical Computing with R Language	Spring Semester 2024
MSC-SEM-2 CC-9	Regression Analysis	Spring Semester 2024

Fall Semester - Visva Bharati University

August 2022 – December 2022

Courses #	Course title	Semester(s) taught
BSC-SEM-6 CC-14	Statistical Computing with R Language	Spring Semester 2024
MSC-SEM-2 CC-9	Regression Analysis	Spring Semester 2024

Spring Semester - Visva Bharati University

January 2023 – July 2023

Courses #	Course title	Semester(s) taught
BSC-SEM-6 CC-14	Statistical Computing with R Language	Spring Semester 2024
MSC-SEM-2 CC-9	Regression Analysis	Spring Semester 2024

Fall Semester - Visva Bharati University

August 2023 – December 2023

Courses #	Course title	Semester(s) taught
BSC-SEM-6 CC-14	Statistical Computing with R Language	Spring Semester 2024
MSC-SEM-2 CC-9	Regression Analysis	Spring Semester 2024

Spring Semester - Visva Bharati University

January 2024 – July 2024

Courses #	Course title	Semester(s) taught
BSC-SEM-6 CC-14	Statistical Computing with R Language	Spring Semester 2024
MSC-SEM-2 CC-9	Regression Analysis	Spring Semester 2024

ACADEMIC ACHIEVEMENTS

1. Qualified for the CSIR-NET EXAM 2018 with All India Rank 6.
2. Best Paper Award: 2019. Best Paper Award. National Seminar on Application of Statistics on Natural Science. (IUCAA Center for Astronomy Research & Development), St Xaviers College (Autonomous), Kolkata

3. Merit Certificate: 2009. Indian Standard Examination in Astronomy. (Astronomy Olympiad), National Board for Higher Mathematics (NBHM) of the Department of Atomic Energy (DAE), Government of India, awarded a prestigious Certificate of Merit for being in the top 1% statewide
4. Qualified for Regional Math Olympiad (RMO)

PH.D. THESIS RELATED PAPERS (PRESENTLY COMMUNICATING/ SUBMITTED AS A WHOLE BOOK)

1. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "Posterior Convergence of Gaussian and General Stochastic Process Regression Under Possible Misspecifications." arXiv:1810.10495 (2018). Available at <https://arxiv.org/pdf/1810.10495>
2. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "Posterior Convergence of Nonparametric Binary and Poisson Regression Under Possible Misspecifications." arXiv:2005.00234 (2020). Available at <https://arxiv.org/pdf/2005.00234>
3. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "Posterior Consistency of Bayesian Inverse Regression and Inverse Reference Distributions." arXiv:2005.00236 (2020). Available at <https://arxiv.org/pdf/2005.00236>
4. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "Convergence of Pseudo-Bayes Factors in Forward and Inverse Regression Problems." arXiv:2006.06020 (2020). Available at <https://arxiv.org/pdf/2006.06020>
5. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "A Bayesian Multiple Testing Paradigm for Model Selection in Inverse Regression Problems." arXiv:2007.07847 (2020). Available at <https://arxiv.org/pdf/2007.07847>
6. **Chatterjee, Debashis**, and Sourabh Bhattacharya. "How Ominous is the Future Global Warming Premotion?." arXiv:2008.11175 (2020). Available at <https://arxiv.org/pdf/2008.11175.pdf>

SUBMITTED & UNDER REVIEW/ COMMUNICATING PAPERS

1. Ghosh P, **Chatterjee D***, Banerjee A, Das S, Mukherjee D, Das P. "On Spatio-temporal Dependence of Bird's Migration Path Direction on the change of the Earth's Magnetic field, Sun and the Moon Positions (American Region Study)" Submitted to **Proceedings of the National Academy of Sciences (PNAS)** [* Corresponding Author]
2. Ghosh P, **Chatterjee, D***, Gamma Ray Burst Classification and Distributional Analysis: A Bayesian Investigation (Submitted to **Astrophysical Journal Letters**). [* Corresponding Author]
3. Ghosh P, **Chatterjee, D***, Dutta J, Rao Jammalamadaka, S, Ghosh S. "On the Directional Nature of Celestial Object's Fall on the Earth (Part 2: Novel Bayesian Model for Meteorite Fall on the Earth)" Tentatively To be Submitted to **Science**. [* Corresponding Author]
4. Ghosh P, **Chatterjee, D***, Banerjee A. Statistical Analysis of Rock Classification: Harnessing Chemical Compositions, Machine Learning and Bayesian Classification Methods for Precise Categorization. To be submitted in **Acta Geochimica**[* Corresponding Author]
5. Ghosh P, **Chatterjee, D***, Spatial Classification of Gamma Ray Burst Using Circular Statistical Methodology. To be submitted in **Monthly Notices of the Royal Astronomical Society (Letters)**[* Corresponding Author]
6. **D. Chatterjee***, A. Banerjee, P. Ghosal. "On the Mystery of Chemical Continuity between Fe-illite and Glauconite". To be submitted to **American Mineralogist**

** The dataset of this paper is given by the late Prof. S. Patranabis of Geological Studies Unit, Indian

Statistical Institute. This paper is dedicated to her memory and work[* First author & Corresponding Author]

7. **D. Chatterjee**, Das, P. “Pseudo-likelihood based Model Selection in Forward & Inverse Regression Problems”. Submitted to **Journal of the Indian Society for Probability and Statistics**[First Author]
8. **Debashis Chatterjee***, Parthasarathi Ghosh, Saurabh Bhattacharya, Prithwish Ghosh.“ Novel Statistical Paleosalinity Reconstruction Model from Ancient Sedimentary Rocks]Novel Statistical Paleosalinity Reconstruction Model from Ancient Sedimentary Rocks”. To be submitted to **Mathematical Geosciences**.
[* First author & Corresponding Author]
9. **D. Chatterjee***, A. Basu, S. Mukherjee. “Another Goodness of Fit Test for Gompertz Growth Curve Model Based on Lognormal Error Assumption.” Tentatively To be Submitted to **Metron** [*First author & Corresponding Author]
10. **D. Chatterjee***. “Investigation on the Properties of Spiral Galaxies: (Part 1: A Multivariate Statistical Study.)” To be Submitted to **Astrophysical Journal Letters** [* Solo Author]
11. **D. Chatterjee***. “Investigation on the Properties of Spiral Galaxies: (Part 2: A Directional Statistical Study.)” To be Submitted to **Astrophysical Journal Letters** [* Solo Author]