

# Debarshi Chakraborty

## Curriculum Vitae

Indrapuri, Belgharia  
Kolkata-700056, India  
☎ (+91) 8902403477  
✉ maharajtheboss@gmail.com

### Education

- 2021–present **Master of Statistics(M.Stat)**, *Indian Statistical Institute(ISI)*.  
Applied Statistics Specialization,  
Scored 76% (till semester 3)
- 2017–2020 **B.Sc Statistics(Hons)**, *St.Xavier's College(Autonomous),Kolkata*.  
Scored 77% in Major
- 2015-2017 **Higher Secondary Examination(12th Standard)**, *Ariadaha Kalachand High School,Ariadaha,Kolkata*.  
Scored 89.8% in aggregate
- 2009–2015 **Secondary Examination (10th Standard)**, *Ariadaha Kalachand High School,Ariadaha, Kolkata*.  
Scored 94% in aggregate with 100 in Mathematics

### Research Interests

Time Series Analysis , High Dimensional Statistics , Statistical Genomics , Graphical Models , Bayesian Methods , Statistical Pattern Recognition , Nonparametric Inference

### Projects and Presentations

- Ongoing **A Study on Non-Gaussian Graphical Models**, *Masters Final Year Project*.  
**Mentor:** Dr.Arindam Chatterjee, Stat Math Unit, ISI Delhi  
**Description:**After reviewing available literature on Gaussian Graphical Models in brief, we proceed to explore nonparametric methods in this area.Current progress is based on a paper by Liu, Lafferty, Wasserman on the nonparanormal and forest density estimation.
- Ongoing **Cluster Analysis of Wine Types Data**.  
**Mentor:** Srijit Mukherjee, PhD student, Pennsylvania State University  
**Description:** Goal is to identify different types of wines from their chemical compositions. Plan is to start with basic EDA and then try different methods, starting from simple algorithms such as K-Means clustering, K-Medoids clustering to Gaussian Mixture Clustering, Hierarchical Clustering.
- Dec 2022 **Bayesian Prediction of Failure Probability of a Space Shuttle Launch**, *Course Project*.  
**Mentor:** Dr.Sourabh Bhattacharya,Interdisciplinary Statistics Research Unit, ISI Kolkata  
**Description:** Data on O-ring failure of 23 space shuttle launches prior to the famous Challenger disaster of January 1986 are available.We try to predict the probability of failure of a launch given the temperature of the O-rings using a Bayesian Approach.
- Nov 2022 **Heart Disease Prediction using Supervised Machine Learning**, *Course Project*.  
**Mentor:** Bilal Banerjee, Senior Research Fellow,Indian Statistical Institute, Kolkata  
**Description:** Given different health measurements of an individual like cholesterol, blood pressure, Exercise Angina, ST Slope, etc we try to predict whether a particular individual is vulnerable to heart related disease. Logistic Regression, Tree based methods and KNN were used.
- Summer 2022 **A Study on Gaussian Graphical Models**, *Summer Project*.  
**Mentor:** Dr.Arindam Chatterjee, Stat Math Unit, ISI Delhi  
**Description:**Introducing Graphical Models briefly, focus on a particular type : Advantages and drawbacks of different existing methods are reviewed in detail.Implementations on real and simulated data are done.
- May 2022 **A Comparative Study between some Classification Techniques**, *Course Project*.  
**Mentor:** Dr.Deepayan Sarkar, Stat Math Unit, ISI Delhi  
**Description:** Illustrated the working principles of Support Vector Machines (SVM),K Nearest Neighbours (KNN) Algorithm and Discriminant Analysis to solve classification problems.Simulations to see advantages of one over others in different situations.Application on a real data and choosing the best performer.

April 2022 **A Study on Kernel Density Estimation, Course Project.**

**Mentor:** Dr.Isha Dewan, Stat Math Unit, ISI Delhi

**Description:**Part of Nonparametric Inference coursework in M.Stat 1st Year.Starting with the simplest form of density estimation i.e. histograms, identifying their drawbacks and step by step trying to overcome them, we eventually illustrate KDE.Simulations from different distributions and taking different choices of kernels show how good the estimates holds.Asymptotic properties are verified.Using a similar approach via kernels, we try to estimate the CDF.Detailed simulations done for each case.Finally we do a case study.

December 2021 **Analysis of Petrol Consumption Data, Course Project.**

**Mentor:** Dr.Swagata Nandi, Stat Math Unit, ISI Delhi

**Description:**Part of Regression Techniques coursework of M.Stat 1st Year.Starting with the linear regression model with all predictors involved, performed regression diagnostics, did appropriate transformations to the data to remove unwanted stuff like heteroscedasticity,multicollinearity,non-normality of errors,etc.Also,variable selection was performed.Finally presented the model which is the best fit to the data.

Spring 2020 **Modelling the UEFA Champions' League, B.Sc Final Year Project.**

**Mentor:** Dr.Ayan Chandra, Department of Statistics, St.Xavier's College, Kolkata

**Description:**Dissertation paper in the 6th semester of B.Sc Statistics Hons at St.Xavier's College, Kolkata. Here we try analyse the number of goals scored in the UEFA Champions' League over the years.Naturally an application of time series analysis.We try to build a simple mathematical model for the goal ratio- which is more reasonable to work. After estimating the trend using Mathematical Curve Fitting, we try to model the remaining part using ARMA.

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## Relevant Cousework

Statistics Probability Theory, Descriptive Statistics, Statistical Inference, Econometrics, ANOVA, Multivariate Analysis, Time Series Analysis, Large Sample Theory, Bayesian Inference, Statistical Computing, Pattern Recognition, Statistical Genomics, Regression Analysis, Stochastic Processes, Design of Experiments, Sample Survey, Data Analysis using R and Minitab, Introductory Computer Programming

Mathematics Real Analysis, Linear Algebra, Advanced Calculus, Numerical Analysis

Computer Science Programming in C, Object Oriented Programming in C++,Visual Basic, Database Management (SQL), Web Development, Computer Fundamentals

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## Technical Skills

Programming R,Python,C,C++,HTML

Softwares RStudio, Microsoft Excel, Minitab, LaTeX, Tableau

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## Languages

Bengali Native Speaker

English Studied as second language in School,Bachelor's and Master's programme studied in English (*TOEFL iBT Score : 100/120*)

Hindi Bilingual Proficiency

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## Academic Achievements

Scholarships Recipient of the **INSPIRE** Scholarship awarded to top **one percent** students nationally and administered by Department of Science and Technology, Government of India

Entrance

Examination 

- All India Rank 18 in ISI M.Stat Entrance, 2021

Scores 

- All India Rank 32 in ISI M.Stat Entrance, 2020

## Extracurricular Activities

### Sports

- Professional Table Tennis Player registered under West Bengal Table Tennis Association (WBTTA, currently BSTTA) from 2008 to 2019
- Represented the district North 24 PGS from seasons 2009-2011 and then represented North Kolkata till 2019
- Bronze Medal in West Bengal State Table Tennis Championship 2019 (Team Event) Youth Boys' category
- Bronze Medal in West Bengal State Table Tennis Championship 2015 and 2014 (Team Event) Junior Boys' category
- Member of St.Xavier's College,Kolkata Table Tennis Team from 2017 to 2020
- Silver Medal in University of Calcutta Inter College Table Tennis Championship 2019 (Team Event) Boys' category
- Won in several other Inter College Table Tennis tournaments

Art Received Shilpa Visharad Degree in Art from Sarbabharatiya Sangeet-O-Sanskriti Parishad in 2015

### Internship and Freelancing

- Former Content Developer at PiParadox Educational Solutions ,April 2020- October 2020
- Data Science and Business Analytics Intern at The Sparks Foundation, January 2021

Social Activities Participated in Prayas Camp 2019, organized by National Service Scheme (NSS), St. Xavier's College, Kolkata , a 3-day camp usually dedicated to promote higher education among rural students.

### Teaching

- Taught undergrad students for the preparation of IIT JAM Statistics and ISI M.Stat Entrance
- Maintaining an initiative **Statistics Repository** to help students find wonderful free online resources of the subject, which is scarce in India

Articles *A Generalization of Banach's Matchbox Problem with an Application in the field of Computer Science*, published in *Prakarsho*(2019),Annual Magazine of Department of Statistics,SXC Kolkata

### Seminars and talks attended

- Ashok Maitra Memorial Lectures 2022 by Professor Ramon Van Handel**, Organised by ISI Kolkata, ISI Delhi, ISI Bangalore
- Youth Statisticians Meet,2021**, Organised by ISI Kolkata
- Understanding Covid-19 Progression through Data Science,2020**, Organised by Department of Statistics, St.Xavier's College,Kolkata

## References

- Dr. Surupa Chakraborty(Roy)**  
Associate Professor, Department of Statistics, St.Xavier's College (Autonomous), Kolkata
- Dr. Ayan Chandra**  
Assistant Professor, Department of Statistics, St.Xavier's College (Autonomous), Kolkata
- Dr. Abhay Gopal Bhatt**  
Professor (HAG), Stat Math Unit, Indian Statistical Institute, Delhi
- Dr. Subir Kumar Bhandari**  
Professor , Interdisciplinary Statistics and Reserach Unit, Indian Statistical Institute, Kolkata
- Dr. Tapas Samanta**  
Professor (HAG) , Applied Statistics Unit, Indian Statistical Institute, Kolkata
- Dr. Sourabh Bhattacharya**  
Associate Professor , Interdisciplinary Statistics and Reserach Unit, Indian Statistical Institute, Kolkata

*I hereby declare that all the information provided above are true to best of my knowledge.  
Debarshi Chakraborty, January 12, 2023*