

Vaishnav Garg

Ph.D. student @ ESSEC Business School

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EDUCATION

Sept 2024-Present **ESSEC Business School**
Ph.D. in Data Analytics

2017-2022 **Indian Institute of Science Education & Research, Kolkata (IISER-K)**
Bachelor & Master of Science in Mathematics

MAJOR RESEARCH EXPERIENCES

June 2023 - **Research Associate: CAFRAL @RBI**

June 2024 *Advisor: Dr. Gautham Udupa*

- Constructing shocks using high-frequency changes in asset prices like OIS rates and bond yields in a narrow window around Monetary Policy announcement in India, and studying its propagation to the macroeconomy.
- Worked on RBI's Bulletin Article for long-run currency demand forecasts and printing needs, proposing gross tax collections and nightlight data as indicators of formal and total economic activity respectively.

July 2022 - **Research Assistant @ Brij Disa Centre of Data Science & AI, IIM Ahmedabad**

May 2023 *Advisor: Prof. Anindya Chakrabarti*

- Working on paper titled 'Networks of financial volatility: Effects of expectation,' where we investigate the difference between Implied and Realized volatility from a network point-of-view.
- Compared the multi-scaling characteristics of the Indian financial market using data sampled at various frequencies. Investigated Power Laws in asset returns and market efficiency for Indian financial markets.
- Wrote an article for the quarterly CDSA communique. Using Hurst exponent, constructed a Pair trading portfolio outperforming NIFTY50 by 6% average annual return sampled over 10 years.

July 2021 - **Masters Thesis Project: IIM Ahmedabad**

May 2022 *Advisor: Prof. Anindya Chakrabarti*

- Studied volatility networks constructed using Implied and GARCH volatility methods for NIFTY 50 Stocks.

Jan-May 2022 **Reading Project IV: IISER Kolkata**

Advisor: Prof. Tushar Kanti Nandi

- Explored homophily in social networks & the homophily effects of caste on inter-firm trading.

July-Dec **Reading Project III: IIT Kharagpur**

2021 *Advisor: Prof. Abhijeet Chandra*

- Studied Cumulative Prospect Theory and its applications in Asset Pricing and Portfolio Optimization.

July-Aug **Summer Research Project: IISER Pune**

2021 *Advisor: Prof. Anindya Goswami*

- Studied Jump Discontinuities in Financial Time Series and used various Jump detection methods.

Aug-Dec **Reading Project I: IISER Kolkata**

2020 *Instructor: Prof. Anirvan Chakraborty*

- Studied the book 'Elementary Stochastic Calculus with Finance in view' by Prof. Thomas Mikosch. Learnt Stochastic Integral/ Differential Equation with application of stochastic calculus in Finance.

SKILLS & RELEVANT COURSEWORK

Softwares/ Languages R, MATLAB, STATA, Python, L^AT_EX, Gephi

Stats/Maths Time Series Analysis, Stochastic Modeling**, Multivariate Analysis, Statistical Inference, Advanced Probability Theory, Linear Algebra, Measure Theory, Numerical Analysis, Ordinary Differential Equations, Fourier Analysis, Real/Complex Analysis, Functional Analysis, Bio-statistics, Bayesian Statistics**

Econ/Fin Asset Pricing*, Macroeconomics I*, Applied Financial Economics*, Econometrics**, Interest Rate Models**, Social & Economic Networks, Decision Theory**, Game Theory**, Quantitative Modeling

Other Optimization**, Machine Learning & Network Analysis, Neural Networks and Deep Learning**, Graph Theory & Combinatorics, Science Communication

* indicates non-certificate courses ** indicates ongoing course.

TEACHING ASSISTANTSHIP

Jan-May 2022 **MA2202: Probability I (Second Year level)**

Instructor: Prof. Soumya Bhattacharya

- Assisted in teaching an intro course for 60 students on Probability Distributions, Moment Generating Functions, Central Limit Theorem, and Markov Chains. Prepared and graded the assignments and exams.

CONFERENCES/ WORKSHOPS/ AWARDS

December **The Financial System and Macroeconomy in Emerging Economies**

2023 *CAFRAL (RBI)*

- Attended the 2-day CAFRAL Annual Conference where working papers in macroeconomic, financial and policy linkages between emerging and developed economies were presented and discussed.

December **International Conference on Network Science in Management(NSM)**

2022 *IIM Ahmedabad*

- Attended the 2-day International Conference on application of Network Science with talks & seminars delivered in Financial linkages, structure of networks, and information spillover in networks.

June 2021 **13th Annual SoFiE Conference (Online)**

Rady School of Management, UCSD

- Attended the annual International Conference on Financial Econometrics, featuring discussions on Volatility, Options Pricing, Forecasting, and Asset Pricing.

July 2018 **International Workshop on Mathematical Finance**

IISER Pune

- Attended the 5-day international workshop on Mathematical Finance with lecture series & seminars delivered in Stochastic portfolio theory and Option Pricing Theory.

February **Kishore Vaigyanik Protsahan Yojna (KVPY)**

2016 *Department of Science and Technology, Government of India*

- Awarded the most prestigious fellowship given by the Govt. of India to undergraduate students doing research in Mathematics & Natural Sciences.

OTHER RELEVANT PROJECTS

May-July **Summer Research Project: IISER Kolkata**

2021 *Advisor: Prof. Satyaki Mazumder*

- Learnt theory and application of Generalized Linear Regression (GLM) - Model Fitting, Estimation & Inference.

Jan-April **Reading Project II: IISER Kolkata**

2021 *Instructor : Prof. Anirvan Chakraborty*

- Studied Brownian motion from mathematical perspective from the book "Brownian Motion" by Prof. Rene Schilling. Learnt to construct/simulate Brownian Motion and studied its mathematical properties.

July-Aug **Summer Research Project : IISER Kolkata**

2020 *Advisor : Prof. Asok Nanda*

- Undertook a 6-week reading project on Markov chains and their characteristics, using the book "Introduction to Stochastic Processes" by Hoel, Port, and Stone.

EXTRACURRICULARS

2018-2019 Spearheaded the IXth edition of the annual science Fest of IISER Kolkata, **INQUIVESTA**

2018-2019 Served as the *Secretary* for the **Badminton Club** at IISER Kolkata

2018-2020 Represented IISER Kolkata twice in **Badminton & Carrom** at *Inter-IISER sports meet*

2021 Represented IISER Kolkata in **Chess** at *Inter-IISER chess championship*

REFERENCES

Prof. Roberto Reno

Professor

IDS Department

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🌐 [Homepage](#) - Prof. Roberto Reno

Prof. Anirvan Chakraborty

Assistant Professor

Department of Mathematics & Statistics

IISER Kolkata

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🌐 [Homepage](#) - Prof. Anirvan Chakraborty

Prof. Anindya Chakrabarti

Associate Professor

Faculty of Economics

IIM Ahmedabad

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🌐 [Homepage](#) - Prof. Anindya Chakrabarti

Dr. Gautham Udupa

Research Director

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🌐 [Homepage](#) - Dr. Gautham Udupa