SHUBHAJIT DEY

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EDUCATION

Bachelor of Science - Master of Science, BSMS Dual-degree

Indian Institute of Science Education and Research, Bhopal
Major in Mathematics | Minor in Data Science

📅 2019 – 2024   **CPI** : 8.13/10

SKILLS & INTERESTS

- **General**   Approximation theory **|** Eigenvalue problems & Numerical analysis on differential equations **|** Optimization problems **|** Optimization algorithms in classical machine learning
- **Other**   Computational Matrix Theory & Mathematical programming **|** Theoretical deep learning

- **Language**   **Fluent** : Python, C++ **| Familiar** : R
- **Libraries**   **Fluent** : NumPy, Matplotlib, Pandas, SciPy, Scikit-Learn, PyTorch
  Familiar : Qiskit, Librosa

- **Tools**   LaTeX **|** Wolfram Mathematica **|** MATLAB
- **Analytics**   Jupyter Notebook **|** RStudio **|** Excel

PROFESSIONAL EXPERIENCES

- **Teaching Fellow**   Taught undergrads and aided host Prof. Partha Pratim Das in the Discreet Mathematics course at *Ashoka University, New Delhi*.   📅 Jan 2025 - Present
- **Teaching Fellow**   Taught undergrads and aided host Prof. Bhargab Bhattacharya in the QRMT course at *Ashoka University, New Delhi*.   📅 Sept 2024 - Dec 2024
- **Graduate Researcher**   Worked under the guidance of Dr. Janosch Ortmann & Dr. Walter Rei on extension of the Mitacs Globalink project.   📅 May 2024 - Sept 2024

RESEARCH EXPERIENCES & PROJECTS

- **Analysis on ODE & Approx. Theory**   **Theoretical & Computational considerations of Sturm-Liouville systems.** *(MS dissertation project)*   📅 Aug 2023 - May 2024
  - **Supervisor :** Dr. Anandateertha Mangasuli & Dr. Ambuj Pandey, IISERB
  - Studied the theory on SL systems, in particular Oscillation Theory, asymptotics and completeness of eigenfunctions.
  - Conducted relevant numerical experiments to visualise Fourier approximation & Chebyshev approximation, including discrete computation of Chebyshev coefficients (pseudo spectral method).
  - **Thesis :** 10.13140/RG.2.2.13890.39364

- **Operational Research**   **On signature based algorithmic algebra involved in stochastic programming.**   📅 May 2023 - Aug 2023 + May 2024 - Sept 2024
  - **Supervisor :** Dr. Janosch Ortmann & Dr. Walter Rei, ESG UQAM
  - Investigated signature-based algorithms and their role in discarding redundant calculations during Gröbner basis computations.
  - Performed theoretical surveys, numerical experiments and contributed towards explaining heuristics of signature based algorithms.
  - **Report :** *soon to be available on ArXiv as a preprint.*

- **Topology**   **On characterizing compact and dense subspaces of $C(\mathbf{X}, \mathbb{R})$.**   📅 May 2022 - Aug 2022
  - **Supervisor :** Dr. Anandateertha Mangasuli, IISERB
  - Studied Ascoli's theorem, Weierstrass approximation theorem and Stone-Weierstrass theorem.
  - Primary objective was to explore, analyse and present the derivation & proof of relevant results.
  - **Report :** ResearchGate

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- **Real Analysis** **On Taylor's approximation and some associated theorems on convergence of power series.** 📅 Dec 2021 - Jan 2022
  - **Supervisor :** Dr. Anandateertha Mangasuli, IISERB
  - Thoroughly analysed the crucial concepts behind the mentioned topics.
  - Further, solved problems to deduce important areas of application.
  - **Report :** ResearchGate

- **Artificial Intelligence** **Acoustic scene classification using auditory dataset.** 📅 Aug 2021 - Dec 2021
  - Built a system which employed a CNN based model (PyTorch framework) to classify audio scenes.
  - The system included handling audio data using Librosa frameworks and usage of spectrograms (Mel) as input to the neural network employed.
  - **Report :** arXiv:2112.13450
  - **Code :** GitHub Repo

READING PROJECTS

- **Deep Maths** **A preliminary survey on Deep Maths.**
  - Rigorous literature survey was done based on an experiment conducted on advancing mathematical intuition using AI. Code deployed was critically analysed to reproduce the base results.
  - **Report :** 10.13140/RG.2.2.18971.34085

CONFERENCES & WORKSHOPS

- **Jan 2025** Attended **exPLORe 2025** [ISLA 2020], a five-day workshop cum conference conducted jointly by **Safexpress Centre for Data, Learning and Decision Sciences** & Google.
- **Dec 2020** Attended 8th **INDIAN SCHOOL OF LOGIC AND ITS APPLICATIONS** [ISLA 2020], a virtual school conducted jointly by **Association of Logic in India (ALI)** & IISERB.

SCHOLASTIC ACHIEVEMENTS

- **2023** Awarded The Mitacs Globalink Research Grant (CAD 10,000) for an on-site research project in Montréal.
- **2019** Cleared ISI B.Math entrance examination - round 1 (clearance for only top 150 out of 50k+ applicants).
- **2019** Obtained **94%** in AISSCE (CBSE class XII boards examination).
- **2017** Obtained **10 CGPA** (out of 10) in SCE (CBSE class X boards examination).

OTHER ACHIEVEMENTS

- **2020** **Second Runners Up** at SBI NUMERO YONO QUIZ, *Central India region*.
- **2017** **Third Runners Up** at CBSE HERITAGE INDIA QUIZ, *National Semi Finale*.
- **2016** **First Runners Up** at BHARAT KO JANO QUIZ COMP., *National Finale*.
- **2014** **Gold Medal** for Intra State Rapid-Fire chess tournament, *Assam*.

POSITIONS OF RESPONSIBILITY

- **2022** **Event Coordinator** & **Core-team member** for the Interactive Quiz Event in the annual outreach programme of IISER-B, *responsibility as a host and an event manager*.
- **2022** **Department Representative** for the mathematics 2019 batch, *responsibility to represent the entire batch to the department & solve relevant issues and grievances*.
- **2020** **Coordinator** at IISERB QUIZ CLUB for 2 consecutive terms, *responsibility to conduct infotainment quizzes*.

*All links and hyperlinks are underlined.

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