

Shouvik Majumder

Curriculum Vitae

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Personal Webpage Link

Education

- 2015–2020 **BS-MS Integrated Dual Degree**, *Indian Institute of Science Education and Research*, Kolkata, **CGPA – 8.73** (10 point scale).
5TH YEAR MATHEMATICS MAJOR | DOUBLE MINORS IN PHYSICS AND BIOLOGY
- Fellowship **INSPIRE**, *Department of Science and Technology, Govt. of India*.
Awarded to top 1% students in India pursuing science.
- 2015 **10+2 High School**, *Ramakrishna Vivekananda Mission Vidyabhawan*, Barrackpore.

Ongoing Research for Master's Thesis

- Title *Exploring Neural Correlates of Cognitive Tasks using Topological Data Analysis*
- Supervisor **Dr. Koel Das** *Neuro-Lab, DMS, IISER-K*
- Description Analyzing and decoding neural signals from cognitive tasks using a combination of Topological Data Analysis (TDA), Networks, and Machine Learning, to explore relevant task-based neural markers, specifically involving the role of visual perception, emotion processing, and attention in Autism Spectrum Disorder
- [Relevant Manuscript](#)
- In Press **S. Majumder**, F. Apicella, F. Muratori, and K. Das, "*Detecting Autism Spectrum Disorder Using Topological Data Analysis*", IEEE ICASSP 2020.

Collaborative Research

- Topic Investigating quantifiable patterns in Canine Behaviour
- Guide **Dr. Anindita Bhadra** *Behaviour and Ecology Lab, DBS, IISER-K*
- Description Mesoscopic properties of canine behavioural networks to decipher relevant behavioural patterns. Multi-Fractal Detrended Fluctuation Analysis (MFDFA) to characterize empirical Pareto Principle in behavioural frequency-rank distribution
- [Relevant Manuscripts](#)
- In review A. Banerjee, N. Das, R. Dey, **S. Majumder**, P. Shit, A. Banerjee, N. Ghosh, and A. Bhadra, "*Unraveling Linguistic Patterns in Dog Behaviour*", arXiv preprint arXiv:1903.11946
- In review M. Paul, A. Nandi, **S. Majumder**, and A. Bhadra, "*The Role of Play in Early Development in Groups of Free-Ranging Dogs*"

Posters, Projects, and Academic Expositions

Posters

- May 2020 **Topological Data Analysis in Autism Detection**, Invited for Poster.
45th International Conference on Acoustics, Speech, and Signal Processing(ICASSP) 2020.
- May 2020 **IEEE Travel Grant**, Highly competitive travel grant for attending ICASSP 2020.
- February 2020 **Topological Data Analysis in Neuroscience**, Invited for Poster.
Max Planck Institute, Florida (MPFI) Selection Symposium

Projects

- Fall, 2018 **Structure of the Grassmannian**, INDEPENDENT STUDY.
Guided by Dr. Somnath Basu, DMS, IISER-K.
- Fall, 2019 **Elements of Statistical Learning**, INDEPENDENT STUDY.
Guided by Dr. Anirvan Chakraborty, DMS, IISER-K.
- 2017 **Convex Analysis and Optimization**, SUMMER PROJECT.
Guided by Dr. Anup Biswas, DMS, IISER Pune for the SSPC program.
- 2015 - 2016 **Harmonic Oscillators and the Isochronousity Problem**, SUMMER PROJECT.
Dr. Ananda Dasgupta, DPS, IISER-K
- 2015 **Quantum Tunneling in Organic Semiconductors**, WINTER PROJECT.
Guided by Dr. Partha Mitra, DPS, IISER-K

Selected Schools and Workshops

- 2019 **Young Statisticians' Meet: Data Science in Action** *ISI Kolkata*
- 2018 **IFCAM School on Mathematical Biology and Applied Mathematics** *IISc*
- 2018 **Basic Algebraic Geometry Summer School** *NCM + IISER Pune*
- 2018 **Annual Foundation School on Mathematics** *NCM + IISER Pune*
- 2015 **Vijyoshi National Science Camp** *KVPY*

Other Experiences

- Fall, 2019 **Teaching Assistant: Numerical Analysis**
- Spring, 2020 **Teaching Assistant: Analysis II**
- Fall, 2019 Student Representative for the Math **Syllabus Review Committee**
- 2017-20 Departmental outreach programs to promote math education in local schools
- 2016-2019 Music Club office-bearer at IISER-K
Organizing Team: 1st Inter IISER Cultural Meet and Inquivesta

Skills and interests

- Math Algebraic Topology, Algebraic Geometry, Functional Analysis, PDE
- Programming Python, C, C++, MATLAB, R, Shell
- Computational Machine Learning, Bayesian inference, TDA, Graph Algorithms
- Webpages [Neuro Lab webpage](#) and [Personal Webpage](#)
- Music Guitar, Sitar, Bass, Ukulele, Mandolin, Tabla, Drums