

Pronoma Banerjee

Email | LinkedIn | GitHub | WebSite | Google Scholar

EDUCATION

Birla Institute of Technology and Science, Pilani, Goa <i>B.E. Computer Science, Integrated MSc. Mathematics</i>	Aug '19- Present CGPA: 8.13/100
Delhi Public School, Ruby Park, Kolkata <i>Class XII</i>	2017-2019 CBSE: 95.2/100
Loreto House, Kolkata <i>Class X</i>	2006-2017 ICSE: 97.8/100

EXPERIENCE

CVC group, Oden Institute of Computational Sciences, UT Austin Remote
Research Engineering/Scientist Associate, Supervisor: [Dr. Chandrajit Bajaj](#) June 2022 - Present

- **Projects:** Continually learning to optimally climb the drug discovery mountain, Sample efficient POMDP for Progressive, Robust Surface Reconstruction, Stackelberg framework on actor-critic RL algorithm, Hyperspectral-multispectral super-resolution using graph-Laplacian regularization.

Birla Institute of Technology and Science, Pilani, Goa
Undergraduate Researcher, Supervisors: [Dr. Snehanshu Saha](#), [Dr. Sukanta Mondal](#) November 2021 - Present

- **Projects:** LogGene, Synth-Breeder- a genetic algorithm based music generator, Approximate Bayesian Computation on Generative Adversarial Networks, A code-hub on Adversarial Deep Learning, Brain-Tumor Radiogenic Classification, Modelling the spread of COVID-19, ML in Bio-informatics.

Swecha (Andhra Pradesh Free Software Foundation) Gachibowli, India
Summer Engineering Intern (Remote) June 2021 - July 2021

- **Project:** Web-extension for detection of fake news from image, video and written texts in Hindi and English

Graphics Research Group, IIIT Delhi Delhi, India
Summer Research Intern (Remote), Supervisor: [Dr. Ojaswa Sharma](#) [[GitHub Link](#)][[Report](#)] May 2021 - July 2021

- **Project:** Volumetric registration and segmentation for Virtual Endoscopy using CT and MRI volumes.

Indian Statistical Institute, Kolkata Kolkata, India
Summer Research Intern (Remote), Supervisor: [Dr. Subhamoy Maitra](#) June 2020 - July 2020

- **Project:** Game-theoretic analysis of computer games in classical (C program) and quantum (IBMQ) environments.

MANUSCRIPTS

- **Correcting Model Misspecification via Generative Adversarial Networks** [[PDF](#)]
[Pronoma Banerjee](#), [Manasi Gude](#), [Rajvi Sampat](#), [Sharvari Hedao](#), [Soma Dhavala](#), [Snehanshu Saha](#)
- **Continuous Model Improvement via Adversarial Optimization** [[PDF](#)]
[Sharvari Hedao](#), [Manasi Gude](#), [Pronoma Banerjee](#), [Rajvi Sampat](#), [Soma Dhavala](#), [Snehanshu Saha](#)

SELECT RESEARCH PROJECTS

Hyperspectral-multispectral super-resolution
Supervisor: [Dr. Chandrajit Bajaj](#) June 2022 - Present

- Combining two low resolution multispectral and hyperspectral video streams into a single super-resolution stream by developing fusion algorithms utilizing graph Laplacian regularization of the higher spatial resolution stream.
- Training a function that transforms SRI to HSI with an adaptive convolutional filter, using a sparse and progressive Bayesian Gaussian process CNN, and training over multiple HSI-MSI and different resolution RGB samples.

SynthBreeder (AI song contest 2022)
[[Process document](#)][[Appendix](#)][[Team page](#)] April 2022- May 2022

- Developed a software called SynthBreeder, which implements the genetic algorithm on various setups of the modular synthesizer, called 'organisms'. Each organism produces a particular kind of sound.
- The organisms evolve by undergoing the graph-based processes of mutation and crossover, and natural selection, resulting in changes in connections and setups, evolving from fragments of sound to a section of a musical piece.

ABC-GAN

Supervisor: [Dr. Snehanshu Saha](#)

November 2021 - June 2022

- Developed a generative modeling paradigm called skipGAN which combines GANs and Approximate Bayesian Computing, with skip connections, and aims at correcting likelihood misspecification in prior models.
- Implementing our model on TabNet, CatBoost and Stats Model priors, on several synthetic and real-life datasets.

Deep Learning in Biomedical Image Processing

Supervisor: [Dr. Sukanta Mondal](#)

March 2021 - May 2021

- Studying the applications of Tensorflow and PyTorch frameworks for object detection and phenotypic classification of biological images in nucleus detection, malaria stage classification and brain tumor classification.
- Trying to implement some deep learning models to get best results in the [Kaggle competition](#).

Modelling the spread of COVID-19

Supervisor: [Dr. Danumjaya Palla](#)

March 2021 - April 2021

- Implemented SIR models described in this [paper](#), in MATLAB to predict the spread of the COVID'19 pandemic over a year based on their limitations, equilibrium and stability analysis, interventions and exit strategies.

Machine Learning in Bioinformatics

Supervisor: [Dr. Sukanta Mondal](#)

January 2021 - March 2021

- Identification of Influential Genes for Early Detection of Cancer by performing feature selection using Machine Learning (Random Forest) and Deep Learning (AutoEncoder+DeepLIFT framework).
- Analysing the genes selected from the transcriptome and their applications in early detection of oral and lung cancers, from a matrix of normalized gene expression (RNA-seq) values from available tumor samples.

Quantum Tic-tac-toe

Supervisor: [Dr. Subhamoy Maitra](#) [[GitHub Link](#)]

June 2020 - July 2020

- Designed a version of Quantum tic-tac-toe using C programming, inspired from this [paper](#).
- Calculated the probabilities of winning, in both quantum and classical systems, when using different states of the board, applying different strategies and tried developing a subgame perfect Nash Equilibrium for the game.

WORKSHOPS/TECHNICAL EVENTS ATTENDED/ORGANIZED

- **Workshop on Brain Computation and Learning, IISc** [[BCL 2023](#)]
Indian Institute of Science (IISc) Bangalore, Pratiksha Trust [Attended] (*January 2022*)
One among 7 undergrads out of 998 applicants selected for the workshop. Gained huge insights on current research in neuroscience by some of the world's best neuroscientists.
- **International Conference on Advances in Data-driven Computing and Intelligent Systems** [[ADCIS 2022](#)] *APPCAIR, BITS Goa and Soft Computing Research Society* [Organized] (*September 2022*)
Student volunteer and one of the 4 student reviewers.
- **International Conference on Emerging Techniques in Computational Intelligence** [[IEEE ICETCI 2022](#)] *IEEE* [Attended] (*August 2022*)
Gained deep insight into RL and dynamical systems in the study of protein folding from keynote speeches.
- **AI and Creation Day, Music and Innovation Summit 2022, Belgium**
International AI song contest, 2022 [Attended Remotely] (*April 2022*)
Attended this event as part of one among the 42 teams selected to participate in the International AI Song Contest 2022. Gained insight into various AI tools developed and being used for music generation.
- **AI Symposium 2021**
Society for Artificial Intelligence and Deep Learning (SAiDL), BITS Goa [Attended] (*October 2021*)
Interacted personally with highly cited researchers across India and graduates pursuing a career in AI.

TECHNICAL SKILLS

Languages: Python, C/C++, Java, HTML/CSS, MATLAB

Libraries: Pandas, NumPy, Keras, Tensorflow, PyTorch, SimpleITK, Elastix

Courses: Machine Learning, Deep Learning, Computer Vision, Graph and Networks, Discrete Mathematics, Mathematical Modelling, Microprocessors and Interfaces, Linear Algebra, Computer programming.

ACHIEVEMENTS

Merit Scholarship: by [INSPIRE-DST](#) in collaboration with [JBNSTS](#), for being among top 0.5% students of West Bengal in board examinations.

Award: All India (National) Rank 1 in Science in ICSE (100/100 PCB).

TEACHING, MENTORSHIP, LEADERSHIP

Teaching Assistant- Graphs and Networks, Computer Programming, Discrete Mathematics.

Course Instructor and Project Mentor- Introduction to Data Science ([QSTP](#), BITS Goa).

Academic Mentor- Probability and Statistics (Academic Assistance Program, [CTE](#), BITS Goa.)

Student Coordinator- Student Faculty Committee, Department of Mathematics, BITS Goa.

Project lead- Music Society [website](#), from scratch.