

# Goirik Chakrabarty

RESEARCHER · PROGRAMMER · BS-MS (MAJOR IN MATHEMATICS)

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“Aut viam inveniam aut faciam tibi.”

## Summary

My research focuses on two primary areas. Firstly, lifelong learning, where I investigate techniques to enable AI systems to accumulate knowledge continuously, adapting to changing environments. Secondly, I am dedicated to advancing robust and reliable machine learning, aiming to enhance model stability and performance in real-world scenarios.

## Interests

- Computer Vision
- Robust Machine Learning
- Vision Language Model
- Foundations of Transfer learning
- Explainable AI

## Publications

- 2024 **Goirik Chakrabarty\***, Aditya Chandrasekar\*, Ramya Hebbalaguppe and Prathosh AP, ReMOVE: A Reference-free Metric for Object Erasure, *Preprint* [arXiv](#)
- 2024 **Goirik Chakrabarty\***, Aditya Chandrasekar\*, Jai Bardhan, Ramya Hebbalaguppe and Prathosh AP, ReMOVE: A Reference-free Metric for Object Erasure, Accepted in *CVPR Workshop (EVCNFM)*
- 2024 Manogna S, **Goirik Chakrabarty** and Soma Biswas, P-STAR: Pseudo-Source Guided Target Clustering for Fully Test-Time Adaptation, Accepted in *WACV'24* [PDF](#) [Code](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, SANTA: Source Anchoring Network and Target Alignment for Continual Test Time Adaptation, Accepted in *TMLR* [PDF](#) [Code](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, A Simple Signal for Domain Shift, In *ICCV Workshop (VCL)* [PDF](#) [Poster](#)
- 2023 **Goirik Chakrabarty**, Manogna S and Soma Biswas, Domain Shift Signal for Low Resource Continuous Test-Time Adaptation, In *ICLR Workshop (PML4DC)*, [PDF](#) [Video](#)

## Work Experience

### Pre-Doctoral Researcher

TCS Innovation Hub, Delhi, India

MENTORED BY: RAMYA HEBBALAGUPPE AND DR. PRATHOSH AP

June 2023 - Present

- Understanding Diffusion models and CLIP model for image editing using diffusion models
- Exploring limitations such as multi-concept editing and iterative editing
- Increase reliability and robustness of image generation
- Our novel solution to Localised Multi-Object Editing (LoMOE) has been submitted to CVPR'24

### Master's Thesis: Test time Domain Adaptation with Deep Learning

IISc, Karnataka, India

MENTORED BY: DR. SOMA BISWAS

July 2022 - May 2023

- Did literature review which included papers such as BNStats Adapt, TENT, CoTTA
- Implemented various Domain adaption techniques such as MixStyle, Prototype classifier, various regularisation etc.
- Our novel Continual Test time Adaptation framework, SANTA is accepted in TMLR
- Our novel signal for domain shift got accepted in ICCV'23 Workshop, a previous version also got accepted in ICLR'23 Workshop

### Semester Project: Unsupervised Learning and Bayesian Methods

IISER-Pune, Maharashtra, India

MENTORED BY: DR. LEELAVATI NARLIKAR

Jan 2022 - April 2022

- Read Bayesian inference and clustering algorithms
- Compared Gibbs Sampling to EM (made by fellow project student) and KMeans (sklearn implementation)
- Link to project site

## Generative Adversarial Network in Climate data science

IITM, Maharashtra, India

MENTORED BY: DR. BIPIN KUMAR AND DR. MANMEET SINGH

July 2021 - Jan 2022

- Reviewing various GAN implementation which have application in climate sciences
- Reproducing relevant techniques such as GAIN, SRGAN, TanoGAN
- Link to project draft

## Curem Biotech (Start up)

AIC-Pune, Maharashtra, India

MACHINE LEARNING AND DEEP LEARNING LEAD

June 2022 - Oct 2022

- Developing cell segmentation model for classifying parasitic and healthy RBCs
- Further, detecting species and estimating infected cell ratios
- Investigating various methodologies for addressing this problem statement

## IAS-SRFP: Model Predictive Control on a Covid-19 Scenario

IIT-Bombay, Maharashtra, India

MENTORED BY: DR. D. MANJUNATH

May 2021 - Sept 2021

- Understanding concepts of model predictive control, mathematical optimisation and economics
- Projecting and framing real life situation as a Control Problem
- Link to Final Report

## Image Segmentation using PSPNet

IITM, Maharashtra, India

MENTORED BY: DR. BIPIN KUMAR AND DR. MANMEET SINGH

Mar 2021 - May 2021

- Reviewing Image Segmentation and instance segmentation
- Reproducing FloodNet Image Segmentation model, my repo
- The model was made using SuperComputer facility at IISER Pune

## Education

### Indian Institute of Science Education and Research (IISER)

Pune, Maharashtra

BS - MS DUAL DEGREE

Aug 2018 - May 2023

- CGPA: 8.1/10 (top 20%) The grading system is relative.
- MS Thesis: 8.7/10 GPA
- Subjects (till second year): Mathematics, Physics, Chemistry, Biology, Earth Sciences, Humanities, and Computer Programming

### Faith Academy Senior Secondary School

New Delhi, Delhi

XII (CBSE)

Aug 2016 - May 2018

- Overall percentage: 94.4%
- Science percentage (PCM and CS): 95.75%

### Faith Academy Senior Secondary School

New Delhi, Delhi

X (CBSE)

Starting - May 2016

- CGPA: 10/10
- Subjects - Science, Mathematics, English, Social Studies, Hindi

## Achievements

- 2022 **Attended ACML**, i.e. 14th Asian Machine Learning Conference as a selected student scholar.
- 2019 **Attended National Science(VIJYOSHI) Camp**, organised by Kishore Vaigyanik Protsahan Yojana and DST, at Indian Institute of Science, Bangalore (incapacity of KVPY Scholar).
- 2019 **All India Rank - 6**, KVPY fellowship 2018, SB scholar. This is organised and given by Department of Science and Technology (DST).
- 2018 **Attended National Science(VIJYOSHI) Camp**, organised by Kishore Vaigyanik Protsahan Yojana and DST, at Indian Institute of Science, Bangalore (incapacity of Selected Student from IISER).
- 2018 **Recipient**, of INSPIRE SHE scholarship from Department of Science and Technology (DST).
- 2018 **Waitlist Rank 2**, after interviewing for B.Stat. course in Indian Statistical Institute, Kolkata

## Selected Courses

### ONLINE COURSES

- 2019 Machine learning, Probability and Statistical inference, Biology Meets Programming: Bioinformatics Financial Engineering and Risk Management I, Network Analysis in R, Welome to Game Theory. Game Theory, Importing and Managing Financial Data in Python, Getting and Cleaning Data, Statistical Inference, R Programming, The Data Scientist's Toolbox, Data Visualisation using Seaborn, Intermediate ML
- 2020
- 2021 Practical Reinforcement Learning

## INSTITUTE COURSES

Sem 1, 2	Single and Multivariable Calculus, Introduction to Proofs in Mathematics, Programming with Python, Mathematical Methods (Vector calculus, ODE, Fourier analysis etc.)
Sem 3, 4	Linear Algebra, Probability and Statistics, Basic Structures in Mathematics, Quantum Physics
Sem 5	Statistical Inference, Random Processes and Queueing Theory, Real Analysis, Group Theory, Combinatorics, Topology, Economics and Public Policy, Biostatistics
Sem 6	Data Science, Mathematical Optimisation (Linear and Dynamic Programming), Graph Theory, Complex Analysis, Vectorspace, Rings and Modules [Audited]
Sem 7	Probability, Measure Theory and Integration, Algorithms, Parameter Estimation and Inverse Theory, Bioinformatics, Numerical Analysis [Audited]
Sem 8	Stochastic Process, Partial Differential Equations, Functional Analysis, Mathematical and Computational Biology, Development Studies
Sem 9, 10	I audited the course Advance Deep Representation Learning (ADRL) in IISc during my MS Thesis

## Skills

<b>Programming</b>	Python(numpy, pandas, tensorflow, pytorch, seaborn), MATLAB, R, C++, SQL
<b>Typesetting</b>	Latex, Markdown, HTML, CSS (with Sass)
<b>Tools</b>	Git, GitHub, VScode, MS-Excel, Linux and command line
<b>Soft Skills</b>	Resourceful, Adaptable, Disciplined, Good Communication and Presentation skills
<b>Languages</b>	English, Hindi, Bengali (fluent in all three)

## Extracurricular Activity

### Corporate Relation Head

KARAVAAN 2020

Mar. 2020 - May 2022

- Karavaan is IISER-Pune's Annual Science-Art-Cultural Festival.
- Event was not held due to Covid-19 outbreak.
- Me and my team analysed all past Karavaan records and refreshed sponsor contact databases.
- Made detailed documentation of how Sponsorship work is to be done for whenever normal life resumes.

### Coordinator of Resource Team

DISHA

Apr. 2019 - Aug. 2020

- Disha is a social non-profit organisation completely run by students of IISER Pune to spread the light of Education and Scientific Temperament among the underprivileged section of the society.
- Provide and manage inventory for Disha.
- Started shooting science demonstration videos for kids.

### Finance and Sponsorship Coordinator

TEDxIISERPUNE

Aug. 2019 - Aug. 2020

- This was the first TEDx event organised by any IISER and we were the founding members
- Arranged for Rs.250,000/- through Sales and Sponsorships

### Center Coordinator (Hyderabad)

MIMAMSA

Nov. 2019 - Feb. 2020

- Mimamsa is the Largest All India Undergraduate Quiz held Annually by IISER Pune

## Referees

### Dr. Soma Biswas

IISc, Bangalore, India

ASSOCIATE PROFESSOR

- Advisor for Master's Thesis
- Home Page: <https://sites.google.com/iisc.ac.in/somabiswas>
- E-mail: [somabiswas@iisc.ac.in](mailto:somabiswas@iisc.ac.in)
- Phone No: +91 802 293 3538

### Dr. Leelavati Narlikar

IISER Pune, Bangalore, India

ASSOCIATE PROFESSOR

- Co-Advisor for Master's Thesis
- Home Page: <http://sites.iiserpune.ac.in/~leelavati/>
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