

# SHUBHAJIT ROY

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## Education

### Indian Institute of Technology Gandhinagar

Ph.D in Computer Science and Engineering

CPI - 9.14

July 2022 – Present

Gandhinagar, India

### Indian Association for the Cultivation of Science

M.Sc in Mathematics and Computing with Major in Computer Science

CGPA - 8.42

October 2020 – July 2022

Kolkata, India

### Presidency University

B.Sc in Mathematics

CGPA - 6.95

June 2017 – August 2020

Kolkata, India

## Publications

- “Local Fragments, Global Gains: Subgraph Counting using Graph Neural Networks” DiffCoAlg@NeurIPS (2025). Shubhajit Roy, Shruti Das, Binita Maity, Anant Kumar, and Anirban Dasgupta.
- “FIT-GNN: Faster Inference Time for GNNs that ‘FIT’ in Memory Using Coarsening” ArXiv (2024). Shubhajit Roy, Hriday Ruparel, Kishan Ved and Anirban Dasgupta.

## Projects

### ⌚ Graph Representation Learning for Fast Detector Simulation

Prof. Shanmuganathan Raman

January 2024 - April 2024

- Quark and gluon jets from high-energy particle collisions produce distinct patterns in jet images, but distinguishing them remains a core challenge in particle physics.
- This project applies machine learning, especially GNNs, VAEs, and GVAEs, to detect patterns that differentiate quark- from gluon-origin jets.

### ⌚ Graph Neural Network for weather data prediction

Prof. Anirban Dasgupta

February 2023 - Present

- Given a set of locations as nodes and edges between, our task is to predict different weather stats based on past information.
- We propose to use GNNs in this streaming fashion and still overcome the current problems faced while learning from streaming graphs.
- One major problem tackled is the catastrophic forgetting problem, where the GNN model tends to forget past patterns in the graphs. Another problem faced is the memory consumption of these models.

### ⌚ Joint Entity Recognition and Relation extraction

Dr. Partha Basuchowdhuri

September 2021 - Present

- Given a sentence, we need to find the entities in the sentences and the relation between these entities. This task helps us in the construction of a Knowledge Graph where the nodes are the entities, and the edges between these nodes have the corresponding relation.
- In our proposed model, we intend to use GNNs to extract the dependencies between the words in a sentence and then predict the entities and relations.

### ⌚ MedEx - A Software for an Pharmacy database

Prof. Paramartha Dutta

June 2021 - July 2021

- Implemented the SRS and the prototype code for transaction management of an online pharmaceutical database.
- The software helps the customer of the wholesaler to open an account and do all the transactions in a digital method. It includes facilities like credit payment, seeing transaction history, etc.
- Done along with Sarthak Das and Avishek Lahiri as a part of the IACS Computer Science Unit 2020 batch.

### ⌚ IACS Neural Networks Verification System (INNVerS)

Dr. Rajarshi Ray

March 2021 - August 2021

- A tool for verification of ReLU neural network (for example, Acas-Xu) properties.
- The tool uses SCIP for optimizing and finding the bound with respect to the neural network and z3 for checking satisfiable conditions.
- Done along with Sarthak Das and Avishek Lahiri as a part of the IACS Computer Science Unit 2020 batch.

## Roles and Responsibilities

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► Tutorial - ACM Summer School: AI for Social Good (Graph Neural Networks: Hands On) June 2025  
Indian Institute of Technology Gandhinagar, India

Reviewer - Empowering Global South AI @ AAAI 2026	December 2025
Reviewer - GCLR @ AAAI 2026	October 2025
Reviewer - NeurIPS 2025	July 2025
Ethics Reviewer - NeurIPS 2025	July 2025
Ethics Reviewer - NeurIPS 2024	August 2024
Ethics Reviewer - NeurIPS 2023	July 2023
Volunteer - Foundations of Software Technology and Theoretical Computer Science Indian Institute of Technology Gandhinagar, India	December 2024
Volunteer - Randomized Methods For Approximation And Parameterized Algorithms Indian Institute of Technology Gandhinagar, India	December 2022
Volunteer - Indian Symposium on Machine Learning Indian Institute of Technology Gandhinagar, India	December 2022
Teaching Assistant - Scalable Data Science NPTEL	July 2025 - November 2025
Teaching Assistant - Introduction to Data Science Indian Institute of Technology Gandhinagar, India	January 2025 - May 2025
Teaching Assistant - Introduction to Data Science Indian Institute of Technology Gandhinagar, India	January 2023 - May 2023
Teaching Assistant - Ordinary and partial differential equations Indian Institute of Technology Gandhinagar, India	August 2022 - November 2022

## Relevant Coursework

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- Social and Complex Networks
- Machine Learning
- Optimisation in ML
- GNN and Transformers
- Understanding Large Language Models

## Events Attended

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Frontiers of Graph Algorithms Indian Institute of Science, Bangalore, India	December 2025
Neuroscience, Data Science and Dynamics International Center of Theoretical Sciences, Bangalore, India	April 2025
Indian Symposium on Machine Learning BITS Pilani Goa Campus, India	December 2024
Pingala Interactions in Computing 2024 Infosys Ltd Mysore, India	February 2024
CODS-COMAD 2024 International Institute of Information Technology Bangalore, India	January 2024
Indian Symposium on Machine Learning Indian Institute of Technology Bombay, India	December 2023
Data Science: Probabilistic and Optimization Methods International Center of Theoretical Sciences, Bangalore, India	July 2023

## Technical Skills

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**Languages:** Python, Java, C, C++, R, SQL, Shell, L<sup>A</sup>T<sub>E</sub>X  
**Technologies/Frameworks:** PyTorch, TensorFlow, GitHub  
**Communicating Language:** English, Hindi, Bengali

## Certificate and online Courses

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### Certification in Scientific Writing

Indian Institute of Technology Gandhinagar

April 2025

- The Certificate in Scientific Writing is a professional credential that validates a participant's proficiency in writing clear, accurate, and well-structured scientific documents. It demonstrates the holder's ability to communicate research effectively in academic and professional settings.

### Introduction to IoT

August 2020

Cisco Networking Academy

- Learned how the current digital transformation is creating unprecedented economic opportunity. Understood how the IoT is bridging the gap between operational and information technology systems. Discovered how standard business processes are being transformed.

### Elements of AI

June 2020

University of Helsinki

- It provides a gentle introduction to the basics that enables us to understand what is possible, and what isn't, and to recognise how AI is affecting our lives.
- We can define and discuss AI, be critical about AI-related claims, explain the underlying technologies including machine learning and neural networks and understand the major implications of AI.

## Awards and Achievements

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### Best Poster Award - PhD Research Showcase

January 2025

Indian Institute of Technology Gandhinagar

### UGC-NET 2022

November 2022

NTA UCG

- Qualified for JRF & Assistant Professor

### GATE 2022

March 2022

### Hacktoberfest 2022

October 2022

Github and Digital Ocean

- Successfully completed Hacktoberfest, 2022, by contributing in public Github repository.

### Hacktoberfest 2021

October 2021

Github and Digital Ocean

- Successfully completed Hacktoberfest, 2021, by contributing in public Github repository.
- Four pull requests were accepted by a public Github repository -  **Cosmos**

### Digital Wellness Online Challenge 2015

July 2015

National e-governance Division