

# Shaurya Goyal

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## Education

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### Indian Institute of Technology, Kharagpur

2020 - Ongoing

BS - MS in Economics

CGPA: 8.74

Minor: Mathematics and Computing

Micro-Specializations: Optimization Theory, Artificial Intelligence

Grade 12 (HSC), score: 92%

2020

Grade 10 (ICSE), score: 95%

2017

## Research Experience

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### Evolution of Eukaryotes

April 2021 – Ongoing

IIT Kharagpur — Prof. Riddhiman Dhar

- Conducting a phylogenetic analysis of cells using genomic data to understand whether an inside-out or outside-in model is favourable and to understand how mitochondria originated in eukaryotic cells
- Sampled proteomes from orthologous groups of LUCA using python, used MUSCLE for multiple alignment and generated maximum likelihood phylogenetic trees using MEGA

### Graph Fourier Transform

July – October 2021

IIT Kharagpur — Prof. Sanand Athalye

- Suggested a faster implementation for the parallel approximate graph fourier transform
- Compared running time of single and parallel approximate graph fourier transform for small graph networks
- Conducted a theoretical analysis for a faster exact graph fourier transform by Haar unit and Givens rotation factoring of graph laplacian eigenspace and reconstructing the graph network

## Selected Projects

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### Reinforcement Learning to Play Pong

Ongoing

- Building a reinforcement learning agent that uses deep Q-learning and learns from pixel data to play Pong

### Conditional GANs (Guided Reading Project)

July - August 2021

- Did a directed reading on the theory of cGAN models in recent papers with an emphasis on face generation and other imaging purposes and presented it weekly.
- Also looked briefly at dynamical systems and stochastic approaches to GANs

### Modelling Global Warming

June 2021

- Used machine learning to model how the temperatures have changed and used it to predict future changes

### Robot Simulation

May 2021

- Simulated a system of floor cleaning vacuum robots in a room with obstacles

## Technical Skills

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**Programming:** Python, MATLAB, C,  $\text{\LaTeX}$

**Libraries:** NumPy, PyTorch TensorFlow, OpenAI Gym

## Selected Coursework

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Machine Learning in Genomics<sup>2</sup>, Linear Programming, Probability & Statistics, Numerical Analysis, Algorithms<sup>2</sup>, Reinforcement Learning<sup>1</sup>, Deep Learning<sup>3</sup>, Partial Differential Equations, Psychology, Discrete Maths<sup>2</sup>, Ordinary Differential Equations

<sup>1</sup> Stanford, <sup>2</sup> MIT-OCW, <sup>3</sup> CMU

## Workshops Attended

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**High Performance Computing and AI for Computational Biology**

**29-30 October 2021**

Workshop organized by IIT Kharagpur and Tezpur University

Online

## Leadership / Extracurricular

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- Active member of Biotechnology Reading group at IIT Kharagpur
- Represented institute at various national level debate tournaments as a member of the Debating Society, IIT Kharagpur
- Selected as Times Scholar by Times of India Group from 300,000+ students across India
- Silver Medal in National Taekwondo Championship (2017) and 1st Dan Black Belt

**Other Interests:** Guitar, Hiking, Running, Reading, Rock music, Star Wars