

# Shaurya Goyal

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## Education

<b>École Normale Supérieure (ENS–PSL), Paris</b>	<b>2024 - 2027</b>
MS in Cognitive Science, Diploma ENS	- / 20
Specialization: Cognitive Modelling, Theoretical Neuroscience and AI	
<b>Indian Institute of Technology (IIT), Kharagpur</b>	<b>2020 - 2023</b>
BS-MS in Economics     Minors : Mathematics, Computer Science	CGPA: 8.9 / 10

## Awards and Scholarships

Selected and funded for ICTP Junior Scientists Workshop on Theoretical Neuroscience	2024
Charpak BCS Scholarship	2024
ENS International Selection Scholarship	2024
Erasmus+ Training Mobility Grant	2024
COSYNE Undergraduate Travel Award	2024
ISTern, IST Austria Summer Program and Oead Scholarship	2023
MITACS Globalink Summer Internship [Declined]	2023
Summer Research Award, Next Gen Scientists Foundation	2022
International Research Fellowship, IIT Kharagpur Foundation	2022
Selected for PhD-level inStem workshop on Stem Cells and funded by Govt. of India	2022
Selected for PhD-level ICTP-ICTS Winter School in Sensorimotor Control	2021
Merit-Cum-Means (MCM) Scholarship, IIT Kharagpur [full tuition + stipend]	2020-2023
Top 1% in JEE Advanced from 150,000 selected students across India	2020
Top 0.3% in JEE Mains from over 1 million students across India	2020

## Publication and Conference Posters

Cumpelik A., **Goyal S.**, Barayeu U., Csicsvari J. L. ; The role of prefrontal spatial coding in supporting a contextual association task.

**Co-Author:** FENS Forum, 2024; Society for Neuroscience (SfN), 2023, 2024

**Presenter:** Junior Scientists Workshop on Recent Advances in Theoretical Neuroscience, 2024

Subbalakshmi, A.R., Sahoo, S., Manjunatha, P., **Goyal, S.**, et al. The ELF3 transcription factor is associated with an epithelial phenotype and represses epithelial-mesenchymal transition. J Biol Eng 17, 17 (2023). <https://doi.org/10.1186/s13036-023-00333-z>

## Research Experience

<b>Role of mPFC and CA1 in Context Association</b>	<b>May 2023 – August 2024</b>
IST Austria — Prof Jozsef Csicsvari	In-Person
<ul style="list-style-type: none"><li>Developed behavioral classification and investigated context and spatial representations over learning</li><li>Analyzed the role of replay in guiding context dependent and independent decision making</li></ul>	
<b>Hippocampal Cell Dynamics During Replay</b>	<b>October 2022 – July 2024</b>
University College London (UCL) — Prof Dan Bendor	In-Person/Remote
<ul style="list-style-type: none"><li>Developed a novel bayesian decoding method to track spatial representations in sharp-wave ripples</li><li>Analyzed CA1 neural activity to investigate memory stabilization and consolidation in novel environments</li></ul>	
<b>Neuro Inspired Reinforcement Learning</b>	<b>February – September 2022</b>
Brown University — Prof Michael J Frank	Remote
<ul style="list-style-type: none"><li>Developed an actor-critic deep RL model motivated by opponent dopamine circuitry in the striatum</li><li>Implemented and compared the performance against A2C on Atari games with sparse rewards</li></ul>	

- Examined the effect of ELF3 gene on transcriptional regulational and immune evasion in breast cancer
- Used mechanistic modelling, simulations and machine learning to analyze phenotype switching dynamics

## Skills

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**Programming:** Python, MATLAB, Linux (Bash), HPC (SLURM), PyTorch, C/C++

**Wet Lab (Beginner):** Animal Handling, RT-PCR, Immunocytochemistry, Gel Electrophoresis

## Relevant Coursework

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**Brain:** Neural Computation<sup>2</sup>, Learning and Decision Making, Intro to Neuroscience<sup>1</sup>, Cognitive Models

**CS:** Machine Learning<sup>1</sup>, Deep Learning<sup>2</sup>, Math Methods for ML, Algorithms 1<sup>2</sup>, Artificial Intelligence<sup>1</sup>

**Math:** Non-Linear Dynamics<sup>2</sup>, Probability, Statistics, Linear Algebra, Numerical Analysis

**Bio:** Systems Biology<sup>1</sup>, Molecular and Cell Biology, Cancer Biology<sup>1</sup>

**Other:** Econometrics 1 & 2, Experimental Economics, Linear Programming, Philosophy of the Mind

*1 PhD level course, 2 Online from Stanford, MITOCW etc, 3 Coursera*

## Selected Projects

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### Simulation & Classification of Theta-Gamma Oscillations

**2022**

- Simulated LFP signals and identified distinct phase - frequency coupled states using neural signal processing

### Computational Neuroscience Mini-Projects

**2022**

- Analyzed epilepsy - normal EEG data, Analyzed tuning curve of visual neurons, Estimated auditory receptive field, Perceptron classification, Dimensionality reduction and decoding activity, Simulated a LIF neuron

### Reinforcement Learning to Play Pong

**2021**

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

## Workshops / Conferences Attended

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FENS Forum 2024

ICTP Junior Scientists Workshop on Theoretical Neuroscience 2024

COSYNE Main Meeting and Workshops 2024

Young Scientist's Symposium - IST Austria 2023

Computational Neuroscience - Neuromatch Academy 2022

Essential Stem Cell Lab Techniques - inStem and NCBS, Bangalore, India 2022

Sensorimotor Control - ICTP & ICTS 2021

## Mentoring

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### Academic Mentor, IIT Kharagpur

**2022 – 2023**

- Mentored 6 students (2022) and 3 students (2023) in their 1st year to ensure they have a smooth integration to university life and assisting with academic and non-academic matters

### English Mentor, IIT Kharagpur

**2022**

- Guided 4 students who struggled with English by providing feedback and solving doubts based on weekly exercises for 1 semester

## Leadership / Extracurricular

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- Co-Founder of Biotechnology Reading Group and iGEM Team, IIT Kharagpur
- National level debate tournaments as a member of the Debating Society, IIT Kharagpur
- Represented institute in the Inter-IIT Scrabble Tournament
- Selected as Times Scholar (2019) from 300,000+ students and felicitated by Vice-President of India
- Silver Medal in National Taekwondo Championship (2017) and 1st Dan Black Belt

**Other Interests:** Hiking, Cooking, Running, Frisbee, Volleyball, Board Games, Boulderling, Reading