Shaurya Goyal

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Education

École Normale Supérieure (ENS–PSL), Paris **2024 - Ongoing**
MS in Cognitive Science, Diploma ENS - / 20
Specialization: Cognitive Modelling, Theoretical Neuroscience and AI

Indian Institute of Technology (IIT), Kharagpur **2020 - 2023**
BS-MS in Economics Minors : Mathematics, Computer Science CGPA: 8.9 / 10
Transferred to ENS-PSL after completing 3 years

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

Learning Rules Underlying Motor Adaptation **January 2024 – Ongoing**
ENS — Prof Alex Cayco-Gajic In-Person

- Analyzing various biologically plausible learning rules in a recurrent neural network
- Comparing the alignment of weight updates and behavioral dynamics with dimensionality reduction

Role of mPFC and CA1 in Context Association **May 2023 – August 2024**
IST Austria — Prof Jozsef Csicsvari In-Person

- Identified learning stages over days using behavior metrics and clustering
- Analyzed spatial representations over days using place field metrics, splitter cell criteria, SVMs and PCA
- Investigated contextual coding in hippocampal replay using Bayesian Decoding and regression
- Collaborated to develop behavioral pre-processing and neural data analysis pipeline using Git

Hippocampal Cell Dynamics During Replay **October 2022 – July 2023**
University College London (UCL) — Prof Dan Bendor In-Person/Remote

- Developed a novel bayesian decoding method to track spatial representations in SWRs during rest state
- Investigate remapping during sleep and timescales of CA1 replay in novel environments

Neuro Inspired Reinforcement Learning **February – September 2022**
Brown University — Prof Michael J Frank Remote

- Developed an actor-critic deep reinforcement learning model motivated by opponent dopamine circuits
- Implemented and compared the performance against A2C on Atari games with sparse rewards

Epithelial - Mesenchymal Plasticity in Cancer **November 2021 – June 2022**
Indian Institute of Science (IISc), Bangalore — Prof Mohit Kumar Jolly Remote

- Examined the effect of ELF3 gene on transcriptional regulation and immune evasion in breast cancer
- Identified phenotype switching dynamics with non-linear dynamics and machine learning

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

Programming Skills

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

Relevant Coursework

Brain: Computational Neuroscience, Learning and Decision Making, Neuroscience[1], Cognitive Modelling
CS: Machine Learning[1], Deep Learning[2], Math Methods for Data Science, Algorithms 1[2]
Math: Non-Linear Dynamics[2], Probability, Statistics, Linear Algebra, Numerical Analysis
Bio: Systems Biology[1], Molecular and Cell Biology, Cancer Biology[1]
Other: Statistical Physics of Machine Learning, Econometrics 1 & 2, Operations Research 1 & 2, Experimental Economics Lab, Intro. to Electrical Engineering, Physics of Waves, Mechanics

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

Workshops / Conferences Attended

PINTS	2024
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

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

- 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, Bouldering, Reading