

KUSHAAN GUPTA

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EDUCATION

University of Lethbridge Master of Science in Neuroscience	<i>May 2022 - Present</i> GPA: 4.0/4.0
Institute of Engineering and Technology, DAVV, Indore, India Bachelor of Engineering in Computer Engineering	<i>July 2016 - July 2020</i> GPA: 8.02/10

WORK EXPERIENCE

Graduate Teaching Assistant - University of Lethbridge <i>Professor: Dr. Habiba Kadiri</i>	Oct, 2022 - Dec, 2022
<ul style="list-style-type: none">· Courses: MATH 7460, MATH 5460, MATH 4460 - Analytic Number Theory· Aiding learning via personalized help on computational programming assignments & projects in Sagemath using Python	
Graduate Teaching Assistant - University of Lethbridge <i>Professor: Dr. David Euston</i>	Sept, 2022 - Present
<ul style="list-style-type: none">· Course: NEUR 3600 - Fundamentals of Neurobiology· Aiding learning via group help sessions, personalized help on material & assignments, & timely feedback on assessed work	
Graduate Research Assistant - University of Lethbridge <i>Supervisor: Dr. David Euston</i>	May, 2022 - Present
<ul style="list-style-type: none">· Interpreting neural dynamics in medial prefrontal cortex of rats doing a spatial working memory task	
Teaching Assistant - Neuromatch Academy	July, 2022 - Aug, 2022
<ul style="list-style-type: none">· Facilitated learning & managed social dynamics of a class of diverse group of students during the course	
Post Bacc. Research Assistant - Indian Institute of Science, Bangalore <i>Supervisor: Dr. Swananda Marathe</i>	Aug, 2020 - Apr, 2022
<ul style="list-style-type: none">· Developed SMorph Python library & tested it in an in vivo study to analyze morphological changes of astrocytes in response to behavioral and pharmacological factors· Extended Multi-layer Perceptron architecture to Artificial Neuronal-Astrocytic Networks via PyTorch implementation inspired by computational models capturing dynamics of tripartite synapses and gliotransmission	
Trainee Software Development Engineer	Jan, 2020 - July, 2020
<ul style="list-style-type: none">· Developed and audited Ethereum smart contracts, and Google Cloud applications for market maker blockchain-based protocol of a stock exchange platform in Ethereum	

PUBLICATIONS

Parul Sethi, **Kushaan Gupta**^{*}, Garima Virmani^{*}, Surya Chandra Rao Thumu, Narendrakumar Ramanan, Swananda Marathe, “Automated morphometric analysis by SMorph reveals plasticity induced by antidepressant therapy in hippocampal astrocytes,” *Journal of Cell Science*; 134 (12): jcs258430. (*: equal contribution) PMID: 34137444

PROJECTS

SMorph: Python library for analysis of the morphology of cells of the nervous system

Semi-supervised morphological analysis of confocal microscopic tissue images containing immunostained cells of elaborate morphology. The pipeline crops out individual cells from tissue images, and extracts morphometric features out of each cell via Sholl analysis. These features are further used to perform classification and analyze their spatial relevance as a function of the organism's phenotype or pharmacology.

Are DNN representations really similar to brain representations?

The project aims at deeper investigation of the purported similarity of ConvNets and fMRI activation patterns in visual cortex employing Representational Similarity Analysis on task-optimized neural networks and task-agnostic neural networks to compare with representations in the visual cortex.

Dynamics of visual working memory and workload in ECoG during n-Back task

The project aims at descriptive modeling of the spatial and temporal dynamics of ECoG data obtained during n-Back task with varying Visual Working Memory workload requirements. Decoding using the broadband spectrum found shifts in neural activity when subjects felt overwhelmed by the memory requirements, specifically in the Parietal and Prefrontal cortex.

Automated Eye-Blink Detection in Electroencephalogram

The project aims at precisely detecting and time-stamping the eye-blinks in real-time electroencephalographic data. A Python implementation of a paper: Agarwal and Sivakumar (2019).

Smart Attendance System

An Android application to mark students' attendance on the institute's database by detecting and identifying their faces with help of clustering and similarity detection over a Deep Learning model's embeddings.

TECHNICAL STRENGTHS

Programming Languages	Python, C, C++, JavaScript
Software & Tools	NEURON, ARACHNE, ImageJ, PyTorch, LaTeX, Tensorflow, Inkscape, Adobe Illustrator, Git

STANDARDIZED TEST SCORES

GRE	330/340 (Verbal: 162 [90 Percentile]; Quant: 168 [93 Percentile]; AWA: 4.0)
TOEFL (iBT)	111/120 (Reading: 30; Listening: 29; Speaking: 25; Writing: 27)

COMMUNITY SERVICE

EWB-IET DAVV Chapter's Hellen Keller Blind School Project *July 2018 - Dec 2019*

Volunteer teacher for visually impaired student: teaching necessary language skills to independently interact with smartphones & computers.

Volunteer at Neuromatch Academy 2021 *May 2021 - August 2021*

Contributed in tutorial production across two summer schools of Computational Neuroscience & Deep Learning. Preparing lectures & tutorials to be delivered to approx. 7,300 students across the world.

CERTIFICATIONS & TRAINING

Neuromatch Academy - Computational Neuroscience summer school

- Theoretical modeling and data driven analysis in Computational Neuroscience as an interactive student.

Neuromatch Academy - Deep Learning summer school

- Tools, mathematics, and intuitions behind Deep Learning as an interactive track student.

Computational Neuroscience

University of Washington (Coursera, Inc.)

- Learned and implemented computational methods for understanding nervous systems using Python.

Tensorflow

Google Cloud Training (Coursera, Inc.)

- Hands on experience with creating machine learning pipelines using Tensorflow framework.

Bayesian Statistics: From Concept to Data Analysis

University of California (Coursera, Inc.)

- Learned and implemented Frequentist and Bayesian paradigms via usage of software statistical packages.

Neural Networks & Deep Learning

Deeplearning.ai (Coursera, Inc.)

- Learned and applied Neural Network architectures in Python for solving classification and regression problems.

Algorithms Specialization

Stanford University (Coursera, Inc.)

- Analyzed, implemented & proved complex Data Structures & Algorithms.

Competitive Programmers Core Skills

Saint Petersburg State University (Coursera, Inc.)

- Learned useful skills like ability to write efficient, reliable, & compact code, managing time well when its limited and applying algorithmic ideas to real problems.