Archit Gupta

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EDUCATION

The University of Texas MD Anderson UTHealth Houston Graduate School of Biomedical Sciences
Aug 2024 – Present
Doctorate of Philosophy in Neuroscience

Nanyang Technological University, Singapore
Aug 2020 – May 2024
Bachelor of Engineering in Computer Science

RESEARCH EXPERIENCE

Graduate Student Mar 2025 - Present
The University of Texas Health Science Center at Houston, Department of Neurobiology and Anatomy
Dr. John H. Byrne

- Applied tensor decomposition to extract low-dimensional representations of neural dynamics during motor learning in the invertebrate *Aplysia*
- Integrated single-neuron and population-level analyses to identify three distinct, functionally relevant neural subpopulations engaged in motor learning
- Identified learning across all subpopulations that decayed to baseline within 15 minutes, suggesting short-term memory
- Discovered two distinct effects of motor learning: widespread changes in neural recruitment and selective changes in timing

Graduate Rotation Student Jan 2025 – Mar 2025
MD Anderson Cancer Center, Department of Neurosurgery
Dr. Kadir C. Akdemir

- Designed and implemented a computer vision algorithm to automatically identify micronuclei in spatial transcriptomic data, generating the largest corpus of micronuclei data from human tissue samples

Computational Biology Intern May 2023 - Aug 2023
MD Anderson Cancer Center, TRACTION
Dr. Timothy Heffernan

- Identified chromosomal changes driving instability (model drift) in a pancreatic cancer model, including copy number gains in regions with known oncogenes
- Developed a pipeline to calculate allele-specific copy numbers and detect loss of heterozygosity in tumor samples using Shell, Python, R
- Quantified and visualized inter- and intra- model drift between 230 profiles in 41 patient-derived xenograft models using mutational, copy number, and RNA sequencing data

Undergraduate Researcher Jan 2023 - Aug 2023
Rice University, Department of Computer Science
Dr. Arlei Silva

- Modeled Hurricane Harvey's impact on Houston's road networks by integrating rainfall, roadway, and demographic data into a unified graph representation
- Developed a multi-step algorithm to compute optimal evacuation routes in flooded and congested networks by combining traffic flow modeling with shortest-path algorithms

Research Assistant Aug 2022 - Dec 2022
Nanyang Technological University, School of Mechanical and Aerospace Engineering
Dr. Ablimit Aili

- Engineered tree-based regression models to predict precipitable water vapour (PWV) using readily available meteorological variables—improving baseline R^2 score by 7.1% and reducing R^2 variance by 52.8%
- Investigated the impact of various variables on the predictability of PWV using explainable machine learning techniques—improving understanding of the roles of various factors such as location, elevation, and time of the day

Research Assistant Feb 2022 – Apr 2022
SP Group-NTU Joint Lab, Singapore

- Implemented and optimized machine learning models to detect faulty electrical cables
- Increased precision by 135% and F1 score by 152% over existing methods across multiple datasets
- Facilitated adoption of improved algorithm by presenting results to stakeholders

WORK EXPERIENCE

Technology Consulting Intern, Data & Analytics Jul 2022 – Dec 2022
Ernst & Young, Singapore

- Wrote SQL, Shell, and Hive scripts, automated user testing pipelines, and resolved data logic issues for a government data platform
- Improved workflow efficiency by streamlining requirements gathering and consolidating automated Python data-processing tasks
- Debugged 15 critical data transformation pipelines using PySpark, SQL, and SAS, impacting 23 tables with millions of rows each

Machine Learning Research Intern May 2022 – Jul 2022
Acronis, Singapore
- Implemented secure federated strategies (FedAvg, FedAvgM, FedOpt) from scratch to train models on encrypted data in a secure computational framework (SCALE-MAMBA SMPC architecture)
- Built custom tools to simulate real-world data properties (non-IID conditions) for testing federating algorithms

PUBLICATIONS

Lawson, N.M., Ye, L., Cho, C.Y., Zhao, B., Mitchell, T., Martín-Barrio, I., Beernaert, B., Gupta, A., et al. Recurrent *ERBB2* alterations are associated with esophageal adenocarcinoma brain metastases. medRxiv [Preprint], 2025. doi:10.1101/2025.02.19.25322558

Gupta, A., Easwaran, A. A low-cost lane-following algorithm for cyber-physical robots. arXiv [Preprint], 2022. arXiv:2208.10765

PRESENTATIONS

Archit Gupta, Curtis Neveu, Elizabeth C. Cropper, John H. Byrne. Tensor component analysis of egestive priming in Aplysia. Poster presentation delivered at the Society for Neuroscience Annual Meeting, San Diego, California, 2025.

Archit Gupta, Curtis Neveu, John H. Byrne. Dimensionality reduction reveals neuronal ensembles mediating motor behavior. Oral presentation delivered at the Neuroscience Fall Symposium, Houston, Texas, 2025.

Archit Gupta, Yidan Pan, Peter Van Loo. Finding doubles in malignant peripheral nerve sheath tumors. Oral presentation delivered at the 2025 Cancer Biology Student Seminar Series, Houston, Texas, 2024.

Archit Gupta, Ablimit Aili. Predicting precipitable water vapour using explainable machine learning techniques. Poster presentation delivered at the 22nd Annual Community Modelling and Analysis System (CMAS) Conference, Chapel Hill, NC, 2023.

Archit Gupta, Arvind Easwaran. A low-cost lane-following algorithm for cyber-physical robots. Oral presentation delivered at the 10th International Conference of Undergraduate Research (ICUR), Singapore, 2022.

Archit Gupta, Chong Yock Eng, Deon Lim Meng Wee, Rashna Analia Ahmed, See Min Sim. A machine learning approach to predicting single event upsets. Oral presentation delivered at the 2nd International Student Conference on Artificial Intelligence (STCAI), Singapore, 2022.

AWARDS

- Travel Scholarship, Neural Data Analysis Workshop, Flatiron Institute 2026
- Trainee Professional Development Award, Society for Neuroscience 2025
- First Place, Pre-Candidacy Elevator Pitch, Neuroscience Program Retreat 2025
- Third Place, Pre-Candidacy Student Seminar Series, Cancer Biology Program 2025
- Travel Award, Neuroscience Program 2025
- First Place, Hanna Student Poster Award, Community Modelling and Analysis System Conference 2023
- First Place, AI Space Challenge 2022
- President's Research Scholar, Nanyang Technological University 2022

LEADERSHIP

Vice Chair, Hackers for Charity Aug 2022 – May 2023
NTU Open Source Society
- Partnered with two non-profits on technical projects to improve their technologies and increase their impact
- Bridged the gap between the project teams and non-profits by performing requirements elicitation, translating user requirements to technical tasks, and performing customer acceptance testing

Honorary General Secretary Aug 2021 – Jul 2022
NTU Social Impact Catalyst
- Helped build a strong and cohesive environment for social entrepreneurship at NTU
- Automated and streamlined the internal operations of the organization