

INIMAI ANA SUBRAMANIAN

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EDUCATION

Massachusetts Institute of Technology (GPA: 5.0/5.0) 2022-2026
Major: Electrical Engineering & Computer Science; Minor: Earth and Planetary Science
Relevant courses: ML (Grad), DL (Grad), NLP, CV (Grad), Controls, Algorithms I/II, Computer Systems, Embedded Systems, Inference, Comp Structures, Autonomous Machines, C/Assembly

Mission San Jose High School, Fremont, CA (GPA: 4.0/4.0, Valedictorian) 2018-2022

Ohlone College: Multivariable Calculus, Linear Algebra, Discrete Math, C++, Python, Java (GPA: 4.0/4.0)

RESEARCH INTERESTS

I am curious about how underlying network structure determines system behavior, through the lens of interpretability. My goal is to build efficient systems whose internal structures are understandable and to derive scalable principles that generalize circuit-level behavior in large models.

RESEARCH EXPERIENCE

SuperUROP EECS Landsman Undergraduate Research Scholar, Shavit Lab - MIT CSAIL Aug 2024 – present

- Developed a novel model expansion technique that disentangles a network by adding neurons without increasing total non-zero parameters
- Designed and analyzed a combinatorial Boolean framework to explain how reducing polysemantic neuron superposition improves feature disentanglement
- Paper submitted and currently under review at ICLR 2026

Undergraduate Researcher, Fiete Lab - MIT BCS June – Sept 2025

- Developed a multi-modal ML pipeline to model relationships between naturalistic movie stimuli and neural activity, integrating SOTA vision/audio feature extraction models on the BrainTreeBank dataset for the first time
- Designed and executed model analyses across time–frequency spectrograms of neural data
- Conducted population- and subject-level analyses to identify feature neural encodings and lobe activation patterns

Independent Research Fellow, MIT Eloranta Summer Undergraduate Research Fellowship June - Sept 2025

- Designed and implemented a Multi-View Canonical Correlation Analysis framework to align semantic representations across five languages for cross-lingual fake news detection
- Developed adaptive correlation-based weighting and ensemble classification pipelines, achieving up to 7.4% accuracy and 7.7% F1-score improvements over single-language baselines on the TALLIP-FakeNews dataset.
- Paper published in the MIT Undergraduate Research Journal (MURJ)

Undergraduate Researcher, Learning & Intelligent Systems Group - MIT CSAIL Feb – May 2024

- Focused on improving robotic imitation learning pipelines for completion of long-horizon tasks.
- Developed object-centric priors to allow for generalizability to unseen tasks, objects, and camera views

Machine Learning Research Intern, NASA-JPL June – Oct 2023

- Built ML recommendation system over LLM-encoded technical anomaly reports from past NASA missions
- Utilized combined knowledge graph (KG) and graph neural net (GNN) architecture and trained over 10,000 reports with link prediction (contrastive, random, MCNS negative edge sampling) and ensemble training
- Invited oral presentation at 2024 SPIE Defense and Commercial Sensing Conference

PUBLICATIONS (* denotes equal contribution)

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- Kong, L.*, **Subramanian, I.***, Shavit, Y., Adler, M., Alistarh, D., & Shavit, N. (2025). Expand Neurons, Not Parameters. arXiv preprint arXiv:2510.04500. [<https://doi.org/10.48550/arXiv.2510.04500>]
 - Subramanian, I.** (2025). Multi-View Canonical Correlation Analysis for Cross-Lingual Fake News Detection. MIT Undergraduate Research Journal, [50 \(Fall 2025\)](#).
 - Payumo, K., **Subramanian, I.**, Lu, T., & Chow, E. (2024, June). Intelligent knowledge base search tool using large language model and graph neural network. In Pattern Recognition and Prediction XXXV (Vol. 13040, pp. 45-54). SPIE. (Invited Oral Presentation). [<https://doi.org/10.1117/12.3014075>]

INDUSTRY EXPERIENCE

Software Intern, Starlink On-Orbit Reliability Group - SpaceX June – Aug 2024

- Developed detection algorithms of solar array debris impacts for risk assessment and anomaly attribution; put an upper bound on MMOD incidence rate
- Characterized fast reheats in satellite burns to justify shortening reheat duration to increase thruster efficiency
- Enabled customized workflows for telemetry data pipelines
- Developed alert bounds for deploy actuator currents to address hardware damage concerns
- Established pipeline and criteria for magnet uniformity study which ruled out magnets as the source of undesired mode-shifting occurrences, a major issue in the propulsion system

TEACHING & MENTORING EXPERIENCE

Teaching Assistant, Intro to Machine Learning Course 6.3900 - MIT Jan 2024 - present

- Write course materials and assist students with designing and implementing machine learning models
- Lead recitation instruction and office hours to support students with labs, homework, and troubleshooting code
- Responsible for giving weekly “checkoffs”, in which I verify concept understanding and coding correctness
- Test-solve, proctor, and grade all class exams

Instructor, MIT MISTI Global Teaching Lab - London, England Jan 2026

- Competitive MIT experiential learning program in Alwyn’s School (high school est. 1619)
- Synthesize and teach Computer Science topics, encouraging teamwork and cross-cultural communication

Peer Mentor - Summer Science Program & Alliance of Indigenous Math Circles Sept 2022 - present

- Provide academic guidance for college-bound high school students in the Summer Science Program (SSP)
- Mentored 40 students on Navajo reservation math camp to solve complex problems and learn the concept of proof

TECHNICAL PROJECTS

Bike Detector Device for the City of Cambridge Feb – May 2025

- Designed and built a radar-based self-contained embedded system for bike detection for the City of Cambridge
- Developed the PCBs, 3D-printed the enclosure, wrote the firmware, constructed and deployed 5 devices
- Built a website to receive and aggregate data from all devices for monitoring: <http://efpi-24.mit.edu/>

The Polyglot Persuader: Unpacking the Influence of Multi-Lingual Conversations on LLMs Sept - Dec 2024

- Examined influence of multi-turn attacks on LLMs for low vs high-resource languages
- Tested the application of Continuous Adversarial Training (CAT) methods to better defend against misinformation. Proposed further techniques for improving model robustness. [Paper Link](#)

Computer Aided Diagnosis for Alzheimer’s Disease via Generative Adversarial Networks March - May 2024

- Improved performance of a standard CNN to classify brain MRI scans by degrees of dementia. [Paper Link](#)
- Performed experiments with four different GAN-augmented CNN models to optimize classification accuracy

Bikes4Newplace: A System for Bike-Sharing and Data Collection March - May 2024

- Designed a hypothetical bike-sharing system considering efficiency of transactions and data privacy
- Managed communications between the bike, docking stations, and central computing facility
- Securely stored data using redundancy algorithms. Designed bike reservations system and user ride tracking

MIT Web Lab – Airport Rideshare App Jan 2023

- Web Development: built a rideshare web app using HTML, CSS, React, Javascript, and Git. Used MongoDB to store and access app data. Coded frontend and backend, built API, called get and post requests to API.
- Deployed app online for use of MIT student body

AWARDS

- MIT Peter J. Eloranta Summer Undergraduate Research Fellowship Awardee 2025
- IEEE-HKN (MIT EECS Honor Society) Inductee by invitation 2025
- Cerebras Research Fellowship Awardee 2024
- Massachusetts Space Grant Consortium Travel Grant Awardee 2024
- MIT Web App Competition: Prize for Most Responsive UI 2023
- Merit Scholarships: Lam Research, Dotcom Monitor’s Women in Computing, CA Teachers Association, American Meteorological Society, Society of Exploration Geophysicists 2022-2026
- International Earth Science Olympiad (IESO): US National Team, 4 gold medals 2021
- DOE National Science Bowl - 2nd place team nationally 2022
- American Invitational Mathematics Examination (AIME) qualifier – Top 5% nationally 2020-2022

EXTRACURRICULARS

- Non-Profits Initiative Director, MIT IEEE-HKN EECS Honor Society 2025-present
- Memberships: IEEE-HKN, IEEE, SPIE, SWE 2023-present
- Selection Exam Writer, US Earth Science Olympiad (USES0) 2021-present
- Exam Writer & Event Supervisor, MIT Science Olympiad 2022-present
- Choreographer & Competition Team Dancer, MIT Bhangra 2022-present

KEY SKILLS

- Strong coding skills: Python, Java, C/C++, Assembly, Machine Learning, PyTorch, TensorFlow, SQL, HTML, CSS, React, JavaScript, Git, AstroImageJ, Swift, ROS 2, Arduino/microcontrollers, PCB design
- Strong Math/Physics background, demonstrated by top honors in national and international competitions
- Thorough, self-disciplined, with clear documentation skills
- Languages: English, French, Romanian, Tamil