PRATYUSH AVI

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EDUCATION

New York University September 2023 – May 2028 (expected)
PhD, Computer Science *New York, NY*
Prospective Thesis Focus: Applying techniques from randomized linear algebra to scientific machine learning for faster, efficient, and theoretically robust learning algorithms.

Arizona State University August 2019 – December 2022
BSE, Computer Systems Engineering & Barrett, The Honors College *Tempe, AZ*
GPA: 4.00

PUBLICATIONS

Query Efficient Structured Matrix Learning
Noah Amsel, **P. Avi**, Tyler Chen, Feyza Duman Keles, Chinmay Hegde, Christopher Musco, Cameron Musco, David Persson
Theory of Scientific Computing Workshop at COLT 2025
In submission for SODA, arXiv:2507.19290

EXPERIENCE

PhD Research Intern May 2023 – August 2023
MIT Lincoln Laboratory, Group 33 - Advanced Sensor Systems & Test Beds *Lexington, MA*
- Built a real-time planning web interface using Python and React.js, improving user interface usability and deployment for mission operators.
- Engineered a domain-specific planning language to automate real-time mission execution and reduce operator workload.
- Mentored junior interns, providing technical guidance to support project completion.

Undergraduate Research Intern May 2022 – August 2022
MIT Lincoln Laboratory, Group 33 - Advanced Sensor Systems & Test Beds *Lexington, MA*
- Built scalable machine learning and signal processing models (CUDA, PyTorch) to detect key events in large-scale radar datasets.
- Implemented YOLOv3 for spectrogram-based signal classification and prototyped a graph neural network model that used raw-spectrogram data for signal recognition.
- Developed a user interface in React.js for a secure meeting recording and trancription utility.
- Gained hands-on radar experience through field-deployment project.

Machine Learning Undergraduate Researcher May 2021 – April 2022
Purdue University & U.S. Army *West Lafayette, IN*
- Built a graph neural network in PyTorch to predict properties of organic molecules relevant to energetics and material science research.
- Wrote a Jupyter Notebook based teaching utility to teach machine learning approaches to undergraduate students.
- Paper Link: Machine Learning for Data Driven Energetics Materials Screening and Performance Design
- Presented findings to leading energetics and Army Research Lab researchers.

PROJECTS

Multi-Scale Visualization of Cellular Features in Cancerous Image Data | *Deep Learning, Data Visualization*
- Used Vision Transformer based encoders to generate high-dimensional embeddings for individual cells in a collection of multiplexed cancer image data. This is combined with a high-fidelity visualization tool to discover and explore novel features in the medical samples.

Dimensionality Reduction for Spatial Audio | *Artificial Intelligence, Data Science, Extended Reality*
- Used random binary matrices for compressing Head-Related-Transfer-Functions for spatial audio
  Project Report Link: Random Projections for Dimensionality Reduction of HRTFs

Evaluating Hierarchical Learning using MAXQ and Q-Learning | *Artificial Intelligence, Reinforcement Learning*
- Re-implemented and evaluated hierarchical learning by comparing MAXQ and Q-Learning in the OpenAI Gym.
  Project Report Link: Re-implementation of MAXQ with the OpenAI Gym in the Taxi Domain

Teaching

Teaching Assistant January 2025 – May 2025
New York University *New York, NY*

- **Course:** Algorithmic Machine Learning and Data Science with Prof. Chris Musco
- Course Website

Teaching Assistant January 2021 – December 2022
Arizona State University *Tempe, AZ*

- **Course:** Introduction to Programming Languages with Prof. Justin Selgrad

Awards & Honors

Best Poster July 2022
MIT Lincoln Laboratory *Lexington, MA*

- Led finalist team at MIT LL's Intern Innovation Idea Challenge, pitching a novel deep-sea exploration vehicle concept.
- Conceptualized vehicle design using MIT LL technologies, along with a supporting research and development pipeline.

Dean's List August 2019 - December 2022
Arizona State University *Tempe, AZ*

- All semesters through Fall 2019 - Fall 2022

Technical Skills

Languages: Python, C/C++, Java, Dart, MySQL, JavaScript, CSS/SASS, HTML, Julia, Verilog, RISC-V
Frameworks: PyTorch, Tensorflow, Jupyter, CUDA, Vue.js, d3.js, Flutter, React.js, Electron.js
Developer Tools: Linux/UNIX, Intel Pin, Arduino, Raspberry Pi, Git, Firebase, MATLAB