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# Pranav M. Murugan

pmuruga@github.io

## Education

Class of 2023 — Massachusetts Institute of Technology — Cambridge, MA
**M.Eng. candidate** in Electrical Engineering and Computer Science | GPA: 5.0/5.0
Selected Courses: *Current: Efficient and Quantum Machine Learning*
*Completed: Statistical Mechanics, ML for Therapeutic Design, Machine Learning Seminar*

Class of 2022 — Massachusetts Institute of Technology — Cambridge, MA
**Bachelor of Science** in EECS and in Physics | GPA: 4.9/5.0

## Experience

Summer 2022 — Genesis Therapeutics — Burlingame, CA
**Machine Learning Research Intern**

- Designed machine learning models to improve and accelerate molecular simulations, up to 100x speedup without compromising accuracy
  - Explored and implemented new architectures in Pytorch for quantum-mechanical molecular property prediction
  - Created benchmarks to compare performance to literature standards
  - Expanded codebase to handle equivariant, vector-labeled prediction tasks
- Used regularization and multi-task techniques to improve out-of-distribution generalization

2018 - present — Massachusetts Institute of Technology — Cambridge, MA
**M.Eng. Candidate and Undergraduate Research Associate**
Advisor: Dr. Arup Chakraborty, Institute for Medical Engineering and Science

- Studying quantum machine learning methods to solve Hamiltonian optimization tasks
- Used statistical mechanical tools to predict the effectiveness of T-cell therapy
- Developed a fast model of affinity maturation for rapid ratinoal vaccine development (published in PNAS, 2020 and manuscript in progress)
  - Derived generalizable principles to improve antibody yield in experiments

2020-2022 — Massachusetts Institute of Technology — Cambridge, MA
**Undergraduate Research Associate**
Advisor: Dr. Mark Harnett, Dept. of Brain & Cognitive Science

- Made LSTM and autoencoder neural networks to predict neuron activity and spatial location from neuron firing rates alone (bioRxiv, 2022, in review)
- Designed stochastic neurons in Tensorflow to model brain-computer interfaces

Summer 2021 — Memorial Sloan Kettering Cancer Center — New York, NY
**Computational Biology Intern**
Advisor: Dr. Wesley Tansey, Computational Oncology

- Developed a tool to identify important cancer-causing genes from patient data using causal inference and novel entropy-based biclustering techniques
- Constructed a framework for automatic hyperparameter selection and to enable user customizability of the dataset and ML model

## Selected Projects and Awards

May 2022 — NLP for Symptom Detection in Unstructured Provider-Patient Conversation
May 2021 — Cost-effective Respiratory Monitor and Communication Platform
April 2020 — Modeling COVID-19 Transmission and Testing through Social Networks
2017 & 2018 — 2x U.S. Physics Olympiad Team member and Gold Medalist (top 20 nationally)

For an extended CV, as well as a full listing of projects and publications, see pmuruga@github.io.