

# Patrick M. TIMONS

✉ ptimons@mit.edu | ☎ 973-906-0325 | 💻 patrick-timons-62508b1a9 | 🔄 ptimons44 | 📍 Woodside, CA

## EDUCATION

**Artificial Intelligence And Decision Making — *Bachelor of Science*** AUG 2021 - MAY 2025  
**Massachusetts Institute of Technology** GPA: 4.7/5.0  
*Minor:* Mathematics; *Concentration:* Economics  
*Relevant Coursework:* Algorithms II, Algorithms I, Mathematics for Comp Sci, Probability, Linear Algebra and Optimization, Deep Learning II, Deep Learning I, Representation, Inference, and Reasoning in AI, Machine Learning I, Networks, Microeconomics, Computation Structures, Low-Level Programming, Quantitative NLP, Computer Vision, Computer Programming, Linguistics  
*Planned Fall 2024:* Statistics, Machine Learning II (Graduate), Software Performance Engineering, Information Policy

## WORK EXPERIENCE

**Amazon Web Services — *SDE Intern*** JUN 2024 - AUG 2024

- Designed and implemented a end-to-end data pipeline to process real-time billing data of 550,000 enterprise AWS customers
- Built an ML-powered forecasting service for AWS cost-savings data analysis, served through an query-based API and a front-end dashboard
- Used AWS, Athena, IaC, CDK, SageMaker, S3, API Gateway, Data Catalog, Java, TypeScript, Python

**Laboratory for Information and Decision Systems — *Research Assistant*** AUG 2022 - FEB 2023

- Spearheaded data collection initiative for fuel emission modeling project
- Generated simulated drive cycle data through use of MOVES
- Used Python, SQL and pandas to deposit simulated data in a MySQL database for downstream analysis

**Baraja — *Research and Development Intern*** JUN 2022 - AUG 2022

- Built testing infrastructure for Baraja’s LiDAR engine by programming Raspberry Pis to run a suite of robustness tests
- Refactored DSP chain to enable improvements to the LiDAR engine’s point cloud generation
- Facilitated technical collaboration with third party point cloud segmentation company

## TECHNICAL PROJECTS

**Improving Deep Learning Based Molecular Fingerprints Through Informed Resampling**

- Researched improvements to pretraining methods for molecular encoders and coauthored 5-page ACL-submission-style write-up
- Created model with 9.1% improvement in Spearman’s rank correlation coefficient on downstream tasks compared to the base model
- Used the transformers and ChemBERTa software packages to finetune models on downstream regression tasks

**Recovering Latent Variables with Variational Autoencoders despite Training Bias**

- Researched how beta-regularization robustifies VAEs to training bias when attempting to recover latent variables
- Trained models with PyTorch Lightning and used scientific computing libraries to generate training data and visualize results

**Attentional Search**

- Search engine interface web-app that presents a graphical representation of knowledge instead of a traditional 1D list representation
- Uses LLMs and word embeddings for query expansion and to filter content scraped from the internet
- Represents knowledge as vectors in a compressed 2D embedding space for human interpretability

## EXTRACURRICULAR ACTIVITIES AND HONORS

**MIT Men’s Lacrosse — *Team Member*** AUG 2021 - PRESENT

- Voted Most Improved for 2023 season, NEWMAC All-Academic Award (2023), 2022 NEWMAC Champion

**AI@MIT — *Club Member*** SEP 2022 - MAY 2023

- Worked in a team of 3 to build a document summarizer and present at the AIM Labs Demo Day

**Global Teaching Labs — *Applied Math Teacher*** JAN 2024 - JAN 2024

- Teaching selected topics in Operations Research with a focus on Bayesian Inference to high school students in Cremona, Italy

## SKILLS

**Foundational** Data Structures & Algorithms, Programming (Python, Java, TypeScript, C)  
**Design Patterns and Programming Paradigms** Model-first development, Dependency Injection, Object-Oriented-Programming, Procedural Programming, Concurrency, Multithreading, Parallel Programming, Reactive Frontend  
**Dev Ops** Git Source Control, Build Tools, Dependency Management, CI/CD  
**Databases & Batch Computing** SQL, AWS Data Catalog, Slurm Workload Manager  
**Libraries and Ecosystems** AWS, SageMaker, PyTorch, Pytorch Lightning, Numpy, Pandas, SciKit Learn, Transformers, Transformers Reinforcement Library, Matplotlib, Plotly, Dash, Vue  
**Soft Skills** Technical Due Diligence, Technical Writing