# ELLIOT TOWER

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## EDUCATION

**University of Massachusetts Amherst**                                                      Amherst, MA

M.S. in Computer Science — Concentration in Data Science (3.85 GPA)                    *Sep. 2020 – May 2022*

B.S. in Mathematics — Concentration in Computing, *Second major in Philosophy*          *Sep. 2016 – May. 2020*

**Graduate Coursework**

| | | |
|---|---|---|
| Neural Networks: A Modern Introduction | Empirical Research Methods in CS | Introduction to Simulation |
| Neural Networks & Neurodynamics | Algorithms for Data Science | Simulation & Causal Modeling |
| Advanced Natural Language Processing | Systems for Data Science | Game Programming |

## EXPERIENCE

**Software Engineer — Farama Foundation**                                                  Mar. 2023 – Present
- Project manager & primary maintainer for *PettingZoo*—the standard API for multi-agent reinforcement learning (RL).
- Developed and cut major releases for *PettingZoo* and *Shimmy* (API conversion tool for external RL environments).
- Contributions to *Gymnasium* (standard API for single-agent RL), *Minigrid* (easily configurable gridworld environments).

**Research Intern — Information Extraction and Synthesis Laboratory (IESL)**               Jun. 2021 – Aug. 2021
- Collaborated to create novel architecture combining Case-based reasoning (CBR) with graph neural networks.
- Implemented KBC baselines and CBR model using PyTorch Geometric, ran hyperparameter sweeps with WandB.
- Coded data pre-processing pipeline and experiment setup, and optimized on-the-fly near-neighbor subgraph retrieval.
- ICML publication: *Knowledge Base Question Answering by Case-based Reasoning over Subgraphs* (Das, 2022).

**Data Science Industry Mentorship — Facebook AI Research (FAIR)**                          Feb. 2021 – Jun. 2021
*Open Catalyst Project: using Graph Neural Networks to model & discover new catalysts for use in renewable energy storage.*
- Adapted Graph Transformer to PyTorch Geometric for project-specific task: energy prediction from atomic structure.
- Benchmarked and achieved superior performance to popular atomic chemistry models: *SchNet*, *DimeNet* and *CGCNN*.
- Open-source contributions: Graph Transformer model, Colab Notebook for installing environment/dataset & training.

**Data & Analytics Intern — Slalom Build**                                                  May. 2020 – Aug. 2020
- Engineered data pipeline architecture with AWS serverless components (DynamoDB, S3, Kinesis, Glue, Athena).
- Automated deployment of entire data pipeline system using AWS CloudFormation (infrastructure as code).
- Created live analytics dashboard for data-driven app development/monitoring using AWS QuickSight.
- Developed analytics, crash reporting, and user tracking features for React Native mobile app (TypeScript).
- Presented results & architecture overview for senior management and consulting client, bi-weekly demos.

## PROJECTS

**Brain-Inspired Generative Replay (Continual Learning, Computer Vision)**     *with Prof. Hava Siegelmann (UMass Amherst)*
- Reduced catastrophic forgetting through novel selective replay method (choosing which samples to replay to model).
- Method inspired by neuroscience research: selective replay mechanism for memory consolidation in the human brain.
- Improved brain-inspired replay model: 21.3% to 25.1% on CIFAR-100 (Class-Incremental) with no added parameters.

## SKILLS

**Tools:** PyTorch, TensorFlow, AWS, Docker, Bitbucket CI/CD, GitHub CI/CD, GitHub pages, pytest, setuptools, poetry, pypi.
**Skills:** Deep Learning, MLOps, Data Engineering, Testing, Documentation, Python Packaging, Open-Source Development.