

ELLIOT TOWER

elliott@elliotttower.com | Newton, MA | 617-631-7512

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
Neural Networks & Neurodynamics
Advanced Natural Language Processing

Empirical Research Methods in CS
Algorithms for Data Science
Systems for Data Science

Introduction to Simulation
Simulation & Causal Modeling
Game Programming

EXPERIENCE

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,

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.

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).

PROJECTS

Brain-Inspired Generative Replay (Continual Learning, Computer Vision) *with Professor Hava Siegelmann (UMass)*

- Reduced catastrophic forgetting through novel [selective replay](#) method (choosing which samples to replay to model).
- Improved [brain-inspired replay](#) model: 21.3% to 25.1% on CIFAR-100 (Class-Incremental) with no added parameters.
- Method inspired by neuroscience research: [selective replay mechanism](#) for memory consolidation in the human brain.

Open-Source Contributions (Reinforcement Learning)

with Farama Foundation (<https://farama.org/>)

- Created compatibility wrapper & testing adapting DeepMind multi-agent evaluation suite Melting Pot to PettingZoo.
- Implemented board games: Gobblet & Cathedral, tutorials for training with RLlib, stable-baselines3, Tianshou, CleanRL
- Tutorials for running RL games in-browser using WebAssembly. Re-wrote rendering for Minigrid repo using Pygame.

SKILLS

Tools: PyTorch, TensorFlow, Ray, AWS, Bitbucket CI/CD, GitHub CI/CD, pre-commit hooks, pytest, setuptools, poetry, pypi.

Skills: Deep Learning, MLOps, Data Engineering, python packaging, testing, documentation, open-source maintenance.