

# ELLIOT TOWER

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## EDUCATION

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### 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

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### 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

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### 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.

### 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: [Gobblot](#) & [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

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**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.