Eric Liu

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EDUCATION

University of Toronto (St. George) — Toronto, Ontario
Bachelor of Applied Science in Computer Engineering + PEY — September 2022 - April 2026

- Relevant Courses: Software Communication and Design (C++), Programming Fundamentals (C++), Calculus III, Advanced Engineering Mathematics, Computer Fundamentals (C), Digital Systems, Signals and Systems

Iroquois Ridge High School — Oakville, Ontario
High School Diploma — September 2018 - June 2022

TECHNICAL SKILLS

- **Programming Languages**: Python, C++, C, SQL, Java, JavaScript, Verilog, MATLAB, Assembly, HTML/CSS
- **Frameworks & Tools:** Stable Baselines3, PostgreSQL, PyTorch, Gym, Git, JSON, Modelsim, Linux, Unix, NumPy, AWS
- **Strong skills in advanced DSA:** Graph Theory, Dynamic Programming, Monotonic Structures, Greedy Algorithms

EXPERIENCE

Market Making Via Reinforcement Learning Research — Toronto, Ontario
Research Assistant Under Professor Wei Xu — May 2023 - Present

- **Tech Environment:** Python, Stable Baselines (DDPG and DQN algorithms), Linux, Pandas, Gym, PyTorch
- Researching and developing a profitable market-making agent for cryptocurrency exchange using Deep Deterministic Policy Gradient (DDPG) and Deep Q-Network (DQN), understanding its underlying mathematical and financial constructs
- Crafted a sophisticated machine learning environment that mimics real-world market conditions and scenarios, integrating over 100 million tradebook data entries, paired with a dynamic reward framework that reacts and gives appropriate response to the model's decisions, facilitating continuous learning and strategic optimization
- Created code documentation that facilitated team collaboration and ensured future scalability
- Using Cedar HPC system, operated by the Digital Research Alliance of Canada to train, simulate and test model

Software Application: Big Tuna — Oakville, Ontario
Seasonal Game Developer — August 2020 – Present

- **Tech Environment:** JavaScript, JSON, SQL, Developer Portal, Game Design, Git, Software Testing
- Part of a three-person team that created and maintained a highly engaging Discord bot with more than 23000 players
- Created expansive in-game content, including artwork and level designs, to elevate the player engagement; managed level statistics and data, encoded into JSON files to enrich data retrieval and transitions
- Integrated SQL database updates corresponding to new content, conducted comprehensive pre-deployment testing

Private Math Tutor (Seasonal) — Oakville, Ontario

CLUBS/EXTRACURRICULARS

University of Toronto Aerospace Design Team — Toronto, Ontario
Simulation Lead for Liquid Propulsion and Aerodynamics Division in Rocketry — July 2023 - Present

- **Tech Environment:** Python, Linux, NumPy, Rocketcea, Git, Project Management | Github Repo
- Completing a code rework that simulates flight data and predict results, transitioning an outdated 2D point system with two degrees of freedom (2DoF) to a new, more accurate 3D model with six degrees of freedom (6DoF)
- Undertaken project management duties after subteam expanded, coordinated tasks and workflow for members, serving as a pivotal knowledge source within the simulation subteam, giving proper documentation for changes and progress
- Implementing error handling for inaccurate rocket testing data and code optimization, to ensure more reliable simulations

University of Toronto Engineering Kompetition (UTEK) | Github Repo — Toronto, Ontario
First place in programming competition (Team of 4) — November, 2023

- Developed a bit-masking method for state storage in a modified Traveling Salesman Problem, combining graph traversal algorithms and backtracking for optimal route determination, while considering the time constraints
- Earned the opportunity to represent the University of Toronto at the Ontario Engineering Competition (OEC)

Ontario Engineering Competition (OEC) | Github Repo — Kingston, Ontario
Represented the University of Toronto for programming competition (Team of 4) — January, 2024

- Developed an adaptive learning system that tailors educational content to accommodate dysgraphia using kinesthetic learning styles, personalized to individual needs

PROJECTS

Energy Distribution System — Toronto, Ontario
Personal Project Utilizing Advanced Graph Theory To Determine Cost-Effective Distributions — November, 2023

- **Tech Environment**: Python, Disjoint-Set Union Find, Kruskal's Algorithm, Heapq | Github Repo
- Developed a comprehensive three dimensional energy distribution system by parsing data through multiple input files, incorporated error handling to ensure data reliability, used efficient algorithms to ensure fast runtime and accuracy
- Made a sophisticated yet intuitive class and object hierarchy structure demonstrating design knowledge
- Utilized Riemann sum techniques to navigate height changes in three dimensions, altering path weights based on the heights of inputted 'obstacles', thus ensuring distributions are as accurate as possible to real-world scenarios