Yixin "Ella" Guo

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EDUCATION

Tufts University **May 2025**
Bachelor of Science in Applied Physics and Computer Science *Medford, MA*
GPA: 3.92/4.00, Dean's List
Academic Awards: Howard Sample Prize Scholarship in Physics

Relevant Courses: Parallel & High Performance Computing, Algorithms, Data Structures, Database systems, Internet-scale Distributed Systems, Machine Structure and Assembly-Language Programming, Quantum Theory, Probability, Linear Algebra, Discrete Mathematics

EXPERIENCE

Tufts Multimodal Learning, Interaction, and Perception Lab ***Medford, MA***
Research Assistant | *ROS, OpenAI Gym, Reinforcement Learning, Docker* *May 2024 – Aug 2024*

- Conducted research under Professor Jivko Sinapov and used ROS to program and operate robots (i.e. turtlebots and Anki cozmo robot) for mapping and human interaction tasks
- Trained the robot agent to avoid obstacles in the simulator using reinforcement learning algorithms
- Augmented the backend database to support displaying the trajectory of the robot in augmented reality

Tufts Quantum Information & Quantum Computing (QIQC) Group ***Medford, MA***
Research Intern | *Python, Linear Algebra, Algorithms, Quantum Computing* *May 2024 – Aug 2024*

- Conducted research under Professor Peter Love's quantum computing group to simplify quantum field theory into a form that can be simulated on a quantum computer
- Reduced operational runtime of the current codebase by an order of magnitude through using cProfile, more efficient data structures and numba, and fixed functionality bugs proactively
- Implemented and profiled new features in the source code to rearrange subatomic particle operators in a specific order, followed by thorough unit testing and optimization

Tufts University, Department of Computer Science ***Medford, MA***
Teaching Assistant for Programming Languages, Data Structures, Intro CS | *C++* *Jan 2023 – Present*

- Leading weekly lab for over 20 students to explain concepts and implementations of various data structures and algorithms (AVL Trees, Huffman Coding, Hash Table, Dijkstra's algorithm, etc) from lectures
- Added the "swap" command to the course's infrastructure database to improve grading for 300 students
- Hosting weekly office hours to help students debug errors and develop implementation plans for projects and grade homework and exams

PROJECTS

OpenParticle | Python, NumPy, SymPy, cProfile **May 2024 - Aug 2024**

- Contributed to an open source package to overload Google's quantum library "OpenFermion", enabling the simulation of subatomic systems in second quantization for analyzing quantum algorithms
- Added new functionalities such as normal ordering and conducted thorough unit tests and profiling, which outperformed industrial standard quantum libraries (IBM Qiskit and Google's OpenFermion) by 64.3%

Theatre@First | React, Typescript, Next.js, MongoDB, Tailwind CSS **September 2023 - May 2024**

- Collaborated with a team of 12 other members to develop an inventory website for an all-volunteer community theatre based in Somerville, MA
- Developed app features such as resizable image view component, item input form, grid view component, and authentication login page

P2P Encrypted Instant Messenger | Python socket, PyCryptodome **March 2024**

- Implemented an instant messenger/online chat that uses the Transmission Control Protocol (TCP) to send messages between different hosts across the networks
- Encrypted the messages using AES-256 in Cipher Block Chaining (CBC) mode and used HMAC with the SHA256 algorithm for message authentication

SKILLS

Programming Languages: C/C++, Python, Swift, JavaScript, SQL, Standard ML/OCaml, x86 Assembly
Developer Tools: CUDA, MPI, OpenMP, PyTorch, Docker, ROS, Xcode, LaTex, Git, GitHub
Frameworks: PostgreSQL, SQLAlchemy, MongoDB, React.js, Next.js, Tailwind CSS, HTML, CSS
Languages: Mandarin, English