Henry Lin

Research Interest

I am interested in the intersection of mathematical physics, quantum information science, and computational method. Specifically, I am interested in developing and deploying quantum or hybrid algorithms that focus on quantum simulation of many-body systems and classical computational methods. I am currently exploring the direction of condensed matter theory.

Education

University of Wisconsin Madison, Madison, WI

Master of Science in Physics   *SEP 2024 – MAY 2026*

University of Massachusetts Amherst, Amherst, MA

Master of Science in Computer Science   *SEP 2023 – MAY 2024*

Bachelor of Science in Computer Science, Physics (Honors), Mathematics   *SEP 2020 – MAY 2023*

Awards

YQuantum hackathon   *2025*

Yale University

- Yale Hackathon BlueQubit challenge winner.

The Blaise Pascal Quantum Challenge   *2025*

Pascal

- *Top 15 teams invited to Pascal Quantum challenge under the team name: quaNtumFix.*
- *Project is about Ammonia production with quantum simulations for green agriculture.*

Bay State Fellowship   *2023-2024*

University of Massachusetts Amherst

- Competitive fellowship awarding a teaching assistantship position, providing full tuition waiver, health insurance waiver, and stipend for up to four semesters for a master's degree in computer science.

Dean's List   *2020-2023*

University of Massachusetts Amherst

- Achieved a GPA of at least 3.50 every semester.

High Demand Scholarship   *2022-2023*

University of Massachusetts Amherst

- Awarded for academic achievement for STEM undergraduate students.

Experience

Woods Lab

Fall 2025 –Present

- Engineer an exchange only system to simulate Kitaev Honeycomb model.

Soley Lab

Summer 2024 – Summer 2025

- Used tensor train and adaptive VQE method to simulate a quantum system.

Krastanov Lab

Fall 2023 - Spring 2024

- Built a publicly accessible quantum error correct (QEC) [wiki](#) that's useful for the QEC community. Learning different QEC codes such as bicycle, LDPC, hypergraph product code, surface code. Learning different decoder such as belief propagation and small-set flip algorithm.
- Worked on implementation for hypergraph product code decoder.

Information Fusion Lab

Fall 2021 – Spring 2024

- Used Canny edge detection, hough circle, and histogram equalization to generate the partial masks.
- Used the weak, synthetic labels and creating a custom loss function to guide the model to predict an accurate segmentation mask in an unsupervised manner.
- Achieved a 0.7 dice score on the testing set.

Undergraduate Research Volunteers Program

Winter 2022-2023

- Investigated the latent space of encoded texts and images by using CLIP developed by OpenAI and deployed the stable diffusion algorithm to generate the image.
- Used linearly interpolate two concepts in the original text embedding space.
- Used gradient descent to the distance, and then non-linearly interpolate two concepts in the original text embedding space.

Wang Lab

Summer 2022

- Worked on single mode Wigner tomography, and my goal was reconstructing the density matrix of a quantum state.
- Read 3 research papers and deployed the techniques such as least-squares fitting, gradient descent, and maximum likelihood estimation in reconstructing the density matrix.

Early Research Scholar Program

Fall 2021 – Spring 2022

- Worked with a team of four undergraduate students, and guided by mentors to learn about the research skills in computer science.
- Worked on the project that focuses on the congenital heart diseases from a cardiac MRI. Built a convolutional neural network using Pytorch framework to estimate the volume of a heart.

- Presented my research findings and poster to the UMass faculties and in the ERSP national conference.

Paper & Presentation

Unsupervised Segmentation of Left Ventricle Using Cardiac MRI
Henry Lin, Ke Xiao, James Ko, Madalina Fiterau
Undergraduate Honors Thesis, 2023

Single/Two-frame(s) Volume Estimation of the Left Ventricle Using Convolutional NN
*Nitya Aryasomayajula, **Henry Lin**, Sneha Pullanoor, Dawn Varughese*
- Presented our poster at the virtual national ERSP conference hosted by UCSD.

Continuous Control of Latent Diffusion Model Through Token Embedding Interpolation
Henry Lin, Pracha Promthaw, Nikhil Gautam, Dmitry Petrov
- Presented our poster at the URV session hosted by UMass Amherst where faculties and students are invited.

Teaching

Math 213 – Calculus and Introduction to Differential Equations   *Fall 2024*
University of Wisconsin Madison

CICS 210 – Data Structure   *Spring 2024*
University of Massachusetts Amherst

CompSci 250 - Introduction to Computation   *Fall 2023*
University of Massachusetts Amherst
- Leading a discussion session for a class of 33 students, holding office hours, grading assignments, answering questions on the Piazza forum.

Certificates

Qiskit Global Summer School – Quantum Excellence   *2025*
IBM
- *Completed all four core labs.*

Skills

Programming Languages: Python, Java, MatLab, JavaScript, HTML/CSS, Julia, Mathematica.
Frameworks: PyTorch, Qiskit, Qutip, TensorFlow.
Languages: English, Mandarin Chinese.
Skills: Problem solving, resilience, self-directed learning, analysis, data visualization, numerical analysis, quantum computing, machine learning, programming.