Gwen Liu

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EDUCATION

Boston University; College of Arts and Sciences *Class of 2024*
Major: Physics. Minors: Computer Science, Philosophy. GPA: 3.81. Dean's list all semesters. Courses include Quantum Physics, Machine Learning, Electromagnetic Fields and Waves, Intermediate Mechanics.

Cornell University, online certificate in Machine Learning Foundations August 2023

Boston Latin School *Class of 2020*
GPA: 4.25. SAT: 1590. National Honor Society. 5 Season Varsity Girls Swimming State Qualifier. Member of Varsity Girls Lacrosse Team. Chief Photo Editor of school newspaper *The Argo*.

RESEARCH EXPERIENCE

FemtoSpec Laboratory – The Boston University Photonics Center Boston, MA
Research Assistant Jun. 2021 – Present

- Demonstrated degradation of organic dye pollutant mediated by plasmon enhanced nanorods and reactive oxygen species. Secured UROP funding in 2022 for this project.
- Built an optical setup for pump-probe spectroscopy, including connecting and coding a shutter to an Arduino Uno and designing a custom cuvette holder using 3D printing.
- Designed an automated cell colony counter by constructing a lightbox and image analysis algorithm in Python.
- Engineered an interactive LCD menu system interfacing with a remodeled 96-plate well mechanical arm, repurposed from Ender 3D printer components, enabling routines for automated sample irradiation within microplate wells.

Advanced Physics Laboratory – The Boston University Physics Department Boston, MA
Student Sept. 2023 – Present

- Investigated water droplet dynamics with an oscilloscope, photogates, and precision scale coordinated to a LABVIEW program to analyze temporal intervals between successive water droplets observing period bifurcation and chaotic behavior.
- Measured thermo-conductivity of argon using a steady state method, employing a gold-plated tungsten wire, improving the 10-year vacuum chamber setup by reorienting the wire for geometry calculations and solving a leak.
- Conducted crystallography studies involving X-ray diffraction analysis of lithium fluoride (LiF) and rubidium chloride (RbCl) crystals. Analyzed diffraction spectra to calculate atomic distances within cubic lattices for each compound.
- Delivered projects orally with in-class presentations and in writing according to Physical Review Letter guidelines

PROJECTS

Break Through Tech Ai – AI Studio Project Jun. 2023 – Present

- Built an AI predictive model in a team of 4 for start-up Bio-Interphase to motivate engineering solutions and incentivize funding for bat conservation efforts.
- Utilized decision trees, support vector machines, and gaussian processes with Sklearn to understand the highest risk factors for white nose syndrome and declining bat populations in North America.
- Interpreting climate data with X-Arrays from NACORDEX, plotting heat maps to determine correlation factors.

MIT Policy Hackathon – Eviction Lab Princeton Nov. 2023

- Collaborated within a team to propose effective policy solutions using a cost-benefit analysis to address housing sustainability challenges.
- Acquired a deeper understanding of the intricate socio-economic factors affecting equitable housing through correlation matrices and calculation of Gini coefficients for eviction filings and eviction prevention and diversion policies.

Unity – Dream Catcher Platformer Dec. 2022

- Built and published a platformer game called Dream Catcher using Unity, coded in C#, designed pixel art animations, game logic, and sound effects (Audacity). Link: https://play.unity.com/mg/other/dreamcatcher_web or https://gwenliu.itch.io/dream-catcher

TEACHING EXPERIENCE

Boston University Department of Computer Science Boston, MA
Course Assistant for CS 210 (Computer Systems) Sep. 2022 - Present

- Test problem sets coded in Assembly and C, hold 3 hours of weekly office hours and discussion sections, contribute edits and examples to class textbook, answer student questions online (Piazza), grade assignments (Gradescope).

PRESENTATIONS

Boston University Undergraduate Research (UROP) Symposium
Poster Presentation

- Title: Plasmon Enhanced Degradation of Organic Dye Pollutant through Reactive Oxygen Species Generation by Gold Nanorods

- Discussed sample preparation methodology, pump-probe experimental setup, results, and implications for further research of the mechanics of gold nanorods using the organize dye Rhodamine B.

EMPLOYMENT HISTORY

City Council President's Office Intern Boston, MA
City Hall Fellow Jun. 2023 – Present

- Researched and compiled comprehensive reports on urban development initiatives, aiding in informed decision-making by city officials.
- Launched an interactive map webpage integrating an API to visualize rising sea and flood risk areas along the Boston coastline.
- Drafted strategic emails and talking points for the City Council President, addressing constituent concerns and prioritizing focus areas like affordable housing, sustainability, and transportation.

EXTRACURRICULAR ACTIVITIES

- Actor in multiple student-directed films: *The Distance Between* (2023)*, Voyeur* (2022)
- Model in Boston University's Off the Cuff Magazine (2021 - Present)
- Member in Directed Reading Program with BU Math & Statistics Department, completing chapters of *A Friendly Introduction to Number Theory* (2020)

HONORS & AWARDS

- Honorable Mention for The Journal Award for Creativity in The Journal of The Core Curriculum (BU) (2021)
- Thomas M. Menino Scholarship (2020-24)
- National Merit Scholarship Finalist (2020)

SKILLS

- Technical skills and Languages: Python, Java, Assembly, Jupyter Notebooks, UV-Vis, oscilloscope, liposome synthesis, bacterial cell culture, working knowledge of C++, SQL, Fortran
- Bilingual in Chinese and English; some knowledge of French (4 yr.) and Latin (4 yr.)