Guohao (Gary) Chen

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Education

Cornell University, College of Engineering **Junior Standing | B.S. Expected May 2025**

- Computer Science Major & Mechanical Engineering Minor (Anticipated) | **GPA**: 3.97 *Ithaca, NY*
- **Courses**: Machine Learning, Digital Signal Processing and Statistical Inference, Computer System Organization, Numerical Analysis, Data Structure & OOP, Discrete Math, Aerospace Propulsion, Fluid Mechanics, Thermodynamics, Nexus Robotics Project Team

Swarthmore College **Transferred Out | Aug 2021 – Aug 2023**

- General Engineering Major & Math and History minors | **GPA**: 3.9 | Center of Innovation Leadership *Philadelphia, PA*
- **Courses**: Computer Vision, Honors Linear Algebra, Differential Equations, Probability, Stochastics, Solid Mechanics, Electrical Circuits Analysis, Physical System Analysis, Computer-aided Design & Manufacturing, Molecular Biology, Middle East History

Work Experiences

Machine Learning Research Affiliate **June 2023 – Aug 2023**

Lawrence Berkeley National Laboratory *Berkeley, CA*

- Built a hierarchical VAE that reconstructed CT images to minimize radioactive exposure without compromising image quality
- Reconstructed COVID-19/Non-COVID-19 lung CT images from sparse sinograms & validated it with SOTA diagnosis classifier
- Reviewed SOTA generative AI papers, proposed strategies, & qualitatively benchmarked VAE's and Diffusion Model's performances
- Preprocessed 30 GBs of real-world CT images from NIH into sinograms with a self-built GPU-enabled Radon Transform pipeline
- Trained models on computing clusters with PyTorch, SLURM, Ray Tune, OpenMPI, & Bash scripts and worked in a team on GitHub

Data Analyst on Molecular Dynamics Simulation **Jan 2023 – May 2023**

Northwestern University McCormick School of Engineering *Remote at Swarthmore College*

- Independently initiated the first academic collaboration on water filtration membranes between Swarthmore and Northwestern
- Developed software that procedurally highlights contaminant-membrane interactions at Angstrom-scale and 2 picosecond resolution
- Utilized Python and NumPy to measure hopping mechanism qualitatively and quantitatively in membrane filtration process
- Programmed a Python codebase to procedurally analyze more than 15 GB simulated data of 7.5 billion atom movements
- Learned an unfamiliar programming language Tcl and a MD simulation software (VMD) in 1 week with working proficiency

President's Sustainability Research Fellow on Sustainable Food Systems **Aug 2022 – May 2023**

Office of Sustainability, Swarthmore College *Swarthmore, PA*

- Used Python & Excel to build digital data-tracking system to quantitatively support purchase recommendations for dining department
- Conducted baseline survey, generated 20-page report, compiled a Retail Product Guide, and raised college's STARS rating to Gold
- Sampled 40% of total retail food spending, tracked 8 special characteristics, and evaluated 340 unique retail products in spreadsheets
- Collected 33 survey & interview responses to evaluate food-sourcing practices and consumer perceptions w.r.t. certified organic foods

Student Club Operation Manager **Aug 2021 – May 2023**

i20 International Student Club, Swarthmore College *Swarthmore, PA*

- Organized monthly cross-cultural events such as Fall Break Ramen Night, Thanksgiving Bonfire, and the annual Fall Feast event
- Recruited 40 student chefs to present 12 dishes from 12 cultural backgrounds and attracted over 150 students to the Fall Feast event
- Led a team to compile a cookbook that records both recipes and cultural significances behind dishes from regions around the world

Project Experiences

Cornell Nexus Robotics Project Team **Spring 2024**

- Researched different real-time obstacle detection algorithms such as YOLO to enhance robot's obstacle avoidance capability.
- Engaged with embedded systems by contributing to Arduino and Raspberry Pi integration with the RGB-D camera on the robot.
- Explored different efficient and scalable computing solutions for our autonomous robots collecting microplastics on extensive beach.

Quantum Computing Summer Program @ The Laboratory for Physical Sciences (College Park, MD) **Summer 2023**

- Gained hands-on experience in designing, running, and evaluating quantum circuits using Python & IBM Quantum Computer
- Acquired quantum principles such as entanglement, quantum algorithms (Grover & Deutsch-Josza), and qubit environmental impacts
- Explored atom interferometry, Bose-Einstein Condensate creation, and Quantum Gravimeters, & Rydberg blockade entanglement
- Familiarized with gate-defined quantum dot qubits, transmon qubits, and the associated operational components and challenges

Some Computer Vision Course Projects: Multi-view Image Stitching and Tracking Juggling Balls in videos **Spring 2023**

- Utilized OpenCV to automatically select 4 pairs of points from 2 images with SIFT and RANSAC algorithms on Google Colab
- Transform image perspectives through computational geometry, stitched images, and validated software in real-world settings.
- Tracked multiple dynamic and similar-looking objects in video with Thresholding, Morphological Operations, and Object Extraction
- Built interactive user interface that allowed users to adjust the output video colors of tracked objects with sliders

Computer-aided Design and Manufacturing Projects **Fall 2022**

- CAD and CAM an evolving 4-D Aluminum Candle Holder with Random Circular Maze with Fusion 360, Python, and Haas Mill
- CAD and CAM an ergonomic wooden pencase for Apple Pen with Fusion 360 and Nomad Desktop Carbide Mill
- Built a guitar prototype by laser cutting wood, acrylic sheets, matboards and assembled them with common makerspace equipment