Raymond Liu

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Education

Princeton University, Princeton, NJ Fall 2019 – Present

Major: Computer Science

In-major GPA: 4.00 — Cumulative GPA: 3.91

Courses: Computer Vision, NLP, Introduction to Machine Learning, Mathematics for Machine Learning
Algorithms and Data Structures, Computer Architecture, Functional Programming
Multivariable Calculus, Linear Algebra, Statistics & Data Analysis

Crescent Valley High School, Corvallis, OR Fall 2016 – Spr 2019

Cumulative GPA: 4.00

Skills

Languages

- Proficient in: C++, C, Python, Java, JavaScript, HTML, CSS, OCaml
- Familiar with: SQL, Bash, Assembly (ARM, MIPS)

Frameworks & Tools

- Proficient in: Git, LaTeX, PyTorch, NumPy, Matplotlib, jQuery, Bootstrap, Flask
- Familiar with: Linux, PostgreSQL, MongoDB, Node.js, Express.js

Work/Research Experience

Links to GitHub repos, posters, and more info can be found on my website.

Software Engineering Intern at Amazon May 2022 - Aug 2022

TBD

Research Project at Princeton University June 2021 – Present

Joined the Laboratory for Intelligent Probabilistic Systems under Dr. Ryan Adams.
Developed a system for visualizing generative models in 3D hyperbolic space. Created a model and projection of 3D hyperbolic space using OpenGL and connected the model with a PGAN for generating correlated images based on geodesic distance.
Currently investigating applications of human-in-the-loop latent space optimization in the system.

Teaching Assistant at Princeton University Fall 2021 – Spr 2022

TA for COS340 - Reasoning about Computation
Course content covers mathematical and theoretical topics in computer science — combinatorics, probability, graph theory, NP-completeness, and cryptography.
Guided students during regular office hours; graded and provided feedback for assignments and exams.

Research Assistant at Princeton University June 2020 – Aug 2020

Joined the Princeton Vision & Learning Lab to work on a visual learning project on optical flow.
Developed and optimized a system for collecting human-annotated images and predicting ground truth optical flow from annotation pairs.

Research Intern at Oregon State University July 2019 – Aug 2019

Joined a visual learning project designed to help provide insight into how neural networks make decisions based on meaningful visual concepts
Helped analyze network activations on images of birds to see what high-level features it focuses on, such as wings, eyes, and beaks

Computer Graphics Internship at Oregon State University June 2018 – Aug 2018

Designed a simple ray tracer / image renderer from scratch using C++
Tested and implemented a variety of methods to increase image realism and accelerate rendering speed

Dementia Diagnosis Project Feb 2016 – Sep 2017

Continued prior work on developing a method for diagnosing Alzheimer's disease using convolutional neural networks.
Implemented a technique for processing 3D MRI scans to improve the stability and accuracy of the existing neural network.
The project won several awards at the CWOSE and NWSE science fairs.

Misc. Computer Science Projects

- Introduced a new state-of-the-art convolutional transformer model for inertial navigation that outperforms previous best methods.
- Reproduced and performed ablations on a Visual Dialog system for answering natural language questions about given images. Improved on the question embedding system by replacing an LSTM with a GRU.
- Trained a CNN on images from the Caltech Pedestrian Dataset to investigate interpretability and reliance on visual cues in neural networks. Improved network performance on low-performing categories of pedestrians while maintaining performance across the board.
- Built and trained a convnet from scratch using CIFAR10 images
- Created several different websites, ranging from an informative PSA to a full-scale website for finding on-campus amenities named TigerTools (requires a Princeton account to access).
- Designed and developed a web interface that allows users to listen to podcasts with advertisements automatically blocked
- Designed and developed a simple mobile app using C# and the Unity game engine that allows users to interactively create and traverse through search trees
- Developed an interactive text-based game using C++ where the user plays as a Union soldier in the Civil War. Mostly historically accurate.

Honors, Awards, and Achievements

Qualified for USA Junior Math Olympiad (One of 156 qualifiers worldwide)	Apr 2018
Qualified for American Invitational Mathematics Examination	2016-2018
Oregon Invitational Mathematics Tournament - 3rd Place (Team Event)	May 2018
Oregon Invitational Mathematics Tournament - 4th Place (Calculus)	May 2017
Intel Northwest Science Expo (NWSE) Finalist	Apr 2017
IEEE Excellence in Computer Science Award at Intel NWSE	Feb 2017
Central Western Oregon Science Expo (CWOSE) Finalist	Feb 2017
Yale Science and Engineering Award in Computer Science (at CWOSE)	Feb 2017

Hobbies

Ping Pong (semi-professional)

I've played at several U.S. national tournaments, as well as many state and local tournaments in Oregon (and I even won a few). My USATT rating is currently 2059.
I was also previously a coach for Oregon State University's ping pong club.

White Water Rafting

I've rafted Class IV rapids at several locations, including McKenzie River (Oregon), Clackamas River (Oregon), and Flathead River (Montana).

Rock Climbing

I occasionally go rock climbing at the Dixon Recreation Center in Corvallis, Oregon.