

Raymond Liu

liur@seas.harvard.edu | (541) 602-0508 | github.com/rl27 | rl27.github.io

Education

Princeton University, Princeton, NJ

Fall 2019 – May 2023

Major in Computer Science – Certificate in Statistics and Machine Learning

In-major GPA: 3.94 – Cumulative GPA: 3.9

Courses: Computer Vision, NLP, Intro 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, 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](#).

Visiting Researcher at Harvard Ability Lab

July 2023 – Present

Developing a smartphone-based navigation assistant for people who are blind or visually impaired.
Received funding from the Amazon Greater Boston Tech Initiative for our proposal, "Curriculum for developing a robotic navigation assistant for people with visual impairment."

Software Engineering Intern at Amazon

May 2022 – Aug 2022

Developed, tested, and optimized an API in Java to send parallelized batch requests to Elasticsearch and greatly speed up workflows.

Research Project at Princeton University

June 2021 – Feb 2022

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 extending this work for my senior undergraduate thesis.

Teaching Assistant at Princeton University

Sep 2021 – May 2023

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

Teaching Assistant at Oregon State University

Sep 2017 - Mar 2018

TA for CS162 - Introduction to Computer Science II
Course content includes C++ programming, data structures, algorithms, polymorphism and inheritance.
Guided students during regular office hours; Graded and provided feedback for projects and labs.

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

Honors, Awards, and Achievements

NSF Graduate Research Fellowship Program Honorable Mention	Mar 2023
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	Apr 2017
Central Western Oregon Science Expo (CWOSE) Finalist	Feb 2017
Yale Science and Engineering Award in Computer Science (at CWOSE)	Feb 2017