# 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
Relevant coursework:
- Computer Vision
- Introduction to Machine Learning
- Mathematics for Machine Learning
- Algorithms and Data Structures
- Computer Architecture and Organization
- Functional Programming

**Crescent Valley High School, Corvallis, OR** Fall 2016 – Spring 2019

Cumulative GPA: 4.00

## Skills

**Proficient in C++ and C**
**Proficient in Python**
**Proficient in Java**
**Proficient in HTML, CSS, JavaScript**
**Proficient in Git**
**Proficient in LaTeX**

**Familiar with Bash**
**Familiar with OCaml/functional programming**
**Familiar with ARM and MIPS architectures**
**Familiar with SQLite, PostgreSQL**

## Work/Research Experience

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

**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 projection of the Poincaré disk model in 3D space using OpenGL and connected the model with a GAN for generating correlated images based on geodesic distance. Work is ongoing.

**Teaching Assistant at Princeton University** Sep 2021 – Present

TA for COS340 - Reasoning about Computation.
Course content covers mathematical and theoretical topics in computer science, including combinatorics, probability, graph theory, NP-completeness, cryptography.
Guided students during regular office hours and answered questions on the course's online forum; 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

Learned basics of neural nets, helped work on the network using images of birds and focused on visual concepts 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** — Sept 2017 – Mar 2018

TA for CS162 - course content includes C++ programming, data structures, algorithms, polymorphism and inheritance.

Guided students during regular office hours and on Canvas

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.

Submitted project to the Intel Science and Engineering Fair.

**Misc. Computer Science Projects**

Trained a CNN on images from the Caltech Pedestrian Dataset to investigate interpretability and reliance on visual cues in neural networks

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

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|---|---|
| **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 |

## Official Testing

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|---|---|---|
| **AP U.S. Government & Politics** | 5 | May 2019 |
| **SAT Math / Reading & Writing** | 800 / 750 | Aug 2018 |
| **SAT Physics Subject** | 800 | June 2017 |
| **SAT Math II Subject** | 800 | May 2017 |
| **AP Physics C: Mechanics** | 5 | May 2017 |
| **AP Physics C: Electricity & Magnetism** | 5 | May 2017 |
| **AP Calculus BC** | 5 | May 2016 |

## 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 gone rafting at several locations, including McKenzie River (Oregon), Clackamas River (Oregon), and Flathead River (Montana).