

# William Liu

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## Bio

I am a software engineer, as well as a computer scientist and cognitive scientist. I am generally interested in high performance computing, compilers, systems design, computer architecture, theoretical neuroscience, deep learning, and teaching.

For a shorter overview, please check out my resume at: [williamliu.me/Rez\\_U\\_May.pdf](http://williamliu.me/Rez_U_May.pdf)

## Education

**The University of Texas at Austin** // Austin, Texas  
M.S. Computer Science

May 2023 (Expected)

**Carnegie Mellon University** // Pittsburgh, Pennsylvania  
B.S. Cognitive Science, Minor in Computer Science  
Research Advisor: Saugata Ghose  
Alpha Epsilon Pi Fraternity

May 2020

**University of Wisconsin—Madison** // Madison, Wisconsin  
High School Dual Enrollment in Applied Mathematics and Engineering Physics

May 2016

## Professional Experience

**SambaNova Systems** // Palo Alto, California  
**Software Engineer**

June 2020 – Present

ML and HPC application compilation and dataflow graph optimization algorithms

**Nvidia** // Santa Clara, California  
**Deep Learning Software Intern**

May 2019 – August 2019

Machine learning model compression for custom embedded processor

**Uber** // Pittsburgh, Pennsylvania  
**Software Engineering Intern**

May 2018 – August 2018

Message passing protocols in a distributed operating system

## Skills

### Programming Languages:

C, C++, Python, SML, TypeScript, JavaScript, MATLAB, Octave, R, OCaml

### Machine Learning:

Tensorflow, Keras, High-Resolution Image Processing, Semantic Segmentation

### Frameworks and Tools:

LLVM, Cuda, OpenMP, Open MPI, Unix, Git, Perforce

### Web Development:

GraphQL, React, MySQL, NextJS, Urql, TypeORM, AWS, DigitalOcean, Vercel, Express, MongoDB

## Design:

InDesign, Photoshop, Illustrator, Adobe XD, Sketch, AutoCAD, SolidWorks, User Research

## Languages:

Mandarin Chinese (Basic Professional Proficiency)

## Miscellaneous:

LaTeX, Gantt Charts, Agile Software Development, Asana, JIRA

## Research Experience

**Computer Architecture Lab at Carnegie Mellon** // Pittsburgh, Pennsylvania

**Research Assistant**

December 2016 – May 2020

Research areas: operating systems and memory architecture

**CMU Articulab** // Pittsburgh, Pennsylvania

**Research Intern**

August 2017 – December 2017

Research areas: modeling rapport between virtual agents and humans

## Peer-Reviewed Publications

S Ghose, A G Yağlıkçı, R Gupta, D Lee, K Kudrolli, **W X. Liu**, H Hassan, K K. Chang, N Chatterjee, A Agrawal, M O'Connor, O Mutlu. **"What Your DRAM Power Models Are Not Telling You: Lessons from a Detailed Experimental Study"** SIGMETRICS 2018.

## Teaching Experience

**15-418 Parallel Computer Architecture and Programming** // Carnegie Mellon University

**Teaching Assistant**

Spring 2020

15-418 "provides a deep understanding of [...] designing modern parallel computing systems as well as teaches parallel programming techniques necessary to effectively utilize these machines"

**85-310 Research Methods in Cognitive Psychology** // Carnegie Mellon University

**Head Teaching Assistant**

Spring 2020

85-310 teaches students how to conduct independent research in cognitive science by designing, running, and evaluating a novel research project and writing up an extensive report

**15-110 Principles of Computing** // Carnegie Mellon University

**Teaching Assistant**

Fall 2019

**Teaching Assistant**

Fall 2018

**Teaching Assistant**

Spring 2018

**Teaching Assistant**

Fall 2017

15-110 is a fast-paced and broad introduction to the field of computer science from basic theory to programming techniques

## Projects

Detailed descriptions for all projects can be found at: <https://williamliu.me/tags/#project>

**Reducing Cache Pollution at Compile Time** // Course Project, May 2020

Reduced cache pollution in large memory streaming applications by inserting non-temporal memory instructions through multiple compiler passes

### **Improving CNN Interpretability** // Course Project, May 2019

Improve CNN kernel interpretability by guiding and extracting kernel gradient convergence results using part-templates

### **Parallel Galaxy Simulation** // Course Project, May 2019

Built and optimized parallel galaxy simulator with a lock-free quadtree and experimented with different parallel numerical integration methods

### **Simon** // PennApps XVIII Hackathon, September 2018

Train a robot to do a simple mechanical task by doing it yourself and the robot will mimic your actions  
**Top 30 Hack**

### **Modware** // PennApps XVII Hackathon, January 2018

Prototype with basic modular hardware components by controlling the “wiring” through software  
**2nd Place Overall, Best Hardware Hack, Hacker’s Choice Award, and Best IoT Prize**

### **Facebook Discourse** // Facebook Global Hackathon Finals, November 2017

Digitize and organize political debates in real time to streamline political media  
**Grand Prize out of 14 finalists from 11 different countries**

### **ResistAR** // TartanHacks 2017 Hackathon, February 2017

Augmented reality app that visualizes the voltage across and current through each component in a circuit  
**Grand Prize**

### **Autonomous Ground Support Equipment** // NASA’s Centennial Challenge, April 2016

Autonomous robotics system to support a rocket launch carrying payload  
**2nd Place as the only high school team in this college competition**

## **Select Coursework** What I thought was interesting

### **Mathematics and CS Theory:**

Topics in Deep Learning, Topology and Modal Logic, Parallel Algorithms, Functional Programming, Machine Learning, Computational Perception, Numerical Analysis and Algebra, Theoretical Computer Science

### **Systems:**

Optimizing Compilers, Parallel Computer Architecture, Advanced Operating Systems

### **Psychology:**

Consciousness, Adaptive Neural Decision Making, Systems Neuroscience, Human Experience in Design, Neural Foundations of Behavior

## **Organization Involvement**

### **CMU Tricking Club** I highly encourage you to look up Tricking if you like gymnastics or parkour :)

Member

Co-Founder and President

January 2020 – May 2020

December 2016 – January 2020

### **Cognitive Science Student Advisory Board**

Treasurer

Board Member

August 2018 – May 2020

January 2018 – August 2018

### **Scotch’n’Soda Theatre**

Assistant Director for *RENT*

January 2020 – March 2020

Production Manager for *The House of Yes*  
Stage Manager for *Young Frankenstein*  
Stage Manager for *Heathers: The Musical*  
Assistant Stage Manager for *Rosencrantz and Guildenstern are Dead*  
Hair and Makeup Artist for *Murder Ballad*

January 2018 – February 2018  
August 2017 – October 2017  
January 2017 – April 2017  
January 2018 – February 2020  
September 2018 – October 2016

**St. Mary's Hospital**

Inpatient Volunteer

July 2013 – May 2015

## Professional Affiliations

IEEE, IEEE TCuARCH, IEEE TCCA, ACM, ACM SIGARCH

## Interests

Photography, Filmmaking, League of Legends, Music, Anime/Animation, Weight Lifting, Pokémon