

Emma Liu

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United States Citizen

EDUCATION

Carnegie Mellon University: School of Computer Science

Aug. 2017 – May 2021

B.S. Computer Science

QPA: 3.24 | Minor/Concentration: Computer Systems

Coursework: * indicates Fall 2020 ** indicates Spring 2021

15-740 Graduate Computer Architecture*

15-462 Computer Graphics*

15-410 Operating Systems Design and Implementation

15-458 Discrete Differential Geometry

15-418 Parallel Computer Architecture & Programming

10-315 Introduction to Machine Learning

15-316 Software Foundations of Security & Privacy*

15-251 Great Theoretical Ideas in CS

15-594 Visual Computing Systems (Stanford CS38K Independent Study)**

15-210 Parallel/Seq. Data Structs & Algs

SKILLS

C | Python | x86 ASM | Objective-C/C++ | CUDA | JavaScript | Java | HTML/CSS | Git

EXPERIENCE

Apple – Software Engineering Intern (Apple Silicon GPU: Pre-Silicon Translator Team)

June–Aug. 2020

- Provided runtime support to a low-level GPU trace explorer tool used on pre-silicon GPU models
- Developed a rich set of features to support functional debugging, including kernel dispatch display, GPU register reads/writes tracing, runtime shader instruction tracing, and register accumulation display

Apple – Software Engineering Intern (iOS GPU: Pre-Silicon User-mode Driver Team)

May–Aug. 2019

- Key contributor to tooling infrastructure for architectural performance studies on next generation GPUs
- Developed automation to classify and simplify GPU workloads based on performance attributes of interest
- Solution heavily used within Apple to perform architectural analysis on GPU performance models

15-418 Parallel Computer Architecture and Programming – Teacher’s Assistant

Jan.–May 2020

- Supported instruction in parallel computing concepts, including multi-core parallelism/ILP, cache coherence, and GPU (CUDA)/shared memory (OpenMP)/message passing (OpenMP) programming

15-213 Introduction to Computer Systems – Teacher’s Assistant

Jan.-May, Aug.–Dec. 2019

- Held lab-based office hours and recitations supporting instruction on computer systems concepts, including assembly, caches, concurrency (processes/threads), dynamic/virtual memory, and networking
- Led exam question development for both midterms and final exams

Robotics Institute Textiles Lab – Research Assistant

Feb.–July 2018

- Investigated script-to-embroidery pattern translation and geometry-based stitches

PROJECTS

OwOS/OSnap (15-410 Operating Systems Partner Projects)

Feb.–May. 2020

- Wrote a kernel in a mixture of C and x86-IA32 assembly supporting virtual paging, multiprocessing, high frequency preemption, and shell console program-running
- Wrote a user-facing thread library on top of core synchronization primitives and auxiliary routines

Accelerating the WebP Image Encoding Pipeline with CUDA (15418 Partner Project)

Oct.–Dec. 2019

- Re-wrote several stages of Google’s WebP image encoding pipeline in CUDA to optimize for parallelism
- Analyzed optimization performance on the Pittsburgh Supercomputing Cluster Bridges machines

Lunar Gala 2019 ANOMIE Show and Organization Websites

May 2018 – March 2019

- Wireframed and styled the theme site for the 2019 show

ACTIVITIES

Dean’s Undergraduate Student Advisory Council, School of Computer Science

Fall 2019 – ongoing

Head Organizer & Tour Guide of Student Tours, School of Computer Science

Spring 2018 – ongoing