Emma Liu

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EDUCATION

Carnegie Mellon University: School of Computer Science

Master's *in* ***Computer Science*** *Expected Aug. 2021 – May 2022*

Bachelors *in* ***Computer Science*** *QPA: 3.32, Minor/Concentration: Computer Graphics* Aug. 2017 – May 2021

Selected Coursework: * indicates Spring 2021

Systems: Graduate Computer Architecture (15-740), Operating Systems (15-410), Parallel Computer Architecture (15-418)
Graphics: Computer Graphics (15-462), Technical Animation* (15-464), Discrete Differential Geometry (15-458)
Algorithms/Machine Learning: Algorithms Design and Analysis* (15-451), Machine Learning (10-315)
Security: Software Foundations of Security & Privacy (15-316)

SKILLS

C, Python, C++, Objective-C, x86 assembly, CUDA, Git, JavaScript, HTML/CSS, Java

EXPERIENCE

NVIDIA, Software Tools Infrastructure Architecture Intern June–Aug. 2021

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 Silicon 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

CMU School of Computer Science, Teacher's Assistant

[15-462: Computer Graphics] Jan.–May 2021
[15-418: Parallel Computer Architecture and Programming] Jan.–May 2020

- Held office hours on parallel programming concepts and API-based assignments (CUDA, OpenMP, OpenMPI)

[15-213: Introduction to Computer Systems] Jan.-May, Aug.–Dec. 2019

- Held recitations and office hours on systems concepts and labs (memory allocator, shell, cache, proxy server)
- Led exam question development for both midterms and final exams

PROJECTS

Scotty3D/DrawSVG [15-462 Solo Projects] Sept.–Dec. 2020

- Building a 3D graphics software package to support mesh editing on half-edge meshes (triangulation, beveling, and subdivision operations); path tracing (realistic rendering with global illumination effects), and animation
- Implemented a software rasterizer supporting point, line, and triangle primitives, as well as texture mapping

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 Tour Guide of Student Tours, School of Computer Science Spring 2018 – ongoing