Max **Slater**

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Education

Carnegie Mellon University — *Pittsburgh, PA*

B.S. in Computer Science, Concentration in Computer Graphics, Concentration in Computer Systems, 3.97/4.0 — *Aug. 2018 - Dec. 2021*

- Computer Graphics (TA), Discrete Differential Geometry, Technical Animation, Physics-Based Rendering, 3D Animation
- OS Design & Implementation, Compiler Design, Parallel Computer Architecture & Programming, Deep Learning Systems

University of Nevada, Reno — *Reno, NV*

Dual Enrollment, 4.0/4.0 — *Jun. 2015 - May 2018*

Davidson Academy — *Reno, NV*

High School Diploma, emphasis in Computer Science and Mathematics, 4.0/4.0 — *Aug. 2012 - May 2018*

Experience

Jane Street — *Pittsburgh, PA*

SWE Intern — *Jun. 2021 - Aug. 2021*

- Incoming software engineering intern.

Carnegie Mellon University — *Pittsburgh, PA*

Undergraduate Researcher — *Jan. 2021 - May. 2021*

- Investigating high performance closest point query algorithms on modern CPU & GPU hardware. Report.
- Working with Rohan Sawhney and Keenan Crane of the Geometry Collective.

Apple — *Reno, NV*

GPU Software Intern — *May 2020 - Aug. 2020*

- Developed a novel automated tool for comparing frame traces across platforms, increasing velocity of competitive performance analysis work.
- Selected to present project to SVP of software Craig Federighi and his team.

NVIDIA — *Santa Clara, CA*

3D Graphics Software Intern — *May 2019 - Aug. 2019*

- Constructed automated regression testing service measuring OpenGL/Vulkan graphics performance on embedded Linux devices.
- Profiled and diagnosed OpenGL benchmark performance bugs.

Teaching

Carnegie Mellon University — *Pittsburgh, PA*

15-462/662: Computer Graphics Teaching Assistant (S20,F20,S21) — *Jan. 2020 - May 2021*

- Re-wrote the course codebase, improving structure, performance, interface, and student directions/documentation. Deployed fall 2020.
- Held solo office hours, answered online questions, and assisted with project/exam grading. Designed short assignments and notes.
- Fall 2020 iteration received 4.7/5.0 (462) and 5.0/5.0 (662) student rating, the highest since 2015.

Davidson Academy — *Reno, NV*

Instructor — *Aug. 2015 - May 2017*

- Taught 3 years of high school computer science electives.
- Created curriculum on C++, data structures, and 2D graphics/games. Published website that maintains ∼2k monthly views.

Skills

Programming C++20, C, Rust, OCaml, Python, x86

Tools OpenGL, Vulkan, Win32, Linux, Git

Projects

Scotty3D

GitHub

Primary Author and Maintainer — *Jan. 2020 - PRESENT*

- Scotty3D is an educational graphics software package including interactive 3D mesh editing, realistic path tracing, dynamic animation, and physically based simulation. It includes code structure and project guidelines for CMU 15-462/662, CMU 15-464/664, and Stanford CS248.
- Implemented all subsystems, a modern OpenGL renderer, a new GUI, C++17 abstractions, and many fixes/optimizations.
- Designed new student tasks and oversaw additional development work from student contributors.

FCPW

GitHub

Contributor — *Jan. 2021 - May 2021*

- FCPW is a C++ library for fast closest point and ray intersection queries. It is about 3x faster than Embree for closest point queries and only slightly slower for ray intersection queries.
- Wrote new bench-marking and data visualization system for testing performance gains and analyzing thread + SIMD-width scaling.
- Implemented additional bounding volumes. Designed and implemented various strategies for GPU acceleration using Vulkan.

Exile

GitHub

Author — *Jul. 2017 - PRESENT*

- *Handmade* from-scratch voxel game engine including a modern OpenGL deferred renderer, parallel voxel world generation, multiple OS layers, a custom C++ standard library with automatic type introspection, debugging/profiling features, and more.
- Currently working on a re-write with a new C++20 standard library and real-time ray tracing in Vulkan. Coming soon!

GPU-RT

GitHub

Author — *Apr. 2021 - May 2021*

- GPU hardware-accelerated path tracer featuring various material models and integrators, particularly ReSTIR for direct lighting.
- Developed from scratch in Vulkan 1.2. Loads and interactively edits GLTF scenes.

Writing

Blog

https://thenumbat.github.io/

Author — *Jul. 2018 - PRESENT*

- Various technical write-ups and thoughts on education.

Lists

GitHub

Author — *Aug. 2017 - PRESENT*

- Curated list of articles focusing on many areas of computer science and technology.

Activities

CMU Esports

Pittsburgh, PA

Overwatch Manager and Player — *2018 - 2020*

- Managed and competed with the CMU Overwatch team in the Tespa collegiate league.