

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

Experience

Jane Street

New York, NY

SOFTWARE ENGINEER

Jul. 2022 - Present

- Working on performance analysis tools for the OCaml ecosystem.

SOFTWARE ENGINEERING INTERN

May 2021 - Aug. 2021

- Contributed to OCaml syntax extension for parsing and auto-completing s-expressions.
- Developed programmatic abstractions used by traders to specify risk limits.

Carnegie Mellon University

Pittsburgh, PA

UNDERGRADUATE RESEARCHER

Aug. 2021 - Dec. 2021

- Investigated optimization-guided sampling techniques for differentiable rendering. Wrote a [poster](#).
- Worked with [Adithya Pediredla](#) and [Ioannis Gkioulekas](#) of the CMU imaging group.

UNDERGRADUATE RESEARCHER

Jan. 2021 - May 2021

- Investigated high performance closest point query algorithms on modern CPU & GPU hardware. Wrote a [project report](#).
- Worked 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

Received CMU Senior Leadership Recognition for teaching work.

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 a 4.7/5.0 (462) and 5.0/5.0 (662) student rating, the highest since 2015.

15-466/666: COMPUTER GAME PROGRAMMING TEACHING ASSISTANT (F21)

Aug. 2021 - Dec. 2021

- Advised students constructing games including 2D/3D rendering, asset creation/processing, networking, and physics.
- Assisted with grading small games and final projects.

Personal Blog

<https://thenumb.at/>

AUTHOR

Jul. 2018 - PRESENT

- Technical blog covering computer graphics, programming, and math. Received over 50,000 visits and counting.

Skills

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

Tools OpenGL, Vulkan, Win32, Linux, Git

Software

Scotty3D

[GitHub](#)

PRIMARY AUTHOR AND MAINTAINER

Jan. 2020 - Present

- Scotty3D is an educational graphics software package including 3D software rasterization, mesh editing, geometry processing, path tracing, skeletal animation, and simulation. It includes code structure and automated testing for projects required by CMU 15-462/662, CMU 15-464/664, and Stanford CS248.
- Implemented the scene graph, OpenGL renderer, path tracer, animation/simulation system, user interface, various C++17 abstractions, and many tests, fixes, and optimizations.
- Designed new student tasks and oversaw additional development work from student contributors.
- Developed extensions for inverse kinematics, cloth simulation, and fluid simulation.

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* 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 for CMU 15-468, where it won the technical award in the 2021 [rendering competition](#).
- Uses Vulkan 1.2 ray tracing APIs and interactively edits GLTF scenes.

Activities

CMU Esports

Pittsburgh, PA

OVERWATCH TEAM MEMBER

Sep. 2018 - Mar. 2022

- Managed and competed with the CMU team in the Overwatch collegiate league.
- Placed top 32 in North America in the fall 2021 tournament.