SAAD AMIN

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I am a computer engineering student at Georgia Tech. My research interests are in GPU computing, computer graphics, AI, and code optimization. My Linkedin: `https://www.linkedin.com/in/saad-amin-4259b8310/`

EXPERIENCE

University of California, San Diego - Center for Visual Computing
Research Intern

April 2024 - Present
Remote

· Hand wrote efficient back-propagation code on the GPU for SVGF, a complex multi-stage denoising filter widely used in computer graphics.
· Implemented the Adam optimizer to find optimal filter parameters and achieved 40% increase in image quality.

Massachusetts Institute of Technology - Computational Reactor Physics Group
Research Lead

May 2023 - October 2023
Remote

· Designed a 5233% faster algorithm for tracking cells in nuclear reactor simulation software.
· Designed a novel parallel algorithm for construction of octrees in constructive solid geometry environments.
· Presented paper at PHYSOR 2024.

University of California, San Francisco - John Irwin Lab
Research Lead

August 2022 - August 2023
Remote

· Ported drug discovery software to GPU for 1455% speed up compared to original CPU version.
· Designed a batch transfer method to minimize GPU/CPU synchronizations.
· Optimized CPU drug discovery code by 190%.
· Rewrote 10k+ lines of Fortran code in CUDA/C++.
· Presented poster at DOCK Developers' Meeting 2023.

PUBLICATIONS

1. Saad Amin, Gavin Ridley, and Benoit Forget. Geometric acceleration structures to speed up cell searches in OpenMC. In *Proceedings of International Conference on Physics of Reactors 2024*, pages 432–441, San Francisco, California, 2024

2. Saad Amin and John Irwin. GPU DOCK: GPU acceleration for molecular docking. DOCK Developers Meeting 2023, 2023

PORTFOLIO

OpenGL Path Tracer
https://saada2006.github.io/projects/path-tracer

March - June 2021, June - August 2022

· Designed highly efficient software-based GPU path tracer in OpenGL 4.6.
· Implemented a custom GPU scheduler and multithreaded SBVH builder.
· Designed a compact memory representation for trees, geometric primitives, and material data to reduce memory bandwidth.
· Real-time performance on a GTX 980 in complex scenes (e.g. Sponza, conference room).

Minecraft Shaders
https://saada2006.github.io/projects/minecraft-shaders

June 2020 - February 2021

· Wrote GPU-based graphical modifications to the game *Minecraft*.

- Implemented physics-based visual effects, including atmospheric scattering, volumetric clouds, DOF, shadows, reflections, chromatic aberration, etc.
- Implemented a 2D LUT pre-generator for real-time atmospheric scattering simulations.
- Wrote a set of tutorials to teach others how to write Minecraft shaders.

SKILLS

Languages	C, C++, CUDA, Slang, Bash, Java, Python
Fields	GPGPU Compute, Computer Graphics, AI, Computational Geometry, Code Optimization
Tools	CMake, GNU Make, Linux, VS Code, VS 2022

AWARDS

USA Computing Olympiad Silver	January 2023
Golden Seal of Merit	May 2024
AP Scholar with Distinction	July 2023

EDUCATION

B.S. Computer Engineering — 2024 - 2028
Georgia Institute of Technology — *Atlanta, GA*

- Incoming freshmen
- Concentration in computer systems and physical design

Dual Enrollment — 2023 - 2024
Ohlone Community College — *Fremont, CA*

- Overall GPA: 4.00
- Took courses in discrete mathematics, linear algebra, and multivariable calculus.

High School Diploma — 2020 - 2024
Mission San Jose High School — *Fremont, CA*

- Overall GPA: 3.96
- Graduated with Golden Seal of Merit diploma