Ayaan Asif

Software Engineer — Scientific Computing — Astrophysicist

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Education

University of Toronto Toronto, ON
BSc. Computer Science Specialist, Astrophysics Minor Sept 2022 – Jun 2026

- **CS Coursework:** Operating Systems (CSC369/469), Algorithm Design (CSC373), Parallel Programming (CSC367), Computer Graphics, Physics-Based Animation, AI (CSC384), Databases (CSC343), Knowledge Representation (CSC484).
- **Physics Coursework:** Quantum Physics (PHY256), Thermal Physics (PHY252), Practical Astronomy (AST325), Galaxies & Cosmology (AST222).

Technical Skills

- **Languages:** Python, C++, C, C#, Java, SQL, Bash, Assembly, R, JavaScript, HTML, CSS.
- **AI Automation:** Agentic Coding Workflows, LLM Training Evaluation, RLHF, Prompt Engineering.
- **Scientific Web:** Three.js, WebGL, Astropy, Photutils, NumPy, SciPy, Matplotlib, FITS workflows.
- **Physics Simulation:** Unity, Blender, Constraint Solvers, Motion Systems, Deformable Meshes.
- **Hardware CAD:** 3D Printing (Ender 3, K1, Cura), CAD (Onshape), Logisim, Optical Alignment.

Projects

Physics-Based Simulation Engine | *C++, Python, Unity, Blender*

- Developed a soft-body physics simulation engine capable of handling deformable tetrahedral meshes and constraint solvers to model complex material behaviors (FEM/PBD-style).
- Visualized C++ and Python simulation logic within Unity to perform stability analysis and optimize timestep behaviors for fluid-like motion.

2D-to-3D Heightmap Generator (Image Tool) | *JavaScript, STL Processing*

- Engineered a web-based tool that converts 2D images into 3D-printable STL heightmaps.
- Enabled users to generate textured surfaces for rapid prototyping by processing pixel data into 3D geometric mesh structures.

Type Ia Supernova Photometry Pipeline | *Python, NumPy, Astropy*

- Processed raw FITS images to measure brightness changes in Type Ia supernovae, applying WCS transforms and aperture photometry.
- Built automated pipelines for data calibration, gaining deep intuition for signal processing and astronomical data structures.

SpaceFox Fabrication Platform | *CAD, G-code, Web Technologies*

- Designed a full-stack fabrication pipeline for custom mechanical components, integrating software requests with physical hardware output.
- Engineered functional parts using Onshape CAD and optimized G-code generation for Creality 3D printers.

Custom Operating System Scheduler | *C, Linux*

- Implemented a user-level threading library and scheduler in C, managing context switching and process states.
- Designed memory management logic to handle concurrent tasks, demonstrating low-level understanding of system resources.

Professional Experience

Data Annotation Tech | *AI Trainer* Oct 2023 – Present

- Leverage agentic coding workflows to evaluate and debug AI-generated programs across Python, C++, and Bash.
- Train LLM agents on complex logic and reasoning tasks, identifying recurring memory faults in Linux sandboxed environments.
- Create specialized technical rubrics to standardize model performance on scientific computing tasks.

Level 9 | *Software Engineer Intern* May 2023 – Jun 2023

- Engineered a 3D runner game featuring procedural obstacle generation and autonomous enemy AI in Unity/C#.
- Implemented custom physics-based movement controllers and tuned update loops to optimize performance.

Mayabious Art LLP | *Game Developer* Aug 2021 – Sep 2021

- Developed character interaction logic, weapon controls, and animation graphs in Unity/C#.
- Created and rigged 3D assets in Blender, integrating them into the engine with proper physics interactions.