

# HongFei Huang

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## Skills

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**Language/tool:** C/C++, C#, Unity, Python, OpenGL, JAVA, Verilog, MATLAB, Git

**Technique:** Computer Graphics, Virtual Reality, Linear Algebra, RTOS, Data Structure, Linux

## Projects

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### Real-Time Rigid Body Fracture Simulation (C++ | OpenGL | Computer Graphics)

- Engineered an interactive **OpenGL** fracture simulation program utilizing pre-fractured 3D models. Implemented a Surface Area Heuristic Bounding Volume Hierarchy (**SAH-BVH**) for efficient collision detection involving Ray-AABB and AABB-AABB intersections.
- Computed **collision dynamics** between debris using conservation of momentum and gravity, enhancing the realism of the simulation.

### Ray-Tracing Engine (C++ | Computer Graphics | Ray Tracing)

- Constructed a custom Ray tracing engine from the ground up using C++, enabling rendering of triangular mesh 3D scenes with 3 textures (lambertian, metal, glass).
- Integrated recursive ray tracing algorithms to handle reflections and refractions, enhancing the realism of rendered scenes.

### VR Algebra Viewer (C# | Unity | Virtual Reality)

- Created an app on Meta Quest 3 headset using Unity + C# to project Geometric Algebra (GA) visualization into **Mixed Reality** using Meta's OVR toolkit.
- Crafted responsive 3D scenes in MR, allowing users to grab & drag vectors and observe **real-time** changes in the algebra volume.
- Processed lexing with **Antlr** to parse user inputs, and used **Dictionaries** for variable storage, providing fine-grained control over custom vectors.

## Experiences

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### Huawei – Software Engineer (RTOS | C | Python | CI/CD)

(Sep 2023 - Dec 2023)

- Developed a user-level program to validate kernel-level priority boosting for CI workflows.
- Leveraged Python with NumPy and Matplotlib to analyze OS metrics, improving performance and power efficiency analysis by 60%.

### OpenText – R&D Software Developer (C++ | OScript | Data Profiling)

(Jan 2023 - Apr 2023)

- Revitalized and enhanced source code profiling suites using JMeter and Intel Vtune to identify bottlenecks with call maps, stack, heap.
- Created a TypeScript VS Code extension with Eclipse LSP4J for CI/CD integration, supporting various IDE features (parse trees, auto-completion, and syntax highlighting).

### OpenText – Software Developer (C++ | Linux | Compiler)

(Jan 2022 - Apr 2022)

- Managed the upgrade of all C++ dependency libraries/modules for newly released products on both Windows and Linux (RedHat7) platforms after performing a thorough compatibility check.
- Resolved 75% of compatibility issues, sped up the validation process by 10% against the deadline.

## Education

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### University of Waterloo (4/8 month co-op term)

2024 - 2026

- Candidate for Master of Mathematics, co-op Computer Science student

### University of Waterloo (4 month co-op term)

2019 - 2024

- Candidate for Bachelor of Applied Science, co-op Computer Engineering student