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Open Source Projects

</> Bevy Kajiya
Adds ray-traced rendering to the Bevy Engine — *Project repo*

- Enables any novice game tech hobbyist to experiment with raytracing
- Performs well– 60+ render frames per second, 60+ engine ticks per second
- Written in Rust using Vulkan Graphics API, winapi, and the most-downloaded Rust game engine crate, Bevy
- Manages, stores, and restores the current 3D scene state for the user automatically on application close/open
- User interface abstracts away low-level raytacing pipeline management from the user for ease of use
- Endorsed by 50+ Rust community members (Github stars)

</> NBody-WASM-Sim — Demo
GPU-rendered astrophysics simulation in the web browser — *Project repo*

- Runs a performant, reactive simulation– approximately 3.5x faster than Javascript implementations
- Compiles to Web Assembly (WASM) to provide near-native performance in the browser
- Performs expensive, real-time physics simulation in Rust with linear algebra libraries and WebGPU
- Builds and deploys the demo web server automatically using GitHub CI/CD Actions
- Serves as an open-source template for any developer to create GPU-accelerated, interactive web apps
- Endorsed by 70+ Rust community members (Github stars)

</> Contributions to KubOS — Demo
Simulation support for Rust flight software — *Contribution*

- Enables Rust-based flight software (KubOS) to run on NASA's software-simulated CubeSat hardware
- Contains Rust bindings for NASA CubeSat emulation HALs

Career

Software Engineer I — Feb 2022 – Nov Present
NASA/ToSC, Command & Control — *Kennedy Space Center, FL, USA*

- Software engineering of simulation software for Exploration Ground Systems for Artemis II, Artemis III
- Developed and verified software conforming to NASA Class C Software requirements
- Developed and debugged networked software communicating with PLC runtimes using the Common Industrial Protocol (CIP)
- Reverse-engineered legacy Rockwell PLC functions and designed their re-implementation and integration into a custom PLC emulator
- Created design presentations to coordinate strategy between workgroups to emulate various PLC functionality in emulation

Software Engineer I — Jun 2020 – Feb 2022
AFIT, Center for Space Research & Assurance — *Wright-Patterson AFB, OH, USA*

- Contributed to the first open-source spacecraft flight software framework written in Rust

- Developed CubeSat flight software in C with NASA's cFS framework and also in Rust with KubOS
- Developed CubeSat ground control software which interfaces with databases and TCP/UDP hardware interfaces in Python
- Automated generation of template files ingested by flight software and ground software to accelerate CubeSat mission development

Software Engineering Co-op Jan 2019 – Aug 2019
NASA IV&V *Fairmont, WV, USA*

- Contributed to NASA's open-source flight software simulator (NOS3) with upgraded packages and documentation
- Developed Rust bindings to C++ based hardware abstractions layers for NOS3 simulator
- Modeled CubeSat OEM hardware components into C++ emulators running in NOS3

Competencies

- **Primary Languages:** Rust, C/C++, Python
- **Other Languages:** Java, TypeScript, GraphQ_, IEC 61131–3 Structured Text, Ladder Logic
- **CI/CD:** GitLab CI configurations (YAML)
- **Content Management:** Git, GitHub, GitLab
- **Software:** Docker, Confluence/Jira, VersionOne, Visual Studio, VSCode

Education

Bachelor of Science, Computer Science & Engineering Class of 2021
University of Toledo, ABET Accredited *Toledo, OH, USA*

- Summa Cum Laude
- 3.97 GPA