

CALLUM FORSYTH

Systems Engineer · Game Developer · Rust

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PROFILE

Rust-focused systems and game developer with a BSc (Hons) in Computing Science & Cyber Security. I build fast, explicit, low-level software — game engines and gameplay systems, command-line tooling, and bare-metal embedded firmware. Comfortable across the stack, from ECS architecture and custom pathfinding to WebGPU graphics and USB firmware, with a strong grounding in secure, correct systems.

SKILLS

Primary Language: Rust

Game & Engine Dev: Bevy · ECS architecture · A* / flow-field AI · MCTS · Finite State Machines · Unity (URP)

Graphics: WebGPU · WGSL shaders · custom OBJ loading · Blender

Systems & Embedded: Raspberry Pi Pico · Embassy · USB HID · multithreading / job systems · WebAssembly (WASM)

Tooling & Infra: Cargo · Git · Linux (Fedora) · networking · Firebase / SQL

Also worked with: C# (.NET) · JavaScript / TypeScript

SELECTED PROJECTS

The Last Vestige — Top-Down Colony Builder

Rust · Bevy · ECS

repo: github.com/Ghosthi1/The_Last_Vestige

- Colony builder/defender built in Rust on the Bevy engine, using an ECS architecture split into separate plugins per feature area for clean, scalable systems.
- Implemented A* pathfinding and flow-field AI to drive performant, large-scale unit navigation.

Networked Board Game AI Engine — Dissertation

Rust (WASM) · MCTS

- Built a networked, multiplayer digital adaptation of a physical board game in TypeScript with boardgame.io, handling data-driven state management and complex UI synchronisation.
- Engineered a Monte Carlo Tree Search (MCTS) AI opponent to navigate large game trees and prioritise optimal win-paths.
- Benchmarked two AI backends (Java and Rust); compiled the Rust build to WebAssembly to cut computational overhead and run high-performance, memory-safe logic directly in the client.

USB HID Game Controller — Bare-Metal Firmware

Rust · Embassy · RP Pico

- Designed a custom USB HID gamepad on a Raspberry Pi Pico with firmware written in Rust using the Embassy async framework.
- Exposed physical buttons as standard controller inputs over USB.

Barrel — Destructible Unity Asset Pack (WIP)

C# · Unity URP · Physics

repo: github.com/Ghosthi1/Barrel

- Physics-based destructible barrel and cube props targeting the Unity Asset Store, with explosion/implosion forces and full debris lifecycle management.
- Optimised for performance with a 3-level LOD chain, non-allocating physics APIs, and object pooling; ships with a first-person demo scene.

Sprite Sheet Packer — CLI Tool

Rust · Image Processing

repo: github.com/Ghosthi1/SpriteSheetPacker_CLI

- Rust CLI that packs PNG sprites into a single atlas image plus a JSON metadata file, using shelf bin-packing and auto-calculated atlas width.
- Supports mixed file/directory input and recursive directory traversal.

Haunted Cottage Diorama — Real-Time 3D Graphics

WebGPU · WGSL · Group

repo: github.com/Ghosthi1/Uni_Graphics_Group_18

- Real-time 3D diorama built with WebGPU and WGSL shaders, featuring a custom OBJ loader, per-object transform uniforms, and interactive camera, lighting, and scene controls.

EDUCATION

BSc (Hons) Computing Science & Cyber Security

Sept 2022 – June 2026

Heriot-Watt University, Edinburgh — **Upper Second Class Honours (2:1)**

- **Relevant modules:** Intelligent Robotics (pathfinding & real-time decision-making), Software Engineering (design patterns, agile, defect tracking), Computer Graphics, Network Security & Digital Forensics.

EXPERIENCE

Team Leader (Acting) — Co-op Food

2021 – Present

- Lead and optimise shift workflows and inventory management for a team of 5, ensuring full compliance with closing and security protocols.
- Act as primary point of escalation for customer and till issues, resolving time-sensitive incidents calmly under pressure.