

Hamish McDonald

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TECHNICAL SKILLS

Languages: C++, C, Python, Lua, GLSL

Graphics & Engine Systems: OpenGL, Deferred Rendering, PBR (Cook-Torrance), Shadow Mapping, Skeletal Animation, Custom Engine Architecture

Engines, Frameworks & Middleware: Unreal Engine, Raylib, SDL3, ImGui, Tracy Profiler, Jolt

Tools & Infrastructure: CMake, Git, GitHub Actions (CI/CD), Visual Studio, RenderDoc, Linux, Windows

PROJECTS

TheEngine – Custom C++ Game Engine | Tech Stack: C++, OpenGL, SDL3, Lua, ImGui

- Implemented a deferred PBR rendering pipeline using the Cook-Torrance BRDF (GGX normal distribution, Smith-GGX geometry term, Schlick Fresnel approximation), with skeletal animation and shadow mapping.
- Designed a GUID-based asset registry with custom binary mesh/animation format and BCn compression.
- Helped develop a custom Lua scripting integration from scratch using template metaprogramming for compile-time component bindings, rather than relying on a third-party binding library.
- Built an ImGui editor suite, including real-time scene hierarchy editing, component reflection inspectors, viewport controls, and profiling overlays.
- Profiled the engine with Tracy to identify and resolve rendering and animation performance bottlenecks.
- Integrated Jolt Physics for 3D rigid body dynamics and developed gameplay features using the custom Lua scripting interface.
- Set up cross-platform CI/CD with GitHub Actions, building and testing the engine on both Linux and Windows using Ninja, ccache, and MSVC tooling.

HPack – Skyline Bin-Packing Texture Atlas Library | Tech Stack: C++

- Engineered a skyline bin-packing algorithm with a min-waste heuristic for efficient texture atlas generation.
- Generates a companion INI config file for each atlas, allowing UV coordinates to be queried at runtime without retaining the original source images.

Feather Treasure – 3D Platformer | Tech Stack: Unreal Engine 5, C++, Blueprints

- Architected core game logic, player systems, and state management in C++ as the sole programmer, exposing modular interfaces to Blueprints for rapid gameplay scripting and iteration.
- Engineered a seeded room generation system that dynamically retrieves, evaluates, and stitches together curated puzzle prefabs from a layout pool to build reproducible, procedural level streams.
- Built an extendable Actor Component interaction framework, a customizable data-driven trap system, and responsive platformer movement using UE5's Enhanced Input (featuring coyote time).
- Integrated Animation Blueprints, Timelines, Niagara particle systems, custom Materials, and UMG UI to deliver full visual and gameplay feedback.

PROFESSIONAL EXPERIENCE

Tutor | MathStar Tutoring, Keilor East VIC

01/2025 – Present

- Deliver engaging and structured lessons to primary and secondary students, with a focus on academic enrichment and exam preparation.
- Support individual student progress through personalised feedback and targeted learning strategies, including VCE Mathematics and Physics.

Tutor | Tutero, Remote

01/2024 – 01/2025

- Provided one-on-one online tutoring across a range of subjects to high school students, with a strong focus on building conceptual understanding and study skills.
- Customised lesson plans to suit individual student needs, learning styles, and academic goals.
- Maintained consistent communication with students and parents to monitor growth and provide ongoing support.

EDUCATION, TRAINING AND CERTIFICATIONS

Advanced Diploma of Game Development (Game Programming)

02/2025 – 12/2026 (Expected)

Academy of Interactive Entertainment, Docklands VIC

- Also completed: Diploma of Information Technology and Diploma of Screen and Media (2025)

Bachelor of Science Advanced Research (Hons), Pure Mathematics and Physics

01/2023 – 12/2024

Monash University, Clayton VIC | 2 years completed

- Completed all units required for a Pure Mathematics major
- Dean's List, 2023