Samuel James Baker IV

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EDUCATION

University of Virginia, School of Engineering and Applied Science   **Expected May 2027**
*Bachelor of Science in Computer Science – **Artificial Intelligence Focal Path**, Engineering Business Minor*
Charlottesville, VA
GPA: 3.5/4.0

Rappahannock Community College   **Aug 2019 – May 2023**
Associate Arts and Science, Summa Cum Laude
Warsaw, VA
GPA: 4.0/4.0

TECHNICAL SKILLS

Languages: C++, C, Python, SQL, TypeScript/JavaScript, Java, C#, Rust
ML/AI: PyTorch, TensorFlow, OpenCV, Hugging Face Transformers, time-series forecasting, NLP, feature engineering, model training/evaluation, inference optimization, LLM tooling
Stack: React, Next.js, Tailwind CSS, Node.js, Express, REST APIs, MongoDB
Systems/Graphics: OpenGL 4.6, GPU compute, Vulkan 1.3, DirectX 11, SDL3, ImGui, Assimp, stb, GLAD, Linux, Git

PROJECT

Entity Component System Game Engine • Charlottesville, VA   **Jun 2025 – Present**

- Built a C++20 ECS game engine (SDL3 + OpenGL) with an ImGui editor, asset pipeline, and profiling/diagnostics (CPU scopes + GPU timers).
- Implemented an experimental real-time GPU path tracer using OpenGL compute (progressive accumulation, tonemapping/debug views, optional A-Trous denoising), running **1–8 spp/frame at ~200–40 FPS** on a 4070 Laptop-class GPU.
- Performance engineering: redesigned component storage (hash maps -> dense arrays) cutting **100k** entity add/remove **99.8 ms -> 11.8 ms** and system update **39.8 ms -> 6.93 ms**; measured **100M** GetComponent lookups at **2.78 s (~27.8 ns/access)** and interactive multi-million polygon scenes.

Homelab + Local LLM Tooling • Charlottesville, VA   **Jun 2025**

- Repurposed a home server (Ryzen 7 3600X, GTX 1660S, 32GB RAM, 1TB SSD, 2TB HDD) to host gaming servers and run local LLM workflows (Hugging Face, Ollama).
- Built a custom UI for continual tokenization and model interaction to support local fine-tuning and iterative testing.

Eggs by the Dozen • University of Virginia   **Apr 2024**

- Designed an offline mobile CV concept for McMaster slide egg counting (**eggs/gram = count × 50**), targeting **< $16/test** on **iPhone 6** with no microscope requirement.
- Conducted stakeholder discovery; quantified current costs/time (**up to $64/animal/year**, **up to 2-week turnaround**, **~2 hours driving**) and set robustness requirements (egg vs bubble differentiation).

Agentic AI RPG Arbiter • Charlottesville, VA   **Aug 2025**

- Built a chat-driven dungeon arbiter that maps player dialogue to state flags and event triggers for branching encounters and immersion.
- Implemented lightweight dialogue/state persistence to support "beefed-up" text-adventure interactions inside an RPG loop.

Mycorrhizal Fungi Inoculation in Glycine max • Chesapeake Bay Governor's School Symposium   **Feb 2023**

- Ran controlled inoculation study on soybeans (**n=60**, **6 groups**, **2 trials**) under **70% / 100% / 130%** water-holding capacity over **7–8 weeks**.
- Found significant differences in **shoot dry mass ($p=0.007$–0.023)** and **chlorophyll ($p=0.014$–0.032)**; presented at Chesapeake Bay Governor's School symposium (VCU).