Samuel James Baker IV

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EDUCATION

University of Virginia, School of Engineering and Applied Science   **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, Java, JavaScript/TypeScript, C#, Rust
ML/Tooling: PyTorch, TensorFlow, OpenCV, Hugging Face, Ollama
Web/Backend: Node.js, Express, MongoDB
Systems/Graphics: OpenGL 3.3/4.3, Vulkan 1.3, DX 11, SDL3, Linux, Git

PROJECTS

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

- Built a C++ ECS engine (SDL3, OpenGL, ImGui), growing from a triangle demo into an editor-style UI, scene renderer, asset pipeline, and diagnostics suite. Currently undergoing refactor to increase accessibility through the support of additional graphics libraries (Vulkan 1.3, Direct X 11/12)
- Optimized ECS storage from hash maps to dense arrays: **Add/Remove** (100k entities) **99.8→11.8 ms (8.6x)** / **66.4→10.1 ms (6.6x)**; system update **39.8→6.93 ms/frame (5.7x)**.
- Benchmarked hot paths: **100M** sequential GetComponent lookups in **2.78 s** (**27.8 ns/access**, **4.2x** faster); renders multi-million-polygon scenes at interactive frame rates.

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).