Mason Bane

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Summary: Computer Science student (Computer Engineering) targeting embedded firmware and hardware/software integration roles. Proficient in microcontroller programming, low-level C/C++ and ARM Assembly, and circuit design. Strong mathematical/analytical skills with research experience.

Education

Tarleton State University Stephenville, TX
Bachelor of Science in Computer Science, Concentration in Computer Engineering *Aug. 2022 – May 2026 (Expected)*
Minor in Mathematics
GPA: 3.94/4.00 (Institutional) — Cumulative: 3.75/4.00

Hill College Hillsboro, TX
Associate of Arts in Liberal Arts *Aug. 2019 – Sept. 2023*

Experience

Undergraduate Research Assistant - Lead Programmer May 2024 – Present
Tarleton State University *Stephenville, TX*

- Developed and optimized of various N-Body simulations utilizing C/C++, enhancing computational efficiency and accuracy through advanced algorithms and parallel processing with CUDA.
- Collaborated with interdisciplinary teams to create digital twins to model complex problems using OpenGL and Blender, translating scientific concepts into interactive simulations and improving data interpretation.
- Conducted rigorous testing and debugging of simulation software, ensuring robust performance and reliability while documenting processes to facilitate knowledge transfer and future research initiatives.

Undergraduate Technology Specialist - HPC Lab Manager Aug. 2024 – Present
Tarleton State University *Stephenville, TX*

- Managed and maintained 15 Linux devices in a high-performance computer lab dedicated to research initiatives
- Performed system updates, hardware maintenance, and technical support, resolving issues promptly to minimize downtime and maintain optimal performance.
- Maintained a clean and organized lab environment, promoting a collaborative workspace that fosters innovation and productivity.

Projects

N-body Digital Twin of the Left Atrium | *NIH Grant #1R15HL179671-01* | *C, CUDA* Aug. 2024 – Present

- Engineered a parallel N-body model of the left atrium using CUDA, with a 20,000+ node mesh to simulate atrial arrhythmias in near real-time.
- Developed an intuitive C++/ImGui interface to control simulation parameters and visualize outputs, bridging the gap between complex computational models and end-user (research/clinical) requirements.
- Presented findings at academic conferences, demonstrating the tool's potential to improve clinical decision-making and transform training for medical professionals.

Analog Pink Noise Generator Circuit | *LTSpice, Python, MATLAB, Breadboarding* Aug. 2025 – Dec. 2025

- Designed and prototyped a BJT-based pink noise generator with active filter stage using LTSpice for simulation and breadboarding for physical implementation.
- Developed Python scripts to quantitatively compare simulation results with an ideal pink noise spectrum, guiding component selection and filter tuning for improved accuracy.
- Built a physical demonstration circuit with audio output, successfully verifying simulation models against real-world performance.
- Collaborated in a two-person team to present comprehensive design methodology, results, and data-driven decision process to peers and professors.

Technical Skills

Programming Languages: C, C++, Python, ARM Assembly (Cortex-M, x86), Java, Bash
Microcontroller Platforms: STM32, TIVA-C Series (TM4C), Arduino, Raspberry Pi
Systems & Development: Git/GitHub, Linux, CMake, Visual Studio, VS Code, GDB
Simulation & Design Tools: LTSpice, MATLAB, Blender
Parallel Programming & Graphics: CUDA, OpenGL, ImGui