

Mason Bane

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Summary: Computer Science/Engineering student proficient across firmware (STM32, ARM Assembly, C/C++), hardware (circuit design, prototyping), and software (CUDA, OpenGL) domains. Combines embedded systems experience with high-performance computing research and complete system development skills. Strong analytical background with proven hardware/software integration capabilities.

EDUCATION

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

Hill College <i>Associate of Arts in Liberal Arts</i>	Hillsboro, TX Aug. 2019 – Sept. 2023
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EXPERIENCE

Undergraduate Research Assistant - Lead Programmer <i>Tarleton State University</i>	May 2024 – Present Stephenville, TX
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- Developed and optimized 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 <i>Tarleton State University</i>	Aug. 2024 – Present Stephenville, TX
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- 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 <i>NIH Grant #1R15HL179671-01</i> C, CUDA	Aug. 2024 – Present
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- 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.

Secure IoT Sensor Node with Hardware TrustZone C, STM32CubeIDE/HAL, I2C/SPI	Dec. 2025 – Present
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- Implementing a secure data pipeline on an STM32H5 MCU, utilizing Arm TrustZone and the Secure Manager to create a hardware-rooted chain of trust for environmental sensor data.
- Developing drivers and application logic to interface with a Bosch BME280 temperature, humidity, and pressure sensor via I2C communication protocol.
- Structuring firmware to cryptographically sign sensor readings within the secure processing environment for tamper-evident logging.
- Utilizing STM32CubeIDE and the HAL for peripheral configuration and hardware security module (HSM) management as a foundation for secure telemetry systems.

TECHNICAL SKILLS

Microcontroller Platforms: STM32 (H5/Cortex-M33), TIVA-C (TM4C), Arduino, Raspberry Pi, ARM Cortex-M

Firmware & Languages: C, C++, ARM Assembly, Python, Java, Bash, TML/CSS/JavaScript, I²C, SPI, UART

Hardware Tools: STM32CubeIDE, LTSpice, PCB Prototyping, Oscilloscope, Multimeter, GDB

Development & Systems: Git, Linux, CMake/Make, Visual Studio, VS Code, RTOS Concepts

Research & Simulation: MATLAB, CUDA, OpenGL, Blender, ImGui