

## PROFESSIONAL SUMMARY

Apple Genius with 12 years' experience triaging hardware and software across Apple's entire product and service ecosystem, mentoring teammates and providing internal systems feedback.

Holds certificates in Computer Science and Embedded C for ARM and is most enthralled by the boundary between hardware and software: writing drivers and debugging at the register level.

A highly motivated learner combining first-hand user insight into how technology is experienced with the engineering skills to understand how device behaviour shapes the customer experience.

## EDUCATION

**Embedded C for ARM**      **Certificate 90%**      **Coursera 2025**      [View Certificate](#)

Designing and implementing efficient embedded C code targeting ARMv7E, using professional-grade tools and debugging techniques within the STMicroelectronics ecosystem.

**Computer Science**      **Certificate 93%**      **Codecademy 2025**      [View Certificate](#)

Modules: Programming in Python, Data Structures, Algorithms, Dynamic Programming, Trees & Graphs, Databases, Computer Architecture and Discrete Math.

**Commercial Music**      **BA (Hons) 2:2**      **Bath Spa University 2012**

Modules: Songwriting, Music Composition / Arrangement, Studio Production, Branding, Music Business and organising our own 18-date UK tour during the summer of 2011.

**Mathematics**      **A Level**      **B**      **Bishop Vesey's Grammar School 2009**

Algebra, Functions, Sequences, Trigonometry, Calculus, Vectors, Proofs, Statistics and Mechanics.

## EMPLOYMENT HISTORY

|                       |                               |                              |
|-----------------------|-------------------------------|------------------------------|
| <b>2016 - Present</b> | <b>Genius</b>                 | <b>Apple Store Touchwood</b> |
| <b>2014 - 2016</b>    | <b>Family Room Specialist</b> | <b>Apple Store Touchwood</b> |
| <b>2009 - 2014</b>    | <b>Self-Employed Musician</b> | <b>Bath &amp; Bristol</b>    |
| <b>2010 - 2011</b>    | <b>Events Photographer</b>    | <b>Bath</b>                  |

## PROGRAMMING SKILLSET

|                  |                                                                                                                                                                                                                                                                                                                                                                         |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>C / C++</b>   | <ul style="list-style-type: none"><li>- Bare-metal embedded firmware favouring direct register addressing over HAL.</li><li>- Initialising and wiring GPIO, I<sup>2</sup>C, ADC and 1-Wire device protocols.</li><li>- IOKit kernel-space kexts with a companion IOUserClient CLI tool.</li></ul>                                                                       |
| <b>Rust</b>      | <ul style="list-style-type: none"><li>- Custom graphics engine and execution model using Rust's strict ownership model.</li><li>- Targeting code to WebAssembly using WebGPU and wasm-pack.</li><li>- Defining GPU resources, compute buffers, render pipelines and WGSL.</li><li>- cfg(test) Cargo testing to prevent self-referential or biased validation.</li></ul> |
| <b>Python</b>    | <ul style="list-style-type: none"><li>- Experience with data science libraries such as NumPy and SciPy</li><li>- Flask backend development deployed through Unicorn/Nginx.</li><li>- HTTP APIs, requests, JSON and server-side application logic.</li><li>- CPython extension development for native high-performance C execution.</li></ul>                            |
| <b>Read-only</b> | JavaScript, ACPI, HTML & CSS, Bash                                                                                                                                                                                                                                                                                                                                      |
| <b>Dev Tools</b> | STM32CubeIDE, Xcode, VS Code, SSH, Git, Clang/GCC, Cargo, CMake                                                                                                                                                                                                                                                                                                         |
| <b>Platforms</b> | macOS, Linux/Ubuntu Server, ARM Cortex-M, STM32                                                                                                                                                                                                                                                                                                                         |
| <b>Libraries</b> | NumPy, SciPy, CPython, ARM NEON SIMD, IOKit, WebGPU/WGPU, Nginx                                                                                                                                                                                                                                                                                                         |
| <b>Protocols</b> | I <sup>2</sup> C, 1-Wire, GPIO, ADC, PWM/Timers, HTTP, JSON, REST APIs                                                                                                                                                                                                                                                                                                  |

## PROJECT TECHNICAL HIGHLIGHTS

### Arm Cortex-M4 Greenhouse Controller

**STM32WB55 | Bare-Metal C | GPIO | ADC | I<sup>2</sup>C | 1-Wire | Low-Power Systems**

Bare-metal C environmental management and power monitoring system on an ARM Cortex-M4 microcontroller, optimising for ultra-low power consumption and real-time sensor processing.

- Custom peripheral clock tree in bare-metal C to minimise active-mode current draw.
- ADC photoresistor with a 22 kΩ resistor to tune the dynamic range of ambient-light readings.
- PWM signals for dynamic brightness control with gamma curve correction.
- I<sup>2</sup>C interface to poll power/current shunt monitors.
- Multi-drop 1-Wire network with ROM command addressing to sample 9 DS18B20 digital thermometers simultaneously.
- Developed the physical system architecture by hand-soldering control electronics, integrating a fused power distribution layer for overcurrent protection.
- Executed firmware validation using SWD/JTAG debugging, analysing register states, live expressions, and memory maps to resolve timing conflicts.

### macOS I/O Kit Nuvoton NCT6796D Embedded Controller Driver

**IOKit | Kernel Extension | IOUserClient | C++ | Xcode | Hardware I/O**

Low-level I/O Kit kernel extension and companion user-space utility to enable advanced thermal matrices and fan speed regulation on an x86\_64 hardware validation platform.

- Translated datasheets into precise register maps, bank-selection logic, and direct I/O routines.
- Built a user-kernel communication layer using IOUserClient and external method dispatch.
- Implemented real-time temperature monitoring and fan RPM polling through direct hardware I/O.
- Designed a CLI diagnostic tool utilising hardware register snapshots to validate register state.
- Implemented thread serialisation and atomic state management to prevent race conditions.

### Rust WebAssembly / WebGPU Rendering Engine

**Rust | WebAssembly | WebGPU/WGPU | WGSL | GPU Rendering | Systems Architecture**

High-performance rendering engine compiled to WebAssembly, leveraging parallel GPU execution to offload heavy computational workloads from the browser's main CPU thread. Hosted at [syeadon.info](https://syeadon.info)

- High-efficiency data serialisation between JavaScript and WebAssembly using compact opcode arrays to minimise input-event serialisation overhead.
- Simulation of up to 1 million smoke particles composed into a continuous density field.
- Font glyph atlas rendered using instanced quad geometry and custom-typed GPU buffers.
- Unified viewport scaling matrix bound via uniform buffers for consistent multi-DPI layouts.
- Sprite animation pipelines and screen-space post-processing cascades.

### ARM NEON Accelerated Document Processor

**Python | CPython C API | ARM NEON SIMD | Vector Intrinsics | Data Analysis**

Developed a high-throughput document structure analysis tool using statistical clustering, accelerated via a custom low-level C extension to exploit hardware-level parallelism.

- Developed a CPython C extension using 128-bit ARM NEON intrinsics to accelerate categorical distance calculations in a K-Prototypes clustering pipeline.
- Grouped heterogeneous structures and mapped scattered raw coordinates into logical text.
- Engineered a feature-extraction pipeline combining typography, text characteristics, bounding-box geometry, and layout statistics to identify recurring document structures.