

# Sean Cunningham Farrelly

Emperor Engineering Limited - Embedded Software Engineer

[sfarrelly.com](http://sfarrelly.com) | [sean.farrelly@outlook.com](mailto:sean.farrelly@outlook.com) | +447504977384 | [LinkedIn](#) | [GitHub](#)

I am an enthusiastic embedded software engineer with proven experience in the automotive and IoT industry. I like to make prototypes and ship products. I am currently a consultant, helping small to medium-sized companies bring their product ideas to fruition.

<i>Key Skills</i>	<i>Description</i>
<i>Languages</i>	C, C++, Python, Java, JavaScript, Assembly, CSS, HTML, and SQL.
<i>Devices</i>	STM32, nRF52, ATtiny, ESP32, ESP8266, EFR32, Apollo 3 Blue, MSP430, Pycom, Beaglebone, RPi, S32K, MPC574xx, ARM Cortex-M Series.
<i>Wired protocols</i>	UART, SPI, I <sup>2</sup> C, I <sup>2</sup> S, 1-Wire, CAN, Ethernet, Modbus, RS232, RS485, and SDHC.
<i>Wireless protocols</i>	Wi-Fi, BLE, GSM/GPRS, LoRaWAN, NB-IoT/LTE CAT-M1, NFC, Bluetooth, and Zig-Bee.
<i>Environments</i>	Bare-metal, RTOS (FreeRTOS), and OS (Embedded Linux).
<i>Embedded Linux</i>	Buildroot, U-boot, kernel modules, device drivers, Input & IIO subsystems, device tree, Busybox.
<i>Build Systems</i>	Make, CMake
<i>Software Testing</i>	Unity, CMock, Google Test, Cpputest
<i>Software Integration</i>	Jira, CircleCI
<i>Source control</i>	Git, GitHub, GitLab, and SVN.
<i>Documentation</i>	Doxygen, Sphinx, Breathe, ReadTheDocs
<i>GUI</i>	Windows & Android applications using frameworks Swing (Java) and Qt (C++).
<i>Lab instruments</i>	Oscilloscope, logic analyzer, current profiler, and signal generator.
<i>Hardware skills</i>	Prototyping, board bring-up, soldering, schematic and PCB design.
<i>Working Constraints</i>	Memory, power, and performance.
<i>Software Design</i>	OOP, SOLID, and TDD principles.
<i>Cloud</i>	Microsoft Azure, storage tables, REST API
<i>Cryptography</i>	Symmetric & asymmetric encryption, authentication, and secure boot.
<i>Communication</i>	Presenting, teaching, and writing.
<i>Personal Qualities</i>	Down-to-earth and approachable personality, always enjoy helping others.
<i>Remote Working</i>	Owner of electronics lab: Oscilloscope, logic analyzer, signal generator, current profiler, power supply, solder station, debuggers, array of development boards and components.

## Employment Experience

**Contract Embedded Software Engineer**, urbanminded, Glasgow

Jan 2020 - present

- Building BLE, Wi-Fi, and NB-IoT based IoT devices.
- Building automated testing infrastructure and integrating it with a continuous development/integration server.

- Freelance Embedded Software Engineer**, Curious Chip Ltd, Glasgow Nov 2019 - present
- Implementing a serial bootloader for Atmel MCU, allowing firmware to be erased, flashed, and verified by another onboard device. Provide a mechanism for delivering firmware updates from onboard Linux-based device.
  - Developing robust and reliable firmware for ATtiny which is responsible for controlling board power domains.
- Contract Embedded Software Engineer**, CENSIS, Glasgow Jan 2019 - Jan 2020
- Developing embedded software in C/C++/Python/Java to realise multiple innovative IoT-related products (bare-metal & OS). General use-cases: data gathering, noise monitoring, people monitoring, water quality, smart infrastructure, smart agriculture, predictive maintenance.
  - Leveraging a variety of wireless IoT protocols (LoRaWAN, NB-IoT, 3G/4G, NFC, Bluetooth).
  - Interfacing with a variety of sensors over common wired protocols.
  - Providing a command-line tool which allows engineers of any discipline to interact with all facets of company projects: firmware, devices, provisioning, debugger, database, gateways.
  - Using appropriate optimisation techniques to meet strict low-power requirements.
  - Providing cost and time estimations for software development tasks.
  - Identifying ideal hardware components from customer requirements.
- Lead Applications Engineer**, NXP Semiconductors, Glasgow 2016 - 2019 (2 yr 7 mos)
- Providing top-tier customer support for the 32-bit MPC574xB/C/G automotive gateway MCU family, requiring in-depth knowledge of all aspects of all devices.
  - Driving customer enablement by developing example projects, demos, reference designs, development boards, and documentation.
  - Delivering customer training workshops on a range of technical topics in the USA, Germany, India, China, and Korea (MCU hardware and software architecture, development environments, dedicated communication engines, hardware security modules, and FreeRTOS).
  - Developing fully interactive demos & reference designs to showcase the key features of a device, including: CAN Gateway framework, Secure communication over CAN, Firmware-over-the-air, Cryptographic principles.
  - Mentoring less experienced engineers.
- Test Engineer**, Freescale Semiconductors, Glasgow 2015 - 2016 (1 yr 2 mos)
- Developing test programs for the S32K automotive MCU family to utilise PSt (Process Optimisation Structures) included on the silicon wafer, to determine the electrical characteristics of the devices includes.
  - Developing test programs consisting of C and VHDL to run on Linux simulation environments.
  - Developing design patterns for running on Ultraflex testing hardware.
- Summer Intern**, Freescale Semiconductors, Glasgow 2014 - 2015 (4 mos)
- Developed a full front-end web demo showcasing 'engine knock' detection using Freescale MCU. This project involved animation, user interaction, and back-end communication with MCU. Implemented in JavaScript, CSS, and HTML on PC side, and C on MCU side.

## Education and Training

First-class MEng Computer and Electronic Systems (CES), University of Strathclyde

2010 - 2015 (5yrs)

- **Computer Science Dept:** Building software systems, software architecture & design, embedded systems, computer graphics, computer security
- **Electronic & Electrical Dept:** Electronic & electrical foundations, digital electronic systems, engineering mathematics, communication networks, information transmission and security.

## Interests

**Professionally**, as someone who enjoys continually learning new skills, I am enjoying the depth and breadth to embedded as it offers constant opportunities to further my knowledge. I often enjoy reading electronic/SW literature. I also enjoy teaching others, being an active member of the STEM team during my previous roles.

**Outside of the workplace** I am enjoying the fruits of Glasgow, with the large number of bars and venues hard to beat given my passion for music. I play a variety of instruments including guitar, drums, and singing. I enjoy keeping fit by frequently attending the gym and playing 5-a-side football. I also enjoy commuting on my motorcycle most days.