

Gregory Brooks

Consultant (Embedded Systems) at TTP plc

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Skills/Technologies

- Bare-metal C
- C++11
- ChibiOS
- mBed RTOS
- IAR
- STM32Cube
- STM32
- Rust
- Jira
- Git
- GitHub
- Subversion
- Altium
- KiCad
- Python
- Raspberry Pi
- Linux (Debian-based)
- Kivy
- PyQt

Relevant Experience

- 2019 to Present **Consultant (Embedded Systems), TTP plc, Melbourn.**
Worked on a range of multidisciplinary projects within the Life Science/Biopharma team, such as:
- Puckdx sample-to-answer human IVD platform (for DiaSorin).
 - CoVent ventilator, a collaboration with Dyson in response to the 2020 'Ventilator Challenge' during the COVID-19 pandemic.
- Responsibilities include:
- Hardware (schematic and PCB) design, assembly of prototypes.
 - Firmware development for STM32 family, from bare-metal C to multithreaded C++ with mBed RTOS.
 - Software/GUI development in Python (Kivy touchscreen interface for an embedded SBC).
 - Testing and debugging of hardware, firmware and software (oscilloscopes, logic analysers, SWD debuggers).
 - Communication and collaboration with other team members, especially those without an electronics/software background (e.g. scientists, project managers).
 - Project timeline estimation, prioritisation of tasks to meet aggressive deadlines.
- 2018 **Summer Intern, Samsung Cambridge Solution Centre, Cambridge.**
3 month internship, developing WiFi chip firmware (in C) within a team of ~10. Introduction to unit tests (Unity) and continuous integration (Gerrit and Jenkins).
- 2017 **Summer Intern, TT Electronics, Cambridge.**
10 week internship, modelling high frequency behaviour of PCBs to troubleshoot and suggest techniques for minimising unwanted parasitic effects.
- 2016 **Technical Delivery Graduate, BAE Systems Applied Intelligence, Guildford.**
12 week internship, configuring Linux (CentOS) systems using Puppet scripts in addition to general development in C++.
- 2014 **Work Experience Student, Surrey Satellite Technology Ltd., Guildford.**
Two week work placement, providing an introduction to satellite design, production and testing.
- 2012 **Work Experience Student, Sperry Marine (Northrop Grumman), New Malden.**
Two week work experience placement - repaired and tested computers returned from the field, wrote reports on tested units.

Education

- 2015–2019 **MEng & BA Electrical and Information Sciences (Electronic Engineering), Christ's College, University of Cambridge, 2.1.**
- 2008–2015 **A-level Mathematics, Further Mathematics, Physics & Chemistry, Sutton Grammar School, Sutton, 4 A* grades.**

Relevant Skills & Activities

- Experienced with time and resource management when working on constrained projects (this is especially important when working at a consultancy with a fees-for-time business model). Familiar with techniques such as:
 - Prioritisation of tasks & project features.
 - Agile development techniques where appropriate, focusing on minimum viable product whilst allowing for future expansion.
 - Minimising accrual of technical debt during the early stages of a project.
 - Selection of development tools based on project requirements (e.g. a need for automated build and test).
- Have used a variety of toolchains and technologies, from self-contained Windows development environments (IAR EW) to open source tools (make and gcc in a Linux environment) and continuous integration & test (Jenkins, Docker).
- Some experience working towards IEC 62304.
- Co-authored and presented a poster at the EuroSys 2019 conference in Dresden (*Gregory Brooks, Youchao Wang and Phillip Stanley-Marbell. Safeguarding Sensor Device Drivers Using Physical Constraints. Poster presented at EuroSys 2019, Dresden, Germany.*).
- Hobby projects can be found on GitHub (github.com/Gregox273), examples include:
 - Ardupilot based UAV project to capture near-infrared imagery of vegetation so that NDVI analysis could be performed to analyse crop health.
 - Apollo 11 guidance computer emulator (with 'DSKY' user interface) using an ARM Cortex-M0 based microcontroller and custom PCB.
- Won Google Creative Technology Prize at the national Big Bang Science Fair 2015.
- Received an Arkwright Engineering Scholarship, sponsored by the ERA foundation.
- At university, I was a core member of Cambridge University Spaceflight society where I have worked on the design, construction, programming and testing/flight of projects such as an inertial measurement unit, GPS/telemetry boards for rockets, lightweight balloon payloads and a time-of-flight trilateration system for tracking a rocket's position during flight.
 - Developed Python backends and GUIs using PyQt for various society projects e.g. the trilateration project mentioned above.
 - Part of the team that launched the society's Martlet 3 rocket at Black Rock desert, Nevada, in 2017.

Master's Degree Project

Title	<i>Compiling Physical Invariant Descriptions to Hardware Descriptions for a Sensor Interface for Security and Privacy in IoT Applications</i>
Supervisor	Dr Phillip Stanley-Marbell
Description	This project involves writing a compiler, in C, that takes a description of physical laws/constraints relating electronic sensor data (e.g. pressure \times volume \propto temperature) and outputs Verilog RTL for use with a low power iCE40 FPGA. This FPGA sits between the sensors and external circuitry, such as a microprocessor, implementing a local differential privacy system which accounts for the physical relationships and hence mutual information between related measurements.

Relevant Degree Modules (Condensed Summary)

- Mathematics
- Signal Processing
- Information Theory
- Embedded Systems
- Analogue and Digital Electronics
- Software Engineering