

# Career Portfolio

Tim Guite



# Full Stack Engineer

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I have a broad range of technical experience, covering almost every layer of complex systems.

My passion is embedded software - I love the feedback from lights, motors and heaters. This requires working with experts in other disciplines to find solutions. Being able to “speak their language” has often opened up new ideas.

This portfolio highlights projects I have worked on throughout my career.

**Web Apps and Data Analysis**

**Control System Software**

**Firmware**

**Electronics**

**Mechanical**

# Education

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BEng Mechanical Engineering - Southampton University

- Excellent foundation for understanding the whole system

**Electronics**

**Mechanical**

Semester Abroad - Purdue University

- Taste of life in America!

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**Control System Software**

**Firmware**

**Electronics**

MSc Embedded Systems

- Theoretical underpinnings of my day to day work
- Dissertation on condition monitoring embedded system

# Rapid Diagnostic Instrument

Firmware

Electronics

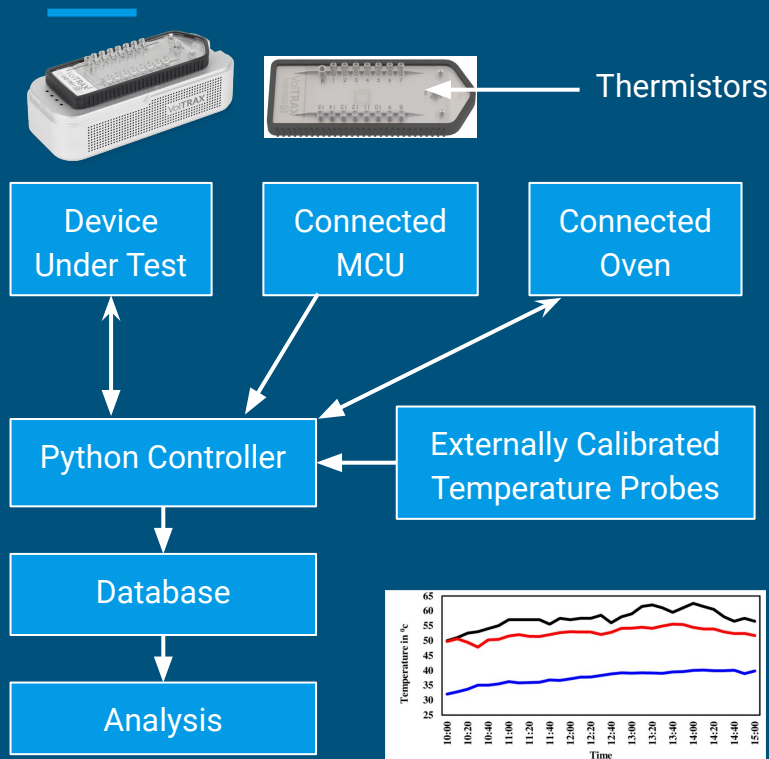
Developed under medical devices regulations ISO62304.

Embedded C++ firmware using ThreadX RTOS and middleware on an NXP MCU with bare metal drivers for I2C and SPI peripherals integrated into custom HAL.

The main algorithm which detects whether samples have a virus in them or not had been developed as a C# application. I ported it and refactored it to be modular and easily testable. Then, I wrote a Python script to convert experimental data into test cases. This was useful at a late stage of the project to resolve differences between running tests offline and using the firmware.



# Thermal Calibration



Firmware

Data Analysis

Electronics

Control Software

Designed and built system for calibrating heating element of VolTRAX device. Thermistor circuit optimised for targeted temperature range.

Firmware written to send data over network. Python controller ran thermistor calibration against externally calibrated probes, then on the device.

Database was used in collaboration with engineering team to define manufacturing limits.

Outcome was < 1degC variation across devices during key heating steps, providing a stable platform to develop sample preparation protocols.

# Online Condition Monitoring of Pumps

Firmware

Electronics

Mechanical

Developed firmware, electronics design and mechanical fixing

Comparison of sensors and methods

Measurements at 8 kHz on ADC

Collected data for offline analysis then moved into firmware

FFT and key statistics identified faults

[PDF Available Here](#)

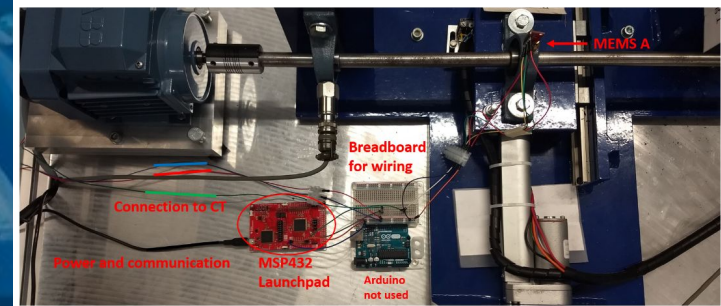
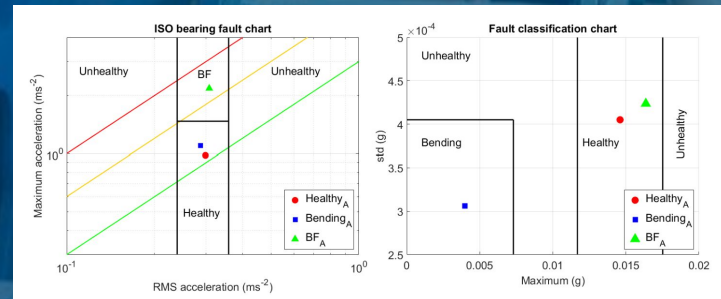


Figure 6.2: Photo of test setup on the CML at nCATS



# Simple Embedded System

Open source project to build a simple system with a wide variety of MCUs, languages, HALs, RTOSs

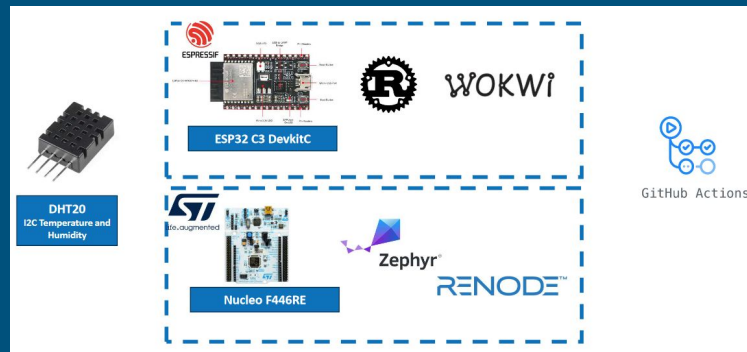
Each implementation has CI build and test pipeline

Complex enough to consider factors for real projects such as drivers, abstractions, simulation

Presented at Embedded Online Conference 2024

Built on previous year's talk on state of embedded systems technologies and companies

Firmware



Session Title	Views	Watch Time	Rating
<a href="#">A Simple Embedded System in X Flavours</a>	170	84%	4.44 (52)
<a href="#">Tour of Embedded Systems: What in the World is Going On?</a>	144	92%	4.63 (35)