

# Tom Milner

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## PERSONAL PROFILE

I am experienced in various programming languages, CAD, 3DP prototyping, and electronics, and graduated amongst the top of the cohort at both master and undergraduate level engineering. I have experience in team-based technical roles, and I am friendly, hard-working, and punctual. I have won scholarships and awards for both academic and business achievements, and I pride myself on my communication, willingness to learn new skills, and self-motivation.

## RELEVANT WORK EXPERIENCE

### **SOFTWARE ENGINEER, OC ROBOTICS (GE AEROSPACE), July 2022 – July 2023**

- Contributed embedded **C**, **C++**, **Python**, and **JavaScript** to the core codebases of “snake arm” robots.
- Wrote deployment and tooling for Linux (**bash**) and Windows (**PowerShell**) systems.
- Optimised a camera calibration algorithm to run 12x faster.
- Diagnosed and debugged complex multithreaded bugs in the robot’s core OS.
- Earned 5 awards over the year for various software contributions to the company.
- Designed, and developed python-based software that became a core technology in the company.
- Learnt **Agile** project management techniques in the form of sprints, stand-ups, and Kanban boards (Jira).

### **SOFTWARE SUPPORT ANALYST, CRISP THINKING, June 2021 – April 2022**

- Contributed to the **.NET C#**-based internal tooling.
- Wrote **Xpath**-based web scraping tools.
- Improved developer workflow by devising a **Git** strategy to organise individuals’ contributions.
- Modularised and refactored codebase following clean code principles (SOLID).

### **SOFTWARE DEVELOPER, APOLLO SOFTWARE, March 2019 - September 2020**

- Communicated with clients to determine project scope and budget.
- Built a web-based registration portal for sixth form students to sign in and out of the premises.
- Built a web-based appointment management system for a local counselling firm.
- Utilised **Vue.js** for the front end, using **SCSS**, **HTML5**, and **Vuex** for state management.
- Utilised **Node.js** for the backend, using **Express** and **MongoDB**, hosted on VPS services, monitored with **DataDog**, CI/CD using **Github Webhooks** and **PM2**.
- Implemented **OAuth authorization** flows.

## FEATURED CAD PROJECTS

### **IN-PIPE INSPECTION ROBOT, FUSION 360, PYTHON**

Designed and prototyped an in-pipe inspection robot designed to traverse underground pipes of 50mm diameter capable of a max speed of 234 mm/s, making it the fastest of its class in the literature. The robot is propelled using a cylindrical cam, developed using a python script to generate the optimal cam path. The robot was designed with Fusion 360 and prototyped using 3D printing. The project taught me parametric design in CAD, as well as Design for Manufacturing and Assembly.

### **“VINYL”, AN AUDIO STREAMING DEVICE, FUSION 360, ESP32, C++**

Designed and built an electronic audio streaming product that blends the tactile experience of a vinyl turntable with digital streaming features like collaborative playlists and podcasts. The product was designed in Fusion360, 3D printed, and houses an ESP32 and RFID reader, which is programmed in C. Presented the product to investors and was rewarded with a SPARK Enterprise Scholarship, worth £3000.

### **“KLIP”, A HOUSEPLANT WALL HANGER, FUSION 360**

Designed and built a homeware product that allows a user to invisibly hang a plant pot on the wall with temporary fasteners. Designed in Fusion360 and prototyped using 3D printing. Performed extensive failure mode analysis and load testing on the product, before pitching it to investors, where I was awarded First Place in the SPARK Business Plan Competition and awarded £2500.

## **FEATURED SOFTWARE PROJECTS**

### **SPOTIFY-SYNCHRONISED LED STRIPS, GO, C++, ESP32**

Built a system to synchronise the intensity and colour of multiple LED strips to a user's currently playing Spotify content. A single Go "Gateway" server runs on a PC. It connects to the Spotify Web API, authenticates using OAuth2, and downloads the album cover art and timestamped "beats" and "bars" of the currently playing track. The Go server computes the dominant colour of the album art, before broadcasting it (and the beat information) via MQTT to C++ "Edge" applications running on ESP32s. Each ESP32 uses the beat and colour information to pulse an LED strip in time with the music, setting the lights to the same colour as the album art.

### **AI-BASED ACTIVITY DETECTION, MATLAB**

Used an IMU sensor belt to record the movement of a patient performing various activities (walking, sitting, standing, jumping etc). Trained ANN, SVM, and CNN models on the data to determine a patient's current activity status using the sensor belt. Data analysis was performed to identify the most significant sensor position on the belt for classifying movement activities, as well as the most useful data points, resulting in a classification accuracy of 95%. The project was awarded a mark of 80%.

### **MONOPHONIC SYNTHESIZER, C, MICROCONTROLLER: DE1-SOC**

Implemented a monophonic audio synthesiser and sequencer on a DE1-SoC development board in C. The synth featured a UI engine to handle user interaction through buttons and an LCD screen, note programming through a sequencer interface, waveform selection, and audio output drivers to a line out. I built a modular component-based user interface library to render buttons, labels, pages, page navigation controls, and sequencer controls, and modified the vendor display driver to improve display rendering times by 17%. I also utilised an oscilloscope logic analyser to debug various audio related bugs. The project was awarded 86%.

## **OTHER TECHNICAL SKILLS**

**SOFTWARE:** Fullstack Web Development (Node.js, Vue.js), Python, C, C++, Java, C#, Go.s

**ELECTRONICS:** Digital Signal Processing, Embedded System Design, FPGAs, Verilog.

**SOFT SKILLS:** Presenting to Non-Technical Audiences, Market Research, Product Pitching.

## **EDUCATION**

### **MECHATRONICS AND ROBOTICS MSC(ENG), UNIVERSITY OF LEEDS, 2024 – 2025**

- Academic Scholarship.
- Expected **Distinction** (80% average).
- Top performing modules: Engineering Computational Methods (91%), Embedded Microprocessor System Design (86%), FPGA System Design (85%), AI and Biomechatronics (80%).

### **ELECTRONICS AND COMPUTER ENGINEERING BENG, UNIVERSITY OF LEEDS, 2020 - 2024**

- Academic Scholarship.
- **First Class** (79%) grade, coming **top of the cohort**.
- Top performing modules: FPGA Design (79%), Embedded Systems (79%), Digital Comms (92%), Compiler Design (97%), User Interfaces (88%), Circuit Design (79%), C Programming (99%).

### **A-LEVELS, GCSES CHURCHER'S COLLEGE, 2018 - 2020**

- A-Levels: Mathematics (A\*), Computer Science (A\*), Physics (A).
- GCSEs: Three 9s, two 8s, five 7s.

## **OTHER ACHIEVEMENTS**

### **1<sup>ST</sup> PLACE 2018, 2<sup>ND</sup> PLACE 2019, CYBERQUEST**

### **1<sup>ST</sup> PLACE 2018, 2<sup>ND</sup> PLACE 2019, CODEQUEST, LOCKHEED MARTIN**

CyberQuest and CodeQuest are national cybersecurity and coding competitions run by Lockheed Martin. In each competition, my team came 1<sup>st</sup> in 2018 and 2<sup>nd</sup> in 2019.

**INTERESTS** Live music and playing guitar.