James Keveren

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Summary

A personable, passionate, and creative individual with expertise in various engineering disciplines and fabrication techniques. I've gained most of my commercial experience during my Software Engineering career but Mechanical, Electrical, and Electronic Engineering have been a huge passion of mine for my entire life as is reflected by my personal projects. During my experience as a Software Engineer I gained many transferable skills around teamwork, project planning and project management.

Skills and Technology

Engineering

Thermal Design, Circuit Design, Electrical and Electronic Debugging, SPICE Simulation, Optoelectronics, Embedded Programming, I2C, UART, SWD, PID Control, Solar MPPT, Adhesive and Fastener Selection

CAD and CAM

Fusion 360, SolidWorks, FreeCAD, OpenScad, Open CASCADE in C++, KiCAD, Chitubox, PrusaSlicer and derivatives, Blender

Fabrication and Production

TIG and MIG Welding (GTAW, GMAW), Soldering (electronics and metalwork), Brazing, Surface Finishing, FDM/FFF 3D Printing, MSLA 3D Printing

IT

Desktop and Server Hardware, Linux, DNS, DHCP, VLANs, TLS/SSL, Let's Encrypt, OPNsense, Unifi, Unifi Edge, TP-Link Omada, PoE, LTO Tape Storage, Raspberry Pi, Google Workspace, Microsoft 365

Linux

Arch Linux, Debian, CentOS, Systemd, Haproxy, Nginx, dm-crypt, Rsync, FFmpeg, Fuse, SSHFS, Certbot

Software Engineering

C, C++, Golang, JavaScript, TypeScript, Node.js, C#, .Net, Git, Mercurial, Jira, Google Cloud, AWS, Firebase, SQL (MSSQL, PosgreSQL, SQLite), MongoDB, Firestore, TDD, Regexp, HTML, CSS, WebSockets

Other

Google Ads, Keyshot, Stable Diffusion

Experience

Product Development Engineer and Fabricator — Jun 2022 - Dec 2024

- Independently designed and prototyped a high end, electromechanical, consumer product.
- Integrated mechanical, electrical, electronic and software systems to work together effectively.
- Simplified complex systems for reliability and safety.
- Designed and built fabrication tooling including a hydraulic press, press brake dies and a custom 3D printer head.
- Developed and tuned an integer only PID control loop for a high speed positioning system with high accuracy and precision.
- Developed firmware for embedded systems that communicated using I2C and UART.
- Created a novel, load bearing adjustment mechanism, optimised for ease of use and small form factor.

Software Engineer and Scrum Master Komi — Mar 2022 - Jun 2022

- Joined with four other engineers to form the new UK based engineering team.
- Worked in an existing, challenging codebase to build complex, client facing features including Spotify pre-saves.
- Led and organised the team to effectively meet deadlines and sprint goals.
- Facilitated team meetings to communicate with steakholders, remove blockers and plan future work.
- Cultivated good teamwork and communication.
- I really enjoyed the teamwork and leadership parts of this role.

CAD Consultant Pharmagraph — Jan 2020

- Created CAD models and technical drawings for a product in Fusion 360 for manufacture.
- This was a small piece of work that was well received.

Software Engineer IFL Management — Mar 2017 - Feb 2022

- Managed servers, hosting of various web apps, DNS, and email.
- Built a QuickBooks data importer to significantly optimise processing and deduplication of financial data using in memory indexing in JavaScript.

- Worked in a small team to build an online quote and sales lead system using .Net and SendGrid.
- Built a tool for backing up office machines to OneDrive using Golang.
- Created a complex data pipeline to import vacancies from various sources using Node.js, .Net, MSSQL, SendGrid and microservices hosted on Google Cloud. Vacancies were normalised, filtered and deduplicated (around 30,000 per day).
- Used scraping, web search APIs and third party data providers to populate missing data.
- Helped develop an automated emailing system that handles unsubscriptions using .Net and SendGrid.
- Established and maintained email IP reputation.
- Maintained an SQL database of hundreds of thousands of vacancies, companies and contacts
- Created a customer facing vacancy web app in vanilla JavaScript with page and data preloading.
- Built a caching proxy on Firebase for a slow third party API (JobAdder)
- Provided technical support for products including: in house tools, Windows and Microsoft 365.

Projects

Benchtop Hydraulic Press

Mechanical Engineering Fabrication TIG Welding

Designed and fabricated a 20 Tonne hydraulic press around an off the shelf bottle jack. This required analysing moment and shear loads in standardised steel beams and designing reinforcements to protect against predicted failure modes. I purchased steel rough cut to size, trimmed, bevelled and TIG welded everything together. MIG would have been more suitable to the mass of wire that I laid down but I work with what I have.

Direct Drive 3D Print Head

Mechanical Engineering Fabrication TIG Welding DC Electrical

Converted an old Ultimaker 2 from 2.85mm bowden extruder to 1.75mm direct drive extruder. Moving to direct drive required a complete re-implementation of the print head but was well worth it. my design successfully protects the linear bearings that must stay below 80°C from the 230°C nozzle with only 5mm between. This was challenging to keep small and lightweight while securing all components and managing high vibration and temperature.

Backup System

Linux LTO Cryptography Rsync

A constantly growing and evolving backup system that stores all of my personal data securely. The system follows the 3-2-1 backup strategy; 3 copies, 2 media types and 1 offsite. I use a custom NAS and LTO5 tapes stored offsite to satisfy these requirements. I modified an external HDD enclosure into a NAS with a Raspberry PI for a secondary off-site NAS that is awaiting deployment. All copies of the backup are encrypted with either DM-Crypt, GPG or OpenSSL.

Solar Powered Mobility Scooter

Electrical Engineering Solar

Re-implemented the electrical system of a mobility scooter to boost speed and charge via a solar panel on the roof. The small roof meant I was limited to a 12V solar panel but I wanted to use a higher voltage to increase vehicle speed. To get around this, while still using mostly off the shelf parts, I used an MPPT solar charger to charge a super capacitor bank. Once the bank reaches 14V, the charge controller discharges it into a constant current boost converter which charges the LiFePO4 battery bank at 55V 2A. The original motor driver was only rated for 24V so I replaced that with another off the shelf driver and modified the driving controls for it. The resulting mobility scooter was pretty fun, although a little sketchy to ride haha.

210kg Steel Workbench

Mechanical Engineering Fabrication youtu.be/0LhPWrXGbMg

This was designed to be possible to disassemble into parts light enough to be moved by one person. Mild steel was an obvious choice due to it's characteristic strength, availability, low cost and weldability (for surface repairs). 210kg workbench made entirely from steel for heat resistance, durability, and welding. This was designed and built to be constructed with my limited tools and without the use of welding. As a result this was assembled using rivnuts, bolts and folding the ends of steel box section.

650A DC Power Supply

Electrical Engineering TIG Welding Fabrication youtu.be/G3t07j_KhL4

Power supply capable of providing 8kW of power for short bursts or 3kW continuous at 12-96VDC. This aggregates the output of eight server power supplies, modified to have a floating output. The power supplies are powered from a custom power distribution unit with fuse, power meter, ground connection and run/stop switch. Outputs can be connected in different combinations of series and parralel to achieve different voltage/current ratios. I typically measure current from this source with a 1kA shunt resistor.

Holonomic Wheel

Mechanical Engineering SolidWorks grabcad.com/library/holonomic-wheel-1

Similar to a mecanum wheel, this is designed to allow a vehicle to move in any direction with as few as three wheels. This was designed to be manufactured using only only basic tools and 3D printing.

Road Bike Frameset

Mechanical Engineering SolidWorks grabcad.com/library/road-bike-5

Frame and forks for a road bike, optimised to resist structural torsion forces created by pedaling at high torque. This project was limited by my ability to manufacture at the time.

For more projects check out these links:

- grabcad.com/james.keveren-1
- thingiverse.com/jkeveren
- github.com/jkeveren