Ben Kazemi
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I create, research, prototype, and implement design and interaction ideas for cutting edge research projects:

- Rapid Prototyping
- Schematic capture and PCB design in Altium
- Firmware and software development
- Laser cutting and CAD for additive manufacturing
- Troubleshooting complex systems, expertise in bare-metal, physical design, and systems interfacing
- Design for Manufacture and management of scaled outsourced assembly
- Lab management and organisation
- Hardware testing, iteration and validation

Relevant work experience

2020-present *Hardware developer - MSD Group at University College London, London*

Primary hardware developer for the flagship 'OpenMPD Particle Based Display' used in cutting edge research at the MSD lab, lead responsiblities for electronics design, mechanical CAD, assembly, fabrication, and testing. Manage and maintain both the distribution of over 100 boards, and assembly which we now outsource.

Lead Authored 'Two-Gimbal PAT: An artistic installation combining mechanical and acoustic rotation of levitated content' CHI 2022.

Co-authored 'Reconfigurable Reflective Spatial Sound Modulators' (forthcoming).

I also help manage the lab and it's associated spaces, supervise the lab's growth, and support the research of over 15 Post Docs and PhDs with a wide variety of technical requirements and issues.

2018-2020 *Research Engineer - Interact Lab at University of Sussex, Brighton*

Supervised the growth and lab space management for a multi-disciplinary HCI lab space that primarily researched holograms, multimodal levitation, wearable technologies, programmable liquid matter, metamaterials,and adaptive shape changing screens. Technical objectives were to enable members to fulfil their research and production goals through rapid prototyping of electronic designs, writing Windows and MacOS programs in Python, C# and Java to communicate with hardware written in C.

This included the revised levitation and Acoustophoretic board. Responsible for a full lifecycle design from concept to a FPGA controlled PCB housing 256 uniquely controllable ultrasound speakers on two six-layer high-speed PCBs designed in Altium. This board is a unique state-of-the-art design and has already been included in a number of accepted academic papers, including Nature journal where I am acknowledged Appl. Phys. Lett. 115, 064101.

2015-2018 *Contract Developmental Engineer & Embedded Systems Consultant - Bitvu Ltd, Brighton*

Engineering a multi-channel, multi-protocol streaming encoder with legacy analogue support, utilising a novel design allowing a price reduction of 80% compared to competing products. Initial contract to interface an audio source to a Broadcom SoC and to control an HDMI-to-CSI IC. Remained as primary project-engineer where my main responsibilities included design and implementation of system architecture, schematic creation, and review and supervision of overseas PCB layout engineers. I worked closely with the Raspberry Pi foundation on an open-source kernel driver.

Relevant technical skills

Hardware Professional experience with Altium and DfM, expert assembly skills. Experience using Bluetooth, 802.11, RS232, USB, I2C, I2S and HDMI. Skilled at troubleshooting hardware, competent at reverse engineering undocumented hardware. Analogue audio design experience, having designed a low-noise Raspberry Pi sound card 'Hat'.

Software Working experience: C, C#, & Java. Light experience: Python, C++, & BASH. Studied: Haskell, Prolog, Pascal, MATLAB, LabView, SQL, VHDL, and MIPS.

Management Have managed offshore engineers and outsourced manufacturers for large projects. I enjoy these challenges and hope to further develop my managerial skills.

Education and awards

2011-2015 *First Class BEng with Honours in Computer Engineering, University of Sussex*

- Full-stack engineered a Galaxy S4 case with multi-touch pressure and positional input data using sensors encapsulating the smartphones sides and rear surfaces
- Developed PCB, firmware, and android app to demonstrate new modes of interaction
  - 2015 Rohde & Schwarz Project Prize Award
  - 2015 IET Gerald David Memorial prize Nominee
  - 2014 Best Engineering student awarded by Eurotherm by Schneider Electric

2007-2009 *A-Levels in Electronics, Computing, and Music Technology - Sussex Downs College, Lewes*

2005-2006 *BTEC certificate in Contemporary Music - Brighton Institute of Modern Music, Brighton*

Other notable experiences

Emerging Leaders – University College London, London. Awarded August 2022

Placed on a five-month course focusing on leadership development.

Learning to Lead *Programme – University of Sussex, Brighton. Awarded June 2011*

Language Teacher – Shijie Chinese-English School, Hunan, China. August – September 2006

Responsible for planning and delivering classes and events to students aged 7 to 19 to strengthen cross cultural ties.

Personal interests and projects

- An Android case that allows full control of the OS without the need to interact with the touchscreen, interfaced through BLE 4.0 or USB OTG;
- A noiseless four-layer line-in & microphone pre-amplifier sound card 'HAT' for a Raspberry Pi, interfaced through I2S
- A BLE MIDI foot pedal controller for the Yamaha THR30ii Guitar amp
- Standalone BLE and USB Thinkpad keyboard and mouse Open-source project engineering Bluetooth controller and case
- Autonomous audio and power IO selector board with SPDIF DAC, controlled by IR/WiFi/BLE
- A reactive baby light designed to gauge the child's state of calmness, helping them fall asleep
  - Android monitor and control application, with hardware and firmware interfaced through Bluetooth
- I designed and manufactured bespoke electronics for a themed escape room at *Escape Kent* in 2017
- Contributed towards the open-source development of Adafruit's *DRV2605 Haptic Controller Board*
- Co-authored Arduino workshops for the organisation 'SheCodes'
- Native English speaker, competent spoken understanding of Farsi