Ben Kazemi
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I specialize in creating, researching, prototyping, and implementing cutting-edge design and interaction ideas for various research projects.:

- Rapid prototyping
- Schematic capture and PCB design in Altium
- Firmware and software development
- CAD with Autodesk Inventor, confident with laser cutting 3D printing
- Troubleshooting complex systems, expertise in bare-metal, physical design, and systems interfacing
- Design for manufacture, management of outsourced manufacturing
- Lab management and organisation
- Hardware testing, characterisation, and validation

Relevant work experience

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

As the primary hardware developer for the "OpenMPD Particle Based Display,"a flagship research project at the MSD lab, I am responsible for all aspects of electronics design, mechanical CAD, assembly, fabrication, and testing. In addition, I manage and maintain the distribution of over 100 boards and the assembly process, which has been outsourced.

In addition to my hardware development work, I have lead authored a paper titled "Two Gimbal PAT: An artistic installation combining mechanical and acoustic rotation of levitated content" CHI 2022, and co-authored a forthcoming paper titled "Reconfigurable Reflective Spatial Sound Modulators."

I also play a key role in managing the lab and its associated spaces, supervising it's growth, and providing technical support to over 15 Post Docs and PhDs who have a wide range of technical requirements and issues.

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

I managed the growth and lab space management of a multi-disciplinary HCI lab that focused on cutting-edge research in holograms, multimodal levitation, wearable technologies, programmable liquid matter, metamaterials,and adaptive shape changing screens. My technical objectives were to enable lab members to achieve their research and production goals through rapid prototyping of electronic designs and writing Windows and MacOS programs in Python, C#, and Java to communicate with hardware written in C.

During my time as a hardware developer, I was responsible for the full lifecycle design of the revised levitation and Acoustophoretic board. This state-of-the-art board was designed in Altium and controlled by an FPGA, housing 256 uniquely controllable ultrasound speakers on two six-layer high-speed PCBs. It has already been included in several accepted academic papers, including the prestigious Nature journal where I am acknowledged Appl. Phys. Lett. 115, 064101.

2015-2018 *Developmental engineer - Bitvu Ltd, Brighton*

I engineered a a multi-channel, multi-protocol streaming encoder that supports legacy analogue signals while also utilizing a novel design that reduced the cost by 80% compared to competing products. The initial contract involved interfacing an audio source to a Broadcom SoC and controlling an HDMI-to-CSI IC. As the primary project engineer, my responsibilities included designing and implementing the system architecture, creating schematics, and reviewing and supervising overseas PCB layout engineers. I collaborated with the Raspberry Pi foundation on an open-source kernel driver.

Relevant technical skills

Hardware I have professional experience working with Altium for PCB design and design for manufacturability (DfM) considerations. I also have expert-level skills in assembly, which is essential in the production process. In terms of communication protocols, I have experience using Bluetooth, 802.11, RS232, USB, I2C, I2S, and HDMI. I am skilled at troubleshooting hardware issues and I am also competent in reverse engineering undocumented hardware. Additionally, I have experience in designing analogue audio systems, such as the design of 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 find these challenges rewarding and look forward to developing my managerial skills further.

Education and awards

2011-2015 *First class BEng with Honours in computer engineering, University of Sussex*

- Designed and engineered a full-stack solution for a Galaxy S4 case that incorporated multi-touch pressure and positional input data using sensors on the sides and rear surfaces of the phone.
- Developed the PCB, firmware, and android app toshowcase new modes of interaction with the device.
  - 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
Completed a comprehensive five-month leadership development course.

Learning to lead programme – University of Sussex, Brighton. Awarded June 2011

Language teacher – Shijie Chinese-English School, Hunan, China. August – September 2006
I was responsible for creating and implementing lesson plans and organizing events to promote cross-cultural understanding among students aged 7 to 19.

Personal interests and projects

- Android case enabling complete control of the OS without touchscreen interaction, using BLE 4.0 or USB OTG.
- noiseless four-layer line-in and microphone pre-amplifier sound card "HAT" for Raspberry Pi, using I2S.
- 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 and aid sleep,
  - Android monitor and control application, with hardware and firmware interfaced through Bluetooth.
- Produced 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 SheCodes organization.
- Native English speaker with a competent spoken understanding of Farsi