

Embedded Design Engineer with extensive experience in hardware and architecture design. My expertise comprises a deep understanding of computer architecture, and core competencies in the hardware and software interface, from analogue circuitry up to software.

Relevant Work Experience

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

Hired to manage a multi-disciplinary HCI lab space lead by Sriram Subramanian primarily researching holograms, multimodal levitation, wearable technology, programmable liquid matter, metamaterials, and other novel research like the adaptive shape changing screens. Primary 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.

Promoted to remain as a dedicated in-house engineer, specialising in hardware design, systems architecture, design for manufacture, assembly, low level software engineering, and sensor technologies. My expertise have been utilised through consultation with internal and visiting researchers to help conceptualise physical prototypes of their designs.

This included but is not exclusive to the revised levitation and Acoustophoretic board. Responsible for a full life-cycle 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 (2019).

Alongside my technical duties were responsibilities for the management of the lab, supervising its growth from five members to over twenty members. This was achieved by shifting the lab culture, restructuring the layout of the lab spaces, procuring new apparatus and providing members with autonomy through appropriate training, including focuses on H&S practices.

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. Main responsibilities include design and implementation of system architecture, schematic creation, and review and supervision of offshore PCB layout engineers. I worked closely on the open-source kernel with the Raspberry Pi foundation. Key skills include:

- Python
- Embedded C
- Linux Kernel Development
- HDMI Control Development
- I2S / I2C
- Altium Hardware Design
- PCB Testing and Troubleshooting

Relevant Technical Skills

- Coding** Heavy working experience: C, C#, Java. Light experience: Python & BASH. Studied: Haskell, Prolog, Pascal, MATLAB, LabView, SQL, VHDL, and MIPS.
- Hardware** I have professional hardware design experience in Altium alongside expert assembly skills, and experience using Bluetooth, 802.11, RS232, USB, I2C, I2S and HDMI transfer links. I have worked on design for manufacturing and am a power conscious designer having multiple battery powered designs. I am comfortable fault finding and troubleshooting both my own and third-party hardware and have successfully reverse engineered undocumented hardware. I have analogue design experience, having designed an audiophile grade sound card for a Raspberry Pi, and have used this experience to work on two original noise sensitive designs.
- Management** My current role requires constant communications with an interdisciplinary team, and delivery of our research depends on intelligent self-scheduling and management of how I delegate assistance from others. I enjoy these challenges and hope to further develop my management skills.

Education

- 2011-2015 *First Class BEng (Honours) Computer Engineering, University of Sussex.*
- Designed an award winning 8-bit microcontroller driven embedded system
 - Designed, fabricated, and assembled a physical portable phone case allowing multi-touch pressure and positional input data for sensors encapsulating a smartphones sides and rear surfaces, encompassing an entire project cycle from conception to completion.
 - Developed firmware (C) and android applications in Android Studio to demonstrate new modes of interaction, code available on my GitHub page
- 2007-2009 *Three A-Levels in Electronics, Computing & Music Technology - Sussex Downs College, Lewes*
- 2005-2006 *BTEC Certificate in Contemporary Music - Brighton Institute of Modern Music, Brighton*

Other Notable Experiences

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

An intensive ten-day leadership programme run in partnership with professional management training consultancy Clemorton, followed by a year-long group project ending with a presentation to senior academic leaders. June 2011 Sussex Bulletin print and here: sussex.ac.uk/broadcast/read/8472

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

As a member of a two-man team responsible for planning and delivering classes and events to students aged 7 to 19 to strengthen cross cultural ties.

Academic Awards and Accomplishments

- 2015 Rohde & Schwarz Project Prize Award
- 2015 IET Gerald David Memorial prize Nominee
- 2014 Best Engineering student awarded by Eurotherm by Schneider Electric
- 2011 Above Learning to Lead programme was accredited by the Institute of Leadership and Management, of which I am an affiliate member

Personal Interests and Projects

A brief selection of completed 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, presented to the head of research at Google;
- A noiseless four-layer line-in & microphone pre-amplifier sound card 'HAT' for a Raspberry Pi, interfaced through I2S;
- 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 have completed contract work which involved the design and manufacture of all electronics for a pirate-themed escape room at *Escape Kent* in 2017.

I have contributed towards the open-source development of Adafruit's *DRV2605 Haptic Controller Board*.

I am interested in teaching and have helped write Arduino workshops for 'SheCodes', an organisation which promotes women in coding. These classes can be viewed on my GitHub page.

I am a native English speaker and maintain a competent spoken understanding of Farsi. I completed a 20-week Japanese Language course in July 2013.

In my free time I enjoy riding my motorcycle, writing and performing music, practising guitar, playing video games and weight lifting.

References - Further references available on request.

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