JACK BROOKES

Mechanical Engineering Graduate, VR Enthusiast, & Perceptual Science PhD Candidate

More project info & code available at http://jbrookes.com/

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∴ PROFILE

I am a versatile, hard-working and motivated PhD student at the University of Leeds with strong multidisciplinary skills. I graduated with a 1st class in MEng Mechanical Engineering in 2016 and now I am studying in perceptual science, focusing on feedback presented to the motor system, and how we can exploit it to enhance learning in virtual reality.

My background in engineering also have influenced my passion for user-centred design, software, mathematics, and in particular virtual and augmented reality. As part of my PhD I have developed a range of experiments in Unity3D, and have played a major part in pushing the use of VR in research at my university as a means of enabling new experimental paradigms, and enabling collection of much richer data.

∴ EDUCATION

UNIVERSITY OF LEEDS, SCHOOL OF MECHANICAL ENGINEERING **2012 - 2016**
MEng Mechanical Engineering

Result: 1st class honours

YEAR 3 INDIVIDUAL PROJECT – Designed and tested a cheaper method of measuring forces in the university's robotic rehabilitation device (iPAM).

YEAR 4 TEAM PROJECT – Designed and developed a robotic testing solution for rehabilitation robotic devices, which allows for long term stress testing, benchmarking, and measurement systems testing. Our project placed 1st in National Instruments Student Competition 2016, and we presented the systems on the company's keynote and in the expo hall.

∴ WORK EXPERIENCE

RESEARCH INTERN – UNIVERSITY OF LEEDS **JUNE 2014 – AUGUST 2014**

Internship where I was researching how the use of virtual 'force fields' created using a haptic robot could influence the learning rate of skilled motor commands. I was required to gather participants and run experiments, and write code that would interface with existing low-level code controlling the hardware. I also developed a user friendly GUI to allow researchers to set up experiments with custom parameters.

RESEARCH INTERN – UNIVERSITY OF LEEDS **SEPTEMBER 2016 – OCTOBER 2016**

Responsible for updating the software suite for a robotic testing device. The project involved programming in LabVIEW & LabVIEW FPGA, with data processing tasks in MATLAB and Python.

R&D ENGINEER – KEY ENGINEERING SOLUTIONS **JUNE 2015 – SEPTEMBER 2016**

I was responsible for designing a prototype control system for an automated milk feeder for new-born calves. I had to research and construct the appropriate hardware, install an operating system and write the controller software including a user-friendly touch-based interface. The final system includes a Linux powered PC with a 7" touch screen. During my time at KeyES I also worked with digital signal processing, and using artificial neural networks in time-series feature classification.

LAB TEACHING ASSISTANT **SEPTEMBER 2016 – PRESENT**

I currently work 6 hours a week as an assistant instructor as part of the University of Leeds' engineering module "Computers in Engineering Analysis", where I teach students how to construct circuits and write software to acquire data and control hardware.

∴ TECHNICAL SKILLS

PROGRAMMING IN ORDER OF EXPERIENCE:
Python, LabVIEW, MATLAB, R (espec. Tidyverse), C# (In Unity3D), HTML/CSS, SQL, JavaScript

TECHNICAL SKILLS:
- Experience using and implementing forward/inverse kinematic methods.
- Excellent mathematics skills, including 3D maths, linear algebra, matrix transformations, calculus.
- Knowledge and interest in multidimensional design optimisation algorithms.
- Understanding of control theory including the implementation/tuning of PID controllers.
- Worked with and programmed on real-time OSs and FPGAs in robotics applications.
- Interest and some experience in using neural networks for machine learning.
- Experience in DSP, filtering and analysing signals.
- Familiarity with Git and GitHub.
- Very familiar with a wide variety of technical software across industries. (Adobe Photoshop, Adobe After Effects, Unity3D, Solidworks, Microsoft Office suite, and more).
- Fluency in most operating systems and knowledge of their ecosystems and their functionality (Windows, Linux Distros, Mac OS, Android, iOS).
- Advanced understanding of modifying, fixing and assembling computer hardware.
- Developing knowledge of experimental psychology and experience application of the scientific method.
- Understanding of electronics allowing for construction of basic circuits and integrating sensors and actuators.

∴ HOBBIES/INTERESTS

- **WEB DESIGN** – I have previously designed and built blogging websites from scratch including my own personal website.
- **GRAPHIC DESIGN** – I have made logos, leaflets and posters for personal use and also for LUUMechEng Society, LUU Veg Society and my Sixth Form. I made the University of Leeds Snapchat “Geofilter” that is currently in use.
- **COMPUTER PROGRAMMING** – I have built and released a few small programs/scripts via my website.
- **PC HARDWARE** – I am very interested in building, modifying and fixing computers and other gadgets.
- **SCIENCE & TECHNOLOGY** – I am a passionate follower in new developments in Science, Technology and Engineering. I follow new computer hardware and mobile phone releases almost religiously. I have a particular interest in virtual & augmented reality and emerging technologies in this field.
- **EDUCATION** – I have previously visited my secondary school as an assistant. Specifically, I helped in A Level Maths revision sessions and gave advice to students who wanted to study Engineering and Science subjects.
- **BLOGGING** – Formerly a blogger for The Gryphon (newspaper/news website)

∴ KEY EMPLOYABILITY SKILLS

- **TEAM WORKING** - experience comes from being a part of and leading many university group projects.
- **PROBLEM SOLVING** – evident by my maths and programming skills.
- **SELF MOTIVATION** – taught myself how to use many different software packages and programming languages.
- **PRESENTATION SKILLS** – Presented in front of 1000s of people at NIWeek Keynote, for example
- **APPLICATION OF NUMERACY –** Developed though University, study of A Levels in Sciences and personal projects in motion graphics, special effects, programming, etc.

∴ REFERENCES

EMPLOYER REFERENCE (Key Engineering Solutions):
Dr David Keeling, Key Engineering Solutions, d.g.keeling@key-es.co.uk

ACADEMIC REFERENCE (University of Leeds Perception-Action-Cognition Lab leader):
Professor Mark Mon-Williams, Leeds School of Psychology, M.Mon-Williams@leeds.ac.uk