JACK BROOKES

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PROFILE

Graduate of Mechanical Engineering and now Cognitive Science PhD candidate. I'm a multidisciplinary problem solver with a unique and broad skillset.

SKILLS

- Early adopter and daily user of VR technology.
- Solid experience developing games, systems, and developer tools with Unity and C#.
- Knowledge of and experience working with all major VR/AR platforms.
- Developer of many VR applications using Unity and popular support packages (OVR, SteamVR, Vuforia, ARCore, VRTK, AWS integration).
- Skilled in using frequentist and Bayesian techniques (i.e. STAN) to analyse datasets and fit computational models.
- Breadth of psychology knowledge e.g. human decision making, perception & action.
- Regularly in charge of performing cognitive testing with adult and child participants.
- Expertise in using Python, R, LabVIEW, & MATLAB for data processing, analysis, visualisation, and creating GUI tools (Tkinter, some QT).
- Understanding of machine learning and computer vision principles.
- Familiarity with web tech (HTML/CSS/JS).
- Experience with cloud computing technology (Amazon Web Services).
- Extensive user of git and GitHub.
- Excellent mathematics and logical reasoning abilities.
- Ability to communicate effectively in a multidisciplinary team.

EDUCATION

>> UNIVERSITY OF LEEDS: 2016 – DEC 2019

PhD in Psychology (in progress) with a focus on human action and cognition in the Immersive Cognition Lab & PACLab at Leeds. I have been a champion of developing virtual reality experimental methods, and recently published UXF – an open source package for developing human behaviour experiments in Unity, which I have used to create many experiments. My area of study includes the interaction between motor control and decision making. Worked closely with Prof. Mark Mon-Williams and Dr Faisal Mushtaq.

>> UNIVERSITY OF LEEDS: 2012 - 2016

1st Class Honours BEng + MEng Mechanical Engineering with a focus on control algorithms for robotic systems and computational solving methods.

EXPERIENCE

>> UNIVERSITY OF LEEDS: Q1 2018

Research Assistant role working on a project extracting and analysing EEG readings in real time and presenting the information back to the participant in order to improve their performance in a virtual reality sports environment. (Industry collaboration with ThoughtBeanie Ltd.)

>> UNIVERSITY OF LEEDS: 2016 - PRESENT

Lab Teaching Assistant teaching and marking within the "Computers in Engineering" module in the Mechanical Engineering and Mechatronics programmes at the university.

>> UNIVERSITY OF LEEDS: SUMMER 2016

Research intern creating a user-friendly testing suite to benchmark and safety test robotic rehabilitation devices used to enhance motor skills of stroke patients.

>> KEY ENGINEERING SOLUTIONS: 2015-2016

Research & development engineer working on a proof-of-concept automated livestock feeder. Focus was placed on gathering of livestock behaviour data and presentation of these data to the user via a touch-screen GUI.

>> UNIVERSITY OF LEEDS: SUMMER 2014

Research intern developing and collection data for an experiment investigating effect of force fields on motor learning, working alongside Prof. Mark Mon Williams.

PUBLICATIONS

- **J. Brookes**, M. Warbuton, M. Alghadier, M. Mon-Williams, F.Mushtaq; "Studying human behavior with virtual reality: The Unity Experiment Framework"; Behav Res (2019) https://doi.org/10.3758/s13428-019-01242-0
- **J. Brookes**, M. Kuznecovs, M. Kanakis, A. Grigals, M. Narvidas, J. Gallagher, M. Levesley; "Robots testing robots: ALAN-Arm, a humanoid arm for the testing of robotic rehabilitation systems"; ICORR

London (2017) http://doi.org/10.1109/ICORR.2017.8009326

- D. Harris, G. Buckingham, M. R. Wilson, **J. Brookes**, F. Mushtaq, M. Mon-Williams, S. J. Vine, Testing the fidelity and validity of a virtual reality golf putting simulator; Virtual Reality; (Preprint)
- D. Harris, G. Buckingham, M. R. Wilson, **J. Brookes**, F. Mushtaq, M. Mon-Williams, S. J. Vine, Testing the effects of virtual reality on visuomotor skills; (Preprint)
- **J. Brookes**, F. Mushtaq, E. Jamieson, A. J. Fath, G. P. Bingham, P. Culmer, R. M. Wilkie & M. Mon-Williams; Exploring Disturbance as a Force for Good in Motor Learning; Proc. Royal Society B; (Under review)
- **J. Brookes**, O. T. Giles, M. Mon-Williams, R. B. Ivry, F. Mushtaq; Learning from your mistakes: Modelling the effects of uncertainty and execution errors on credit assignment gating; (In preparation)
- E. C. Stanyer, P. D. Baniqued, **J. Brookes**, M. Awais, A. Davies, E. C. Killan & F. Mushtaq; The Impact of EEG-guided Acoustic Stimulation of Sleep on Cognitive Performance: Evidence from a Meta-Analysis; Neuroscience & Biobehavioural Reviews; (In preparation)
- F. Mushtaq, S. D. McDougle, M. P. Craddock, D. E. Parvin, **J. Brookes**, A. Schaefer, M. Mon-Williams[1], J. A. Taylor & R. B. Ivry; The electrophysiological correlates of selection and execution errors in reinforcement learning; (In preparation)
- M. Warbuton, **J. Brookes**, M. Mon-Williams, F. Mushtaq; Getting stuck in a rut with decision making: modulating & modelling sensorimotor hysteresis; (In preparation)
- M. Alghadier, **J. Brookes**, R. Coats, A. Jackson, R. Holt, F. Mushtaq, M. Mon-Williams; Exploring how extrinsic and intrinsic costs interact to determine human decision making; (In preparation)
- A. Balkhoyor, **J. Brookes**, A. Keeling, F. Mushtaq; Haptic guidance and disruption in virtual reality dental simulators: Help or hinder? (In preparation)
- Z. Uludag, **J. Brookes**, O. Giles, F. Mushtaq; Manipulating sense of agency in a decision-making task; (In preparation)

PUBLIC ENGAGEMENT ACTIVITIES

- Article on my Unity Experiment Framework – The British Psychology Society https://thepsychologist.bps.org.uk/volume-32/august-2019/new-immersive-cognition-laboratory.
- Presenting our VR motor task on understanding the interceptive timing abilities of children at a stall at the UKRI's anniversary event (June 2019).
- Public engagement of several VR activities for the launch of the Centre for Immersive Technologies at the University of Leeds (June 2019).
- I organised and took part in a citizen science project with the EUREKA! science museum, where we tested 1000+ children and adults in my VR cognitive & motor tests (throughout 2018).
- Radio interview on haptic enhancement of motor skills with children in the Born in Bradford project (Speaking around 17:50) https://www.bbc.co.uk/programmes/b08vzt8d
- BBC Inside Out TV Appearance on cognitive & motor testing of children https://www.bbc.co.uk/programmes/b09cg4pg
- Expo hall stall and keynote presentation at National Instruments NIWeek 2016 https://www.youtube.com/watch?v=8WbgjWfF17g
- Public engagement demonstrations at several events including Leeds's annual "Be Curious" science festival, showing robotic devices from my master's project ("Project ALAN"; 2016).

CONFERENCES & PRESENTATIONS

- **J. Brookes**, M. Mon-Williams, F. Mushtaq; The value of motor mistakes in sensorimotor decision making; Progress in Motor Control (2019); Poster.
- "Transforming the study of human behaviour using VR"; University of Leeds Research Nights 3 (2018); Presentation.
- "VR as a tool for human behaviour research"; Visual Media Conference; 2018; Presentation.
- "Information and sensorimotor learning"; UCL Karl Friston Neuroimaging Lab Meeting; 2017; Presentation.
- "VR in sensorimotor learning research"; Accelerating the impact of sensorimotor learning research (EPS Conference); 2017; Presentation.
- "An introduction to Python"; Leeds postgraduate led seminar series; 2017; Presentation.
- "Accelerating skill acquisition through haptics in dentistry and surgery". Haptics in healthcare, European Robotics Forum Edinburgh; 2017; Presentation.
- "Using Unity3D and LabVIEW to accelerate rehabilitation robotics research". National Instruments NIDays London; 2016; Presentation.

AWARDS

- National Instruments global student design competition winner (2016) for a robotics project aiming to help people regain motor skills through interface with an assistive robot device.

PERSONAL INTERESTS

- Graphic design
- Hobbyist software/electronics (e.g. RaspPi)
- Animal photography
- Quizzing