JOHN ALEXANDER HARSTON

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EDUCATION

Imperial College London *July 2017 - July 2021*
Neural Engineering and Machine Learning PhD Student
Department of Bioengineering
I am in the final year of a PhD at Imperial College London with Prof. Aldo Faisal, where I build autoregressive deep learning models for analysis and prediction of high-dimensional behavioural time series data. I combine this with novel object recognition models to build real-time human intention prediction systems. I also develop Python libraries for multimodal human behavioural recordings.

University of Edinburgh *September 2012 - May 2016*
Biomedical Sciences BSc (Hons) Neuroscience 2:1
1st Class Honours in Dissertation: "Kinematic Analysis of Mouse Forelimb Movement"
I undertook my undergraduate project with Prof. Ian Duguid, where I worked on developing novel mouse tracking paradigms. My work in this project led to my being offered a research assistant job in 2016.

TECHNICAL SKILLS

Programming	Python, Javascript, Bash, LaTeX, MATLAB, PostgreSQL, NGINX
Libraries/Frameworks	Django, React, GraphQL, Numpy, PyTorch, Tensorflow, OpenCV
Languages	English (native), German (moderate), Bulgarian (moderate)

EXPERIENCE

Goodwright Ltd June 2019 - present
Co-founder and developer

· I run a web development startup, building Software-as-a-Service platforms, apps and websites for science.

Imperial College London October 2017 - January 2018
Graduate Teaching Assistant

· Head Teaching Assistant for the Masters-level "*Machine Learning and Neural Computation*" course at Imperial.
· Designed and set coursework questions, involving building regression and Gaussian mixture models to estimate London house prices given a particular location.

University of Edinburgh May 2016 - July 2017
Research Assistant

· Designed a novel rodent behavioural paradigm, utilising existing touchscreen technologies to build programmatically-controlled rodent behavioural assays, combined with implanted neural probes, in order to study functions of the premotor cortex.
· Utilised low-cost Android devices, Arduinos and machine vision algorithms to perform lifetime in-cage monitoring.
· Work led to a £100,000 Simons Foundation grant and continuing consultancy role to scale in-cage solution to 30 smart-cages. Designed and wrote software for coding mouse locomotor patterns using Python/OpenCV, and produced mechanistic designs for a novel rodent joystick-push behavioural paradigm.

PUBLICATIONS

Natural history, trajectory, and management of mechanically ventilated COVID-19 patients in the United Kingdom (2020). Brijesh V Patel, Shlomi Haar, Rhodri Handslip, Teresa Mei-Ling Lee, Sunil Patel, **J. Alex Harston**, ..., & A. Aldo Faisal. medRXiv

Linear Embodied Saliency: a Model of Full-Body Kinematics-based Visual Attention (2020). WW Abbott, **JA Harston**, & AA Faisal. bioRXiv

Human visual attention prediction boosts learning & performance of autonomous driving agents (2020). A Makrigiorgos, A Shafti, **JA Harston**, J Gerard, & AA Faisal. arXiv:1909.05003

A Model of Full-body Kinematics-based Visual Attention in Daily-Life Tasks (2019). **JA Harston**, C Auepanwiriyakul, & AA Faisal. Computational Cognitive Neuroscience.

Cerebellar-Recipient Motor Thalamus Drives Behavioral Context-Specific Movement Initiation (2019). Dacre, J., Colligan, M., Ammer, J., Schiemann, J., Clarke, T., Chamosa-Pino, V., Claudi, F., **Harston, J.A.**, ... & Duguid, I. . bioRXiv.

Generalised Structural CNNs (SCNNs) for time series data with arbitrary graph-topologies (2018). T Teh, C Auepanwiriyakul, **JA Harston** & AA Faisal. arXiv:1803.05419

Semantic Fovea: Automatic real-time streaming annotation of egocentric videos with gaze context (2018). C Auepanwiriyakul, **JA Harston**, PA Orlov & AA Faisal. Proceedings of ACM Symposium on Eye Tracking Research and Applications (ETRA 2018).

POSTERS

Body Kinematics Predict Visual Attention. **JA Harston**, C Auepanwiriyakul, Sarah Daniels & AA Faisal. Progress in Motor Control (PMC 2019) (May 2019)

Body Kinematics Predict Visual Attention. **JA Harston**, C Auepanwiriyakul, Sarah Daniels & AA Faisal. Vision Sciences Society (VSS 2019) (May 2019)

Embodied Saliency. **JA Harston**, WW Abbott, P Orlov & AA Faisal. Understanding Images In Biological and Computer Vision Conference, The Royal Society (Feb 2018)

Low-cost touchscreen-based screening for mouse behaviour. **JA Harston** & IC Duguid. NC3Rs Symposium, Edinburgh (2017)

INVITED TALKS

Gaze Prediction in Real-World Environments, Justus-Liebig University Giessen, Germany, 18 December 2019