DR. JACK KELLY

Manchester
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RESEARCH INTERESTS

I have an interest in applications of causal inference to biological networks to better understand large scale omics data and analysis of high throughput data with applications to complex diseases. Much of my research has been on neurodegenerative disease and hypertension in particular, and I have used a broad range of different bioinformatics techniques to produce novel and exciting results.

Currently, using genomic and transcriptomic data I have been developing an approach expanding on MR using machine learning to build molecular causal networks of hypertension, in order to elucidate the complex biological mechanisms that underlie this disease.

Additionally, I am the consultant statistician for the Manchester University Centre for Audiology and Deafness. I have experience collaborating on large projects with many researchers and handling a wide variety of health data types and methodologies.

PROFESSIONAL APPOINTMENTS

Research Associate at the University of Manchester *Jan 2021 - Dec 2023*
Developing causal molecular networks of hypertension. Joint funded by the British Heart Foundation and The Turing Institute.
Biostatistics Collaboration Unit point of contact for the Manchester Centre for Audiology and Deafness (ManCAD).

EDUCATION

PhD in Medical studies at Plymouth University *Exp. Nov 2021*
Title: Statistical learning on biomarker discovery for neurodegenerative diseases
MSc. in Biomedical Science at Plymouth University *Sep 2017*
Project: Bioinformatic characterisation of the recent endogenous retrovirus lineages in the Rhesus and Cynomolgus Macaques
BSc. in Biomedicine at the University of East Anglia *Sep 2016*
Project: Analysis of the structure and binding between Smads and the WWP2 ubiquitin ligase

SKILLS

- Fluent in R and Python programming languages
- Applications and development of causal inference approaches to networks
- Analysis of high throughput genomic and transcriptomic data
- MongoDB databasing and mySQL language
- Designing and applying Machine Learning algorithms
- Mining, cleaning and handling Big Data
- Basic wet lab skills (eg. gel electrophoresis, western blots, protein purification etc.)
- Creating Nextflow pipelines to handle high throughput data analysis

PUBLICATIONS

Kelly J, Berzuini C, Keavney B, Tomaszewski M, Guo H (2022). Discovery methods for systematic analysis of causal molecular networks in modern omics datasets. *arXiv* :2201.12229

Saunders G, Beukes E, Uus K, Armitage C, **Kelly J** and Munro K (2022). Shedding Light on SARS-CoV-2, COVID-19, COVID-19 Vaccination, and Auditory Symptoms: Causality or Spurious Conjunction?. *Frontiers in public health*, 10: 837513.

Visram A, Purdy S, **Kelly J** and Munro K (2022). Longitudinal assessment of listening skills in UK infants with hearing aids using the LittlEARS Auditory Questionnaire. *International Journal of Audiology*.

Kelly J, Moyeed R, Carroll C, Luo S, and Li X (2020). Genetic networks in Parkinsons and Alzheimers disease. *Aging*, 12(6): pp.52215243.

Valionyte E, Yang Yi, Roberts SL, **Kelly J**, Lu B, Luo S (2020). Lowering Mutant Huntingtin Levels and Toxicity: Autophagy-Endolysosome Pathways in Huntington's Disease. *Journal of Molecular Biology*, 432(8): pp.2673-2691.

Kelly J, Moyeed R, Carroll C, Albani D and Li X (2019). Gene expression meta-analysis of Parkinsons disease and its relationship with Alzheimer's disease. *Molecular Brain*, 12:16.

Maze E, Ham C, **Kelly J**, Ussher L, Almond N, Towers G, Berry N, Belshaw R (2019). Variable Baseline Papio cynocephalus Endogenous Retrovirus (PcEV) Expression Is Upregulated in Acutely SIV-Infected Macaques and Correlated to STAT1 Expression in the Spleen. *Frontiers in Immunology*, 10:901.

Yang Y, Valionyte E, **Kelly J**, Luo S (2019). Histone H3F3/H3.3 chaperone DAXX converts to modulate SQSTM1 phase condensation for NFE2L2 activation. *Autophagy*, 16(1): pp.171-172.

POSTERS + TALKS

- Talk at Postdoctoral session of AI UK conference 2022.
- Contributed Talk at the Royal Statistical Society 2021 International Conference titled: Machine learning for gene expression biomarker detection in Alzheimer's disease
- Poster talk at AiPBAND workshop on Knowledge Translation in Cancer Study titled: Integrated systems approach to identify genetic networks and hubs
- Poster at FENS 2020 titled: Gene expression analysis of Huntingtons disease brains identifies the potential importance of Desmoplakin
- Poster at AD/PD 2019 Portugal titled: Integrated systems approach to identify genetic networks and hubs in Parkinsons disease
- Poster at Parkinsons Disease UK 2018 titled: Integrated systems approach to identify genetic networks and hubs in Parkinsons disease
- Poster at Alzheimers Research UK 2018 titled: Cross-talk between Parkinson and Alzheimer's disease

AWARDS

- The Alan Turing Institute Post-Doctoral Enrichment Award 2022

PROJECTS + TRAINING

- IPDGC Hackathon. Project using Python to scrape Reddit and twitter data to perform sentiment analysis and investigate attitudes towards Parkinson's disease.

- M101P: MongoDB for Developers run by MongoDB University
- Big Data methods in R run by Mind Project
- Courses in academic writing and presenting run by Plymouth doctoral college

ADDITIONAL ACTIVITIES

- Teaching on Experimental Design and Statistics module on the MSc Bioinformatics and Systems Biology
- Reviewed for Communications Biology, Journal of Translational Medicine, Scientific reports and BMC medical research methodology
- Assisted in supervising bioinformatics MSc student project
- Supervised MSc Health Data Sciences student project