JACK KELLY

Manchester
jack.kelly@manchester.ac.uk ⋄ github.com/jackkelly75

RESEARCH INTERESTS

I have an interest in high throughput data analysis in particular 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. My research projects include:

- Use of integrated -omics data to build Molecular causal networks of hypertension
- Use of novel meta-analysis methods on Parkinson's disease microarray data and investigation into Parkinson's relationship with Alzheimer's
- Building and analysing gene interaction networks for Parkinson's and Alzheimer's disease. Development of novel R function to use multiple methods to detect hubs in gene interaction networks and give significance using a permutation test
- Analysis of Huntington's RNA-seq data to identify gene regulators and experimental confirmation of results
- Use of various machine and deep learning algorithms to identify a potential panel of genetic blood biomarkers for Parkinson's disease

PROFESSIONAL APPOINTMENTS

Research Associate at the University of Manchester *Jan 2021 - Dec 2023*
Developing causal molecular networks of hypertension
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 of causal inference 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, Moyeed R, Carroll C, Luo S, and Li X (2020). Genetic networks in Parkinsons and Alzheimers disease. *Aging*, 12(6): pp.52215243.

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.

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.

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

- 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

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 and Scientific reports

- Assisted in supervising bioinformatics MSc student project
- Supervised MSc Health Data Sciences student project