

# Ashkan Alvand (Ph.D.)

[linkedin.com](#) | [github.com](#) | [alvand.ashkan@gmail.com](mailto:alvand.ashkan@gmail.com) | 02102265747

## EDUCATION

2018-2024	University of Auckland	Doctor of Philosophy, Psychology
2014-2016	University of Auckland	Master of Engineering (1st Class Honors), Information Technology
2010-2014	University of Auckland	Bachelor of Engineering, Information Technology

## WORK EXPERIENCE

### Liggins Institute, Auckland, NZ

#### Postdoctoral Research Fellow, Feb 2023 - Sep 2023

- Analyzed big datasets (1+ TB) on two computer vision projects with 200+ participants' data
- Developed Bash scripts using docker containers and Python packages (e.g., Niprep, Nilearn) for data organization, quality check and cleaning
- Developed image processing and analysis pipelines using Bash and Matlab for semi-automated image segmentations, alignment, registration, noise reduction and feature extractions
- Configured Ubuntu systems on cloud platform (NeCTAR) for data warehousing, organisation and processing (connection through WinSCP, SSH, PuTTY)
- Developed statistical analysis pipeline on randomised control trial dataset using  $t$ -test, histogram and permutation tests (Matlab, Bash) for assessing biomarkers on babies' brain growth
- Communicated insights with multidisciplinary teams by writing reports and presentations

### University of Auckland, NZ

#### Doctoral Researcher, 2018-2023

- Authored/co-authored 5 original [research articles](#) and reviews published in peer-reviewed journals, contributing to manuscript writing, design of controlled hypothesis-driven experiments, literature reviews, data plotting (Python, Matlab), schematic drawing, and statistical analysis ( $t$  test, ANOVA, linear regression, non-parametric tests with Matlab statistical tools, SPSS, and FSL PALM)
- Developed an image processing and analysis pipeline for multimodal imaging dataset (fMRI/dMRI/SMRI) using Matlab, Bash, docker container, Python (Tedana, Nilearn, Nibabel), for semi-automated image segmentation, registration and denoising, which was subsequently published [here](#) and [here](#)
- Created 15+ pipelines for implementing graph algorithms (community detection, random forest etc.) utilizing Matlab, with the methodology and results published in top tier journal [here](#) and [here](#)
- Conducted two large-scale human project on 70+ clients by designing project's plans, writing SOPs, strategizing data collection (e.g., Human recruitment, tests, survey, questionnaire and interviews)
- Mentored postgraduate students (2 Masters), tutored course labs for over 100 graduate students and volunteered as committee member in multiple student-led societies for organizing workshops/seminars
- Collaborated with international researchers on two global research for improving cross-species neuroimaging pipelines, published in top tier journal of [Neuron](#)
- Managed \$80k in research funding for my projects and authored mobility grant applications for studies I designed, securing over \$6k in funding from sources such as [EMC](#)

## SELECTED PROJECTS

### Interactive brain systems in children with APD

Identifying functional biomarkers in the brains of children diagnosed with APD

- Implemented graph theory framework using Matlab and C++ for applying community clustering algorithms (Louvain, Infomap, Leiden), hub detection as well as topology-based algorithms for modeling and finding relationship (i.e., networks) on data points
- Implemented evaluation procedure such as intra/inter subject reproducibility tests for comparing different brain parcellation pipelines for accurately segmenting brain regions in pediatric population, resulted with 76% accuracy
- Implemented multivariate statistical tests such as ANOVA, ANCOVA, GLM, permutation and correlation tests for assessing brain-behavior relationship
- Wrote Bash scripts and utilised Python packages (e.g., Pybids) and neuroimaging tools (e.g., dcm2niix) for structuring and formatting multimodal dataset
- Performed performance and efficacy tests such as pearson's r, Spearman' rho and temporal DOF (Matlab) on fMRI denoising pipelines resulted with 20% improvement in the pipeline selection
- Processed and visualized fMRI time series for extracting signal from noise based on Matlab and Python (Nilearn) tools in imaging platform (e.g., FSLview)
- Visualized study results using MATLAB visualization functions and Python (e.g., Nilearn) for plotting distributions, brain's region of interests and network simulation

### Brain's wiring in children with APD

- Implemented mathematical frameworks for modeling brain's graph for assessing network's backbone structure and anomaly detection (alteration) using minimum spanning tree, community, rich-club algorithms (Matlab)
- Wrote scripts for utilizing tracking algorithms (FACT) for modeling water molecules diffusion in brain's tissues (docker container, Bash and Matlab)
- Developed statistical analysis scripts such as multivariate tests, network anomaly test for assessing the relationship between network measures, brain's tissue and behavioral data points (SPSS, Matlab, FSL PALM)

## TECHNOLOGIES

Matlab, Python, Docker, Git, Linux, SPSS, SAS, Office suite

## AWARDS

- |   |           |
|---|-----------|
| • Eisdell Moore Centre mobility grant (\$2k NZD)      | Nov 2022  |
| • Travel award from Child Mind Institute (\$1.2k USD) | Sep 2019  |
| • Faculty of Science full tuition award (\$36k NZD)   | 2018-2022 |

## CERTIFICATION/TRAINING

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|-------------------------------------|--|
| • MATLAB: LinkedIn Skill Assessment | • Power BI: Dashboards, LinkedIn       |
| • Linux: LinkedIn Skill Assessment  | • Ngā Paerewa Te Tiriti: Nov 2023      |
| • Bash: LinkedIn Skill Assessment   | • Research Methods: The UoA, 2019      |
| • Python: LinkedIn Skill Assessment | • Fundamental of network science, 2015 |