



Democratizing Machine Learning for Researchers Working in Alzheimer's Disease

Benjamin Goudey

Research Fellow, Computing and Information
Systems, University of Melbourne

- **Parent Grant:** Alzheimer's dementia onset and progression in international cohorts
 - Aim: to understand the natural course of disease through integration of 5 longitudinal AD studies
 - Data harmonisation/integration is hard, requires domain knowledge AND deep statistical understanding, hard to replicate
- **Aims of this supplementary grant:**
 1. Develop software to enable easier application of harmonisation methods while following FAIR principals
 2. Implement multimodal, knowledge-informed harmonisation using recent



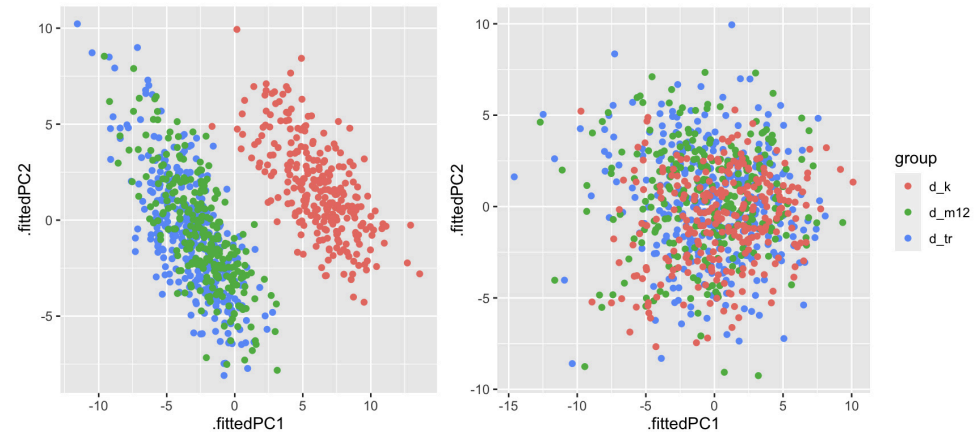
- Developed user-friendly software for exploring and harmonising large dataset (BiobankSeer)
- Exploring novel harmonisation techniques and benchmarks
 - Focus on image-to-image translation and understanding

BiobankSeer + New cohort Cohort Explorer Derived fields Settings

Cohorts Filter...

Hamonisation_2022
N = 1,092 Harmonisation experiments using bias-aware loss functions on ADOPIC data Open Export to CSV

AB Centiloid_subset_ctrl
N = 482 Amyloid-related cognitively normals Open Export to CSV



Pre- and post- harmonisation

- Grant helped to build collaborations
 - Brought more ML/statistical knowledge to the parent grant
 - Helped to reinforce international collaborations
- Helped us to understand the limits and opportunities of data harmonisation in longitudinal AD cohorts
 - Our investigation provided further evidence motivating this grant, more work to be done
- Primary issues encountered were COVID lock downs in Australian and slow IP/data sharing agreements



MELBOURNE

University of Melbourne

Colin Masters

Victor Fedyashov

Master Saint-Jalmes

Shu Liu

Liang Jin

Tim Baldwin

Xiyuan Zhang

Paul Maruff

Larry Ward

CSIRO

Jurgen Fripp

James Doecke

UCSF

Duygu Tosun

Mike Weiner

Washington University

Manu Goyal

John Morris

...and the large set of collaborators on the parent grant who have helped in a number of conversations throughout the last 12 months.