



THE UNIVERSITY OF
AUCKLAND
Te Whare Wānanga o Tānaki Makaurau
NEW ZEALAND

Advanced Graph Analytics for Human Brain Connectivity

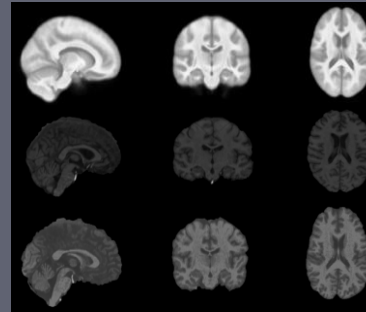
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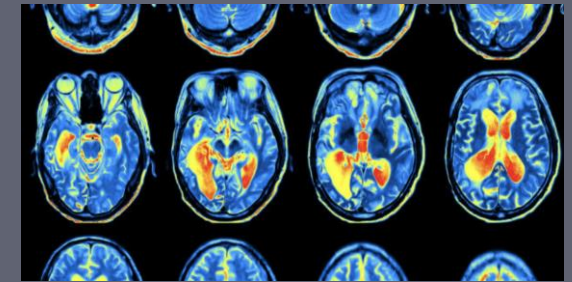
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School of Computer Science



Auckland Bioengineering Institute



School of Medical Sciences
Mātai Medical Research Institute



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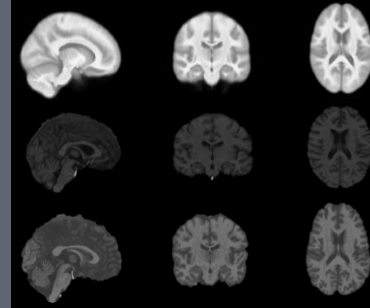
Samuel Weston

Master March 1, 2021

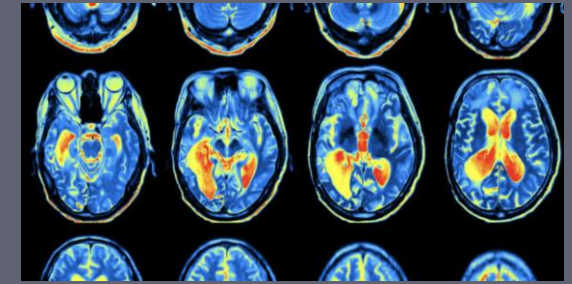
Research – Achievements



School of Computer Science



Auckland Bioengineering Institute



School of Medical Sciences
Mātai Medical Research Institute



☐ Background & Literature Study

- Survey: Spectral graph theory, graph neural-network and efficient subgraph extraction: *Completed.*

☐ Data-sharing repository

- *Completed.*

☐ Preliminary study generated **2 x A* conference papers** + 2 x submissions

- M. Qiao, Y. Tao, Two-Attribute Skew Free, Isolated CP Theorem, and Massively Parallel Joins. (PODS), 2021.
- Z. Feng, M. Qiao, H. Cheng, Clustering Activation Networks. To appear in ICDE 2022.
- Two more papers submitted.

☐ Background & Literature Study

- Survey: Data harmonization.
- *Completed.*

☐ Public Data Collection

- Collect public datasets: *Completed.*
- Preprocessing public datasets: *In progress*

☐ Data Preprocessing

- Brain template for concussion: *In progress*

☐ Rugby Player Data Collection

- *Completed.*

☐ Māori Student

- Samuel Weston
- *Completing.*



One-year Progress Summary

Year 1 Milestone	
NZ	
Collect local neuro-imaging data on rugby players recruited from the Gisborne/Tairāwhiti region.	Completed
Establish a data-sharing repository for local use.	Completed
Preprocess local data for subsequent analysis.	In progress
Joint NZ-SG	
Background/literature study.	Completed
Collect and preprocess multi-modal neuroimaging data from public sources.	In progress
Establish a repository for common access on public/processed data and research outcomes.	Completed



Challenges

❑ Year 1 scheduled tasks slightly delayed

- Covid-19 has impacted the recruitment process. Mitigation: Our postdoc and research fellow are catching up on the progress on preprocessing the data by engaging more computation resources.
- Covid-19 has impacted the staff and students in Auckland. Mitigation: We work closely with each other and slightly relax the timelines to accommodate their situation.



Q & A

Thank you!



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI



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- Catalyst: Strategic Fund from Government Funding,
administered by the Ministry of Business Innovation and Employment.
- Singapore Data Science Consortium (SDSC) International Research Collaboration Grant



NZ-Singapore Collaboration

- ❑ Joint Supervision
 - Callum Cory is supervised by both the NZ team and SG team.
 - Established joint meeting on graph analytics.
- ❑ Establishing long-term collaborations targeting
 - A platform for knowledge sharing, and
 - A unified data preprocessing pipeline for our project.