

Hayden McAlister

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**Github**

<https://github.com/hmcalister>

# Hayden McAlister

## Postgraduate Student - University of Otago

### Education

#### MSc. Computer Science

University of Otago, 2023 (In Progress)

Thesis: *Energy and the Hopfield Network: A Complementary Perspective*

#### BSc(Hons), 1st Degree. Computer Science

University of Otago, 2022

Dissertation: *Sequential Learning in Hopfield Networks*

#### BSc. Major in Computer Science, Minors in Physics, Mathematics

University of Otago, 2019-2021

### Research Projects

#### 2022-2023, *Interpretability of Deep Neural Networks*, University of Otago

Summer research project into the interpretability of deep neural networks with a focus on convolutional networks.

Found current state of the art interpretability methods are highly sensitive to hyperparameters. Also found interpretability methods have some relation to weight importance measures.

#### 2022-2023, *Connecting Semantically Similar Stories using Natural Language Processing*, University of Otago

Ongoing group research project in natural language processing. Goal was to create methods of measuring similarities between documents with respect to different metrics.

Found that similar documents can be clustered together even when presented without that structure.

#### 2023, *Handwriting Analysis over Dominant vs Non-Dominant Hands*, University of Otago

Ongoing group research project in handwriting analysis. Attempted to classify handwriting quality using a variety of metrics.

Gained experience with data cleaning, signal processing, data visualization, and model comparisons. Currently in the data collection phase.

#### 2021-2022, *Provenance Tracking*, University of Otago

Summer research project into tracking provenance across different domains. Focus on distributed ledger technologies as a support for event calculus. Found other technologies may be more promising for the role, but current implementation may be sufficient.

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## Experience

### **2021-2023, *Lab Demonstrating, University of Otago***

Involved presenting computer science topics to students. In later years, also involved creating and refining teaching resources for labs.

Detailed achievements:

- Demonstrated for the papers:
  - COSC201: Algorithms and Data Structures
  - COSC202: Software Development
  - COSC203: Web, Databases, and Networks
  - COSC204: Computer Systems and Security
  - COSC301: Network Management and Security
  - COSC343: Artificial Intelligence
- Gained experience working with a team.
- Gained experience communicating difficult concepts to the point of deep understanding.
- Gained leadership experience with additional responsibility to creating lab material.

### **2019-2023, *Tutoring, Freelance***

Freelance tutoring for various subjects about the university. Specifically tutored in the fields of Computer Science, Mathematics, and Physics.

## Awards

### **2023, *Master's Research Scholarship, University of Otago***

Awarded to students with high academic achievement moving into Masters research.

### **2021, *Sir George Grey Senior Scholarship, University of Otago***

Awarded to the top Bachelors student in the Division of Science.

### **2021, 2022, *Summer Research Scholarship, University of Otago***

Awarded to students who undertake a research project over summer.

### **2020, *Robert Jack Physics Prize (200 Level), University of Otago***

Awarded to the top student in 200-level physics.

### **2019, *Academic Excellence Entrance Scholarship, University of Otago***

Awarded to the students with high academic achievement entering the University of Otago.

### **2019, *Gordon Jupp Memorial Prize in Physics, University of Otago***

Awarded to the top student in 100-level physics.

### **2019, *Dux, Otago Boys High School***