

Hayden McAlister

**Email**

haydenmcalister49@gmail.com

**Phone**

022 120 8324

**Github**

<https://github.com/hmcalister>

# Hayden McAlister

## Software Engineer

**About Me** I am a Masters student of Computer Science at the University of Otago. My research has focused on artificial intelligence, neural networks, and high dimensional dynamic systems. I enjoy investigating new ideas, trying new technologies, and solving problems both mathematical and engineering in nature. I have a strong background in computer science, as well as mathematics and physics, which has helped me develop problem solving skills.

## Education

### MSc. Computer Science

University of Otago, 2023

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 Neural Networks*, University of Otago

Research project in interpretability of convolutional neural networks.

Gained a lot of experience with very low level Tensorflow and other machine learning libraries. Worked independently to achieve project goals.

### 2023, *Handwriting Analysis Project*, University of Otago

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.

### 2022, *Natural Language Processing Project*, University of Otago

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

Gained experience with data cleaning, data processing, natural language processing, and natural language tools.

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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.

### 2019 - 2022, *IT + Web Design*, STMSNZ

Detailed achievements:

- Designed and created custom websites.
- Aided with many mundane IT tasks, e.g.:
  - Email clients
  - Software bugs
  - Fixing user errors

## Software Development Skills

### Programming

- |          |                   |          |
|----------|-------------------|----------|
| ◦ Python | ◦ Go              | ◦ Rust   |
| ◦ Java   | ◦ C/C++           | ◦ Matlab |
| ◦ Shell  | ◦ JS + Frameworks |          |

### Machine Learning + Data Science

- |              |           |          |
|--------------|-----------|----------|
| ◦ Tensorflow | ◦ Pytorch | ◦ SpaCy  |
| ◦ Dash       | ◦ NumPy   | ◦ Pandas |
| ◦ Polars     | ◦ SciPy   | ◦ SQL    |

### Databases

- |              |             |           |
|--------------|-------------|-----------|
| ◦ MySQL      | ◦ MongoDB   | ◦ SQLite  |
| ◦ PostgreSQL | ◦ Cassandra | ◦ GraphQL |
| ◦ Monarch    |             |           |

### Other Technologies

- |                   |              |              |
|-------------------|--------------|--------------|
| ◦ AWS             | ◦ Git/GitHub | ◦ gRPC       |
| ◦ Shell Scripting | ◦ Docker     | ◦ Kubernetes |
| ◦ Terraform       |              |              |

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## 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***

## Interests

**Professional**

Machine Learning, Neural Networks, Data Science, Data Visualization, Software Engineering, Software Development, Software Scalability

**Personal**

Mathematics, Physics, History, Guitar, Dungeons and Dragons, Magic: The Gathering

## References

References are available upon request.