# Application for Summer Research

## 1 PREFERENCES

1. Project 3394 – learning sequential robot assembly in furniture bench
2. Project 3385 – information storage in synthetic DNA
3. Project 3383 – Measuring responses of brain cells to natural images

## 2 APPLICANT DETAILS

**Monash ID:** 30630711

**Title:** Mr

**Given name:** Alexander

**Family name:** Li

**Date of birth:** 10/06/2000

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**Street Address:** 1 Harwood Cl

**Suburb:** Wheelers Hill

**State/Territory:** Victoria

**Postcode:** 3150

**Citizenship:** Australian citizen

## 3 STUDY DETAILS

**Study level:** undergraduate

**Course code:** E3007

**Course title:** Bachelor of Engineering (Honours) and Bachelor of Science

**University:** Monash University

**Year level:** 5

### 3.1 CURRENTLY ENROLLED AND COMPLETED UNITS:

**Current units:**

- ECE4179 Neural Networks
- ECE4078 Intelligent Robotics

- ECE4191 Engineering Integrated Design

**Past relevant units:**

- MTH2025 Advanced Linear algebra (HD)
- MTH3020 Complex Analysis and Integral Transforms (HD)
- MTH2040 Mathematical Modelling (HD)
- TRC3600 Control Theory (HD)
- ENG2005 Advanced Engineering Mathematics (HD)
- PHS2061 Quantum and Thermal Physics (HD)
- PHS2062 Electromagnetism and Optics (HD)
- ECE3161 Analogue Electronics (HD)
- FIT2014 Theory of Computation (HD)
- ECE2071 Computer Organisation and Programming (HD)
- TRC3500 Sensors and Artificial Perception (D)

## 3.2 REASONS FOR APPLYING AND BENEFITS TO APPLICANT

1. I find deep fulfilment in a life of learning and teaching; for this reason I am exploring the pathway of doing research in the future. These projects would help me immensely as I undertake this path.

2. I believe I have qualities that are fit for the projects.

- I am fearless when it comes to studying and understanding difficult concepts. My strong mathematics and physics background allows me to learn almost any topic quickly and thoroughly. Moreover, I enjoy the process. I am thriving in the neural networks unit, helping my peers learn the concepts.
- My strong programming background for data analysis and robotics control in various languages (C, Python, MATLAB) and familiarity with software tools (ROS, linux, docker) makes me ideal for the machine-learning based projects.

3. Project 3394: I really want to learn about long-horizon control tasks. It is a very important problem to solve that could open truly amazing doors to automation. As I go about my daily life, I find my mind returning to this topic again and again; it's a very difficult problem but very fun due to how fundamental it is to life. On a more concrete note, maybe we can better understand some limits of the transformer architecture. I've had experiences in MCAV implementing potential-field based Hybrid A* path planner. I've implemented a robot IK solver for the spherical parallel manipulator while in Nova Rover.

4. Project 3385: the idea of using DNA as a storage medium just sounds so crazy and interesting hahaha! Not only is it cool, it is beautiful. The idea alone makes this project worth spending my time in. I love signal processing, spectral analysis, all the associated maths. What a fun project!

# 4 DECLARATION

- I have read and understood the information provided on the Coursework Scholarships web page.
- All information I have provided in this application form is true and accurate to the best of my knowledge at this time.

- I understand that should the information be shown to be false at any stage, the scholarship will be terminated immediately and I will be liable to re-pay the University the total sum of any payments already made.
- I acknowledge that giving false or misleading information is a serious offence under the criminal code (Commonwealth).
- I understand that the Coursework Scholarships Unit may disclose the details of my application for selection purposes.
- I understand that the Coursework Scholarships Unit may disclose the details of any scholarships I am awarded to other areas of Monash University.
- I understand that my details may be passed on to donors who fund scholarships for students at Monash University.

**I certify that I have read and agree to be bound by the terms and conditions set out above.**