

## Negative Space Utilization for Robot Safety: Point Cloud Ground Segmentation for Ditch Avoidance

### Who can apply?

- Australian Citizens & Permanent Residents
- New Zealand Citizens
- Five Eyes Alliance Citizens

### Start date

- By December 2024

### Industry partner and funding body

- [Chironix](#)
- [Defence Trailblazer](#)

### Program of study available

- Master of Philosophy (MPhil) with the University of New South Wales

### Total annual stipend amount

- A base scholarship of \$40,000pa plus \$10,000 top-up x 2 years scholarship

## About the project

The project aims to enhance the safety of autonomous robots by utilizing point cloud and image segmentation to prevent them from accidentally falling into ditches or gaps in their environment. This project will develop software and algorithms that can identify negative spaces (such as ditches, holes, or gaps) using point cloud and visual data and enable robots to make real-time navigation decisions to avoid them.

## Eligibility criteria

- Applicants with strong theoretical and practical skills in machine learning and perception, particularly in semantic segmentation and data fusion will be considered favourably.
- Excellent students who hold a Bachelor of Mechatronics Engineering or a double degree with Computer Science or equivalent would be especially suitable and encouraged to apply.

## Benefits

- Work closely with skilled experts on defence industry led projects
- Translate research into a tangible solution for Defence
- \$50,000pa tax-free stipend (pro-rated for eligible part-time students)
- No tuition fees apply
- Acquire a unique set of skills and expertise
- Enhance your employability skills sought after by industry; graduates are highly regarded by employers
- Opportunities for local and international travel
- Work alongside world-leading researchers
- Gain industry experience and grow your networks
- Solve real life problems through industry engaged projects
- Publish your contributions
- Become an expert and make a real impact
- Access paid annual, parental and personal leave

## How to apply

- Complete an [expression of interest](#)
- Once your initial eligibility assessment is approved, formally lodge an application for admission via [the University of New South Wales Graduate Research School](#)
- **Application intake, opening and closing dates are listed on the university website.**

## More about Defence Trailblazer

The Defence Trailblazer for Concept to Sovereign Capability is a once in a generation opportunity to strengthen the collaboration between defence, academia and industry whilst accelerating research and commercialisation.

In partnership with the University of Adelaide (UoA), the University of New South Wales (UNSW), industry partners and supported by the Australian Government, the \$240 million dollar initiative will skill the workforce of the future, support defence-focused innovation, and play a leading role in accelerating the delivery of sovereign capabilities for the nation's security and prosperity...at-speed and at-scale.

Learn more: <https://dtb.solutions/>

## Industry Research Program

All students supported under the Defence Trailblazer initiative will participate in the Defence Trailblazer Industry Research Program (IRP).

Candidates will be located on-site at both university and industry offices for at least 60 FTE days (pro-rated for eligible Masters candidates), to enable professional development opportunities in an industry setting.

## Defence Research Capability

Academics participating in the Defence Trailblazer IRP are leaders in their fields.

UNSW adds a critical dimension to preparing defence forces across areas as diverse as Autonomous Systems, Hypersonics, Sensors and Space. The UNSW Defence Capability Portfolio showcases UNSW's excellence in defence research and technology and highlights work across academia, government and industry, as well as with global policy makers, to create a hub of defence-related knowledge. The vision is to translate this knowledge into impact which can transform Australian and global societies.

There's no greater reassurance for our community than knowing we're well prepared to prevent or avert threats to our security. UoA researchers support this in very domain: on land and online; in space, the air and at sea, working extensively with the [Department of Defence](#) and defence-related organisations in a variety of ways—as an advisor, research partner and producer of high-quality, career-ready graduates equipped to make our world a better and more secure place.

[Find out more](#) about defence research at UNSW.

## Further information

For a confidential discussion contact:

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*Defence Trailblazer, together with UoA and UNSW, are actively working to support equity groups. We strongly encourage applications from people with a disability, veterans and women interested in working in non-traditional work settings*  
UNSW CRICOS Number 00098G