PHD PROJECT

An improved methodology for evaluating the risk of orbital debris impacts on spacecraft structures

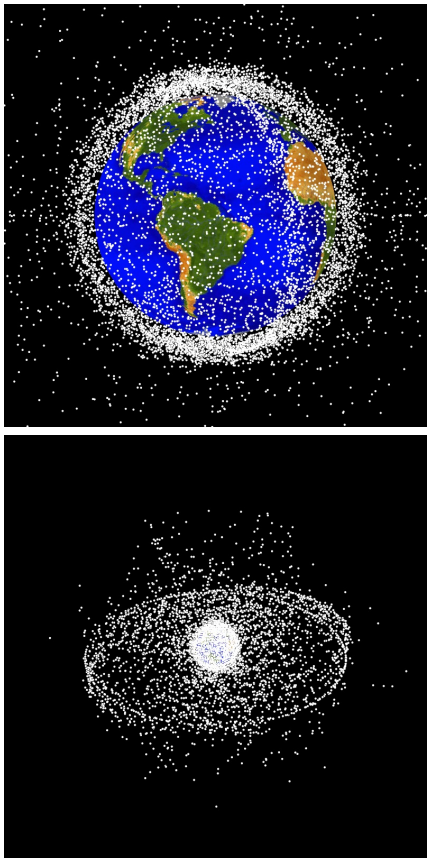
Join a large and diverse group of students, and work with world-class researchers on some of the most exciting AI problems. This project will utilise machine learning and adaptive optimisation to make spacecraft safer from orbital pollution, in collaboration with NASA's Orbital Debris Program Office (https://orbitaldebris.jsc.nasa.gov/).

The ideal candidate will be based at A2I2 in Waurn Ponds and will study under the supervision of A/Prof Santu Rana and Dr Shannon Ryan at A2I2.

Background

The space environment continues to become increasingly polluted with man-made debris. Small fragments of such debris travel at hypersonic speeds and, as a result, pose a significant risk to the safe operation of spacecraft. Indeed, micrometoroid and orbital debris impact presents the #1 risk to the International Space Station (and prior to its retirement, the Space Shuttle Orbiter).

All manned space missions and some robotic missions require a risk assessment to quantify the risk of debris impact. Part of this assessment uses equations which describe the protective capability of the spacecraft walls – referred to as ballistic limit equations. The current state-of-the-art equations are semi-analytical equations that are limited in accuracy, statistical relevance, and in their application to different types of potential space debris materials and shapes.

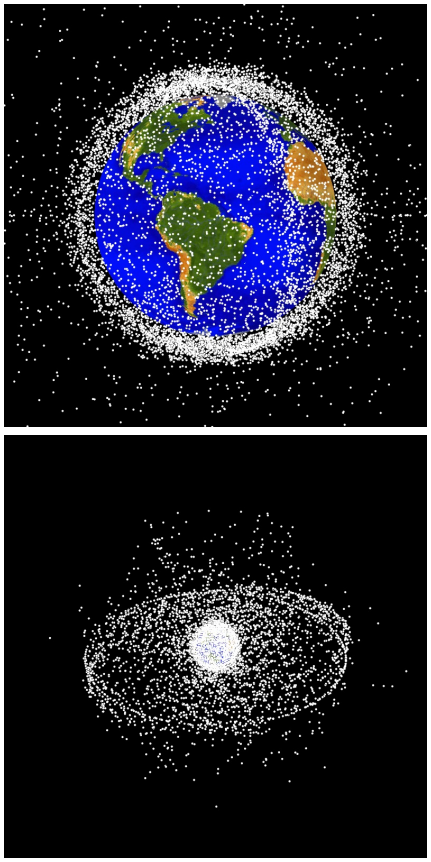


Scope

The goal of this project is to utilise machine learning and adaptive optimisation to develop new methods for evaluating the protective capability of spacecraft walls impacted by micrometeoroid and orbital debris particles.

Scholarships

Scholarships are available for local students and onshore international students currently staying in Australia. The 2021 stipend is $28,600 (tax-exempt) plus attractive HDR funding to cover the cost of presenting at major international conferences in the field. The qualified candidate will also receive a tuition-fee waiver and can claim up to $1,500 for relocation expenses.



For Applicants

All applications will go through a rigorous assessment process and shortlisted applicants will be interviewed.
Qualification: 4-year undergraduate degree or master degree in computer science, machine learning, artificial intelligence, electrical engineering, or similar disciplines.
Skills: Python (preferred), R, Julia
Research experience: Preferred - machine learning model development and applications, including artificial neural networks, symbolic learning, transfer learning, and Bayesian Optimisation.

Interested applicants should email applications to:
Dr Trang Tran, HDR Coordinator at trang.tran@deakin.edu.au
The application should include:

- Resume (or CV),
- A2I2 Expression of Interest (access via this link: https://bit.ly/3ssl0Al); and
- other supporting documents (if available): Degree certificates, Academic transcripts; Published papers; Research proposal; and Referral reports.