



POSITION DESCRIPTION

School of Electrical, Mechanical and Infrastructure Engineering
Department of Electrical and Electronic Engineering
Melbourne School of Engineering

Research Fellows in Autonomous Systems

POSITION NO	0049539
CLASSIFICATION	Research Fellow (Level B)
SALARY	\$102,967 - \$122,268 p.a.
SUPERANNUATION	Employer contribution of 9.5%
WORKING HOURS	Full time (1 FTE)
BASIS OF EMPLOYMENT	"CONTINUING / FIXED-TERM" FOR/TO XXXX MONTHS / YEARS / DATE Three full-time (fixed-term) positions available for 12 months with additional renewals possible up to 24 months (Three years total).
OTHER BENEFITS	http://about.unimelb.edu.au/careers/working/benefits
HOW TO APPLY	Online applications are preferred. Go to http://about.unimelb.edu.au/careers , select the relevant option ('Current Staff' or 'Prospective Staff'), then find the position by title or number.
LOCATION	Currently Parkville campus, however in the future as we move towards a multi precinct model there may be a requirement to locate either permanently or flexibly elsewhere including but not limited to Melbourne Connect and Fishermens Bend Precinct
CONTACT FOR ENQUIRIES ONLY	Professor Chris Manzie Email manziec@unimelb.edu.au <i>Please do not send your application to this contact</i>

For information about working for the University of Melbourne, visit our websites:
about.unimelb.edu.au/careers

The University of Melbourne

Established in 1853, the University of Melbourne is a public-spirited institution that makes distinctive contributions to society in research, learning and teaching and engagement. It's consistently ranked among the leading universities in the world, with international rankings of world universities placing it as number 1 in Australia and number 32 in the world (Times Higher Education World University Rankings 2017-2018).

<https://about.unimelb.edu.au/strategy/growing-esteem>

Melbourne School of Engineering

Melbourne School of Engineering (MSE) has been the leading Australian provider of engineering and IT education and research for over 150 years. We are a multidisciplinary School organised into three key areas; Computing and Information Systems (CIS), Chemical and Biomedical Engineering (CBE) and Electrical, Mechanical and Infrastructure Engineering (EMI). MSE continues to attract top staff and students with a global reputation and has a commitment to knowledge for the betterment of society.

Our ten-year strategy, MSE 2025, is our School's commitment to bring to life the University-wide strategy *Growing Esteem* and reinforce the University of Melbourne's position as one of the best in the world. Investment in new infrastructure, strengthening industry engagement and growing the size and diversity of our staff and student base to drive innovation and develop the transformative technologies of the future are all fundamental principles underpinning MSE 2025.

<http://www.eng.unimelb.edu.au/about/join-mse/why-join-mse>

School of Electrical, Mechanical and Infrastructure Engineering

The School of Electrical, Mechanical and Infrastructure Engineering undertakes teaching and research across a range of disciplines that are internationally recognised for their contribution to fundamental research. It has a number of well-established industry linkages and international partnerships. It is building a vibrant profile of interdisciplinary research, working with industry with an aim to contribute to society. It offers a comprehensive range of accredited Masters of Engineering and Master of Information Technology programs taught through the Electrical, Mechanical and Infrastructure departments as well as professional Masters programs. It has a substantial cohort of research higher degree students. A major focus of the school is to attract and retain outstanding and internationally recognised academic staff. The School is committed through strategy, culture and mentorship to increasing the number of female engineers and scientists on its staff.

Position Summary

The three research fellows will join a team of academic staff and postgraduate students located within the Department of Electrical and Electronic Engineering and the School of Computing and Information Systems. The research fellows will also have the opportunity to collaborate with leading computer vision and machine learning researchers at the University of Adelaide, and our industry partner BAE Systems Australia.

There are two research themes that will be explored in the domain of trusted autonomous systems, and the appointees will work on one of these areas.

The first theme will address one of the key issues in ground vehicles by developing algorithms that schedule the sensing and actuation on-board an autonomous vehicle in order to maintain situational awareness and ensure completion of complex tasks. In essence developing approaches that can solve constrained optimisation approaches multi-objective optimisation problems, particularly under uncertainty. Whilst the initial phase of research will focus on algorithms that manage the exploration-exploitation tradeoff in a single vehicle, the subsequent extensions will consider multiple vehicles sharing information to reduce the uncertainty in the decision-making process.

The second research theme considers the hierarchy of control, sensing, classification and symbolic planning modules that constitute the software in an autonomous system. Each of these modules has a level of uncertainty has the potential to propagate through the overall systems. This research theme will investigate the development of codesign and verification tools that allow the overall autonomous system behaviour to be guaranteed at a certain level of performance.

The research fellows will have an outstanding background in Engineering, Applied Mathematics or Computer Science, ideally with experience in engineering applications of real-time control of dynamical systems and/or exposure to mathematical foundations of learning and optimisation.

In addition to preparing technical reports, research publications, and computer simulations, the research fellow will present to the industry partner and a multi-disciplinary group of collaborators.

The University plan seeks to increase the diversity of the workforce and the representation of women in areas they have been traditionally under-represented. Consistent with this, the School is seeking to increase the representation of women in the academic workforce across engineering disciplines. Under a Special Measure, Section 12 (1) of the Equal Opportunity Act 2010 (Vic), the School is seeking to lift the representation of women from 20% in 2014 to at least 25% over the next 5 years, and strongly encourages applications from suitably qualified female candidates.

1. Selection Criteria

1.1 ESSENTIAL

- ▶ A PhD in Engineering or Applied Mathematics, or a closely related discipline;
- ▶ A record of quality research as evidenced by research publications in leading journals and at conferences of systems and control, and optimisation commensurate with opportunity;
- ▶ Expertise in system modelling and control and a strong interest in the application of these to address practical problems in real-time decision-making scenarios;
- ▶ Excellent programming skills in multiple languages including C/C++ and MATLAB, and capability of working with simulators to deliver tangible outcomes;
- ▶ Demonstrated capacity to communicate research concepts to technical and non-technical audiences;

- ▶ Experience taking initiative and working with minimal supervision and ability to prioritise tasks to achieve project objectives within timelines;
- ▶ Excellent interpersonal skills, including an ability to interact with internal and external stakeholders (academic, administrative and support staff) in a courteous and effective manner.

1.2 DESIRABLE

- ▶ Experience with the implementation of numerical methods and engineering applications of optimisation techniques in real-time control of dynamical systems;
- ▶ Experience in delivering tangible results with real-world relevance in research projects;
- ▶ Ability to structure, engage and present information clearly to various audiences;

2. Key Responsibilities

2.1 RESEARCH – ADVANCEMENT OF DISCIPLINE

- ▶ Conduct fundamental and application-oriented research consistent with the “Position Summary” above;
- ▶ Develop effective timelines and milestones based on goals of the research program;
- ▶ Preparation and publication of top-quality research papers and technical reports;
- ▶ Preparation and delivery of technical presentations to Academia and Industry;
- ▶ Assistance in the supervision of student projects;
- ▶ Work towards building an independent research project.

2.2 ENGAGEMENT

- ▶ Attend and actively contribute to group meetings and department seminars;
- ▶ Present research results at local and national meetings and conferences;
- ▶ Effective liaison with external networks to foster collaborative research partnerships;
- ▶ Contribute to the development of field trials with the industry partner.

2.3 SERVICE AND LEADERSHIP

- ▶ Assist with administrative duties and general laboratory duties including maintenance of the laboratory and equipment;
- ▶ Assist in the preparation and submission of competitive grant applications relating to the appointee’s research program;
- ▶ Perform other duties as requested by the appointee’s immediate supervisor;
- ▶ Perform other tasks as requested by the supervisor or the Head of the Department.
- ▶ Undertake Occupational Health and Safety (OH&S) and Environmental Health and Safety (EH&S) responsibilities as outlined in Section 4.

3. Equal Opportunity, Diversity and Inclusion

The University is an equal opportunity employer and is committed to providing a workplace free from all forms of unlawful discrimination, harassment, bullying, vilification and victimisation. The University makes decisions on employment, promotion and reward on the basis of merit.

The University is committed to all aspects of equal opportunity, diversity and inclusion in the workplace and to providing all staff, students, contractors, honorary appointees, volunteers and visitors with a safe, respectful and rewarding environment free from all forms of unlawful discrimination, harassment, vilification and victimisation. This commitment is set out in the University's People Strategy 2015-2020 and policies that address diversity and inclusion, equal employment opportunity, discrimination, sexual harassment, bullying and appropriate workplace behaviour. All staff are required to comply with all University policies.

The University values diversity because we recognise that the differences in our people's age, race, ethnicity, culture, gender, nationality, sexual orientation, physical ability and background bring richness to our work environment. Consequently, the People Strategy sets out the strategic aim to drive diversity and inclusion across the University to create an environment where the compounding benefits of a diverse workforce are recognised as vital in our continuous desire to strive for excellence and reach the targets of Growing Esteem.

4. Occupational Health and Safety (OHS)

All staff are required to take reasonable care for their own health and safety and that of other personnel who may be affected by their conduct.

OHS responsibilities applicable to positions are published at:

<http://safety.unimelb.edu.au/people/community/responsibilities-of-personnel>

These include general staff responsibilities and those additional responsibilities that apply for Managers and Supervisors and other Personnel.