POSITION DESCRIPTION

THE UNIVERSITY OF MELBOURNE

**School of Electrical, Mechanical Infrastructure Engineering**
Melbourne School of Engineering

# Research Fellow in Optimal Control

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| **POSITION NO** | 0043014 |
| **CLASSIFICATION** | Research Fellow (Level A) |
| **SALARY** | $69,148* - $93,830 p.a. (*PhD entry Level A.6 $87,415 p.a.) |
| **SUPERANNUATION** | Employer contribution of 9.5% |
| **WORKING HOURS** | Full-time (1.0 FTE) |
| **EMPLOYMENT TYPE** | Fixed term position available for 12 months<br>Fixed term contract type: Externally Funded<br><br>The Melbourne School of Engineering is strongly committed to supporting diversity and flexibility in the workplace. Applications for part-time or other flexible working arrangements will be welcomed and will be fully considered subject to meeting the inherent requirements of the position. |
| **OTHER BENEFITS** | http://about.unimelb.edu.au/careers/working/benefits |
| **CURRENT OCCUPANT** | New |
| **HOW TO APPLY** | Online applications are preferred. Go to http://about.unimelb.edu.au/careers, under 'Job Search and Job Alerts', select the relevant option, and find by title or number. |
| **CONTACT FOR ENQUIRIES ONLY** | Associate Prof Peter Dower<br>Email: pdower@unimelb.edu.au<br><br>*Please do not send your application to this contact* |

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.

The School's aim is to attract and retain outstanding staff. The School is highly supportive of increasing the number of female staff.

# Position Summary

The research fellow will work as part of a team of researchers, academic staff and postgraduate students, and will contribute to the development and application of new theory and methods for solving continuous time nonlinear optimal control and related problems.

The research fellow will be principally responsible for the following:

(a) The conduct of systems theory oriented research into the development of new theory and efficient computational methods for the solution of nonlinear optimal control and related problems, in continuous time, using tools from idempotent analysis, convex analysis, and semi-group theory;

(b) The preparation, communication, and publication of research outcomes in conferences and journals;

(c) Other activities as deemed appropriate to the successful completion of the research project.

The research fellow will have an outstanding background in applied mathematics (or equivalent), with experience in optimal control theory for continuous time nonlinear systems. Exposure to abstract algebra, convex analysis, optimization, and / or the development of numerical methods is desirable.

The research fellow will be located in the Department of Electrical and Electronic Engineering in the Melbourne School of Engineering under the direction of Associate Professor Peter Dower and will be expected to be an active member of the Department, collaborating with other researchers.

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, under 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 Applied Mathematics or Electrical Engineering, or equivalent qualification;
- A track record of quality research commensurate with experience, as evidenced by research publications in the top systems theory journals and conferences;
- A solid working knowledge of optimal control theory;
- A solid understanding of functional analysis;
- A strong commitment to the responsibilities outlined in (a)-(c) in the “Position Summary” above;
- Commitment and ability to work as part of a team, including with graduate and undergraduate students;
- Excellent technical communication skills;
- Demonstrated experience in using initiative, working with minimal supervision and ability to prioritise tasks to achieve project objectives within timelines.

### 1.2 DESIRABLE

- Exposure to abstract algebra;
- Exposure to convex analysis;
- Exposure to optimization;
- Experience in the development of numerical methods.

## 2. Key Responsibilities

### 2.1 RESEARCH

- Independently plan and carry out research on the nominated research project and work towards completion of the aims of the project;
- Develop effective timelines and milestones based on goals of the research programme;
- Produce reports, conference and seminar papers and publications associated with the research project;
- Regularly write technical reports on the outputs of the experiments conducted, and maintain accurate and detailed records of all experiments conducted;
- Preparation and publication of top quality research papers and reports;
- Liaise effectively with collaborators with a variety of internal and external stakeholders;
- Assist other researchers in carrying out experiments in order to work as a team and further the department's research output;
- Contribute to the development of the Department's and the School's strong research program in optimal control;
- Work towards building an independent research project.

### 2.2 TEACHING AND LEARNING

- Occasional contributions to teaching within the staff member's area of expertise;
- Effective supervision or co-supervision of junior research staff and postgraduate students;
- Conduct lectures, tutorials, mark and undertake laboratory duties as required by the Department.

### 2.3 ENGAGEMENT

- Attend and contribute actively to lab/team meetings;
- Preparation and delivery of technical presentations to Academia and Industry;
- Attend and actively participate in departmental seminars, meetings and/or committee memberships.

### 2.4 SERVICE & LEADERSHIP

- Lead and contribute in the preparation and submission of competitive grant applications relating to the appointee's research program;

- Assist with administrative duties and general laboratory duties including maintenance of the laboratory and equipment and ordering of supplies.

### 2.5 OTHER RESPONSIBILITIES

- 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.

## 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.