A PhD Scholarship in SPARC Hub

The Opportunity

The ARC Smart Pavements Hub (SPARC) invites applications for a PhD position in Characterising road roughness using accelerometer- and profilometric-based methods.

Smart Pavements Australia Research Collaboration (SPARC)

SPARC Hub, which is a partnership between Monash and 7 other Australian Universities and 20+ Industry Partners, is embarking on a range of exciting research projects, offering an unprecedented opportunity for recent graduates to establish their postgraduate career in various engineering fields. The Hub offers a coherent PhD and Masters by research program for high achieving passionate students and is committed to creating an intellectually exhilarating and vibrant environment towards excellence.

Project Background

Road roughness is an important indicator of the level of service and cost to the user of using the road. Initially, until the 1990s, it was estimated through calibrated measurement of the displacement of vehicle chassis relative to the point of contact with the road. In the 1990s, we developed the means to directly measure changes in profile height on the road and link that to the International Roughness Index (IRI). Both require specific and sometimes expensive equipment.

With the advent of smartphones and compact measuring and computing powers, attention is turning to use 3-axis accelerometry to estimate road roughness. This is done through mobile phone apps and similar low-cost and uncalibrated technologies. What is not known is the relationship between the definitive profilometric measurement of roughness and roughness measured by ‘handheld’ accelerometer devices such as mobile phones. This project aims to find the accelerometer-based method of measuring road roughness which provides the closest match to profilometric-based methods.

Hypothesis 1: There is a means of accelerometric measurement of road roughness which provides measurements of sufficient accuracy for some road management purposes.

Hypothesis 2: some or all the following factors influence the extent to which accelerometric based roughness correlates with profilometer-measured roughness, such as wavelength/type of roughness, vehicle type, age and/or and inbuilt accelerometers, and mobile phone type.

Industry Embedment

ARRB, the National Transport Research Organisation, is the Hub’s lead Industry Partner and Industry Partner for this project. A key requirement for the scholar is to spend a significant proportion of their time embedded at ARRB’s state-of-the-art facility in Port Melbourne. There, the scholar will have the opportunity to work alongside ARRB’s experts in pavement deterioration/performance modelling, road roughness measurements and asset management amongst others.
Qualification Requirements

1. Applicants must have completed at least a bachelor’s degree in one of the following areas: Information Technology, Computer Science, Engineering or Data Science. Both Australian and international applicants will be considered.

2. The applicant must have a strong academic record, which, for example, amounts to a grade point average (GPA) of 3.5 (out of 4.0) or higher, or an average score of 80 or higher, or equivalent to H1 or First-Class Honours Degree.

3. The applicant should have some knowledge/background and a strong interest in the following areas: machine learning, big data, accelerometer devices and road pavements.

4. The following criteria will be considered during the assessment:
   (i) Candidate’s academic performance in the bachelor’s degree (or Master’s degree),
   (ii) Quality of the degree completed (preference will be given to Master’s degree),
   (iii) Completion time of the degree,
   (iv) Knowledge in the relevant research field including any publications in reputable journals and conferences,
   (v) English language proficiency (refer to the following link for more information: English Language Requirements), and
   (vi) Online interviews and references.

Faculty/Portfolio: Department of Civil Engineering, Faculty of Engineering

Location: Clayton Campus, Monash University & ARRB, Port Melbourne

Remuneration: Stipend can range from $28,373 p.a. full-time rate (2020 rate, pro-rata) and tax-free

Closing date for expression of interest (EOI): 09 October 2020

To Apply:

- Submit an Expression of Interest
- A curriculum vitae, including a list of published works
- A full statement of academic record, supported by scanned copies of relevant certified documentation
- Contact details of two academic referees
- Evidence of English-language proficiency (international applicants only)

Enquiries and EOIs shall be sent to:
The Lead Chief Investigator, Dr Yihai Fang, Department of Civil Engineering, Monash University, Clayton Campus (Australia)

Email: Yihai.Fang@monash.edu