

## **PhD Project: New monitoring technologies serving a better understanding of land and river degradation in urban areas**

Joint PhD between The University of Melbourne and two laboratories in University of Lyon, France  
Supervisors: Prof Tim Fletcher (UoM), Dr Kathryn Russell (UoM), Prof Etienne Cossart (France), A/Prof Oldrich Navratil (France), A/Prof Frédéric Cherqui (France)

The world is increasingly urban. This project aims to explore human-river interactions in urban areas, with a focus on the major issues of soil erosion and sediment transfer in rivers. Human activity and land use change are the main drivers of soil erosion. Soil erosion on hillslopes and its transfer through river systems are major issues for society and ecosystems at local and global scales, affecting land productivity, nutrient and carbon cycling, water resource quality, quality of aquatic ecosystems, and infrastructure. To date, research on urban and peri-urban sediment cascades has been constrained by cost- and time-intensive monitoring methods, limiting our understanding of the spatial and temporal heterogeneity of erosion and sediment transport processes. A paradigm shift is needed to develop new systems capable of deployment at finer spatial resolution and time scales of measurement.

A **fully-funded PhD project** is available investigating relations between land use and soil erosion using innovative low-cost, open-source and Internet of Things technologies. The project will investigate the **dynamics of soil erosion on hillslopes and suspended sediment sources in peri-urban areas**: what are the spatio-temporal dynamics of soil erosion in relation to land use; where is sediment supply coming from in the urban context; and how much is generated? Based on a comparative analysis of river catchments involved in long-term research observatories in Australia (Melbourne) and France (Lyon), this project will develop and implement low-cost sensor networks (e.g. water level, turbidity, and colour) in headwater streams to quantify dynamic sediment yields and fraction derived from each source.

**This project offers a unique and original opportunity to work within an international collaboration** on a global problem. The PhD will be jointly enrolled and jointly awarded by University of Melbourne and University of Lyon, and hosted primarily at the University of Melbourne, within the Waterway Ecosystem Research Group (WERG – [www.thewerg.org](http://www.thewerg.org)) – *a world leading research group*. The project will fit together with another PhD project to begin later and to be based primarily in France, investigating the problem of sediment transfer in peri-urban streams and its interaction with riverbed morphology. The student will be supported to travel to Lyon to develop the collaboration and to allow for comparative data collection in both countries.

We are offering a PhD Scholarship at the standard rate of a University of Melbourne Graduate Research Scholarship, and travel and research funds of up to 5000 EUR (approx. 8000 AUD) per year.

The successful applicant will have an appreciation of geomorphology and/or catchment hydrology, good technological literacy and quantitative skills, ideally with basic literacy in R (or a willingness to develop such skills). Ideally, the applicant would also have an interest in open-source electronic prototyping or programming. Importantly, this project requires an independently-motivated candidate with excellent communications skills as you will be required to work effectively with researchers across disciplines and across countries, as well as industry practitioners. A first-class honours or master's degree, and/or evidence of publishing in international peer-reviewed scientific journals is essential. **The applicant must be prepared to accept the scholarship offer by Wednesday 11 December 2019.** The scholarship may be deferred with candidature for commencement in 2020.

Applicants should submit an expression of interest, including a 500-word personal statement outlining your interest in the research and relevant skills and experience, a CV, academic transcript and contact details for two academic referees. Please send your EOI to: [kathryn.russell@unimelb.edu.au](mailto:kathryn.russell@unimelb.edu.au)

**Closing date for expressions of interest is midnight Wednesday 20 November 2019** for both international and domestic applicants. Interviews will be conducted by Skype or in person between 26 November 2019 and 3 December 2019. Applicants should confirm their available dates and times during this period in their application.

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