Improved rainfall measurement accuracy using the mobile phone network

Applications are invited for a 3 year PhD. scholarship within the Water Group of the Department of Civil Engineering at Monash University, on an exciting project focusing on the use of the mobile phone network to improve rainfall measurements. The project is funded by the Australian Research Council (ARC).

The Project

Accurate near-real-time precipitation data at high resolution are critical to flood forecasting in and around Australia's capital cities. Current precipitation estimates suffer from the limited availability of rain gauge data in urban areas. However, mobile phone towers abound, and the microwave links between them can provide information on rainfall intensity, meaning that these data may be used to supplement the shortfall in raingauge data. This project will develop the technology to generate precipitation maps using the combination of mobile phone network link, raingauge and weather radar data. Melbourne will be the case study, validated using a microwave scintillometer and super high resolution mobile weather radar.

In order to transmit mobile phone calls, a microwave signal is transferred from the receiving mobile phone tower to the distribution centre through a network of tower-to-tower microwave links. The project is developed based on the knowledge that the attenuation of this microwave signal is very strongly related to rainfall intensity. Initially, the relationship between the link attenuation and rainfall intensity will be validated. Then, the impact of the tower configuration on the rainfall retrieval accuracy will be investigated. This step is required because of the particular manner in which the microwave signal is logged. The tower estimates will then be up-scaled to the weather radar resolution, and both data sets will be merged to make the best possible rainfall product available.

The Opportunity

This position is for 3 years full-time research towards a PhD. A tax-free stipend ($25,849 per annum) is provided. There is potential for the applicant to earn additional money through assistance in undergraduate teaching. Attendance at both national and international conferences will be expected and funded during the course of the degree. The applicant will work with an internationally recognized research group specializing in water management.

Candidates must meet the eligibility criteria for PhD. candidature at Monash University:

http://www.monash.edu.au/migr/apply/

Selection Criteria

The successful candidate must meet ALL of the following criteria:

1) Bachelor of Science degree with H1 or H1E Honours (majoring in mathematics or physics) or Bachelor of Engineering Degree with H1 or H1E Honours (majoring in civil engineering or electrical engineering).
2) An excellent academic record.

Furthermore, the candidate should have an interest in (microwave) remote sensing applied to hydrology and meteorology, proficiency in computer programming, excellent oral and written communication skills, and the ability to work efficiently alone as well as in a team. Experience with handling large-scale data sets and a strong quantitative background (e.g. radiative transfer, statistics) are preferred. Experience with setting up hydrometeorological field experiments is an asset.

Enquiries

Prof. Jeffrey Walker and A/Prof. Valentijn Pauwels,
Department of Civil Engineering, Jeff.Walker@monash.edu, Valentijn.Pauwels@monash.edu

Applications

Applications should include:

1) Cover letter, specifying interests, qualifications and experience as it relates to the project.
2) Curriculum vitae which should include employment history, details of journal publications, and the names of two academic referees.
3) A certified copy of you academic transcript.

Applications should be sent to Jeff.Walker@monash.edu and Valentijn.Pauwels@monash.edu

Closing date

January 31, 2017