PhD Opportunity in Wildland fire modelling and risk assessment

Applications are invited for a fully funded three-year PhD scholarship in the department of Civil and Natural Resources Engineering, to work under on a **wildland fire modelling and risk assessment** under the supervision of Dr Andres Valencia (UC Senior Supervisor), Dr Marwan Katurji (co-supervisor) and Tom Logan (co-supervisory) in the context of the Project "Extreme fire behaviour, are we ready?" founded by Ministry of Business, Innovation and Employment (MBIE).

Description

Large and severe wildfires have increased in occurrence, duration and intensity the last decade. Recent mega-fires in Canada, Australia, United States and Brazil provide evidence of this natural hazard**.** Communities in the rural-urban interface are currently in risk as wildland fires can impact them directly and indirectly (cascade risk). On the one hand, direct impact can be estimated via spread models (e.g. Prometheus and Spark), as well as advanced wildland fire simulators (e.g. FDS) which provide spatiotemporal description of the development of the fire, its behaviour and potential of harm. However, the use of these tools for exposure estimation is not standardized and there are few validation cases for New Zealand fire scenarios. On the other hand, estimation of indirect impact requires integration of wildland fire risk into urban systems such as roads, building type and arrangement, electricity network, etc; which has not been implemented in New Zealand.

In this project, **direct and indirect wildland fire risk will be implemented and studied in New Zealand**. The student will validate and use fire spread modelling tools to estimate wildland fire exposure and direct risk. The student will have access to high-quality experimental dataset from previous experiments (e.g. Figure 1) and will participate in upcoming crown-fire field experiments for validation purposes. Additionally, the student will use an existing urban digital twin (Urban Intelligence) to study cascade and indirect risk.

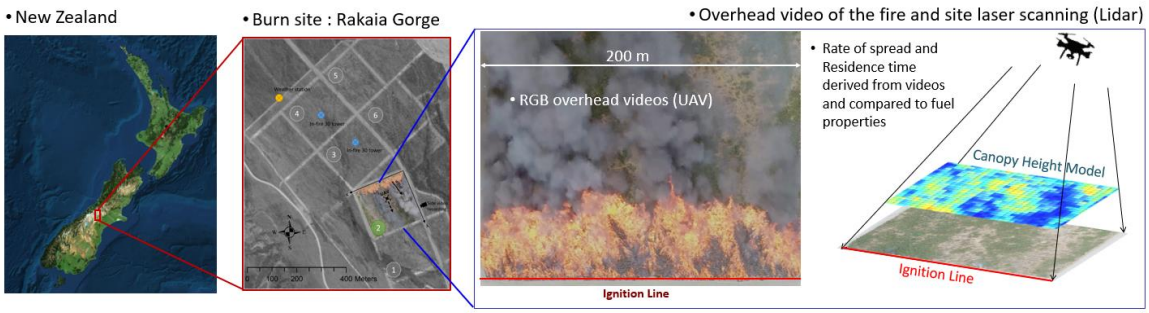

Figure 1. Shrubland experimental campaign and experimental methods.

Candidates are expected to demonstrate strong background in fire/wildfire sciences and strong analytical skills using (Python and GIS tools preferred).

Scholarship

Provided by: Ministry of Business, Innovation and Employment (MBIE)
Amount: $32,000 per annum + domestic tuition fees (New Zealand Dollars).

Closing date: 29th September 2023.

To apply, please contact Dr. Andres Valencia: andres.valencia@canterbury.ac.nz