

MSc Research Opportunity: Modelling the Geomorphic Drivers of Avulsion Risk

Fully funded MSc project | Waterways Centre | University of Canterbury

Predicting river avulsion remains a central challenge in geomorphology and flood hazard management, particularly in highly dynamic, sediment-rich braided rivers. Despite this, avulsion processes are rarely represented explicitly in flood hazard assessments, which typically rely on static terrain or expert-defined scenarios. This MSc project aims to address this research gap by developing a practical, process-informed approach to modelling geomorphic change and avulsion risk.

The research focuses on the Rees River at the head of Lake Wakatipu, a highly active braided system characterised by rapid sediment throughput, channel aggradation, and documented avulsion potential. Using a unique archive of high-resolution DEMs spanning 2011–2025, the project will apply numerical sediment routing models to simulate decadal-scale sediment delivery, aggradation patterns, and deposition hotspots. These geomorphic scenarios will be used to modify terrain inputs for 2D hydrodynamic models, enabling flood hazard simulations that explicitly incorporate plausible future channel configurations and avulsion pathways



The project is co-funded by the NZ Rivers Group and Otago Regional Council, with outcomes directly supporting flood risk and natural hazards planning for the Glenorchy–Kinloch area. More broadly, the work will develop a transferable framework applicable to braided rivers across New Zealand.

Supervision

The project will be co-supervised by Professor James Brasington and Dr Justin Stout (University of Canterbury), with industry input from Dr Alex Sims (Alluvium Consulting).

Eligibility & funding support

The project is available for students who have completed an honours year, PGDip, professional Masters, or MSc Part I in a relevant discipline.

The scholarship covers a tax-free stipend of NZ\$20,000 and full domestic MSc tuition fees. Domestic fees apply to New Zealand and Australian citizens and permanent residents. Applicants who are not eligible for domestic fees are warmly encouraged to apply; a contribution of approximately NZ\$10,000 toward international tuition fees may be available for outstanding candidates.