

## Project 14 - Combining natural heat as a tracer with high resolution head gradients to quantify the changing hydraulic conductivity of lake and stream sediments

**Location:** The project is to be based at UNSW, Sydney, NSW

**Required area of expertise/background:** An Honours or MSc degree in either Engineering or Science. Strong mathematical skills are essential. A sound knowledge of physical hydrogeology is desirable, but not essential as training will be provided. The successful candidate should also be willing to do fieldwork.

**Project: Project Description (Max 200 words):** The propagation of daily temperature fluctuations over depth is routinely used to calculate the sediment thermal diffusivity as well as vertical water flux (referred to as analytical heat tracing). While heat and head are both established tools for the assessment and quantification of surface water-groundwater interactions, their results can be combined to quantify time changes in hydraulic conductivity. However, this has rarely been accomplished with good accuracy because accurate measurement of hydraulic head gradients over small distances is thwarted by the inaccuracies inherent to the practicalities of measuring pressure at two points in space. This project aims to combine the results obtained from heat tracing with high accuracy hydraulic head gradients to quantify the change in hydraulic conductivity of shallow stream and lake bed sediments over time. This project requires a strong foundation in groundwater science as well as the ability to analyse hydrogeochemical datasets. The project will be hosted within the Connected Waters Initiative Research Centre (CWI) at UNSW and the duration of the top up scholarship is 3.5 years.

**2017 RTP full time RTP Stipend Rates\* (\$26,682). Approximate annual top-up amount:** \$5000/year for 3.5 years.

**Principal Supervisor:**

[Dr Martin Andersen](#) – UNSW

**Co Supervisor:**

[Dr Gabriel Rau](#) - UNSW

