

# GEOCHEMICAL TOOLS FOR ORE EXPLORATION: INVESTIGATING RESISTANCE PHASE MINERALS CHEMISTRY IN THE COBAR BASIN

## PHD PROJECT

University of New South Wales

## PRIMARY SUPERVISOR

Dr. Indrani Mukherjee

e: [indrani.mukherjee@unsw.edu.au](mailto:indrani.mukherjee@unsw.edu.au)

## CO-SUPERVISORS

A/Prof. Ian Graham Graham (UNSW)

Dr. Chris Folkes & Dr. Joel Fitzherbert (GSNSW)

## PARTICIPATING ORGANISATIONS



## RESEARCH PROJECT

Resistate minerals such as monazite, zircon, and rutile are valuable indicators of mineralization, preserving geochemical signatures that withstand weathering and erosion. These minerals host trace elements, including rare earth elements (REEs), uranium, thorium, niobium, and tantalum, which are essential for modern technologies. Their geochemical signatures can extend the footprint of mineral systems, aiding in ore deposit exploration. However, a major challenge lies in characterizing these minerals when they are incorporated into younger cover sequences that obscure older mineralized basement rocks. Understanding how these minerals redistribute through geological processes and how their signatures can be used to detect hidden ore deposits remains a key research gap.

This PhD project aligns with the MinEx Cooperative Research Centre (MinEx CRC), which focuses on improving exploration techniques in covered terrains. The Cobar Basin, a key study area for MinEx CRC, hosts concealed mineral deposits, making it an ideal location to refine geochemical tools for detecting ore systems beneath cover sequences. This study aims to:

- 1) Investigate the trace element geochemistry of resistate minerals,
- 2) Assess their potential as pathfinders for mineralization, and
- 3) Develop improved exploration strategies for REEs and critical elements to support a more sustainable supply of these materials.