

Faculty of Engineering

ASPIRE Summer Research Program 2026-2027

Project Title: Agentic AI for X-ray Science

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Objective

Develop and test human-in-the-loop agentic AI workflows for X-ray science, converting sample history, measurement metadata, analysis decisions, verification evidence, and expert review into structured records for reproducible research and future AI-assisted instruments.

Project Details

X-ray characterisation records are often split across notebooks, instrument files, refinement inputs, spreadsheets, and expert judgement. The student will design simple workflow records and checks that help an AI agent organise evidence while keeping expert review explicit. Quantitative XRD phase analysis will be the first case study. Outputs: reusable record templates, basic metadata/lineage checks, a worked example, and a short technical note.

Project Timeline

TASK	1	2	3	4	5	6	7	8	9	10
Induction and background										
Review example workflows										
Design workflow records										
Build metadata checks										
Test XRD case study										
Final note and presentation										

Prerequisites

Open to eligible Monash Engineering students interested in X-ray science, materials characterisation, data analysis, or AI-assisted research. Basic Python, spreadsheet, or structured documentation skills are useful.

Placement Agreement

Student placement agreement required before commencement.