

## Hunting for the Cosmic Dawn

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<https://scholarships.curtin.edu.au/Scholarship/?id=6647>

**Description:** The first billion years of the Universe mark a remarkable transition in the state of the Universe, with the once-neutral hydrogen gas that fills the voids of the cosmos becoming ionised by high-energy photons from the first generations of stars and black holes. This project will use the thousands of hours of data from the Murchison Widefield Array project, combined with recent Curtin-led advances in data processing and analysis, to search for the weak radio signal from this primordial hydrogen. This project has the potential for a student to be first author on world-leading publications reporting the outcomes.

The primary aim of this project is to harness the improvements in data quality assessment and data treatment developed by Curtin over the past 5 years to produce the deepest insights into the structure and evolution of the early Universe.

1. Apply data calibration improvements to MWA EoR observations from 2014-2022
2. Assess data quality with newly-developed quality metrics to select the best data
3. Combine the best sets of data together to provide new insights into the signal from the early Universe.

Exploration of the first billion years of the Universe is a primary goal of the SKA Observatory, with the low-frequency telescope being built in the WA Outback. We have yet to detect the radio signals from this primordial hydrogen, but these are the best way to explore the evolution of the infant Universe, and understand the properties of the first generations of stars and galaxies. Detection of this signal with the MWA will provide the first glimpses into this period of the Universe.

This project may provide an Internship opportunity. Potential for internships with SKAO.

If this project excites you, and your research skills and experience are a good fit for this specific project, you should contact the Project Lead (listed below in the enquires section) via the [Expression of Interest \(EOI\) form](#). ahead of the closing date.

Course type

- Higher Degree by Research

Citizenship

- Australian Citizen, Australian Permanent Resident
- New Zealand Citizen, Permanent Humanitarian Visa



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