

ICRAR & ICRAR-Pawsey Summer Studentships 2016 - 2017 Project Proposal

Project Details	
Project Title	Finding Clusters in the Early Universe Around MWA Sources
Primary Supervisor	Nick Seymour
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Additional Supervisors & Contact Details	Guillaume Drouart Guillaume.drouart@curtin.edu.au
Additional Resources Required	none
Student Location for project	Curtin
Project Description	Clusters of galaxies are the most massive gravitationally-bound structures in Universe. They are predominantly comprised of massive quiescent galaxies which formed early in the Universe's history. Hence, they must have had periods in the past when they grew extremely rapidly. This project aims to detect "proto-clusters" in the early Universe around radio-loud active galactic nuclei (RL AGN). RL AGN are very luminous radio sources which are powered by super-massive black holes at the centre of galaxies. Simply put the more luminous the radio source, the more massive the black hole, and the more massive the host galaxy and surrounding dark matter halo. It is these dark matter halos which dominate the evolution of the cluster. By searching for over-density of sources around RL AGN detected in wide area survey with the Murchison Widefield Array, this project will commence the search for proto-clusters when the Universe was less than half its present age.
Student Attributes	
Academic Background	Physics Undergraduate, some astronomy useful
Computing Skills	Some programming skills useful, plus willingness to learn. Python preferred, but other languages can be used.
Training Requirement	
Project Timeline	
Week 1	Background reading and getting familiar with coding
Week 2	Commence writing code to obtain and analyse data
Week 3	Refine code and test on known distant proto-clusters
Week 4	Scale code to run on all MWA sources over New Year break
Week 5	Analyse results on all sources
Week 6	Select best candidates for further study
Week 7	Detailed examination of best candidates

Week 8	Multi-wavelength follow-up with surveys are other wavelengths
Week 9	Plan potential follow-up observations
Week 10	Write-up report
	Final Presentation