

ICRAR & ICRAR-Pawsey Summer Studentships 2017-2018 Project Proposal

Project Details	
Project Title	Low-Cost Automated Noise Parameter Measurement System
Primary Supervisor	Dr. Adrian Sutinjo
Primary Supervisor Availability	I may be traveling for 2 weeks outside of Christmas break from Dec 25 2017 to Jan 5 2018, but otherwise available during the studentship.
Contact Details	92669177 / adrian.sutinjo@icrar.org (adrian.sutinjo@curtin.edu.au)
Additional Supervisors & Contact Details	Mr. Daniel Ung (daniel.ung@curtin.edu.au)
Additional Resources Required	A laptop. If the student does not own one, one will be provided.
Pawsey Centre Hardware Use	N/A
Software Required	Student Desktop Requirements (to be provided by ICRAR/Curtin Engineering): <ul style="list-style-type: none"> • MATLAB • NI Applied Wave Research
Student Location for project	ICRAR-Curtin
Project Description	<p>Instrumental noise plays an important role in radio astronomy. For a low-frequency radio telescope such as the Murchison Widefield Array (MWA) or Low-Frequency Square Kilometre Array (SKA-Low), the instrumental noise of the telescope depends on the interaction between the low-noise amplifier (LNA) and the impedance of the antenna. As a result, the design and optimization of the LNA is strongly coupled to the antenna.</p> <p>The interplay between the LNA and the antenna is fully characterized by four “noise parameters.” Once these parameters are known, the designer can easily predict the instrumental noise due to the antenna-LNA interaction. However, device manufacturers typically do not publish noise parameters at low frequencies (tens to hundreds of Hz) as they are difficult and costly to obtain.</p> <p>At ICRAR/Curtin we have recently developed a low-cost technique to obtain noise parameters of the MWA LNA. This method requires multiple steps of measurement, calibration and verification that will benefit from computerized automation. We seek a motivated student to automate this process by interfacing with the instruments and to succinctly process and present the data.</p>

Student Attributes	
Academic Background	The student should have completed 3 rd year studies in Electrical/Electronics/Communications Engineering.
Computing Skills	MATLAB
Training Requirement	Training will be provided
Project Timeline	
Week 1	Project introduction and background reading
Week 2	Background reading and lab training
Week 3	Data processing training
Week 4	Interfacing with instruments and automation programming
Week 5	Continue week 4
Week 6	Include data processing and verification in the program
Week 7	Continue week 6
Week 8	Test and verification
Week 9	Final verification and report writing
Week 10	Final Presentation and Reporting