

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

Project Details	
Project Title	Radio-over-Fiber Calibration for Radio Astronomy
Primary Supervisor	Adrian Sutinjo
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Additional Supervisors & Contact Details	Budi.Juswardy@curtin.edu.au
Additional Resources Required	ICRAR/Curtin Engineering Lab.
Student Location for project	Curtin
Project Description	<p>Radio-over-Fiber (RFoF) is the preferred solution for long-distance (~kilometers) analog signal transport in radio astronomy due to low loss compared to coaxial cables. As we found through experimentation at the Murchison Radio-astronomy Observatory (MRO), RFoF links are highly stable under environmental exposure such as temperature variation. Certain science cases to be observed by next-generation radio telescopes, however, require extreme flatness and stability in frequency response.</p> <p>There is no perfect instrument. We deal with imperfections by either keeping them below the required limit or by knowing them with less uncertainty than the limit to facilitate their removal through calibration. In practice, we employ a mixture of the two. This project is about developing the right “mixture” when it comes to RFoF links for next-generation low-frequency radio telescope such as the Square Kilometre Array (SKA) and/or future expansion of the Murchison Widefield Array (MWA). The student will likely work on processing RFoF measurement results taken from the MRO.</p>
Student Attributes	
Academic Background	3rd year undergraduate (or equivalent) student in Electrical Engineering or Physics (or similar)
Computing Skills	High-level programming with MATLAB or Python (or similar)
Training Requirement	Induction to ICRAR/Curtin Lab and in-house/on-the-job RF/Microwave instrumentation training.
Project Timeline	
Week 1	Introduction to Lab and basic measurements
Week 2	Introduction to RFoF

Week 3	Collect/process RFoF measurement data
Week 4	Review initial results
Week 5	Refine measurement/data processing
Week 6	Second review of results
Week 7	Finalize measurement method/data processing
Week 8	Draft report complete
Week 9	Review and revise report
Week 10	Deliver report and prepare for presentation
	Final Presentation