

Faculty of Engineering

ASPIRE Summer Research Program 2026-2027

Project Title:

Marching to the beat: Using combs to synchronize optical communications

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Objective

Most applications of microcombs use the many wavelengths that they produce to support parallel data streams to get to aggregate rates of 10s of terabits per second. However, combs also have an inherent “tick”, which we can use for timing. Here, we’re looking at extracting that tick using a combination of analogue and programmable digital hardware (RFSOCs, incorporating FPGAs and analogue/digital interfaces), to synch massively parallel communications systems

Project Details

This project will work on FPGA coding on an AMD RF SoC, to create an “overlay” that can then be accessed for research purposes via python (or similar). This builds on an existing approach being developed in our lab for turning RF SoCs into flexible tools for science. Specifically, you’ll look at scaling an output from a microcomb to provide 10 MHz references for equipment.

This project is part of research for the ARC Centre of Excellence in Optical Microcombs for Breakthrough Science (COMBS – combs.org.au), and will link into the broader Summer Scholars Program run through COMBS.

Prerequisites

This project is aimed at 2nd year (and beyond) students studying engineering, particularly those who would like to get a feel for how some of the skills you learn in engineering fit into research.

Ideal for those who know have programmed FPGAs before, and want to get some idea of what working in a university research lab is like.

Student Placement Agreement

[A student placement agreement](#) must be signed by the project supervisor and the student prior to commencement of the ASPIRE program.

Additional Information

Applicants will need to forward a short CV and attend an interview (in person or virtual).