

## Faculty of Engineering

### Summer Research Program 2022-2023

#### Project Title:

Fibre in the sky – Investigating ground-to-satellite optical links

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#### Objective

Satellite communications is going through a new wave of expansion, due to the cost of launch into orbit reducing significantly. Projects like Starlink, OneWeb, and Amazon's Kuiper are promising to provide broadband access to remote areas. Current sat-comms systems use RF waves, and are limited in capacity to 10's to 100's of Gb/s. Optical communications is the logical next step to improve capacity, delivering >1000x higher data rates, but challenges lay ahead.



#### Project Details

You will investigate the use of modern coherent fibre optical communications to enable extreme data rates from ground to orbit. This will rely on measurement data from an existing stabilized free-space optical link, which reduces the phase and amplitude noise through atmospheric turbulence, to enable a fibre-like channel through the sky. You will aim first at the upper end of RF data capacity (100 Gb/s) and look at extending this far into the terabit-per-second regime.

#### Prerequisites

Some communications subject expertise will be appreciated. Applicants with some experience in numerical modelling (e.g. using MATLAB, Python, etc.) will be preferred.

#### Additional Information

If shortlisted, you will be required to attend an interview, to make sure that the project is a good match for you.