

## PhD Scholarship at ACSER & School of Electrical Engineering & Telecommunications, UNSW

Required Background: Bachelor/Masters Degree in Physics or Electrical Engineering  
Application Deadline: 31/03/2012  
Supervisors: A/Prof Francois Ladouceur, Dr Steven Tsitas  
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### Fibre Optic distribution of RF signals across a microchip amplifier SAR antenna using silicon photonics

Microchip amplifiers are a way of realising a fully active SAR antenna with individual phase control of each radiating element. They also enable highly deployable SAR membrane antenna designs by allowing compact amplifiers to be integrated into the membrane. Such designs may allow much cheaper SAR spacecraft designs to be realised. The preamplified RF signal from the spacecraft bus must be distributed to each chip on the antenna, and the receive signals from each chip must be distributed back to the bus for combination. At L-Band (~1 GHz) this can be done using suitable lines embedded in the membrane, however at X-Band (10 GHz) line losses are prohibitively high.

One solution is to analogue modulate a laser beam signal with the RF signal and then transmit the laser beam down a fibre optic line to the chip, where the RF signal is demodulated off the laser beam and passed to the microchip for amplification. This offers a lossless frequency independent method of transmitting an RF signal within a SAR antenna. The research will begin with a review of Commercially available Off-The-Shelf (COTS) silicon photonics technologies from the telecom industry that may form a suitable starting point for further research.

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We will be providing scholarships for some students. All prospective students should, however, apply for:

- Australian Postgraduate Award (APA; for Australian citizens) OR an
- International Postgraduate Research Scholarship (IPRS; International students).

Suitability for the scholarships will be assessed in the same way as applicants for APA and IPRS. For more information about these scholarships please go to <http://research.unsw.edu.au/postgraduate-research-scholarships>.

Further Information on the project may be obtained from Dr Steven Tsitas ([s.tsitas@unsw.edu.au](mailto:s.tsitas@unsw.edu.au)).