

## PhD Scholarship at Australian Centre for Space Engineering Research

Required Background: Bachelor Degree in Mechanical Engineering  
Application Deadline: 31/03/2012  
Supervisors: Dr Steven Tsitas, Prof Andrew Dempster  
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### Deployable radar antennas for compact lightweight spacecraft

ACSER is investigating a constellation of formations of small SAR spacecraft for disaster monitoring including floods. In order to achieve the high temporal resolution (short time between revisits) of less than a few hours necessary for disaster support a large number of spacecraft are anticipated. To implement such a system affordably the smallest and lightest spacecraft is required that can meet the requirements for data quality (e.g. resolution). The problem for the SAR design can be restated as "how low can you go"; how small can a spacecraft based SAR be made that meets the data quality requirements

Spacecraft imaging radar antenna size is of the order of 3-10 sq m and is a major obstacle to designing very compact and lightweight spacecraft. Such spacecraft are desirable because they offer the promise of being low cost, allowing many to be launched to achieve short times between revisits to a region on the Earth. High temporal resolution is essential for monitoring fast moving floods which is one application being considered. Deployable radar antennas, including foldable and inflatable designs, offer the possibility of radically more compact antennas, removing this as a system driver. This project will research options for deployable radar antennas, trading off existing concepts and developing novel designs in Solidworks or CATIA that meet requirements.

The smallest SAR spacecraft currently contemplated are around 100 kg. This project seeks to reduce that to the order of tens of kilograms. Such a breakthrough will help lead to a large scale constellation of high resolution satellites, delivering the elusive "high spatial/high temporal" resolution from space for the first time. By researching options for deployable antennas the student will make an important contribution to achieving this breakthrough since antenna size is one of the drivers of SAR spacecraft size.

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ACSER and the Garada Project 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 ACSER and Garada 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)).