

# Research Directions



Office of Research Services

## **COMPUTATION OF THIN-WALLED STRUCTURES**

Associate Professor Yang Xiang, School of Engineering, is developing computational methods for analysis of thin-walled structures. This ARC Discovery project will address some of the difficulties associated with the mechanical behaviour of thin-walled structures, such as high frequency vibration, stress concentration and buckling after being subjected to various loading conditions.



*Communications satellite*

Understanding and controlling high frequency vibration response is of crucial importance in aircraft, satellites and other space vehicles. When a thin-walled structure is subjected to a high frequency, the response can lead to forced vibration or heat. Excessive vibration and unacceptable noise can create great fluctuations of mechanical loads and stresses and result in fatigue of structural components, friction, wear, and damage of electronic and other delicate components.

'These problems need to be controlled at the design stage and this can be done with analysis methods that are able to predict the structural response' said Professor Xiang. 'Current computational methods lack the numerical stability to do this, so our aim is to create an algorithm that combines accuracy with flexibility overcoming the shortcomings of present methods' said Professor Xiang.

The research will assist engineers to understand the responses of thin-walled structures of varying shapes and sizes when subjected to a range of complex loading conditions.

**Project title:** *Development of a Local Spectral Method for the Computations of Thin-Walled Structures*

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