

An Indian-Australian research partnership

Project Title:	<input type="text" value="The Serre spectral sequence for integral cohomology"/>	
Project Number	<input type="text" value="IMURA0341"/>	
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Research Academy Themes:**Highlight which of the Academy's Theme(s) this project will address?**

(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1. **Advanced computational engineering, simulation and manufacture**
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. Nanotechnology
6. Biotechnology and Stem Cell Research

The research problem

Define the problem

A complete calculation of the cohomology of integral Eilenberg-Mac Lane spaces can be made over mod p coefficients using the Serre spectral sequence. Over integer coefficients no complete calculation has been made and reasons for this do not appear explicitly in the literature.

Project aims

Define the aims of the project

The project is to further calculations already made by Andrew Percy into the more difficult regions of the E_2 page as an investigation of the explicit problems associated to integer coefficients and an investigation of unformulated cohomology operations and relations.

Expected outcomes

Highlight the expected outcomes of the project

A collection of previously uncalculated cohomology groups of integral EM-spaces over integer coefficients. A determination of where integer coefficients fail the constructions made by Cartan and Serre for calculation.

Capabilities and Degrees Required

List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.

The project could be available as a MSc or PhD. For the former, a first course in algebraic topology would be beneficial, for the latter some knowledge of homological algebra would also be necessary.