Department	School of Engineering and the Built Environment
Supervisors	Dr. Kevin Hughes
Project Title	Analysis and Arithmetic

PROJECT DESCRIPTION

Project description: There are multiple options in and between Fourier analysis and analytic number theory. The number theory option builds on the recent substantial progress in our understanding of solutions to Diophantine equations in many variables through the use of mean value estimates and the circle method e.g., the use of Vinogradov's mean value theorems in Waring's problem. The Fourier analysis option builds on recent progress in maximal functions defined by averages over geometric objects such as curves or hypersurfaces and their ergodic implications. There are many projects that utilise a combination of these ideas and methods in discrete harmonic analysis.

Outline of PhD:
Year 1: Complete postgraduate modules in analysis, algebra and geometry/topology as part of the SMSTC while being directed in a course on analytic number theory or Fourier analysis.
Year 2: Train in Fourier analysis or analytic number theory and acquire the necessary background to begin research in analytic methods for Diophantine equations or harmonic analysis.
Year 3: Conduct world class research and disseminate their results culminating in a thesis on their original research.

Perspective applicants are encouraged to contact the Supervisor before submitting their applications. Applications should make it clear the project you are applying for and the name of the supervisors.

Academic qualifications
A first degree (at least a 2.1) ideally in Mathematics with a good fundamental knowledge of Analysis and Number Theory.

English language requirement
IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. Full details of the University's policy are available online.

Essential attributes:

- Knowledge of Pure Mathematics including analysis
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

Enquiries	For informal enquiries about this PhD project, please contact Dr. Kevin Hughes K.Hughes@Napier.ac.uk
Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process