School of Maths UG Summer Bursary Scheme

Coordinator: Dr Mauro Mobilia (m.mobilia@leeds.ac.uk)

Leeds undergraduate students who are based in the UK and currently in the second year of a BSc programme, or the second or third year of the MMath, BSc Integrated Masters programme, can apply to undertake a summer project with a member of staff in the School of Mathematics. Home, EU and International Undergraduate students can also apply, as long as they are enrolled in an Undergraduate programme in the UK and are neither in their first nor in their final year of undergraduate studies (even if they are not at Leeds and are not studying Mathematics).

The projects are funded, at around £230 a week for around 10 weeks[1]. Specific details will be agreed individually by each Supervisor. **This is a competitive process, and some projects include specific pre-requisite knowledge.**

Students will be allocated to projects according to the following selection criteria:

- Student's preferences (if/when possible)
- Student's grade profile (expected to be at least of a 2:1 level, and usually would need to be a 1st class)
- Student's background (or experience) in the area of the project (e.g. marks in relevant modules, pre-requisites to be met)
- Balance between the projects subscription and the availability of the academic staff
- The School's and the EPSRC's priorities (e.g. industrial links; covering a range of research areas)
- Students who are selected for a project are required to produce a report and to give an oral presentation in front of academics and other students (during approximately the 3rd week of September).

A list of projects for Summer 2020 will be available on Minerva/VLE from early February. To apply complete the application form and email this to the Maths Taught Student Office (Maths.Taught.Students@leeds.ac.uk**) by Thursday the 27th of February 2020.**

Selected students will tentatively be contacted before the Easter break and asked to meet with their prospective supervisors to discuss and agree on the details on the project, and to complete an acceptance form. Only when the acceptance form, signed by student and supervisor(s), will be returned to the Maths Taught Student Office by 30 April 2020 (before 12 noon) will the award be effective. Students should note that by accepting the award, they commit to submit a report and give an oral presentation. Selected students are also asked to inform the Maths Taught Student Office and their prospective project supervisor(s) if they receive, or have applied for, a similar award (including an internship).

1 *We anticipate that one or two bursaries may be funded by the EPSRC and the students selected, on a merit basis, for those bursaries will be paid at slightly higher rate than the others.*

The **summer 2020 projects** on offer are listed below (list and description available also on Minerva):

Project Title	Project Supervisor(s)	Pre-Requisites
Computing Universal Compressors and Homogeneity Tests	Leonid Bogachev and Alexander Veretennikov *Statistics*	Required: Good marks (65 or higher) on one or more of the following: MATH1710/MATH1712/MATH2715/MATH2735/MATH2750 (Statistics); MATH2041/MATH2042/MATH2230/ MATH2231 (Logic, Discrete Maths, Computing) Desirable: some computer skills (R or Python) for simulations and statistical analysis
Geometry Revisited. Again	Vladimir Kisil *Pure Maths*	No specific pre-requisites, but the project would nicely combine with MATH3232 - either you have already studied it, or are planning to.
Escape over a barrier driven by correlated fluctuations	Steve Fitzgerald *Applied Maths*	Required: MATH2600 Numerical Analysis, MATH1710 Probability and Statistics Desirable: MATH3424 Introduction to Entropy in the Physical World.
Lagrangian aspects of superintegrable systems	Mats Vermeeren and Vincent Caudrelier *Applied Maths*	Required: Calculus of Variations. Desirable: MATH3355
Exams Data	Philip Walker and Derek Harland *Applied and Pure Maths*	N/A
Matching and Morphing	Kevin Houston *Pure Maths*	Essential: Basic ability in the use of a computer package such as Maple, Matlab, or Mathematica or programming language, for example, Python. Core first-year modules. Desirable**:** An interest in the geometry of shapes.
Visualisation of Music	Kevin Houston *Pure Maths*	Essential: The ability to use a computer package such as Maple, Matlab, or Mathematica or programming language, for example, Python. Desirable**:** An interest in the geometry of shapes.

Project Title	Project Supervisor(s)	Pre-Requisites
Caricature from 3D scans	Kevin Houston *Pure Maths*	Essential: Basic ability in the use of a computer package such as Maple, Matlab, or Mathematica or programming language, for example, Python. Essential: The prerequisites are the core first year modules. Desirable: An interest in the geometry of shapes. Mathematica or programming language, for example, Python. Desirable**:** An interest in the geometry of shapes.
Mathematical models of ocan circulation	Stephen Griffiths *Applied Maths*	Good background across Applied Maths, with expertise in Differential Equations (MATH2391), programming in Python (MATH2920), Fluid Dynamics (MATH2620), Basic Vector Calculus (MATH2365), and knowledge of the heat equation and Fourier series (MATH2375). Ideally, the student would also have experience with Asymptotic Methods (MATH3365), but these could be taught druing the project.
The Climate of the Last Intergracial	Jochen Voss *Statistics*	Good computer skills, using either R or Python, basic knowledge about statistics (e.g. correlations and linear regression).
Mathematical modelling of how rocks flow between the Earth's crust	Yue-Kin Tsang and Sandra Piazolo *Applied Maths + SSE*	Essential: Basic ability in the use of a computer package such as Maple, Matlab, or Mathematica or programming language, for example, Python. Core first-year modules. Desirable**:** An interest in the geometry of shapes.
Analysis of X-ray images to classify femoral fractures	Robert Aykroyd *Statistics*	Required: Multivariate Analysis
The Archetypal Equation with Rescaling	Leonid Bogachev & Vladimir Kisil *Statistics/Pure Maths*	Essential: Good marks (65 or higher) on one or more of the following: MATH1710/MATH2016/MATH2375/ MATH2600/MATH2750; Desirable: some computing skills for numerical analysis
