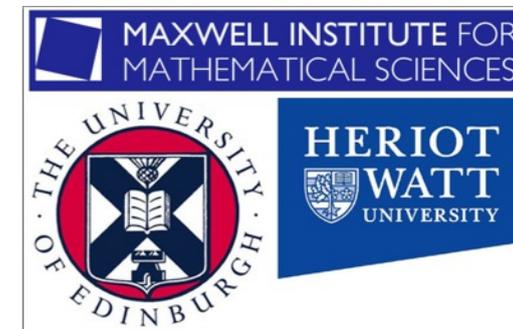


EPSRC

Engineering and Physical Sciences
Research Council



MIGSAA

The Maxwell Institute Graduate School in
Analysis and Its Applications



Tony Carbery, Director

What is **MIGSAA**?

MIGSAA is a new **Centre for Doctoral Training in Analysis and its Applications**, funded by **EPSRC**, **SFC**, **Edinburgh University** and **Heriot-Watt University**.

It will take in around 60 PhD students over 5 yearly intakes (Sept 2014 -- Sept 2018) in the areas of **Mathematical Analysis and its Applications**, with the needs of both academia and industry/commerce as beneficiaries in mind.

It is a joint venture between UoE and HWU under the aegis of the Maxwell Institute for Mathematical Sciences.

The degree programme is jointly administered between the two universities, students will be registered at both, and will receive a **PhD jointly from the two institutions**.

Students will be trained across the broad spectrum of Analysis and its Applications, including **theoretical analysis**, **PDE**, **stochastic analysis**, **numerical analysis** and relevant areas of **applied mathematics**.

What's the Difference?

What's the difference compared to a “standard” PhD programme?

In a standard PhD, students are admitted with a named supervisor in mind, the supervisor will direct the research leading to the PhD thesis, after around 3 -- 3.5 years of study.

In a CDT, students are **admitted to the programme** (rather than with a specific supervisor), and take PhD training courses and projects over their first year, leading to a match with a supervisor some time in the second half of Year 1.

It is still the case that **the research project directed by the supervisor is the centrepiece of the PhD**, but this is augmented by an **on-going training programme** in Years 2--4 of the student's studies.

Note that the MIGSAA PhD is a 4-year programme and **MIGSAA students are funded for the full 4 years.**

Why do it differently?

Concern that the standard route leads to students who are too narrowly trained.

Statistics demonstrating that more broadly trained students from other systems are more successful in obtaining jobs -- academic and otherwise.

Concern that there is not a sufficiently strong link between academia and **industry/commerce**.

The current system is producing too few PhDs in relevant academic areas (Mathematical Analysis and its Applications).

We will offer the best practice from PhD training internationally to students in CDTs with a view of addressing the above concerns.

Scope of MIGSAA

Analysis • Stochastic Analysis/Probability

Numerical Analysis • Analysis-Driven Applied Mathematics

Including (but not limited to)

Linear and nonlinear PDEs

Harmonic analysis

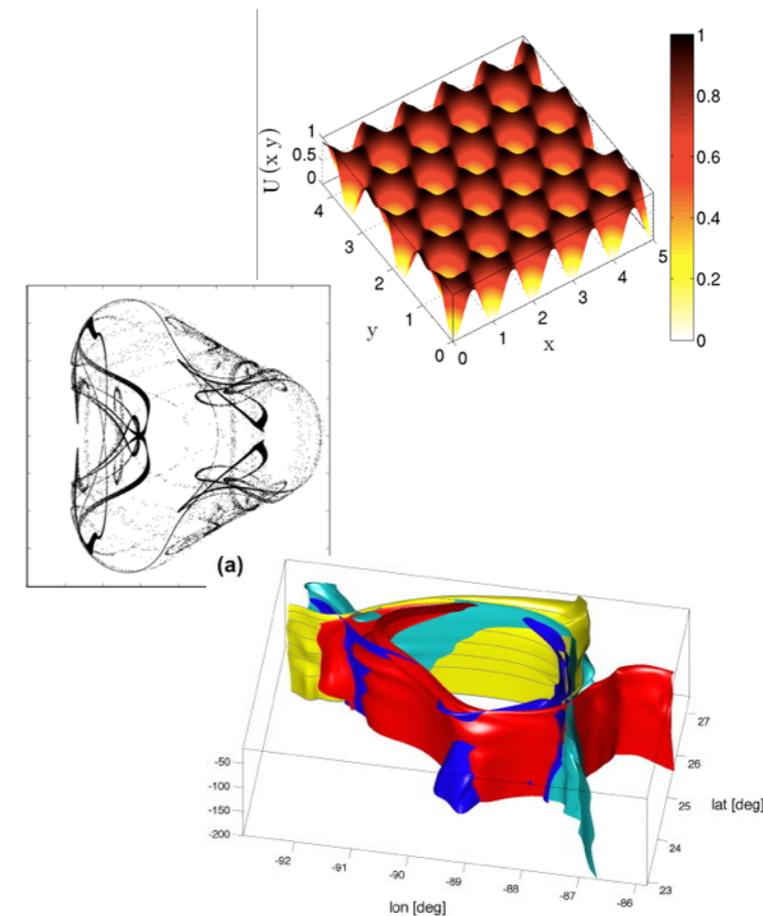
Analysis of discrete structures

Applied analysis

Dynamical systems

Stochastic analysis, applied probability

Computational and numerical mathematics



We have at least 40 potential supervisors -- some from other Schools in UoE and HWU and some from industrial partners.

USPs

Breadth

We want all MIGSAA students to have some awareness across the intellectual spectrum from theoretical to stochastic to applied and numerical.

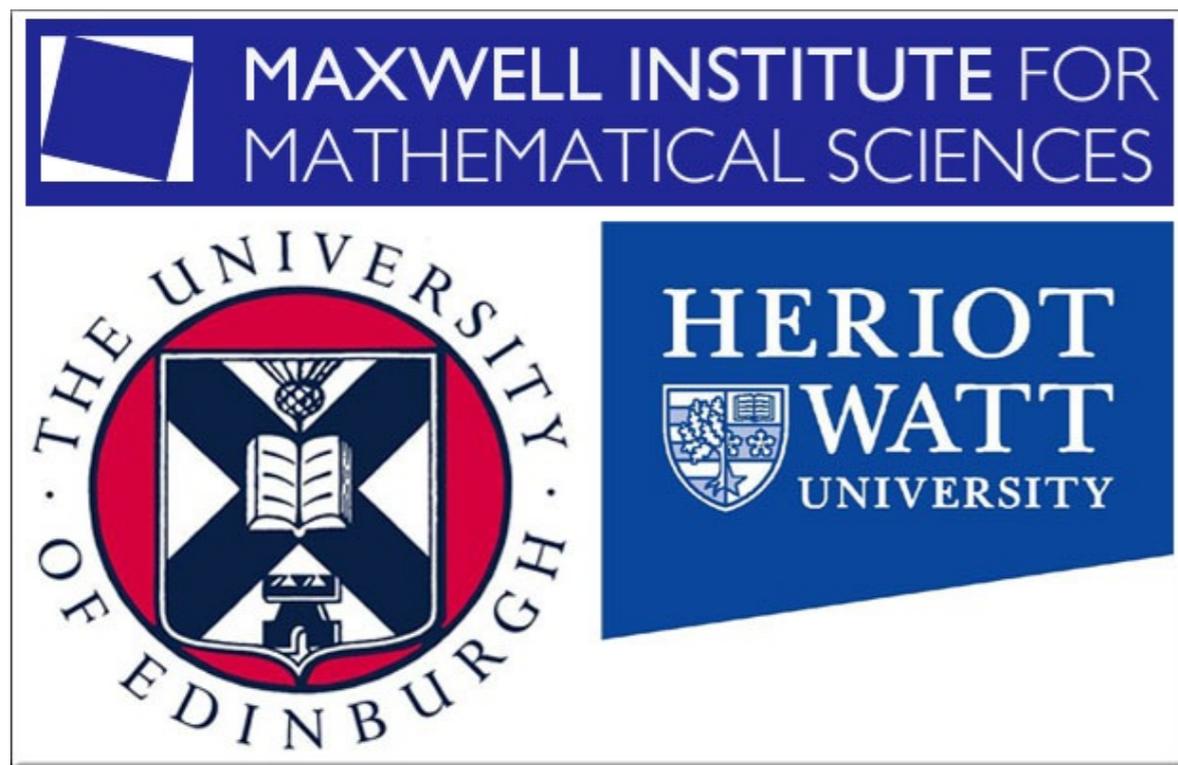
Therefore we expect all students to take some training spanning these areas -- even though their eventual PhD thesis may specialise in only one or two.

In the modern world theoreticians need to know about implementation of their results and likewise applied mathematicians need an understanding of the underlying theory.

Stochastics are (literally) to be found everywhere!

USPs **Two Institutions**

MIGSAA students benefit from an exceptionally wide-ranging environment fostered by the collaboration of two of the UK's leading mathematics departments.



The institutions complement each other in their focus, staffing and courses. They have a long history of cooperation that has included many major grants and joint RAE and REF submissions.

Staff typically meet and interact at a common site in the centre Edinburgh

USPs

ICMS



MIGSAA students benefit from proximity to ICMS - the International Centre for Mathematical Sciences, one of the UK's major mathematical conference centres.

Modern mathematical research is a global, dynamic and collaborative enterprise.

Staff from other institutions (from the UK and abroad) regularly visit Edinburgh's ICMS and talks at ICMS are normally open for advanced PhD students to attend.

USPs

Depth

Expanding one's horizons in mathematics is a lifelong endeavour.

In the top North American and European institutions PhD students, postdocs and academic staff attend advanced courses on a regular basis.

We will offer a suite of **advanced courses** within MIGSAA (and beyond) and it's expected that MIGSAA students will continue to attend classes these into their second, third and fourth years.

USPs **Interdisciplinarity**

Edinburgh is home to some of the UK's leading researchers in many areas of science and engineering

MIGSAA therefore includes partners in a wide range of disciplines:

Petroleum Engineering,

Informatics,

Chemical Engineering,

Biological Sciences,

Built Environment,

Engineering

Students working on projects related to these areas would normally have a first supervisor from mathematics, but might be co-supervised by a staff member from the application field.

USPs

Industry

For the broader social and economic good, it is crucial that mathematicians engage fully with industry.

MIGSAA will offer a variety of opportunities to students for interaction with companies, for example

Selex ES UK, DSTL, Microsoft Inria, John Deere

Students working on projects with a input from industrial partners can expect a good deal of interaction with those partners and significant exposure to the industrial environment at this stage.

Our industrial partners have agreed to host **student placements**.

We will host **industrial afternoons** and MIGSAA factory visits will be offered by Selex.

The International Dimension

These days, advances in mathematics often rely on collaborations between researchers based at sites around the world.

Much of this can be performed using skype chats and email, but sometimes nothing can replace human interaction.

International Placements are therefore available (usually in Year 3 or 4) for students whose research would benefit.

Sharing the Experience

It's well established that young researchers in mathematics thrive when they're well-connected to each other and not working in isolation. It's also recognised that learning with and from your peers is very important.

For these reasons all our **Y1 students are housed together** in the city centre to share the Y1 experience together and take the same suite of courses.

We are also planning a number of pan-MIGSAA events for Y2 -- Y4 in order to encourage the connections to continue to grow:

crash courses,

mini-symposia,

residential symposia,

MIGSAA Student Colloquium,

topic-focused interactive research workshops...

You will also enjoy all the benefits of everything that is offered in the Graduate Schools of Mathematics at UoE and HWU.

Some MIGSAA People

MIGSAA Administrator: **Keira Farrell**

Director: **Tony Carbery (UoE)**

Deputy Director: **Dugald Duncan (HWU)**

Director of Training: **Jim Wright (UoE)**

Director of Cohort: **Kevin Painter (HWU)**

Communications: **Ben Leimkuhler (UoE)**

Industrial Liaison: **Gabriel Lord (HWU)**

Generic Skills Director: **Lyonell Boulton (HWU)**

You: not least in the form of MIGSAA student representatives

Edinburgh - lots to do!



skyline



highlands not far away



folk music



(still) part of the UK



Edinburgh Fringe Festival
(oops...that's the MIGSAA Staff)



great beer