

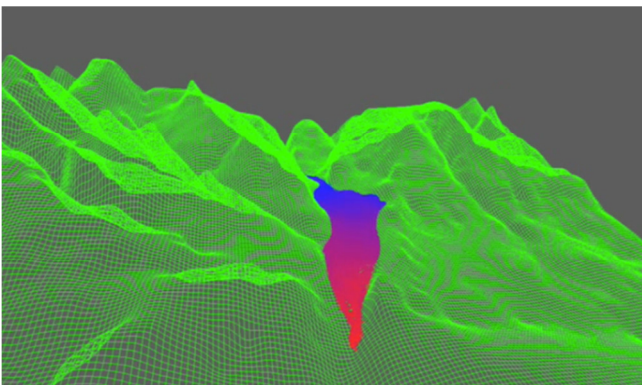
MATHS@BROOKES

Newsletter - Autumn 2015

NEW FOUR YEAR MMATH IN MATHEMATICS

The Department of Mechanical Engineering and Mathematical Sciences is delighted to announce the introduction of a new four year MMath in Mathematics course (validated subject to three minor conditions). The first cohort will begin in September 2016, and students will be able to apply to study this course directly through UCAS or transfer from the BSc programme in Mathematics. The new four year programme will give students more flexibility to adapt their degree to match their career aspirations, whether this is working in industry in positions involving a deeper level of mathematics or pursuing postgraduate research towards a higher level qualification.

Head of the Department, Prof. Gareth Neighbour remarked "I am delighted by the news of the successful validation of this course, which builds upon a strong heritage of mathematics at Brookes and is the outcome of a strategic vision of meeting the needs of society. The hard work undertaken by the programme development team has produced an exceptional and leading course."



The Oxford Brookes MMath course has an enhanced focus on mathematical modelling, which will be developed throughout the entire degree programme. A compulsory mathematical modelling module runs across each of the first two years, and in the second year students will have the opportunity to solve a real-world problem put to them by industry. Students will also develop their transferable skills through a wide range of assessments including group projects and presentations, encouraging the use of mathematical literature from the very outset.

According to Stewart Chidlow, Senior Lecturer in Mathematics, "many real-world problems currently in the news today, such as making sense of big data or predicting the spread of the Ebola virus, involve mathematicians somewhere in a modelling capacity and we want to produce graduates able to solve such problems."

For further information, see
<http://tinyurl.com/BrookesMMath>

EXCELLENT NSS RESULTS FOR MATHEMATICS AT OXFORD BROOKES

Mathematics at Oxford Brookes University has yet again scored excellent ratings from its graduates in the 2015 National Student Survey. We spoke to Programme Lead, Dr Rachel Long, about the results.

What are the headline figures from this year's NSS?

I'm delighted to report that we have scored well in terms of students' overall satisfaction and for many of the individual questions regarding the issues that directly affect teaching and learning on our course. For example, 100% of our graduates agreed that staff are good at explaining things and that staff are enthusiastic about what they teach.

Is that particularly important for Mathematics?

Mathematics is an abstract subject. We can't just pass around an object to show students a concept. Instead, we have to explain that concept so that students can visualise it for themselves. The ability to communicate these ideas to a variety of audiences is therefore extremely important.

The scores around assessment and feedback are especially good. How did you achieve that?

We take pride in the feedback that we give to students, and take steps to ensure that it is

provided as soon as possible after the students have completed the work so that it is still fresh in their minds. We think it's important that students not only see where they went wrong, but also learn how they can avoid making the same error in the future. Assessment is a big part of the learning process, as well as a means of grading the students.

Was there anything you were particularly pleased about in the results?

I think the most pleasing response was to the question about feeling confident in tackling unfamiliar problems. A huge 92% of our graduates said that they felt confident, and this is well above the upper quartile result for courses in the UK. Most of our graduates will find themselves working on applications which they haven't studied during the course in their jobs – in fact, the applications they will work on might not even exist yet – and so being able to tackle the problems will be crucial for their career success. We spend a lot of time developing students' research skills as well as their mathematical knowledge and modelling techniques, and so students should leave the course with the ability to find out whatever they need to know about the application area.

For further information, see:
<https://unistats.direct.gov.uk/>

“100% of our Mathematics graduates agreed that staff are good at explaining things and enthusiastic about what they teach.”

NEWS FROM THE MATHEMATICAL MODELLING TEAM

Mathematical modelling is the application of Mathematics to real life problems.

In order to enhance students' modelling skills, we have created a mathematical modelling team to take part in international modelling competitions. These competitions require the application of Mathematics to real life problems. Membership of the team will give students the opportunity to gain training and hands-on experience in mathematical modelling, to enhance their CV and to broaden

their understanding of mathematics in an extra-curricular environment.

For the 2015-16 academic year, the team will be concentrating on the Mathematical Competitive Game, organised jointly by the Fédération Française des Jeux Mathématiques and the Société de Calcul Mathématique SA. Previous competitions have included problems as diverse as calculating the uncertainty in GPS positioning, checking an industrial process, and determining the ideal positioning of equipment to minimise the cost of fighting forest fires in Siberia.

NEW FACILITIES FOR 2016

The campus relocation provides us with the opportunity to consolidate some of our Mathematics facilities into one space – **The Maths Lab** - to provide a focal point for Mathematical activity within the Department. The room may be used for teaching purposes, but will also be available for student social learning. The Maths Lab will be a room containing group working facilities including several whiteboards, group working tables, data projection and other specialist Mathematics equipment.



The room will be used for group study and small group teaching, careers sessions, modelling team meetings, and a weekly Maths Arcade where a wide range of strategy games and puzzles are available for students to play with each other and with staff, in order to develop their problem solving skills.

RESEARCH NEWS

The mathematics department have recently welcomed Mr. Carlos Fresneda-Portillo and Dr. Armando Coco to the fold as new lecturers in mathematics and mathematical modelling respectively. Both members of staff will strengthen the existing research conducted in Applied Mathematics as Armando's research activities are focussed on the design of highly efficient numerical models to simulate and potentially predict the occurrence of complex phenomena in geophysics (e.g. volcanoes) and Carlos is interested in studying boundary domain integral equations that occur in problems arising in fluid mechanics.

Other areas of research already being conducted in the department include mathematical modelling of the blood glucose regulatory system during exercise, inverse problems with applications in medical tomography (e.g. non-invasive methods of screening for breast cancer) and the application of statistics to problems in medicine such as preventing alcohol misuse in university students and determining how treadmill training can help people with Multiple Sclerosis reduce fatigue.

COMMENTARY: LIES AND DAMNED LIES?¹

Dr Hooshang Izadi, Senior Lecturer in Statistics

One of the most interesting features of our time is that we live in the age of information. Consequently our decisions in every aspect of life, simple or complex, are mainly based on collecting information in terms of data.

The amount of data we obtain, the speed and the relevance of that data will all be important factors in our decision making process. Even more crucial is whether the information we receive is factual, semi-factual, misinterpreted or just made up, although sometimes unintentionally.

Today, we overwhelmingly agree that scientific methods, including statistical analysis, are the correct way towards reliable conclusions. How we analyse data, and whether that analysis is done correctly, will ultimately determine the reliability of our conclusions

This is almost universally accepted, but an unfortunate fact is that there are still a considerable number of individuals who attempt to contradict scientific results by referring to anecdotes and coincidences. (Try to warn them about health hazards of smoking and you immediately hear about a certain person who smoked like a chimney, drank like a fish and lived until the age of 120!) It is striking to know that such individuals can be part of academia too.

It seems this is mainly the consequence of a partial understanding of Statistics. It is true that the fundamental concepts of Statistics can be understood intuitively, but we should be aware of the limits of our intuition as well as this is the main cause of many misconceptions in Statistics.

Textbooks are full of examples of such fallacies. A classic example is the Monty Hall problem – an incorrect answer can appear far too quickly and too credibly before our eyes. A contestant is given a choice of three doors, only one leading to a prize. After selecting a door the host opens one of the other two doors that does not lead to a prize and gives the contestant the option to change their choice of door. The question is whether it is in the contestant's best interest to switch. The answer is yes, but when a solution was published in *Parade* magazine, thousands of readers, many with PhD's, wrote in that the answer was wrong!

The media, too, have a responsibility towards the public understanding of scientific methods. A survey for the Royal Statistical Society and King's College London in 2013 showed that a major proportion of public opinion was repeatedly "off the mark" on issues including crime, benefit fraud and immigration. It is an irony that The Independent² published the summary of the survey under the title: "British public wrong about nearly everything"!

The study of Statistics is an important part of any scientific or analytical subject, and this is why we include such techniques in our courses. Increasingly, Mathematics graduates working in a wide range of industries will find themselves with a large volume of data to analyse, and their statistical training will serve them well.

¹ "There are three kinds of lies: lies, damned lies, and statistics." Attributed to Benjamin Disraeli.

² The Independent, Tuesday 9 July 2013.



<http://mems.brookes.ac.uk>



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