

Programme of Exploring Mathematics, 29th June 2011

9.45-10.00am	Refreshments and Welcome
10.00-11.00am	Prof. Dave Cohen: Populations, Goats and Envelopes.
11.00am-11.30am	Prof. Sean Murphy: Quick quiz session with prizes.
11.30am-11.40am	Break
11.40am-12.40am	Prof. Glyn Harman: Mathematics at University.
12.40am-2.00pm	Lunch, and tours of Campus.
2.00pm-3.00pm	Small group sessions on a variety of topics.
3.00pm-4.00pm	Prof. Vincent Jansen: Prey, Predators and Pathogens: Mathematics meets Biology.
4.00pm	End.

Most events are in the Founders Main lecture theatre, only the small group sessions are in various rooms across the Campus (tba on the day).

Abstracts of the plenary talks

Prof. Dave Cohen - Populations, Goats and Envelopes

In this talk we will show how cheats got caught fiddling their expenses and how even the American military chief statistician can be confused about health screening

Prof. Glyn Harman - Mathematics at University

Are you interested in studying Mathematics at University? This session will deal with the types of course available and the qualifications required, the ways in which university mathematics is different from or similar to that at A level, and the careers available.

Prof. Vincent Jansen - Prey, Predators and Pathogens: where Mathematics meets Biology

Find out how biology works in an lecture by Vincent Jansen, Professor of Mathematical Biology at Royal Holloway.

In his presentation: "Prey, predators and pathogens: where mathematics meets biology" he will show how mathematical models can be used to understand complicated biological problems.

Professor Jansen has worked in the areas of ecology, evolutionary biology and epidemiology. Topics he has addressed range from the formation of prion molecules to the evolution of altruism. In this lecture he will explain how mathematics has helped us understand the population dynamics of predators and their prey and outbreaks of infectious diseases.

Abstracts of the small group sessions

1. **A special session for teachers only!**

Ms Gill Buque (Regional Coordinator for the South East Further Mathematics Support Programme): Further Maths for Teachers

This is an informal opportunity for current or potential teachers of Further Maths to share ideas and to find out how the Further Maths Network can support them. It will also provide an opportunity for teachers get together and discuss different aspects of Further Maths teaching.

2. **Dr James McKee: The Mathematics of Doodles.**

We'll learn (and play) the game of Sprouts, and explore the mathematics of the resulting doodles.

3. **Dr Benjamin Klopsch: Mathematics under the Leaning Tower of Pisa.**

Imagine you are seated in a small cafe near the Tower of Pisa in Italy. It is a fine summer day, perfect for mathematical daydreaming. Is it possible to build towers which lean over more seriously? – We will experimentally build such leaning towers and explore the mathematics behind the scene. Not entirely unexpectedly, a cup of strong coffee will save the day.

4. **Dr Keith Mayes: Introduction to Smart Cards.**

Smart cards are becoming increasingly important in our day today lives. For example they are found in mobile phones, banking cards, identity cards, electronic-tickets etc. Their general capabilities are quite surprising but a most fundamental feature is tamper-resistant security, which is vital as security systems are often subject to a range of sophisticated attacks. The smart card security defences are provided by a mixture of cryptographic and engineering techniques aimed to stay one step ahead of the hackers.

5. **Dr Yiftach Barnea: Counting Infinity.**

Often people talk about infinity as the “biggest number”. We will explore the idea of infinity as a number. In particular, we will try to see whether infinite objects may have different sizes.

6. **Mr U. Mat, Dr Alexey Koloydenko, room C103: How is doing mathematics in 21st century different from that in “the good old days”?**

You will have an opportunity to experiment with Matlab, a powerful computer environment which helps us to bridge abstract and concrete. Have in mind a math problem your teacher said could take a century to compute the solution for? See what Matlab thinks about that!