Adrakey, Hola:

**Novel approach for targeting control for spatio-temporal epidemics**

The control of highly infectious disease of livestock such as foot-and-mouth disease and classical swine fever; and agricultural crop such as Citrus canker, Cassava Mosaic disease and Chalara dieback is consider as a key challenge in epidemiological and ecological modelling. We explore some approaches to optimising surveillance and control for such epidemics within a Bayesian setting. We investigate the benefit of using latent processes (eg: Selike thresholds) and identifying control conditional on these, rather than doing a fully Bayesian approach along with the benefit of using cost functions based on the outcome of the epidemic rather than ones based on the information provided on parameters.

Azalekor, Abla:

**TBA**

**TBA**

Bunk, Severin:

**Instantons on conical extensions of Sasakian manifolds**

We present an explicit scheme for deformations of $G$-structures on manifolds $M$. Applying this to Sasaki-Einstein $SU(2)$-structures on 5-dimensional spaces allows us to construct several different lifts of these structures to $SU(3)$-structures on warped products of $M$ with an interval. We thereby obtain nearly Kaehler, half-flat and Calabi-Yau structures, which are all prominent in flux compactifications of string theory. As a first step towards constructing such compactification scenarios, we consider the instanton equation on these spaces and, making a suitable ansatz for the gauge fields, reduce these geometric equations to a set of matrix equations. Solutions to the equations are presented and discussed subsequently.

El Ghandour, Lalia:

**TBA**

**TBA**
Eljazi, Radhia:

Modelling the interaction between brain tumor invasion and brain vasculature

The vascular supply to different brain regions is highly heterogeneous, with significant differences in capillary density between grey and white matter, or among the brain lobes. However, the interaction between the brain vascular and glioma invasion is poorly understood. The aim of this research is to investigate how blood vessels impact on glioma invasion via a simple PDE mathematical model based on an underlying random walk for movement.

Jones, Hannah:

A modelling assessment of population dynamics of red squirrels in Northern England in relation to forest design plans

Since its introduction into the UK, the grey squirrel has been replacing the native red squirrel. There are now only certain regions in which the red squirrel survives and maintaining these populations is a major conservation priority. The Kielder and Uswayford forests in Northumberland are designated strongholds for red squirrels managed by the Forestry Commission. The forests composed predominantly of Sitka spruce and other conifer species, are managed for timber with large sections periodically felled for wood production and then re-planted. It is important to know how felling and planting regimes affects red squirrels viability and therefore we have developed a mathematical model to assess the current levels of red squirrel population abundance and the impact of predicted felling and restocking regimes on future population levels. The mathematical model developed is a spatial, stochastic model which simulates birth and death processes over a realistic landscape (extracted from digital landscape maps). We test how squirrel population numbers change for different forest design plans with the aim of maximising long-term squirrel population survival. Our results can be used to direct conservation strategies to protect red squirrels in the UK.

Lijoka, Oluwaseun:

A Trefftz Space-Time Discontinuous Galerkin for the solution of wave equation in time domain

We present a new time-space dG method for one field wave equation which utilizes special Trefftz-type basis functions. The method is motivated by the class of interior Penalty discontinuous Galerkin (IPdG) methods together with classical work of Hulbert and Hughes. We prove the existence and uniqueness of the scheme and we perform theoretical experiments to show the performance of the method on specific (scalar) wave problems compared with standard polynomials of total degree.
Willetts, Jennifer:

Spin-Chains, Vertex Operators and Structure Factors

One-dimensional Heisenberg spin chains can be used to model certain quasi-one-dimensional materials. Using the vertex operator approach due to Jimbo and Miwa, it is possible to compute exact results for correlation functions of the spin-1/2 XXZ chain and so calculate the dynamic structure factors of these materials - objects measurable in inelastic neutron scattering experiments. This poster gives an overview of the techniques involved and introduces our application of this approach in the spin-1 case, the goal of which being to compute exact form-factors.

Yang, Junye:

TBA

TBA