Programme Overview

	Mon 25	Tues 26	Wed 27	Thur 28
9:00–9:55		**White** (AT 4) **Brown** (AT 6)	**Barrow-Green** (AT 4) **Vallette** (AT 6)	**Leinster** (AT 4) **Dooley** (AT 6)
10:00–10:55		**Lykova** (AT 4) **Dokchitser** (AT 6)	**Rempe-Gillen** (AT 4) **Ardakov** (AT 6)	**Bridgeland** (AT 4) **Reinert** (AT 6)
11:00–11:30	Satellite events (Hicks Building)	*coffee (AT foyer)*	*coffee (AT foyer)*	*coffee (AT foyer)*
11:30 - 12:45		LMS meeting incorporating **Kapranov** (AT 4)	AGM then Open Access Forum (AT 4)	**Schick** (AT 4) close 12:30
12:45–14:00		*lunch*	*lunch*	
14:00–16:00	*registration* *(Arts Tower foyer)*	Workshops (Hicks Building) to 16:20	Workshops (Hicks Building) to 16:20	
16:00–17:00	**Piene** (AT 4)	*coffee (AT foyer)*	*coffee (AT foyer)*	
17:00–18:00	*reception* *(Arts Tower foyer)*	**Henniart** (AT 4)	**Saloff-Coste** (AT 4)	
18:30–19:30	Public Lecture **Baez** (St George's)			
19:30		*Colloquium* *Dinner* *(Crucible Theatre)*		

Monday 25 March

09:30–15:30	**Satellite events** Hicks Building See page 26 for information
	94th Peripatetic Seminar on Sheaves and Logic Non-commutative Geometry, Analysis and Groups Joint ARTIN-BLOC meeting
14:00–16:00	**Registration** Arts Tower Foyer
16:00–17:00	**Ragni Piene** (Oslo) Arts Tower, Lecture Theatre 4
	Polytopes, discriminants and toric geometry This talk will survey recent work by various authors concerning the description of dual and higher order dual varieties of projective toric varieties and the corresponding lattice configurations and polytopes. The interplay between algebraic geometry and combinatorics makes it possible to prove algebro-geometric statements using combinatorial methods, and combinatorial statements using algebro-geometrical methods. An example of the latter is a combinatorial characterization of certain Cayley polytopes.
17:00–18:00	**Wine reception** Arts Tower Foyer
18:30–19:30	**Public lecture** St George's **John Baez** (University of California, Riverside)
	The Mathematics of Planet Earth The International Mathematical Union has declared 2013 to be the year of The Mathematics of Planet Earth. The global warming crisis is part of a bigger transformation in which humanity realizes that the Earth is a finite system and that our population, energy usage, and the like cannot continue to grow exponentially. If civilization survives this transformation, it will affect mathematics—and be affected by it—just as dramatically as the agricultural revolution or industrial revolution. We cannot know for sure what the effect will be, but we can already make some guesses.

Tuesday 26 March

9:00–9:55	**Stuart White** (Glasgow) Arts Tower, Lecture Theatre 4	**Gavin Brown** (Loughborough) Arts Tower, Lecture Theatre 6
	Interplay between C^* and von Neumann algebras This talk will focus on the transfer of ideas and techniques between the topological setting of C^*-algebras and the measure theoretic setting of von Neumann algebras. I'll develop this theme primarily in the context of tensorial absorption properties for operator algebras. A key step in Connes's groundbreaking work in the 70's on injectivity and hyperfiniteness for von Neumann algebras is to show that an injective II_1 factor M absorbs a copy of the hyperfinite II_1 factor R tensorially (i.e. $M \cong M \overline{\otimes} R$). Over the last decade a similar property ($\mathcal{Z}$-stability) has come to the forefront of the study of nuclear C^*-algebras. I'll discuss what this means, the analogies with the measure theoretic situation, why $\mathcal{Z}$-stability is useful and methods for establishing it. The talk will start with a discussion of C* and von Neumann algebras; all necessary terminology will be introduced as we go.	*Geographies of complex projective varieties* I will review well-known parts of the classification of complex algebraic varieties in low dimension, starting with curves, which are classified into irreducible families by their genus, and surfaces, where additional invariants come into play. It is fun and enlightening to arrange the irreducible families arising in such classifications according to the values of discrete invariants like genus, and the result is 'maps' of regions of possible invariants. I will show a few such maps, some in their very early stages, and explain recent attempts to populate them. In particular, I will sketch a method that constructs different families of varieties that have the same basic algebro-geometric invariants (their associated commutative Gorenstein coordinate rings have the same Hilbert series) but are distinguished by their topology (they have different Euler characteristic).
10:00–10:55	**Zinaida Lykova** (Newcastle) Arts Tower, Lecture Theatre 4	**Tim Dokchitser** (Bristol) Arts Tower, Lecture Theatre 6
	Amenability of Banach algebras A Banach algebra $\mathcal{A}$ is called *amenable* if every continuous derivation $D : \mathcal{A} \to X^*$ is inner for every dual Banach $\mathcal{A}$-bimodule X^*. This notion was introduced by Barry Johnson in 1972 with the aim of identifying Banach algebras which have trivial continuous Hochschild cohomology $\mathcal{H}^n(\mathcal{A}, X^*)$ for all Banach $\mathcal{A}$-bimodules X and all $n \geq 1$. There exists a rich theory of amenability of Banach and C^*-algebras. Several books have been written on this topic. However, during the last few years a number of open questions have been solved and new descriptions of n-amenable Banach algebras have been discovered. For any $n \geq 1$, a Banach algebra $\mathcal{A}$ is called *n-amenable* if $\mathcal{H}^n(\mathcal{A}, X^*) = \{0\}$ for every Banach $\mathcal{A}$-bimodule X. In this talk I will give an overview of what is known about amenable and n-amenable Banach algebras.	*Brauer relations and number theory* If G is a finite group, non-isomorphic G-sets X, Y may give rise to isomorphic permutation representations $\mathbb{C}[X]$ and $\mathbb{C}[Y]$. These phenomena are called 'Brauer relations', and they turn out to have interesting applications in number theory. I will explain how to classify Brauer relations in all finite groups, the history of the problem and some number-theoretic applications. This is joint work with Alex Bartel.
11:00–11:30	**Coffee (Arts Tower Foyer)**	

Tuesday 26 March (ctd)

11:30–12:45	**London Mathematical Society meeting** incorporating the following talk **Mikhail Kapranov** (Yale) Arts Tower, Lecture Theatre 4
	Higher Segal spaces The concept of a Segal space, having roots in the classical work of G. Segal and developed by C. Rezk, has become an important tool for working with higher categories. It is a simplicial topological space satisfying a series of conditions which can be encoded geometrically in terms of an interval subdivided into several sub-intervals. The lecture will discuss a "2-dimensional" generalization of this concept which is based on triangulations of convex polygons instead of subdivisions of intervals. Such structures (called 2-Segal spaces) underlie many "associative algebras of correspondences", e.g., Hall algebras, Hecke algebras etc. Remarkably, there are many examples of 2-Segal spaces of quite diverse origins, including Waldhausen spaces in K-theory, cyclic bar-constructions, as well as spaces of holomorphic polygons. They can also be understood in higher-categorical and operadic terms. This is joint work with T. Dyckerhoff.
12:45–14:00	**Lunch**
14:00–16:20	Workshops (Hicks building) See pages 10–25 for workshop schedules and abstracts
16:20–17:00	**Coffee (Arts Tower Foyer)**
17:00–18:00	**Guy Henniart** (Paris 11) Arts Tower, Lecture Theatre 4
	From modular forms to automorphic representations: a tale of Hecke operators, continued Classical modular forms are better viewed as functions on a group of 2×2 matrices, a so-called adelic group, and those functions give rise to irreducible complex representations of $\mathrm{GL}(2, \mathbb{R})$, and $\mathrm{GL}(2, \mathbb{Q}_p)$ as well, where p is any prime number and $\mathbb{Q}_p$ the field of p-adic numbers, a non-Archimedean completion of $\mathbb{Q}$. The most frequent such representations are spherical, i.e. have non-zero vectors fixed by the maximal compact subgroup $\mathrm{GL}(2, \mathbb{Z}_p)$, where $\mathbb{Z}_p$ is the ring of p-adic integers. To classify them, one uses an algebra of operators, introduced by Hecke in the context of modular forms. If $\mathrm{GL}(2)$ is replaced with a general reductive group G over $\mathbb{Q}_p$, the corresponding Hecke algebra was described by Satake, and its representations are classified using the dual group ${}^LG$ introduced by Langlands, who used it to formulate a classification of the non-spherical irreducible representations as well. That classification was known only for $\mathrm{GL}(n)$ until recently, when J. Arthur completed it for classical groups, by a comparison with $\mathrm{GL}(n)$. The talk will introduce p-adic numbers, briefly explain why one has to study representations of p-adic groups, and give an idea of Arthur's results, with some applications to lattices in dimension 24 due to Chenevier and Lannes. If time allows, I shall mention how the study of congruences between modular forms imposes new twists for the theory of Hecke algebras.
19:30	**Colloquium dinner (Crucible theatre)**

Wednesday 27 March

9:00–9:55	**June Barrow-Green** (Open) Arts Tower, Lecture Theatre 4	**Bruno Vallette** (Nice, Isaac Newton Institute) Arts Tower, Lecture Theatre 6
	G. D. Birkhoff and the development of dynamical systems theory In October 1912, the young American mathematician G. D. Birkhoff astonished the mathematical world by providing a proof of Poincaré's last geometric theorem. The theorem, which was connected to Poincaré's long standing interest in the periodic solutions of the three-body problem, had been proposed by him only months before he died. Birkhoff continued to work on aspects of dynamical systems throughout his career, his aim being to create a general theory. Many of his ideas are contained in his book Dynamical Systems (1927), the first book to develop the qualitative theory of systems defined by differential equations and where he effectively created a new branch of mathematics separate from its roots in celestial mechanics and making broad use of topology.	*Higher algebra with operads* In this talk, I will explain how to do homotopical algebra with operads. I will survey the recent homological methods which provide us with nice resolutions for operads and ways to describe the homotopy category for the various types of algebras. The induced higher structures will be applied to Geometry (Riemann surfaces), Topology (trivialization of the circle action) and Mathematical Physics (Field theories).
10:00–10:55	**Lasse Rempe-Gillen** (Liverpool) Arts Tower, Lecture Theatre 4	**Konstantin Ardakov** (Queen Mary, London) Arts Tower, Lecture Theatre 6
	Density of Axiom A in Arnol'd's standard family Consider the self-maps $F_{\mu_1,\mu_2}(t) : \mathbb{R}/\mathbb{Z} \to \mathbb{R}/\mathbb{Z}; \quad t \mapsto t+\mu_1+\mu_2 \sin(2\pi t)$ of the circle. (Here $\mu_1 \in \mathbb{R}$ and $\mu_2 > 0$ are parameters.) This family, known as the *standard family*, was introduced by Arnol'd in 1961 to model periodically forced nonlinear oscillators, and has since served as one of the simplest models of one-dimensional dynamical systems. I will discuss a recent result (joint with van Strien) establishing the density of *Axiom A* (or *hyperbolic*) maps in the region $\{\mu_2 > 1/(2\pi)\}$, where the maps are non-invertible. (*Axiom A* maps exhibit the simplest type of dynamical behaviour.) This solves a long-standing open problem. I will also mention connections with recent advances in the dynamics of transcendental entire functions. The talk will begin with a short general introduction to one-dimensional dynamics (and the standard family) for a general mathematical audience.	*Localisation of p-adic representations of p-adic Lie groups* We introduce a sheaf $\widehat{\mathcal{D}}$ of non-commutative rings on smooth rigid analytic spaces that is morally a "rigid analytic quantisation" of the cotangent bundle. Using equivariant $\widehat{\mathcal{D}}$-modules on rigid analytic flag varieties, we give an approach to the localisation of admissible locally analytic representations of semisimple compact p-adic Lie groups.
11:00–11:30	**Coffee (Arts Tower Foyer)**	

Wednesday 27 March (ctd)

11:30–12:45	**British Mathematical Colloquium AGM** followed by **Forum on Open Access Publishing** Arts Tower, Lecture Theatre 4
	Chair: **John Greenlees** (Sheffield) Panel to include: John Baez (University of California, Riverside) Susan Hezlet (London Mathematical Society) Carmen O'Dell (University of Sheffield Library) Joerg Sixt (Springer)
12:45–14:00	**Lunch**
14:00–16:20	Workshops (Hicks building) See pages 10–25 for workshop schedules and abstracts
16:20–17:00	**Coffee (Arts Tower Foyer)**
17:00–18:00	**Laurent Saloff-Coste** (Cornell) Arts Tower, Lecture Theatre 4
	Random walks and the geometry of groups This talk is concerned with properties of random walks on finitely generated groups that reflect or capture some of the geometric (or even algebraic) properties of the underlying group. This area of research was initiated by Harry Kesten in his Cornell Ph.D. thesis. Using illustrative examples, I will attempt to discuss some recent progress in this area with a general mathematical audience in mind.

Thursday 28 March

9:00–9:55	**Tom Leinster** (Edinburgh) Arts Tower, Lecture Theatre 4	**Anthony Dooley** (Bath) Arts Tower, Lecture Theatre 6
	The Convex Magnitude Conjecture (Joint work with Simon Willerton) Magnitude is a real-valued invariant of metric spaces, springing from a category-theoretic study of size. Unlike most invariants of metric spaces, it changes unpredictably as the space is scaled up or down. It therefore assigns to each space a real-valued function on the positive real line. Roughly, the Convex Magnitude Conjecture states that for convex subsets of $\mathbb{R}^n$, this function is a polynomial encoding all the most important quantities associated with convex sets: dimension, volume, surface area, perimeter, and so on. I will explain where magnitude comes from, how it is defined, and what makes the conjecture interesting. I will also explain the conjecture's unusual status: while there is compelling evidence in its favour, not a single nontrivial example is known.	*Riesz products: from classical harmonic analysis to modern ergodic theory* Riesz products, weak$*$ limits of measures on the circle of the form $\Pi_{i=1}^{n}(1 + a_i \cos(3^k t + \phi_k)dt$, have an interesting history in harmonic analysis: if $\Sigma a_i^2 = \infty$, they are singular with respect to Lebesgue measure, yet one can calculate their Fourier transforms quite explicitly. Replacing the functions $1 + a_i \cos$ with a sequence of more general functions g_i, one obtains the notion of a G-measure. In some senses, every measure quasi-invariant for the action of the triadic rationals on the circle is a G-measure, and one can identify amongst them extreme points which are uniquely ergodic. Today, uniquely ergodic G-measures provide a tool for studying general non-singular ergodic dynamical systems, and progress has been made in their classification up to orbit equivalence using this tool. This talk will be a survey of work with the late Gavin Brown, and its recent developments.
10:00–10:55	**Tom Bridgeland** (Oxford) Arts Tower, Lecture Theatre 4	**Gesine Reinert** (Oxford) Arts Tower, Lecture Theatre 6
	Hall algebras in representation theory and algebraic geometry Hall algebras first appeared in the work of Steinitz (1901) and Philip Hall (1957). The basic idea is to use the set of short exact sequences in an abelian category to define a convolution product on the set of integer-valued functions on the isomorphism-classes of objects of the category. In this talk I will discuss a couple of recent applications of this construction relating respectively to representations of quivers and curve-counting invariants of Calabi–Yau threefolds.	*Shortest paths and gossip models on networks* Both small world models of random networks with occasional long range connections and gossip processes with occasional long range transmission of information have similar characteristic behaviour. The long range elements appreciably reduce the effective distances, measured in space or in time, between pairs of typical points. In this talk, we shall see that their common behaviour can be interpreted as a product of the locally branching nature of the models. In particular, both typical distances between points and the proportion of space that can be reached within a given distance or time can be approximated by formulae involving the limit random variable of an approximating branching process.
11:00–11:30	**Coffee (Arts Tower Foyer)**	

Thursday 28 March (ctd)

11:30–12:30	**Thomas Schick** (Göttingen) Arts Tower, Lecture Theatre 4
	Coarse geometry and index theory Geometric differential operators like the Laplace operator, Dolbeaut operator or Dirac operator play an important role in modern geometry, most prominently their index. Coarse geometry uses C*-algebra methods to describe in particular the large scale structure of spaces. We show how these approaches naturally come together and provide new geometric insights. For the applications we will concentrate on the question of existence of Riemannian metrics of positive scalar curvature.
12:30	**End of BMC**

The following pages contain information about the

Afternoon Workshops

Hicks Building

LT stands for "Lecture Theatre"
Floor D is the floor of the main entrance and reception
To reach LT3 and LT4 cross the hall between the reception and the lifts.
Floor F is two floors up; Floor K is seven floors up, the top floor.

Tuesday workshops	14:00–14.30	14:35–15:05
Category Theory (F24)	Nicola Gambino (Palermo and Leeds) *The bicategory of operads is cartesian closed*	Dimitri Ara (Nijmegen) joint with Georges Maltsiniotis *Towards a definition of normalised lax n-functors*
Higher Education (K14)	13:45–15:00 Chair: David Jordan (Sheffield), Speakers: Lars Olsen (St Andrews), John Hunton (Leicester), Sam Marsh (Sheffield) *Projects, investigation and research*	15:00
K-theory and Analysis (D-LT4)	Jacek Brodzki (Southampton) *K-homology for groups acting on* CAT(0)*-cube complexes*	15:00
Non-com. Algebra and Rep. Th. (F38)	Kobi Kremnitzer (Oxford) *Beilinson-Drinfeld factorization algebras*	TBC
Number Theory (D-LT3)	Ivan Fesenko (Nottingham) *Analytic and geometric ranks of elliptic surfaces*	15:00
Probability (F28)	Peter Windridge (Queen Mary, London) *Law of large numbers for the SIR epidemic on a random graph [...]*	Andrew Wade (Durham) *Convex hulls of planar random walks with drift*
Topology (F41)	Markus Szymik (Copenhagen) *Characteristics of structured ring spectra*	Constanze Roitzheim (Kent) *Modular rigidity of E-local spectra*

	15:15–15:45	15:50–16:20
Category Theory (F24)	François Métayer (Paris 7) *From word rewriting to higher categories*	Martin Hyland (Cambridge) *The Fundamental Theorem of the Lambda Calculus*
Higher Education (K14)	15:15–16:30 Chair: Camilla Jordan (Open), Speakers: David Pritchard (Strathclyde), Lara Alcock (Loughborough), Tim Lowe (Open) *Old and new technology in teaching*	
K-theory and Analysis (D-LT4)	Roger Plymen (Southampton) *The Dirac operator and the discrete series for the universal cover of $SL_2(R)$*	Eli Hawkins (York) *Non-commutative rigidity*
Non-com. Algebra and Rep. Th. (F38)	Tom Lenagan (Edinburgh) *Totally nonnegative matrices*	Abdenacer Makhlouf (Haute Alsace) *Representations and Cohomology of Hom-algebras*
Number Theory (D-LT3)	Sanju Velani (York) *Multiplicative and Inhomogeneous Diophantine Approximation*	16:15
Probability (F28)	Maren Eckhoff (Bath) *Preferential Attachment Networks under Attack*	Mathew Joseph (Sheffield) *Semi-discrete Stochastic Heat Equation*
Topology (F41)	Andrew Russhard (Southampton) *Power maps on quasi-p-regular SU(n)*	Julian Gibbons (Imperial) *The Hodge decomposition of higher order Hochschild homology*

Wednesday workshops	14:00–14.30	14:35–15:05
Category Theory (F24)	Jon Woolf (Liverpool) *Whitney categories and the Tangle Hypothesis*	Tamara von Glehn (Cambridge) *Fibrations and Polynomial Functors*
History of Maths (F20)	Stephen Huggett (Plymouth) *Newton, the geometer*	Jeremy Gray (Open) *On the cusp of new Physics: Henri Poincaré and mathematical physics [...]*
K-theory and Analysis (D-LT4)	John Hunton (Leicester) *Derived invariants in the K-theory of aperiodic patterns*	15:00
Non-com. Algebra and Rep. Th. (F38)	André Leroy (Artois, Lens) *Idempotents in ring extensions*	Alex Martsinkovsky (Northeastern) *How to stabilize the tensor product*
Number Theory (D-LT3)	Vladimir Dokchitser (Cambridge) *Reconstructing Weil representations from Euler factors*	15:00
Probability (F28)	Amanda Turner (Lancaster) *The emergence of branching in Hastings-Levitov type random clusters*	Antal Járai (Bath) *Electrical resistance of the low-dimensional critical branching random walk*
Topology (F41)	Birgit Richter (Hamburg) *The Hodge decomposition of higher order Hochschild homology*	Magdalena Kedziorek (Sheffield) *Towards an algebraic model of rational equivariant cohomology theories*

	15:15–15:45	15:50–16:20
Category Theory (F24)	Victoria Lebed (Paris 7) *Associative Algebras, Bialgebras and Leibniz Algebras as Braided Objects*	Neil Ghani (Strathclyde) *Putting right that which we got wrong*
History of Maths (F20)	Chris Hollings (Oxford) *An Obsession for Documentation*	Peter Rowlett (Nottingham Trent) *The unplanned impact of mathematics*
K-theory and Analysis (D-LT4)	Christian Voigt (Glasgow) *Coarse geometry and quantum groups*	Nick Wright (Southampton) *The boundary coarse Baum-Connes conjecture*
Non-com. Algebra and Rep. Th. (F38)	Agata Smoktunowicz (Edinburgh) *Some new results on Golod-Shafarevich algebras*	Jonathan Nelson (Cambridge) *Localisation in Iwasawa algebras*
Number Theory (D-LT3)	Christian Johansson (Imperial) *Control theorems for overconvergent eigenforms on some Shimura varieties*	Barinder Banwait (Warwick) *A local-global principle for rational torsion on simple abelian varieties*
Probability (F28)	Ben Hambly (Oxford) *Diffusions on critical random clusters on the diamond lattice*	Matt Roberts (Warwick) *Intermittency in branching random walk in random environment*
Topology (F41)	Martin Palmer (Oxford) *Homological stability for spaces of disconnected submanifolds*	Raymond Vozzo (Adelaide/Glasgow) *Geometry and topology of certain infinite dimensional spaces*

Workshops: Category Theory
Tuesday 26 March

Hicks Building, F24 (floor F)

14:00–14:30	14:35–15:05
Nicola Gambino (Palermo & Leeds) *The bicategory of operads is cartesian closed* Extending work of Charles Rezk, it is possible to define a bicategory that has operads as objects, operad bimodules as 1-cells and bimodule morphisms as 2-cells. The aim of the talk is to introduce this bicategory and explain why it is cartesian closed. This will involve some general results on bicategories of bimodules and an extension of earlier joint work with Fiore, Hyland and Winskel. This is joint work with André Joyal.	**Dimitri Ara** (Nijmegen) *Towards a definition of normalized lax n-functors* If C and D are two strict 2-categories (or even bicategories), there is a classical notion of normalized lax 2-functor from C to D. This notion is very related to the (2-truncation) of Street's orientals. In this talk, based on joint work with Georges Maltsiniotis, I will explain how the notion (to be defined) of normalized lax n-functor between strict n-categories is related to some generalized orientals for a non-full subcategory of Joyal's cell category Theta. This will lead to a definition of normalized lax n-functors.

15:15–15:45	15:50–16:20
François Métayer (Paris 7) *From word rewriting to higher categories* Generators and relations are the first building blocks in the construction of resolutions for monoids. These resolutions may be seen as particular morphisms in the category ω-**Cat** of strict, globular higher categories. I shall give a brief overview of the homotopy theory of ω-**Cat** and its relationship with the properties of computations in monoids.	**Martin Hyland** (Cambridge) *The Fundamental Theorem of the Lambda Calculus* The lambda calculus was one of the great creations of 20th century logic. When invented it was conceptually radical, and it has proved to have extraordinary impact in Informatics. However the mathematical meaning of the lambda calculus has proved problematic. I shall propose a view of interpretations of the lambda calculus as themselves theories. The equivalence between that view and an algebraic view encapsulates aspects of the lambda calculus of which experts are aware but hitherto have not been able to make precise: it deserves to be called the Fundamental Theorem of the Lambda Calculus. I shall give a categorical formulation and proof of the Fundamental Theorem. The talk will contain a (hopefully clearer) account of some material from a paper (arXiv:1211.5762) placed on the arXiv last November.

Workshops: Category Theory
Wednesday 27 March

Hicks Building, F24

14:00–14:30	14:35–15:05
Jon Woolf (Liverpool) *Whitney Categories and the Tangle Hypothesis* Baez and Dolan's Tangle Hypothesis is that 'higher categories of tangles' have an algebraic characterisation as 'free multiply-monoidal categories with duals'. I will sketch the proof of an interpretation of this hypothesis within the context of 'Whitney categories'. These are a geometric notion of 'higher category with duals' defined to be sheaves on a category of Whitney stratified spaces. The idea is that the Tangle Hypothesis for Whitney categories reduces to the Pontrjagin-Thom construction. This is joint work with Conor Smyth.	**Tamara von Glehn** (Cambridge) *Fibrations and Polynomial Functors* Polynomial functors between slices of a locally cartesian closed category are the categorical version of polynomial functions on natural numbers, built from sums and products. I will consider the structure of the bicategory of polynomials in the context of a bicategory of fibrations, and look at a general construction from the monads which freely add sums and products to fibrations.

15:15–15:45	15:50–16:20
Victoria Lebed (Paris 7) *Associative Algebras, Bialgebras and Leibniz Algebras as Braided Objects* A representation theory and a homology theory for braided objects in a monoidal category C will be presented. Some familiar categories (for instance, those of associative algebras, bialgebras and Leibniz algebras in C) will then be reinterpreted as full subcategories of (a generalized and enhanced version of) the category $\mathrm{Br}(C)$ of braided objects in C. The classical representation and homology theories for these structures turn out to be particular cases of the corresponding theories for braided objects.	**Neil Ghani** (Strathclyde) *Putting Right That Which We Got Wrong* Natural transformations between functors lie at the heart of category theory. But what if our functors are mixed variant? Category theorists came up with the notion of dinatural transformations... but they don't do the trick. So they came up with strong dinatural transformations. But they don't actually work either. Meanwhile (and don't say it too loudly) computer scientists came up with what looks to me to be the right answer—parametricity. So what is parametricity? Well, as I shall explain, it's actually very simple once you look at it in the right way. Parametricity simply means we shift from working in a categorical universe of categories, functors and natural transformations, to working in a fibrational universe of fibrations, fibred functors and fibred natural transformations. What could be more beautiful!

Workshops: Mathematical Higher Education
Tuesday 26 March

Hicks Building, K14 (floor K)

This workshop is funded by the Higher Education Academy (HEA).
Lunch is provided in K14 for those who pre-registered.
Each session will begin with three short talks and proceed to a discussion with the three speakers as a panel.

13:00	Lunch
13:30	Welcome (Mary McAlinden)

13:45–15:00

Projects, investigation and research
Chair: **David Jordan** (Sheffield)

Lars Olsen (St Andrews)	Project work at third year and above
John Hunton (Leicester)	Leicester's second year module "Investigations in Mathematics"
Sam Marsh (Sheffield)	Investigatory aspects of a new first year module at Sheffield

15:15–16:30

Old and new technology in teaching
Chair: **Camilla Jordan** (Open)

David Pritchard (Strathclyde)	When/why lectures are and aren't effective
Lara Alcock (Loughborough)	Improving proof comprehension: changing the presentation vs changing the engagement
Tim Lowe (Open)	An example of the sorts of technologies typical of a "modern" Open University module

Workshops: History of Mathematics
Wednesday 27 March

Hicks Building, F20 (floor F)

14:00–14:30	14:35–15:05
Stephen Huggett (Plymouth) *Newton, the geometer* This is joint work with Nicole Bloye. We describe some of Newton's most profound geometrical discoveries, arguing that by thinking of him as a geometer we gain a deep insight into his peculiar genius. We pay particular attention to Newton's work on the organic construction, which deserves to be better known, being a classical geometrical construction of the Cremona transformation (1862). Newton was aware of its importance in geometry, using it to generate algebraic curves, including those with singularities.	**Jeremy Gray** (Open) *On the cusp of the new physics: Henri Poincaré and mathematical physics one hundred years ago.* Henri Poincaré spent much of his working life exploring every branch of mathematical physics, and he wrote about it at every level from the advanced research paper to the popular essay. He was involved at the very start of the move to quantum mechanics, and he famously discovered many of the key ideas in special relativity before Einstein. This paper considers how he tried to shape the mathematical physics at the start of the 20th century.x

15:15–15:45	15:50–16:20
Chris Hollings (Oxford) *An Obsession for Documentation: Surveys of Mathematical Progress in the USSR* Mathematics was one of the most successful sciences to be pursued in the USSR, with many Soviet mathematicians achieving worldwide fame. Perhaps as a documentary basis for international boasting, a number of official surveys were commissioned on the progress of Soviet mathematics. These appeared at intervals, and thereby give us a series of snapshots of Soviet mathematics down the decades. I will give an overview of the surveys that are available, and indicate what they can tell us about the study of mathematics in the USSR.	**Peter Rowlett** (Nottingham Trent) *The unplanned impact of mathematics: surprising examples of unexpected applications* Time and again, mathematics displays an astonishing quality. A piece of pure mathematics is developed (or discovered) by a mathematician who is, often, following his or her curiosity without a plan for meeting some identified need or application. Or a piece of applied mathematics is taken into the abstract, beyond any hope of relevance to its original context. Later, perhaps decades or centuries later, this mathematics fits perfectly into some need or application. This is unplanned impact: impact which was not—and could not have been—planned when the original work took place. As funding bodies ask researchers to predict the impact of their research before it is funded, and research quality is measured partly by its short term impact, the need to communicate this aspect of mathematics is vital. However, mathematicians often name one of three well-known examples: number theory in cryptography, logic in computing and complex numbers in fluid mechanics. How convinced might a lay person be that the phenomenon is more widespread if they keep hearing the same few examples? This talk will present a set of (hopefully) more surprising examples from history and give an update on a project to collect and share more.

Workshops: K-Theory and Analysis
Tuesday 26 March

Hicks Building, Lecture Theatre 4 (floor D)

14:00–15:00

Jacek Brodzki (Southampton)
K-homology for groups acting on CAT(0)*-cube complexes.*

This talk will introduce a very natural and interesting differential complex associated with a CAT(0)-cube complex. The construction builds on and extends ideas first introduced by Pytlik and Szwarc for the free group and extended by Julg and Valette in the case of groups acting on trees. We will discuss applications of this construction for the study of K-homology of groups acting on such complexes. This talk is based on joint work with Erik Guentner and Nigel Higson.

15:15–15:45

Roger Plymen (Southampton)
The Dirac operator and the discrete series for the universal cover of $SL_2(\mathbb{R})$

We show how the Dirac operator generates the equivariant K-homology of $\widetilde{SL}_2(\mathbb{R})$ and relate this to the discrete series.

This is joint work with the Southampton team: J Brodzki, G Niblo, N Wright.

15:50–16:20

Eli Hawkins (York)
Noncommutative Rigidity

If the algebra of smooth functions is smoothly deformed to a noncommutative algebra, then this defines a Poisson structure on the manifold. If the algebra of differential forms is smoothly deformed, then this defines the structure of a differential graded Poisson algebra, which is geometrically defined by a contravariant connection. If a compact Riemannian manifold is deformed into a noncommutative geometry, then the Poisson structure can be constructed locally from commuting Killing vectors.

Workshops: K-Theory and Analysis
Wednesday 27 March

Hicks Building, Lecture Theatre 4 (floor D)

14:00–15:00

John Hunton (Leicester)
Derived invariants in the K-theory of aperiodic patterns

Aperiodic patterns and tilings in Euclidean space have proved a rich source of commutative and non-commutative geometry. In this talk I will introduce some of the basic examples and problems, and describe some recent work with Alex Clark that utilises ideas from homological algebra and shape theory to give further, distinguishing structures to the K-theory of such patterns. We further interpret the phenomena observed in terms of the behaviour of certain types of chaotic attractors in manifolds.

15:15–15:45

Christian Voigt (Glasgow)
Coarse geometry and quantum groups

I shall indicate some attempts to study discrete quantum groups from the point of view of coarse geometry.

15:50–16:20

Nick Wright (Southampton)
The boundary coarse Baum–Connes conjecture

This talk is based on joint work with Martin Finn-Sell. In this talk I will introduce a boundary variant of the coarse Baum–Connes conjecture. Skandalis, Tu and Yu, showed that the coarse Baum–Connes conjecture can be formulated as the Baum–Connes conjecture for the coarse groupoid of a space. In many cases it turns out that the boundary of this groupoid is better behaved than the coarse groupoid. I will show that the boundary conjecture holds for sequences of graphs with large girth, including large girth expanders. This gives an alternative proof of Willet and Yu's result that for large girth expanders the coarse Baum–Connes assembly map is injective but not surjective.

Workshops: Non-commutative Algebra and Representation Theory
Tuesday 26 March

Hicks Building, F38 (floor F)

14:00–14:30	14:35–15:05
Kobi Kremnitzer (Oxford) *Beilinson–Drinfeld factorization algebras* I will explain what are factorization algebras and how they can be defined in very general settings of geometries with a good notion of D-modules. I will then talk about applications of this theory. In particular I will discuss the differentiable case and its relations to quantum field theory.	**TBC**

15:15–15:45	15:50–16:20
Tom Lenagan (Edinburgh) *Totally nonnegative matrices* A real matrix is totally nonnegative if all of its minors are nonnegative. There is a very close connection between the cell decomposition of totally nonnegative matrices and the torus invariant prime ideal structure of the algebra of quantum matrices. In this talk, I will outline this connection and illustrate one or more results in the totally nonnegative theory that were motivated by existing ideas in quantum matrices.	**Abdenacer Makhlouf** (Haute Alsace) *Representations and Cohomology of Hom-algebras* The main feature of Hom-algebras is that the identities are twisted by a homomorphism. The main structures are Hom-Lie algebras and Hom-associative algebra generalizing classical Lie and associative algebras. Hom-Lie algebras appeared naturally in the study of q-deformations of Witt and Virasoro algebras. They are also related to σ-derivations. In this talk, I will give a review of the theory and discuss representations theory and corresponding cochain complexes, as well as derivations, deformations and central extensions.

Hicks Building, F38 (floor F)

14:00–14:30

André Leroy (Artois, Lens)
Idempotents in ring extensions

This is joint work with P. Kanwar and J. Matczuk.

The aim of the talk is to study idempotents of ring extensions $R \subseteq S$ where S stands for one of the following rings

$$R[x_1, x_2, \ldots, x_n],\ R[x_1^{\pm 1}, x_2^{\pm 1}, \ldots, x_n^{\pm 1}],\ R[[x_1, x_2, \ldots, x_n]].$$

We give criteria for the idempotents of S to be either contained or conjugate to idempotents of R. In particular, we will show that idempotents of the power series ring are conjugate to idempotents of the base ring and we apply this to get a new proof of the result of P. M. Cohn that the ring of power series over a projective-free ring is also projective-free. Applications related to 2 primal rings and to semicentral idempotents will also be given.

14:35–15:05

Alex Martsinkovsky (Northeastern)
How to stabilize the tensor product

Tate cohomology for finite groups was introduced around 1950. It was only in the mid-1980s, when Pierre Vogel and Ragnar-Olaf Buchweitz independently introduced two different but equivalent constructions generalizing it to arbitrary rings. In the approach of Vogel, one explicitly produces a complex with the desired cohomology. The construction of Buchweitz is based on his remarkably simple and elegant method of inverting an endofunctor. The desired cohomology is the result of the formal inversion of the syzygy endofunctor on the category of modules modulo projectives.

Vogel also gave a homological analog of his construction, but there has been no homological analog for the Buchweitz construction. The latter is of special interest to us because, in the language of Eckmann–Hilton which views homomorphisms of modules modulo projectives as analogs of homotopy groups of topological spaces, the resulting cohomology becomes the exact analog of stable homotopy groups. This justifies the name "stable cohomology" for the cohomology theories of Buchweitz and Vogel. Thus we have a question: is there a stable analog for the functor Tor?

In this lecture, based on joint work with Jeremy Russell, I will propose a candidate for such a homology theory. It is based on a construct which we call an injective stabilization of the tensor product, and which is an analog of Buchweitz's stabilization of the syzygy endofunctor.

15:15–15:45

Agata Smoktunowicz (Edinburgh)
Some new results on Golod-Shafarevich algebras

One of the most beautiful and useful parts of noncommutative ring theory is the Golod-Shafarevich theorem (1964), which shows that free algebras defined by homogeneous relations are infinite dimensional, provided that the number of defining relations of each degree is not too large. Golod-Shafarevich algebras were introduced by Golod and Shafarevich in 1964, and were later used to solve several interesting open problems in several different areas of mathematics, namely the Burnside problem in group theory, the Kurosh Problem in noncommutative algebra and the Class Field Tower in number theory.

The results concerning Golod-Shafarevich algebras are related to Golod-Shafarevich groups, and the results often mirror one another even though the proofs are often different. For example, in 2006 the author solved a question of Zelmanov by showing that there are Golod-Shafarevich algebras that have no infinite-dimensional homomorphic images of polynomial growth. It was shown by Ershov that there exist Golod-Shafarevich groups without infinite images of polynomial growth. In 2000, Zelmanov showed that Golod-Shafarevich groups contain non-abelian free pro-groups and later related results on free subgroups were obtained by Kassabov. Recently, it was shown by the author that finitely presented Golod-Shafarevich algebras contain free noncommutative subalgebras under mild assumptions on the number of generating relations of each degree, and that such Golod-Shafarevich algebras can be mapped onto algebras with linear growth.

There are many inspiring open questions in this area; for example, it is an open question whether the converse of the Golod-Shafarevich theorem is true (Anick's question). Very interesting results related to this question were obtained by Wisliceny and recently by Iyudu and Shakarin. In this talk we mention recent results on Golod-Shafarevich algebras and some open questions in this area.

15:50–16:20

Jonathan Nelson (Cambridge)
Localisation in Iwasawa algebras

In commutative algebra, localisation at a prime ideal has long been an important tool in understanding properties of rings and their links with algebraic geometry. However in the noncommutative setting, the picture is much less clear cut, with localisation only possible at a clique of prime ideals, and even then not always. Several years ago, Jategaonkar and Brown showed that these cliques and their localisability could be determined by certain injective hulls, and Brown, Donkin and Musson were able to ascertain both objects for polycyclic-by-finite group rings. In this talk, we use similar techniques to generalise work of Ardakov by computing certain cliques in soluble Iwasawa algebras, showing that they are localisable, and then use this information to determine Euler characteristics of modules of small dimension.

Workshops: Number Theory
Tuesday 26 March

Hicks Building, Lecture Theatre 4 (floor D)

14:00–15:00

Ivan Fesenko (Nottingham)
Analytic and geometric ranks of elliptic surfaces

Two-dimensional zeta integral is a tool which translates analytic properties of the zeta function of a model of an elliptic curve over a number fields into geometric properties of subquotients of two-dimensional adelic spaces associated to the model. I will try to show how explicit two-dimensional global class field theory provides a bridge between the analytic rank and geometric rank of the surface and explains their relation.

15:15–16:15

Sanju Velani (York)
Multiplicative and Inhomogeneous Diophantine Approximation

A result of Gallagher implies that for almost every $(\alpha, \beta) \in \mathbb{R}^2$

$$\liminf_{q\to\infty} q \log^2 q \|q\alpha\| \|q\beta\| = 0\,.$$

In the first part I will try to convince you that this result can be improved and thus expect more from Littlewood's Conjecture – at least from a metrical point of view. In the second part, I will investigate concrete situations in which inhomogeneous Diophantine approximation results can be derived from their homogeneous counterparts. For example, for any real number γ , let $\mathbf{Bad}_\gamma$ denote the inhomogeneous badly approximable set consisting of real numbers α for which $\liminf_{q\to\infty} q\|q\alpha - \gamma\| > 0$. Then the basic construction that proves the homogeneous statement that $\mathbf{Bad}_0$ is of full dimension can be naturally adapted to show that $\dim \mathbf{Bad}_0 = 1$. Moreover, the transference idea enables us to show that any countable intersection of the simultaneous badly approximable sets $\mathbf{Bad}_\gamma(i, j)$ in the plane is of full dimension – the inhomogeneous Schmidt Conjecture.

Workshops: Number Theory
Wednesday 27 March

Hicks Building, Lecture Theatre 3 (floor D)

14:00–15:00

Vladimir Dokchitser (Cambridge)
Reconstructing Weil representations from Euler factors

If an elliptic curve E over $\mathbb{Q}_p$ has good reduction, the number of points over the residue field $\#E(\mathbb{F}_p)$ determines the Euler factor $1 - a_pT + T^2$, which in turn determines the associated l-adic representation (essentially $T_l(E)$) as a Galois module. Similar results are classically true for curves of higher genus and abelian varieties over local fields. I will discuss a method of dealing with bad reduction: how to use Euler factors, that can similarly found by point-counting, to reconstruct the associated l-adic representations. The central result is that a Frobenius-semisimple Weil representation is uniquely specified by its Euler factors over finite extensions of the ground field.

15:15–15:45

Christian Johansson (Imperial)
Control theorems for overconvergent eigenforms on some Shimura varieties

A theorem of Coleman states that an overconvergent modular eigenform of weight $k > 1$ and slope $< k - 1$ is a classical modular form. This theorem was later reproved and generalized using a geometric method very different from Coleman's cohomological approach. In this talk I will hopefully explain how one might go about generalizing the cohomological method to some higher-dimensional Shimura varieties.

15:50–16:20

Barinder Banwait (Warwick)
A local-global principle for rational torsion on simple abelian varieties

Let N be an integer, and A/K an abelian variety over a number field. If A has a K-rational N-torsion point, then so too do all good reductions have N-torsion rational over the residue field. A question of Lang from the 70s, addressed by Katz in 1981, is whether a converse statement holds: if all good reductions have rational N-torsion, then must some isogenous variety have K-rational N-torsion? Katz showed that in general the answer is NO, but one can hope for families where the answer is YES; for instance Katz showed this for elliptic curves. I'll discuss my attempts in finding generalisations, namely that the answer is YES for modular abelian varieties, and for absolutely simple varieties.

Workshops: Probability
Tuesday 26 March

Hicks Building, F28 (floor F)

14:00–14:30

Peter Windridge (Queen Mary, London)
Law of large numbers for the SIR epidemic on a random graph with given vertex degrees

We consider the limiting behaviour of the SIR epidemic model on a random graph chosen uniformly subject to having given vertex degrees. In the model, each vertex is either susceptible, infective or recovered. Infective vertices infect their susceptible neighbours, and recover, at a constant rate. Initially there is only one infective vertex. The infection and recovery rates, together with the limiting vertex degree distribution, determine a 'growth' parameter for the disease. If this parameter is below a (specified) critical threshold then, with high probability, only a small number of vertices ever get infected. Above the threshold there is a positive probability that many vertices get infected. In that case the evolution of the epidemic is almost deterministic in the sense that key quantities, like the fraction of infective vertices, are concentrated around the solutions to some ODEs. I'll explain these results and sketch our new proof. Compared to existing approaches, ours surmounts a technical assumption on the degree sequence and is shorter.

This is joint work with Malwina Luczak and Svante Janson.

14:35–15:05

Andrew Wade (Durham)
Convex hulls of planar random walks with drift

On each of n unsteady steps, a drunken gardener drops a seed. Once the flowers have bloomed, what is the minimum length of fencing required to enclose the garden? Denote by $L(n)$ the length of the perimeter of the convex hull of n steps of a planar random walk whose increments have finite second moment and non-zero mean. Snyder and Steele showed that $L(n)/n$ converges almost surely to a deterministic limit, and proved an upper bound on the variance $\mathrm{Var}[L(n)] = O(n)$. I will describe recent work with Chang Xu (Strathclyde) in which we show that $\mathrm{Var}[L(n)]/n$ converges, and give a simple expression for the limit, which is non-zero for walks outside a certain degenerate class. This answers a question of Snyder and Steele. Furthermore, we prove a central limit theorem for $L(n)$ in the non-degenerate case.

15:15–15:45

Maren Eckhoff (Bath)
Preferential Attachment Networks under Attack

We study a dynamical network model in which at every time step a new vertex is added and attached to every existing vertex independently with a probability proportional to an increasing function of its current degree.

A local approximation by a typed branching random walk is used to investigate the behaviour of the network under random and targeted attacks. Robustness and vulnerability of the giant component will be discussed. This is joint work with Peter Mörters.

15:50–16:20

Mathew Joseph (Sheffield)
Semi-discrete Stochastic Heat Equation

We consider the discrete space, continuous time Stochastic Heat Equation and describe the long term behavior of the solution. In particular, we show that in transient dimensions and with a suitable decay condition on the initial profile, the solution dissipates if the noise is not too large. This is based on ongoing work with Nicos Georgiou, Davar Khoshnevisan, Pejman Mahboubi and Shang-Yuan Shiu.

Workshops: Probability
Wednesday 27 March

Hicks Building, F28 (floor F)

14:00–14:30

Amanda Turner (Lancaster)
The emergence of branching in Hastings-Levitov type random clusters

In 1998 Hastings and Levitov proposed a one-parameter family of models for planar random growth in which clusters are represented as compositions of conformal mappings. This family includes physically occurring processes such as diffusion-limited aggregation (DLA), dielectric breakdown and the Eden model for biological cell growth. In the simplest case of the model (corresponding to the parameter alpha=0), James Norris and I showed how the Brownian web arises in the limit resulting from small particle size and rapid aggregation. In particular this implies that beyond a certain time, all newly aggregating particles share a single common ancestor. I shall show how small changes in alpha result in the emergence of branching structures within the model so that the beyond a certain time, the number of common ancestors is a random number whose distribution can be obtained.

This is based on joint work with Fredrik Johansson Viklund (Columbia) and Alan Sola (Cambridge).

14:35–15:05

Antal Járai (Bath)
Electrical resistance of the low-dimensional critical branching random walk

We consider the trace of a critical branching random walk in $d + 1$ dimensions conditioned to survive forever. We show that the electrical resistance between the origin and generation n grows sublinearly in n when $d < 6$. In particular, it follows that in $d = 5$ the spectral dimension of simple random walk on the trace is strictly larger than 4/3, answering a question of Barlow, Jarai, Kumagai and Slade. (Joint work with Asaf Nachmias.)

15:15–15:45

Ben Hambly (Oxford)
Diffusions on critical random clusters on the diamond lattice

We will consider the random cluster measure on the diamond hierarchical lattice. We construct the critical clusters on this lattice and describe their scaling limits as random fractals. We show how to construct diffusions on these critical clusters for a range of parameters in the random cluster model and study properties of their spectra and heat kernels.

15:50–16:20

Matt Roberts (Warwick)
Intermittency in branching random walk in random environment

Over the last 20 years mathematicians have proved rigorously that the parabolic Andreson model shows the intermittency behaviour predicted by physicists. We shall see that a branching random walk in Pareto random environment displays the same qualitative behaviour, but with several important differences. This is work in progress with Marcel Ortgiese.

Workshops: Topology
Tuesday 26 March

Hicks Building, F41 (floor F)

14:00–14:30

Markus Szymik (Copenhagen)
Characteristics of structured ring spectra

Much work in algebraic topology has been devoted to the understanding of bordism spectra, in particular in terms of their genera. In this talk, characteristics will be motivated by the dual approach. I will then describe some of the exotic phenomena to be encountered when studying commutative ring spectra (in the structured sense) of prime characteristic. If time permits, I will also indicate the usefulness of chromatic generalisations.

14:35–15:05

Constanze Roitzheim (Kent)
Modular rigidity of E-local spectra

One key objective in stable homotopy theory is finding Quillen functors between model categories. Stable frames provide a way to construct and classify Quillen functors from spectra to any given stable model category. Furthermore, they equip the homotopy category of a stable model category with a module structure over the stable homotopy category Ho(Sp). We will investigate how this is compatible with Bousfield localisations and how it can be used to study the deeper structure of the stable homotopy category. We will then see that the Ho(Sp)-module structure completely determines the homotopy type of the E-local stable homotopy category for any homology theory E.

15:15–15:45

Andrew Russhard (Southampton)
Power maps on quasi-p-regular $SU(n)$

McGibbon, Arkowitz, Curjel, Schiffman and others have looked at the problem of when power maps on particular H-spaces are also H-maps. Recently Theriault has looked at the p-th power map on p-regular connected, semi-simple, simply connected Lie groups and shown that this is also an H-map. I will discuss the problem when we look at $SU(n)$ for values of n where $SU(n)$ is only quasi-p-regular. This draws significantly on work by Kishimoto on the nilpotency of quasi-p-regular $SU(n)$.

15:50–16:20

Julian Gibbons (Imperial)
A Dehn surgery obstruction and unknotting number one

It has been known for a long time that knots with unknotting number one are strongly connected to Dehn surgery. Explicitly, Montesinos showed that their double branched covers should be obtainable by half-integral surgeries on knots in the 3-sphere. Motivated by this fact, I will outline recent efforts using Heegaard Floer homology to obstruct such surgeries and explain how these methods generalise to rational coefficients. If time permits, I will also discuss applications of this technique towards a classification of the 3-strand pretzel knots with unknotting number one.

Workshops: Topology
Wednesday 27 March

Hicks Building, F41 (floor F)

14:00–14:30	14:35–15:05
Birgit Richter (Hamburg) *The Hodge decomposition of higher order Hochschild homology* Pirashvili introduced higher order Hochschild homology and showed that rationally there is a Hodge decomposition of Hochschild homology of order n for all $n > 0$ generalizing the one for ordinary Hochschild homology. In joint work with Stephanie Ziegenhagen we show that the Hodge summands can be described in terms of derived functors of Gerstenhaber indecomposables.	**Magdalena Kedziorek** (Sheffield) *Towards an algebraic model of rational equivariant cohomology theories* Cohomology theories are represented by spectra. However, the category of spectra is quite complicated. The machinery of model categories allows us to look for different (easier, algebraic) models with the same homotopy information as the category of spectra. It is well known that rational chain complexes give an algebraic model for the rational cohomology theories. However, for G-equivariant cohomology theories, no general result of this form is known when G is a compact Lie group. In this talk I will describe some earlier work and introduce a framework for constructing algebraic models in general. It is conjectured that the models will take the form of sheaves of modules over a topological category of subgroups of G.

15:15–15:45	15:50–16:20
Martin Palmer (Oxford) *Homological stability for spaces of disconnected submanifolds* This talk will concern spaces of disconnected submanifolds of another manifold. More precisely, we fix an open connected ("background") manifold M, a closed connected ("model") manifold P and a positive integer n. We are then interested in the space of all submanifolds of M which are diffeomorphic to n disjoint copies of P (or rather a certain path-component of this space). When P is 0-dimensional (in other words, a point) this is the classical configuration space of n unordered points in M, which is well-known to have homological stability with respect to n – its homology in any fixed degree is eventually independent of n. We will explain a generalisation of this result to higher-dimensional model manifolds P – namely, homological stability, w.r.t. the number of path-components n, holds as long as $\dim(M)$ is at least $2\dim(P) + 3$. Moreover, if P is a sphere this restriction can be weakened to $\dim(M)$ at least $\dim(P) + 3$.	**Raymond Vozzo** (Adelaide/Glasgow) *Geometry and topology of certain infinite dimensional spaces* I will introduce a method known as the caloron transform and explain how to use this to compute characteristic classes of (certain) infinite-dimensional principal bundles (mostly with structure group the loop group of a compact Lie group). I will also outline some applications of these methods.

Satellite Events

Monday 25 March
Hicks Building

94th Peripatetic Seminar on Sheaves and Logic

Organised by Eugenia Cheng and Nick Gurski
F24, floor F

09:30–09:55	Julia Goedecke (Cambridge) *Galois Groupoids and semi-abelian homology*
10:00–10.25	John Huerta (Instituto Superior Técnico, Lisbon) *The categorified Poincaré supergroup*
11:00–11:25	Thomas Athorne (Sheffield) *Constructing Bifibrations*
11:30–11:55	Christina Vasilakopoulou (Cambridge) *Enrichment of Categories of Algebras and Modules*
13:00–13:25	Peter Johnstone (Cambridge) *Hyland + Gleason = Herbrand?*
13:30–13:55	Paul Taylor *Overt subspaces of metric spaces*
14:00–14:25	John Baez (University of California, Riverside) *Bicategories and Tricategories of Spans*

Non-commutative Geometry, Analysis and Groups

Organised by Paul Mitchener
LT4, floor D

11:00–11:55	Andrew Hawkins (Glasgow) *A twisted spectral triple on the Cuntz algebra*
13:00–13:55	David O'Sullivan (Sheffield) C^**-Algebras*
14:30–15:25	Nadia Gheith (Sheffield) *The Coarse Cofibration Category*

Joint ARTIN-BLOC Meeting

Organised by Vladimir Bavula
LT6, floor E

11:15–11:55	Alexander Premet (Manchester) *Derived subalgebras of centralizers and multiplicity-free primitive ideals*
12:00–12.40	Sinead Lyle (East Anglia) *Graded homomorphisms between Specht modules for KLR algebras of type A*
14:00–14:40	Simon Wadsley (Cambridge) *Finite dimensional p-adic representations of compact p-adic groups*
14:45–15:25	Xiuping Su (Bath) *0-Schur algebras and 0-Hecke algebras*