GLEN seminar

Edinburgh, Thursday 14 & Friday 15 June 2018

All talks will happen in JCMB 5323

14:00 14/6 Leonardo Mihalcea (Virginia Tech)

Chern classes of Schubert cells, Hecke algebras, and stable envelopes.

The Chern-Schwartz-MacPherson (CSM) class of a compact (complex) variety X is a homology class which provides an analogue of the total Chern class of the tangent bundle of X, for X singular. Its K-theoretic version, the motivic Chern class, is a class with good functorial properties, and for smooth X it normalizes to the Hirzebruch's lambda-y class of the cotangent bundle of X. One can associate these classes to any constructible subsets, and in the talk I will discuss how one can use the Demazure-Lusztig operators in the Hecke algebra to calculate the motivic Chern classes for Schubert cells in generalized flag manifolds. I will also discuss relations to K theoretic envelopes of Maulik and Okounkov, and a conjectural positivity property. This recovers and extends beyond Lie type A recent results obtained by Fejer, Rimanyi and Weber, using localization techniques. The talk is based on ongoing joint work with Paolo Aluffi, Changjian Su, and Jorg Schurmann.

15:30 14/6 Andrew Dancer (Oxford)

Integrability in Riemannian Geometry

We discuss several situations where equations arising in Riemannian geometry have unexpected integrability properties. In particular we describe work with Mckenzie Wang and Alejandro Betancourt where examples of the Ricci soliton equations may be integrated explicitly, due to the existence of superpotentials or conserved quantities.

9:45 15/6 Hendrik Suess (Manchester)

On irregular Sasaki-Einstein manifolds in dimension 5.

Sasakian geometry can be seen as the odd-dimensional counterpart of Kaehler geometry. Indeed, a /regular/ Sasakian manifold M is a circle bundle over some Kaehler manifold Z. In this situation the Sasakian geometry of M and the Kaehler geometry of Z are closely related to each other. For example the problem of finding a Sasaki-Einstein metric on M is equivalent to the problem of finding a Kaehler-Einstein metric on Z. However, in the so-called /irregular/ case this approach breaks down. On the other hand, one also obtains a new tool in this situation: a torus action of higher rank.

In this talk I will explain how to make use of this new tool in order to prove the the existence or non-existence of irregular Sasaki-Einstein metrics on certain 5-manifolds.

11:00 15/6 Maxence Mayrand (Oxford)

Stratified hyperkähler spaces

Symplectic reduction is the natural quotient construction for symplectic manifolds. Given a free and proper action of a Lie group G on a symplectic manifold M, this process produces a new symplectic manifold of dimension dim(M) - 2 dim(G). For non-free actions, however, the result is usually fairly singular. But Sjamaar-Lerman (1991) showed that the singularities can be understood quite precisely: symplectic reductions by non-free actions are partitioned into smooth symplectic manifolds, and these manifolds fit together nicely, in the sense that they form a stratification.

Symplectic reduction has an analogue in hyperkähler geometry, which has been a very important tool for constructing new examples of these special manifolds. In this talk, I will explain how Sjamaar-Lerman's results can be extended to this setting, namely, hyperkähler quotients by non-free actions are stratified spaces whose strata are hyperkähler.

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