BMC 2012: Noncommutative Geometry Workshop
16-19 April 2012
University of Kent

Tuesday 17 April 2012

1:30-2:00: Kevin McGerty (Oxford): *Quantum Hamiltonian reduction and Derived Equivalences*

2:15-2:45: Natalia Iyudu (Belfast): *The Anick conjecture on the minimal Hilbert series of quadratic algebras*

3:00-3:30: Chris Spencer (Edinburgh): *Harish-Chandra bimodules of some rational Cherednik algebras at regular parameter values*

3:45-4:15: Javier Lopez (UCL): *Noncommutative geometry of finite groups*

Wednesday 18 April 2012

1:30-2:00: Sue Sierra (Edinburgh): *Graded maximal orders in a generic Sklyanin algebra*

2:15-2:45: Simon Wadsley (Cambridge): *Non-commutative rigid analytic spaces*

3:00-3:30: Re O'Buachalla (Queen Mary): *Quantum Groups and Noncommutative Kähler Geometry*

3:45-4:15: Uli Kraehmer (Glasgow): *Batalin-Vilkovisky Structures on Ext and Tor*

Natalia Iyudu (Belfast): *The Anick conjecture on the minimal Hilbert series of quadratic algebras*

Abstract: We present several results on the Anick conjecture which asserts that the lower bound for the Hilbert series, known as the Golod-Shafarevich estimate is attained on generic quadratic algebra. The technique (due to Anick), allowing to write down precisely the formula for the Hilbert series will be demonstrated. We will discuss also related questions of Koszulity and being noncommutative complete intersection (NCCI).

Uli Kraehmer (Glasgow): *Batalin-Vilkovisky Structures on Ext and Tor*

Abstract: I will speak about the algebraic structure of (co)homology theories defined by a left Hopf algebroid U over a possibly noncommutative base algebra A, such as for example Hochschild, Lie algebra, Poisson or group (co)homology. Explicit formulae for the canonical Gerstenhaber algebra structure on $\mathrm{Ext}_U(A, A)$ are given. The main technical result is a generalised Lie derivative along with a generalised Cartan-Rinehart homotopy formula whose essence is that $\mathrm{Tor}^U(M, A)$ becomes for suitable right U-modules M a Batalin-Vilkovisky module over $\mathrm{Ext}_U(A, A)$, or in the words of Nest, Tamarkin, Tsygan and others, that $\mathrm{Ext}_U(A, A)$ and $\mathrm{Tor}^U(M, A)$ form a differential calculus. As an application, Ginzburg's result that the cohomology ring of a Calabi-Yau algebra is a Batalin-Vilkovisky algebra is generalised to twisted Calabi-Yau algebras.
Joint work with Niels Kowalzig (U Glasgow)

Javier Lopez (UCL): *Noncommutative geometry of finite groups*

Abstract: It is a well known fact that classical differential structures on finite groups are trivial. In this talk, we show that one can construct a wide range of noncommutative differential structures over finite groups and how each of these structures yields a series of group invariants. In particular we will talk about the Killing form of a noncommutative differential structure and state some results abouts its non-degeneracy, linking it to the number of irreducible representations that appear as summands in the adjoint representation of the group.

Kevin McGerty (Oxford): *Quantum Hamiltonian reduction and Derived Equivalences*
Abstract:

Re O'Buachalla (Queen Mary): *Quantum Groups and Noncommutative Kähler Geometry*

Abstract: Noncommutative geometry is an area that has seen intense activity over the past 25 years. Despite this, however, noncommutative complex geometry, and noncomutative Kähler geometry, remain largely unexplored areas. Most of the work that has been done has focused on how to construct spectral triples for the quantum flag manifolds. In this talk I will outline a novel algebraic approach to this question which generalises the methods of Woronowicz for bicovariant calculi over a Hopf algebra. This will be done in the context of Kähler spectral geometries due to Fröhlich, Recknagel, and Grandjean.

Sue Sierra (Edinburgh): *Graded maximal orders in a generic Sklyanin algebra*

Abstract: Let S be a (generic) 3-dimensional Sklyanin algebra. As is common, we consider S to be a noncommutative projective plane, containing a commutative elliptic curve E. We show that it is possible to blow up a non-effective divisor on E; we further show that all integrally closed graded subalgebras of S are obtained by blowing up a divisor on E of degree no more than 8.
This is a preliminary report on joint work with Rogalski and Stafford.

Chris Spencer (Edinburgh): *Harish-Chandra bimodules of some rational Cherednik algebras at regular parameter values*

Abstract: Harish-Chandra bimodules of rational Cherednik algebras have been a subject of increasing interest by a growing number of researchers in the field. In this talk, I will attempt to outline a classification of these bimodules at regular parameter values for rational Cherednik algebra of cyclic groups and - time permitting - sketch what I know about the general case (this should be done very quickly).

Simon Wadsley (Cambridge): *Non-commutative rigid analytic spaces*

Abstract: Rigid analytic spaces were first introduced by Tate in the early 1960s in his work on uniformization of p-adic elliptic curves with bad reduction. This talk will be a discussion how one might quantize these spaces together with some examples of some early successes that suggest that there should be a good theory. It will describe joint work with Konstantin Ardakov.