

Workshop on Lie Groupoids and Lie Algebroids

10-21 December, 2012

An outline of the program for Week II (17-21 December)

December 17, 2012

Speaker: **Kirill Mackenzie**, U. Sheffield, UK

Title of talk: Lie theory II

Speaker: **Mainak Poddar**, ISI Kolkata/ U. Los Andes, Colombia

Title of talk: Equivariant principal bundles on toric manifolds

Abstract: We will describe progress towards classification of torus equivariant principal GG -bundles on nonsingular toric varieties when GG is an abelian linear algebraic group. This is a joint work with Arijit Dey,

Speaker : **Debashish Goswami**, Indian Statistical Institute, Kolkata

Title of talk: C^* algebraic approach (a la Connes) to foliations - I

Abstract: I'll briefly discuss (with some concrete examples) how the principles of noncommutative geometry of Alain Connes can be applied to study foliations. In particular, I'll describe the construction of the C^* algebra of holonomy groupoid of a foliation, which can be viewed as a noncommutative candidate for the 'leaf space' of a foliation. Treating this as a 'noncommutative manifold', one can use the powerful machineries of noncommutative geometry such as K theory of C^* algebras, cyclic cohomology and the Atiyah-Singer-Connes index theorem to obtain interesting and useful invariants.

Speaker: **Anilesh Mohari**, Institute of Mathematical Sciences, India

Title of talk: Harmonic functions and Brownian flows on Manifold

December 18, 2012

Speaker: **Andres Angel**, U. Los Andes, Colombia

Title of talk: String topology of fiberwise monoids and classifying spaces.- I

Speaker: **Mathieu Stienon**, Pennsylvania State University, USA

Title of talk: Atiyah class of Lie algebroid pairs

Speaker : **Debashish Goswami**, Indian Statistical Institute, Kolkata

Title of talk: C^* algebraic approach (a la Connes) to foliations -II

Speaker: **Soumen Sarkar**, KAIST, South Korea

Title of talk: On equivariant cobordism of torus orbifolds.

Abstract: We introduce generalized weighted projective spaces. We show that any torus orbifold with locally standard torus action is equivariantly cobordant to some copies of generalized weighted projective spaces. Moreover, if the torus action has no fixed point then it is equivariantly boundary.

December 19, 2012

Speaker: **Kirill Mackenzie**, U. Sheffield, UK

Title of talk: Double Lie groupoids and double Lie algebroids

Abstract: This will be an outline of the Lie theory of double Lie groupoids and double Lie algebroids, and its connections to Poisson geometry, mostly based on Ehresmann doubles and Drinfel'd doubles for Lie algebroids and Lie bialgebroids, *Journal für die reine und angewandte Mathematik (Crelles Journal)*. Volume 2011, Issue 658, Pages 193–245.

Speaker: **Andres Angel**, U. Los Andes, Colombia

Title of talk: String topology of fiberwise monoids and classifying spaces - II

Speaker: **Mathieu Stiennon**, Pennsylvania State University, USA

Title of talk: Atiyah class of Lie algebroid pairs.

Speaker: **Samik Basu**, Ramkrishna Mission Vivekananda University, Belur

Title : Cohomology with Local Coefficients, Crossed Complexes and Parametrized Spectra

Abstract : Cohomology with Local Coefficients can be written as homotopy classes of maps in crossed complexes by the work of Brown et al. The realization of the representing crossed complexes assemble to form a parametrized spectrum. These arguments can also be extended to the equivariant category, in the case of Bredon cohomology with local coefficients.

December 20, 2012

Speaker: **Ping Xu**, Pennsylvania State University, USA

Title of talk: Lie bialgebroids and generalised complex geometry - I

Speaker: **Kirill Mackenzie**, U. Sheffield, UK

Title of talk: To be announced.

Speaker: **Alexander Cardona**, U. Los Andes, Colombia

Title of talk: Poisson Algebras Associated to Twisted Dirac Structures

Abstract: In this talk we will recall the basic definitions of Dirac structures on manifolds, their naturally associated Poisson algebras of functions and we define Poisson algebras of admissible functions associated to Dirac structures twisted by a background 3-form. We will study the standard cases associated to Dirac structures defined by graphs of non-degenerate 2-forms and other natural examples.

Speaker: **Arijit Dey**, IIT, Chennai, India

Title of talk: Gieseker-Uhlenbeck morphism for parabolic moduli spaces over an algebraic surface.

Abstract: We prove the Gieseker-Uhlenbeck morphism for parabolic moduli over surface is semismall and will show some of its applications. This is a joint work with R. Parthasarathi.

December 21, 2012

Speaker: **Ping Xu**, Pennsylvania State University, USA

Title of talk: Lie bialgebroids and generalised complex geometry - II

Speaker: **Alexander Cardona**, U. Los Andes, Colombia

Title of talk: Extended Symmetries, Twisted Dirac Structures and Reduction

Abstract: In this talk we present the relationship between the extended symmetries of exact Courant algebroids over a manifold M , the Poisson algebras of admissible functions associated to twisted Dirac structures when acted by Lie groups and Dirac reduction. We will show that the usual homomorphisms of Lie algebras between the algebras of infinitesimal symmetries of the action, vector fields on the manifold and the Poisson algebra of observables (appearing in symplectic geometry) generalize to natural maps of Leibniz algebras induced both by the extended action and compatible moment maps associated to it in the context of twisted Dirac structures.

Speaker: **Parthasarathi Chakraborty**, Institute of Mathematical Sciences, India

Title: Instances of equivalence of two approaches to Yang-Mills in NCG

Abstract: There are two approaches to the Yang-Mills action functional in NCG. One due to Alain Connes and Marc Rieffel and the other due to Connes. A proposition in the NCG book of Connes says that for the non-commutative two torus both these approaches agree. We will show that for non-commutative higher torus as well they are same in the most appropriate sense.

Speaker: **Parameswaran Sankaran**, Institute of Mathematical Sciences, India

Title: Formality of certain CW complexes

Abstract: A space is formal if its rational homotopy type is a 'formal consequence of its rational cohomology algebra'. We shall show that a space X is formal if it has the homotopy type of a finite CW complex such that its rational cohomology algebra is generated by $H^k(X; \mathbb{Q})$ for some even integer k . We will obtain applications to formality of some interesting class of spaces. This based on joint work with Prateep Chakraborty.

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10 – 21 December, 2012

Time table : 17 – 21 December, 2012

	10:15	12:00	2:45	4:15
17 December	K. Mackenzie	M. Poddar	D. Goswami	A. Mohari
18 December	A. Angel	M. Stienon	D. Goswami	S. Sarkar
19 December	K. Mackenzie	A. Angel	M. Stienon	S. Basu
20 December	P. Xu	K. Mackenzie	A. Cardona	A. Dey
21 December	P. Xu	A. Cardona	P. Chakraborty	P. Sankaran

Venue: L-infinity, 5th Floor, Kolmogorv Bhavan