Higher Geometric Structures along the Lower Rhine IX

Location

All talks take place in room HG00.071 in the Huygensgebouw,
Heyendaalseweg 135, Nijmegen, The Netherlands

Program

Thursday May 11
14:00 - 15:00: Pflaum
15:15 - 16:15: Arici
16:15 - 16:45: Coffee break
16:45 - 17:45: Lang
18:30: Conference Dinner (in the Faculty Club)

Friday May 12
09:45 - 10:00: Coffee
10:00 - 11:00: Bailey
11:15 - 12:15: Werndli
12:15 - 14:00: Lunch break
14:00 - 15:00: Klaasse
15:00 - 15:30: Coffee break
15:30 - 16:30: Crisp

Speakers, titles and abstracts

- Francesca Arici (Radboud University Nijmegen)
  Quantum lattice gauge theories and groupoid C-algebras*
  Abstract: We will describe the quantization of gauge theories on a graph in terms of their algebras of observables and of the Hilbert space on which the algebra is represented. The algebra of observables for the quantum system admits a natural geometric realization as a groupoid C*-algebra. I will describe the behaviour of such algebras under lattice refinements and the resulting continuum limit of the theory. Based on joint work with R. Stienstra and W. van Suijlekom.

- Michael Bailey (Utrecht University)
  Some remarks about complex structures on stacks
  Abstract: I will explain how a generalized complex structure (a la Gualtieri) may be understood as a complex structure on a shifted symplectic stack. From this point of view, the local classification result for these structures may be understood as a special case of a (so-far-conjectural) "derived Newlander-Nirenberg theorem", which I will also discuss if I have time. Involves joint work with Marco Gualtieri and Brent Pym.

- Tyrone Crisp (Radboud University Nijmegen)
  Descent of operator modules
  Abstract: I will describe how some basic notions of categorical algebra, namely monadicity and descent, play out in the setting of Haagerup's tensor product for algebras and modules of Hilbert space operators. For an important class of operator algebras – the nuclear C*-algebras – the descent problem turns out to have a very satisfactory solution: every monomorphism satisfies effective descent for modules. I will also explain the motivation for this work, coming from the representation theory of reductive Lie groups.

- Honglei Lang (MPIM Bonn)
  Double Principal Bundles
  Abstract: We define double principal bundles (DPBs), for which the frame bundle of a double vector bundle, double Lie groups and double homogeneous spaces are basic examples. It is shown that a double vector bundle can be realized as the associated bundle of its frame bundle. Also dual structures, gauge transformations and connections in DPBs are investigated. This is a joint work with Yanpeng Li and Zhangju Liu.

- Ralph Klaasse (Utrecht University)
  Constructing A-Symplectic Structures
  Abstract: In this talk we discuss how to construct A-symplectic structures for a Lie algebroid A by adapting Gompf-Thurston techniques to Lie algebroid morphisms. As an application we obtain both log-symplectic and stable generalized complex structures out of log-symplectic structures. In particular we define a class of maps called boundary Lefschetz fibrations and show they equip their total space with a stable generalized complex structure. This is based on joint work with Gil Cavalcanti.

- Markus Pflaum (University of Colorado Boulder)
  Inertia Groupoids and the concept of stratified groupoids
  Abstract: The inertia space of a compact Lie group action or more generally of a proper Lie groupoid has an interesting singularity structure. Unlike the quotient space of the group action, respectively the groupoid, the inertia space can not be stratified by orbit types, in general. In the talk we explain this phenomenon and provide a stratification and local description of the inertia space. Moreover, we show that that leads naturally to the concept of a stratified groupoid which lies in between the one of a Lie groupoid and the one of a topological groupoid. Finally we show that a de Rham theorem holds for inertia spaces and explain the connection of the inertia space with the non- commutative geometry of the underlying groupoid.

- Kay Werndli (Utrecht University)
  Higher Homotopy Excision via Bousfield Classes
  Abstract:In the 90s, Chachòlski initiated a programme to reformulate and strengthen the classical homotopy excision theorem due to Blakers and Massey in terms of the then newly developed language of Bousfield classes. Some twenty years later, we reached this goal in a highly satisfactory manner, albeit only for homotopy pushout squares. Since then, some results have been obtained about cubical diagrams, though this question is mostly still open. In this talk, we will quickly discuss the necessary formalism of Bousfield classes, state the result for squares and give a first glimpse on how the cubical case can be approached.