Speaker: Matt Feller (University of Virginia)

Title: New model structures on simplicial sets
Place: Room Seminar C3b
Date: Friday July 5th, 12h-13h

Abstract: In the way Kan complexes and quasi-categories model up-to-homotopy groupoids and categories, can we find model structures on simplicial sets which give up-to-homotopy versions of more general objects? We investigate this question, with the particular motivating example of 2-Segal sets. Cisinski's work on model structures in presheaf categories provides abstract blueprints for these new model structures, but turning these blueprints into a satisfying description is a nontrivial task. As a first step, we describe the minimal model structure on simplicial sets arising from Cisinski's theory.

Speaker: Marc Stephan (MPI, Bonn)
Title: A multiplicative spectral sequence for free p-group actions
Place: Room Seminar C3b
Date: Friday May 24th, 12h-13h

Abstract: Carlsson conjectured that if a finite CW complex admits a free action by an elementary abelian p-group G of rank n, then the sum of its mod-p Betti numbers is at least 2^n. In 2017, Iyengar and Walker constructed equivariant chain complexes that are counterexamples to an algebraic version of Carlsson's conjecture. This raised the question if these chain complexes can be realized topologically by free G-spaces to produce counterexamples to Carlsson's conjecture. In this talk, I will explain multiplicative properties of the spectral sequence obtained by filtering the mod-p cochains of a space with a free p-group action by powers of the augmentation ideal and deduce that the counterexamples can not be realized topologically. This is joint work with Henrik Rüping.

Speaker: Sune Precht Reeh (BGSMath-UAB)
Title: A formula for p-completion by the way of the Segal conjecture
Place: Room Seminar C3b
Date: Friday May 10, 10h-11h

Abstract: A variant of the Segal conjecture (theorem by Carlsson) gives a correspondence between homotopy classes of stable maps from BG to BH and the module of (G,H)-bisets that are H-free and where the module is completed with respect to the augmentation ideal I(G) in the Burnside ring of G. The details of this correspondence change depending on whether you

add a disjoint basepoint to BG, BH, or both, and it is also not a priori clear what algebraic consequences the I(G)-adic completion has for the module of (G,H)-bisets.
Separately, we have the functor of p-completion for spaces or spectra. We can apply p-completion to each classifying space BG, and according to the Martino-Priddy conjecture (theorem by Oliver) the p-completed classifying space depends only on the saturated fusion system F_p(G) of G at the prime p.
Saturated fusion systems also have modules of bisets, and so it is not unreasonable to ask how p-completion interacts with the Segal conjecture: Suppose we are given a (G,H)-biset, we can interpret the biset as a stable map from BG to BH. Apply p-completion to get a stable map from BF_p(G) to BF_p(H). By the Segal conjecture for fusion systems, that stable map corresponds to an (F_p(G), F_p(H))-biset -- up to p-adic completion. Which (F_p(G),F_p(H))-biset do we get?
This innocent question was the starting point for a joint paper with Tomer Schlank and Nathaniel Stapleton, and in my talk I will give an overview of all the categories involved and how they fit together with functors. If time permits, we will even see how p-completion and fusion systems can help us understand the I(G)-adic completion for any finite group -- and I suppose we might even consider that "a formula for the Segal conjecture by way of p-completion".

Speaker: Matthew Gelvin (Bilkent University, Ankara)
Title: Fusion-minimal groups
Place: Room Seminar C3b
Date: Friday April 27, 12h-13h

Abstract: Every saturated fusion system $mathcal{F}$ on the p-group S has an associated collection of characteristic bisets. These are (S,S)-bisets that determine $mathcal{F}$, and are in turn determined by $mathcal{F}$ up to a more-or-less explicit parameterization. In particular, there is always a unique minimal $mathcal{F}$-characteristic biset, $Omega_mathcal{F}$. If G is a finite group containing S as a Sylow p-subgroup and realizing $mathcal{F}$, then G is itself, when viewed as an (S,S)-biset, $mathcal{F}$-characteristic. If it happens that $_SG_S=Omega_mathcal{F}$ is the minimal biset for its fusion system, we say that G is emph{fusion-minimal}.

In joint work with Sune Reeh, it was shown that any strictly p-constrained group (i.e., one that satisfies $C_G(O_p(G))leq O_p(G)$) is fusion minimal. We conjecture that converse implication holds. In this talk, based on joint work with Justin Lynd, we prove this to be the case when p is odd and describe the obstruction to a complete proof. Along the way, we will draw a connection with the module structure of block algebras and how this relates to the question at hand.

Speaker: Joshua Hunt (University of Copenhagen)
Title: Lifting G-stable endotrivial modules
Place: Room Seminar C3b
Date: Friday April 12, 12h-13h

Abstract: Endotrivial modules of a finite group G are a class of modular representations that is interesting both because endotrivial modules have enough structure to allow us to classify them and because such modules give structural information about the stable module category of G. They form a group T(G) under tensor product, and Carlson and Thévenaz have classified the endotrivial modules of a p-group. We examine the restriction map from T(G) to T(S), where S is a Sylow p-subgroup of G, and provide an obstruction to lifting an endotrivial module from T(S) to T(G). This allows us to describe T(G) using only local information and to provide a counterexample to some conjectures about T(G). This is joint work with Tobias Barthel and Jesper Grodal.

Speaker: Antonio Díaz (Universidad de Málaga)
Title: Fusion systems for profinite groups
Place: Room Seminar C3b
Date: Friday March 29, 10h-11h

Abstract: For both finite groups and compact Lie groups, there exist algebraic structures that encode their fusion patterns as well as their classifying spaces at a given prime. In this talk, I will introduce similar ideas for profinite groups and, in particular, for compact p-adic analytic groups. In particular, we will study classifying spaces and stable elements theorem for continuous cohomology. We will provide some concrete continuous cohomology computations. This is an ongoing joint work with O. Garaialde, N. Mazza and S. Park.

Speaker: Jesper Moller (University of Copenhagen)
Title: Counting p-singular elements in finite groups of Lie type
Place: Room Seminar C3b
Date: Friday January 25, 12h-13h

Abstract: Let G be a finite group and p a prime number. We say that an element of G is p-singular of its order is a power of p. Let G_p be the {em set/} of p-singular elements in G, i.e. the union of the Sylow p-subgroups of G. In 1907, or even earlier, Frobenius proved that $|G|_p mid |G_p|$: The number of p-singular elements in G is divisible by the p-part of the order of G. The number of p-singular elements in a

symmetric group is known. In this talk we discuss the number of p-singular elements in a finite (untwisted) group of Lie type in characteristic p.
The situation in the cross-characteristic case will maybe also be considered.

Speaker: Letterio Gatto (Politecnico di Torino)
Title: Hasse-Schmidt Derivations on Exterior Algebras and how to use them
Place: Room Seminar C3b
Date: Friday January 18, 12h-13h

Abstract: In the year 1937, Hasse & Schmidt introduced the so-called higher derivations in Commutative Algebra, to generalize the notion of Taylor polynomial to positive characteristic. Exactly the same definition can be phrased in the context of exterior algebras, by replacing the ordinary associative commutative multiplication by the wedge product. Hasse-Schmidt derivations on exterior algebras embody a surprisingly rich theory that candidates itself to propose a unified framework for a number of theories otherwise considered distincts, such as, e.g., (quantum, equivariant) Schubert Calculus for complex Grassmannians. In the talk we shall focus on one of the simplest but most powerful tools of the theory, the integration by parts formula. It will enable us to guess the shape of the vertex operators arising in the representation theory of certain infinite dimensional Lie algebras. In spite of the fancy vocabulary used in the abstract, the talk shall be entirely self-contained and no special prerequisite, but elementary multi-linear algebra, will be required.

Speaker: Branislav Jurco (Charles University)
Title: Quantum L-infinity Algebras and the Homological Perturbation Lemma
Date: 17/9/2018
Time: 12:00
Web: http://mat.uab.cat/~topalg
Abstract: Quantum homotopy Lie algebras are a generalization of homotopy Lie algebras with a scalar product and with operations corresponding to higher genus graphs. We construct a minimal model of a given quantum homtopy Lie algebra algebra via the homological perturbation lemma and show that it is given by a Feynman diagram expansion, computing the effective action in the finite-dimensional Batalin-Vilkovisky formalism. We also construct a homotopy between the original and this effective quantum homotopy Lie algebra. **Speaker:**
Thomas Poguntke (Bonn)
Title: Higher Segal structures in algebraic K-theory
Date: 14/9/2018
Time: 12:00
Web: http://mat.uab.cat/~topalg

Speaker: Louis Carlier (UAB)
Title: Hereditary species as monoidal decomposition spaces

Date: 7/9/2018
Time: 12:00
Web: http://mat.uab.cat/~topalg
Abstract: Schmitt constructed an important family of combinatorial bialgebras from what he called hereditary species: they are combinatorial structures with three different functorialities. The species of simple graphs is an example. These bialgebras do not fit into the standard theory of incidence algebras of posets or categories. We show Schmitt's hereditary species induce decomposition spaces, the more general homotopical framework for incidence algebras and Möbius inversion introduced recently by Gálvez, Kock, and Tonks, and we show that the bialgebra associated to a hereditary species is the incidence bialgebra of the corresponding monoidal decomposition space.