Programme - ARTIN Manchester, 8 - 9 May 2015

All talks will be in the Frank Adams Room, on the first floor of the Alan Turing Building

Friday, 8 May, 2015

13:00 - 14:00: Matthew Pressland (Bath): Cluster Structures from Internally 3-Calabi-Yau Algebras
Abstract: I will introduce internally 3-Calabi-Yau algebras, which are algebras exhibiting 3-Calabi-Yau duality away from their ‘boundary’. Such algebras play a significant role in the study of Frobenius categorification of cluster algebras. In particular, I will explain how an internally 3-Calabi-Yau algebra \( A \) gives rise to a Frobenius category containing a cluster-tilted object with endomorphism algebra \( A \). I will also describe aspects of Geiß - Leclerc-Schröer’s cluster structures on homogeneous coordinate rings of partial flag varieties, which provide motivation for the general theory, as well as lots of examples of internally 3-Calabi-Yau frozen Jacobian algebras.

14:15 - 15:15: Julia Sauter (Bielefeld): On Kato’s standard modules (for nilpotent representations of the oriented cycle)
Abstract: We explain a cell decomposition of quiver flag varieties of nilpotent representations for the oriented cycle which is parametrized by (certain) multitableau. This is a generalization of work of Fresse on Springer fibres in type A and of the Schubert cell decomposition. The cells give a basis of the (co)homology groups of these quiver flag varieties, which can be identified with "standard" modules (introduced by Kato) for the associated quiver Hecke algebra. We introduce these modules and play around with the information we win from the cell decomposition.

15:15 - 16:00: Tea and coffee.
16:00 - 17:00: Ed Segal (Imperial): All autoequivalences are spherical twists.
Abstract: Seidel and Thomas found a symmetry of a triangulated category, called a spherical twist, using the idea of a ‘spherical object’. Their construction was swiftly generalized to produce spherical twists around ‘relatively-spherical objects, and from there to a completely abstract construction of a twist around a ‘spherical functor. Ill explain why this notion of a twist around a spherical functor is so general that any autoequivalence of a triangulated category can in fact be described as a spherical twist, for purely formal reasons.

Saturday, 9 May, 2015

09:15 - 10:15: Grzegorz Bobiński (Toruń): Characterization of singular points of orbit closures for Dynkin quivers of type D
Abstract: When studying orbit closures of representations of quivers, it is a nontrivial task to describe tangent spaces and, in particular, to determine if a given point is nonsingular. The problem lies in the fact that, in general, there is no representation theoretic interpretation of equations describing orbit closures. On the other hand, there exist natural schemes, which are defined in terms of hom-spaces and whose reduced structures coincide, in the case of Dynkin quivers, with those of orbit closures. Moreover, Riedtmann and Zwara have proved that these schemes are reduced if a quiver is of type A. The main result of my talk says that in the case of Dynkin quivers of type D the singular points of the orbit closures can be detected by investigating the above schemes.

10:15 - 11:00: Tea and coffee.
11:00 - 12:00: Michael Wemyss (Edinburgh): The combinatorics of flops, via cluster mutation.
Abstract: There is a homological version of the minimal model program which interprets the flop functor equivalence of Bridgeland-Chen as a mutation functor in cluster theory. This gives a surprising number of corollaries and new results, and in this talk I will focus on one, namely the braiding of flops in dimension three, and their combinatorics. Unexpectedly, the braiding of these derived functors is controlled not by the standard braid group of a Dynkin diagram, or even the braid group of a Coxeter group, but instead by a naturally occurring hyperplane arrangement. I will give lots of examples, and outline some open problems, particularly when we try to lift the action to affine braid groups. This is joint work with Will Donovan.