OAC-manifolds

Fourth Meeting
Oxford, Monday 13 March 2017

Time	Speaker	Location
	Registration	
09:30-10:30	**Terry Wall (Liverpool)**	**L5**
	Coffee	
11:00-11:30	**Hongyun Yon (Oxford)**	**L5**
11:30-12:30	**Michael Weiss (Muenster)**	**L5**
	Lunch	
14:00-15:00	**Nathalie Wahl (Copenhagen)**	**L5**
	Tea	
15:30-16:30	**Oscar Randal-Williams (Cambridge)**	**L5**
18:00-20:00	**Dinner at Pierre Victoire**	**OX1 2HP**

Programme

Terry Wall: *Surgery on manifolds: The early days.*

Abstract: In 1956 Milnor published a paper proving that there are manifolds homeomorphic to the 7-sphere but not diffeomorphic to it. Seeking to generalise this example, he was led in around 1960 to introduce a construction for killing homotopy groups of manifolds. When this was generalised to killing relative homotopy groups it became a general and powerful method of construction.
An obstruction arises to killing the last group, and the analysis of this obstruction in general leads to a new theory.

Hongyun Yon: *Diffeomorphism-equivariant configuration spaces with twisted coefficients*

Abstract: We construct the diffeomorphism-equivariant "scanning map" associated to the configuration spaces of manifolds with twisted summable labels. The scanning map is also functorial with respect to embeddings of manifolds. To adapt P. Salvatore's idea of non-commutative summation into twisted setting, we define a bundle of Fulton-MacPherson operads over a manifold M whose fibres are built within tangent spaces of M.

Michael Weiss: *Homotopical properties of the diffeomorphism group of a smooth homotopy sphere*

Abstract: It is hard to detect the exotic nature of an exotic n-sphere M in homotopical features of the diffeomorphism group Diff(M). The well known reason is that Diff(M) contains a big topological subgroup H which is identified with the group of diffeomorphisms rel boundary of the n-disk, with a small coset space Diff(M)/H which is invariably homotopy equivalent to O(n+1). Therefore it seems that our only chance to detect the exotic nature of M in homotopical features of Diff(M) is to see something in this extension. (To make sense of "homotopical features of Diff(M)" one should think of Diff(M) as a space with a multiplication acting on an n-sphere.) I am planning to report on PhD work of O Sommer and calculations due to myself and Sommer which, if all goes well, would show that Diff(M) has some exotic homotopical properties in the case where M is the 7-dimensional exotic sphere of Kervaire-Milnor fame which bounds a compact smooth framed 8-manifold of signature 8. The theoretical work is based on classical smoothing theory and the calculations would be based on ever-ongoing (>30 years) joint work Weiss-Williams, and might give me and Williams another valuable incentive to finish it.

Nathalie Wahl: *Operad groups and the homology of the Higman-Thompson groups*

Abstract: Markus Szymik and I computed the homology of the Higman-Thompson groups by first showing that they stabilize (with slope 0), and then computing the stable homology. I will in this talk give a new point of view on the computation of the stable homology using Thumann's "operad groups". I will also give an idea of how scanning methods can enter the picture. (This is partially joint work with Søren Galatius.)

Oscar Randal-Williams: *Stable twisted cohomology via scanning*

Abstract: The technique of scanning, or the parameterised Pontrjagin-Thom construction, has been extraordinarily successful in calculating the cohomology of configuration spaces (McDuff), moduli spaces of Riemann surfaces (Madsen, Tillmann, Weiss), moduli spaces of graphs (Galatius), and moduli spaces of manifolds of higher dimension (Galatius, R-W, Botvinnik, Perlmutter), with constant coefficients. In each case the method also works to study the cohomology of moduli spaces of objects equipped with a "tangential structure". I will explain how choosing an auxiliary highly-symmetric tangential structure often lets one calculate the cohomology of these moduli spaces with large families of twisted coefficients, by exploiting the symmetries of the tangential structure and using a little representation theory.