Algebraic Methods in 4-Manifold Topology

Monday, 19th June

Talks in 311B.

Break out room: 309, booked 1300 − 1800.

09:00 − 9:30	Welcome and coffee, 311A.
9:30 − 10:30	Arunima Ray: *Embedding surfaces in 4-manifolds.*
10:30 − 11:00	Discussion.
11:00 − 12:00	Csaba Nagy: *A special case of the Q-form conjecture.*
12:00 − 13:30	Lunch.
13:30 − 15:00	Daniel Kasprowski: *Stable classification of 4-manifolds.*
15:00 − 15:30	Discussion.
15:30 − 17:30	Focused group work.
18:30	Welcome dinner at Ashoka.

Tuesday, 20th June

Talks in 311B.

Break out room: 309, booked 1300 − 1800.

09:00 − 9:30	Coffee, 311A.
9:30 − 10:30	John Nicholson: *Simple homotopy types of 4-manifolds.*
10:30 − 11:00	Discussion.
11:00 − 12:00	Daniel Kasprowski: *4-manifolds with infinite dihedral fundamental group.*
12:00 − 13:30	Lunch.
13:30 − 15:00	Anthony Conway: *The rôle of the ℓ-monoid in the classification of 4-manifolds.*
15:00 − 15:30	Discussion.
15:30 − 17:30	Focused group work.
18:30	Dinner at Curler's Rest.

Wednesday, 21st June

Talks in 116.

Break out room: 309, booked 1300 − 1800.

09:00 − 9:30	Coffee, 311A.
9:30 − 10:30	Simona Veselá: *Strategies and methods of classifying manifolds with boundary.*
10:30 − 11:00	Discussion.
11:00 − 12:00	Patrick Orson: *Unknotting nonorientable surfaces.*
12:00 − 13:30	Lunch.
13:30 − 17:30	Focused group work.
18:30	Dinner.

Thursday, 22nd June

Talks in 116.

Break out rooms: 110, booked 1330 − 1630; and 309, booked 1600 − 1800.

09:00 − 9:30	Coffee, 311A.
9:30 − 10:30	Anthony Conway: *The ℓ-monoid, realisation, and the stable classification.*
10:30 − 11:00	Discussion.
11:00 − 12:00	Michelle Daher: *Topologically concordant surfaces are smoothly concordant.*
12:00 − 13:30	Lunch.
13:30 − 15:00	Jim Davis: *Homeomorphism classification of 4-manifolds from the viewpoint of classical surgery.*
15:00 − 15:30	Discussion.
15:30 − 17:30	Focused group work.
18:30	FRG dinner at Bothy.

Friday, 23rd June

Talks in 116.

Break out room: 309, booked 1300 − 1800.

08:30 − 9:00	Coffee, 311A.
9:00 − 10:30	John Nicholson: *Homotopy classification of 4-manifolds.*
10:30 − 11:00	Discussion.
11:00 − 13:00	Lunch (graduation event in 116 from 11:00 - 12:00).
13:00 − 14:30	Daniel Galvin: *Non-smoothable homeomorphisms on non-simply-connected 4-manifolds.*
14:00 − 14:30	Discussion.
14:30 − 15:30	Jim Davis: *Aspherical 4-manifolds with elementary amenable fundamental group.*
15:30 − 17:30	Focused group work.
1800	Pub.

Titles & Abstracts: Expository Talks

Daniel Kasprowski: *Stable classification of 4-manifolds.*

I will explain methods to classify 4-manifolds up to connected sum with $S^2 \times S^2$s or other simply connected 4-manifolds. This will mostly be an overview over Kreck's modified surgery.

Anthony Conway: *The rôle of the ℓ-monoid in the classification of 4-manifolds.*

Following work of Kreck and Crowley-Sixt, this talk will describe the odd-dimensional l-monoid and how it fits into the modified surgery programme to classify 4-manifolds.

Jim Davis: *Homeomorphism classification of 4-manifolds.*

John Nicholson: *Homotopy classification of 4-manifolds.*

I will discuss various approaches to classifying 4-manifolds up to homotopy equivalence, with a focus on the case of finite fundamental group and the work of Hambleton-Kreck on classification using the quadratic 2-type. I will also discuss invariants beyond the quadratic 2-type.

Titles & Abstracts: Research Talks

Arunima Ray: *Embedding surfaces in 4-manifolds.*

I will talk about a general surface embedding theorem in the topological category (joint work with Daniel Kasprowski, Mark Powell, and Peter Teichner). Since there are so few of us, I hope to get our hands dirty and talk about some gory details.

Csaba Nagy: *A special case of the Q-form conjecture.*

John Nicholson: *Simple homotopy types of 4-manifolds.*

The aim of this talk will be to present the first examples of two 4-manifolds which are homotopy equivalent but not simple homotopy equivalent, as well as in all higher even dimensions. I will also discuss a number of new directions including progress on classifying the possible fundamental groups for which examples exist. This is joint work with Csaba Nagy and Mark Powell.

Daniel Kasprowski: *4-manifolds with infinite dihedral fundamental group.*

I will give a homeomorphism classification of 4-manifolds with infinite dihedral fundamental group. This is joint work with Mark Powell and Aru Ray.

Simona Veselá: *Strategies and methods of classifying manifolds with boundary.*

I will talk about some basic tools people use to classify, either stably or nonstably, 4-manifolds with a fixed boundary 3 manifold. For example to every non-degenerate symmetric bilinear form λ there corresponds a boundary form $\partial\lambda$. Geometrically this corresponds to a map from the intersection form on H_2 of a manifold to the linking form on $\mathrm{Tors}(H_1)$ of its boundary. This might become a joint work with Daniel Galvin.

Patrick Orson: *Unknotting nonorientable surfaces.*

I will report on joint work with Anthony Conway and Mark Powell where we study nonorientable surfaces with knot group of order 2 in the 4-sphere.

Anthony Conway: *The ℓ-monoid, realisation, and the stable classification.*

This talk will outline how the nontriviality of the odd-dimensional l-monoid leads to the existence of infinitely many (high-dimensional) closed manifolds that are stably diffeomorphic, have the same equivariant intersection form but are not homotopy equivalent. This is joint work with Diarmuid Crowley, Mark Powell and Joerg Sixt.

Michelle Daher: *Topologically concordant surfaces are smoothly concordant.*

We show that topologically locally flat concordance implies smooth concordance for smooth surfaces in smooth 4-manifolds. This is a joint work with Mark Powell.

Daniel Galvin: *Non-smoothable homeomorphisms on non-simply-connected 4-manifolds.*

The Casson-Sullivan invariant is a stable obstruction to smoothing homeomorphisms and in this talk I will report on work on realising this invariant for non-simply-connected 4-manifolds.

Jim Davis: *Aspherical 4-manifolds with elementary amenable fundamental group.*

- All talks in the School of Mathematics and Statistics, University Place, Glasgow G12 8QQ.

- Contact: Mark Powell, mark.powell@glasgow.ac.uk.

- To locate rooms, it helps to know that floors in the department are enumerated with the natural numbers.

- Coffee, water, and milk will be provided. Cups and glasses are scarce. If possible bring a drinks receptacle.

- Close and fast lunch options. University: the James McCune Smith Hub, and the ARC. Take away Italian sandwiches: Little Italy, La Pastina Deli, and Santa Lucia Deli.

- Nearby restaurants, for lunch or dinner: Ting Thai, Ramen Dayo, Ubiquitous Chip, Bibimbap, TriBeCa, Dumpling Monkey, The Left Bank, Pulp, Mother India's Cafe, Eusebi's Deli, Paesano Pizza, Bantawala, Epicures.

- Lunch dessert at Pastéis Lisboa or Bertos Brownies recommended.

- Nearby approved coffee shops: Hinba, The Alchemy Experiment.

- Nearby approved pubs: The Aragon, Òran Mór, Sparkle Horse, Curler's Rest, Inn Deep, Three Judges.