BIRS Topology in Dimension 4.5 titles and abstracts
(All talks in TCPL 201)

Mini-series: each mini-series will include a handful of speakers giving expository talks or problems on a common theme.

Mini-series A, Monday 9am-12pm (coffee break 10-10:30)
Theme: Knotted surfaces in 4-manifolds
Speakers:
- Anthony Conway
- Seungwon Kim
- Patrick Naylor
- Arunima Ray

Mini-series B, Wednesday 9am-12pm (coffee break 10-10:30)
Theme: 4-dimensional concordance invariants
Speakers:
- Dave Gabai
- Michael Klug
- Mark Powell
- Rob Schneiderman

Mini-series C, Thursday 9am-12pm (coffee break 10-10:30)
Theme: Smooth mapping class groups of 4-manifolds
Speakers:
- Ryan Budney
- Daniel Hartman
- Danica Kosanović
- Tadayuki Watanabe

50-minute "Hot off the press" talks

1. **Mark Powell,** Monday 3:30pm

   Title: **Mapping class groups of simply connected, compact 4-manifolds**

   Abstract: I will describe the eponymous groups in the topological category. When the boundary is nonempty, the complete computation is new and joint with Patrick Orson. Then I will do some subset of: (i) make comparisons with the smooth category; (ii) mention applications to isotopy of surfaces; (iii) discuss possible avenues for generalisation to 4-manifolds with non-trivial fundamental group.

2. **Slava Krushkal,** Monday 4:30pm

   Title: **Topological pseudoisotopy of 4-manifolds**

   Abstract: This talk will focus on work in progress, joint with Mark Powell, on pseudoisotopy theory for topological 4-manifolds. The goal is to extend Quinn's theorem, that a pseudoisotopy of a simply-connected 4-manifold is topologically isotopic to an isotopy, to 4-manifolds with good fundamental groups, provided that the Hatcher-Wagoner obstructions vanish. A part of the project is to establish what the relevant analogue of Hatcher-Wagoner's higher-dimensional obstructions should be in dimension 4. The talk will aim to explain these notions, problems, and our results.

3. **Nick Castro,** Tuesday 1:30pm
   TBA

4. **Vincent Longo,** Tuesday 3:30pm

Title: **An Infinite Family of Counterexamples to Batson's Conjecture**

Abstract: Batson's conjecture is a non-orientable version of Milnor's conjecture, which states that the 4-ball genus of a torus knot T(p,q) is equal to 1/2(p-1)(q-1). Batson's conjecture states that the nonorientable 4-ball genus is equal to the pinch number of a torus knot, i.e. the number of a specific type of (nonorientable) band surgeries needed to obtain the unknot. The conjecture was recently proved to be false by Lobb. We will show that Lobb's counterexample fits into an infinite family of counterexamples.

5. **Allison Miller,** Tuesday 4:30pm (Zoom)

Title: **Strongly invertible knots and equivariant slice genera.**

Abstract: A strong inversion of a knot K is an involution i of the 3-sphere that setwise fixes K and whose fixed set intersects K in exactly two points.The equivariant 4-genus of a (knot, inversion) pair (K, i) is defined to be the minimal genus of an embedded surface F in the 4-ball with boundary K and that is setwise fixed under some extension of i to an involution of the 4-ball. We give a new lower bound on the equivariant 4-genus in terms of the Blanchfield pairing, and discuss how this can be used to give many examples of knots with arbitrarily large equivariant 4-genus. In the process, we show that genus one strongly invertible knots with nontrivial Alexander polynomial are never equivariantly slice. This is joint work with Mark Powell.

6. **Patrick Naylor,** Thursday 1:30pm

Title: **Doubles of Gluck twists**

Abstract: The Gluck twist of an embedded 2-sphere in the 4-sphere is a 4-manifold that is homeomorphic, but not obviously diffeomorphic to the 4-sphere. Despite considerable study, these homotopy spheres have resisted standardization except in special cases. In this talk, I will discuss some conditions that imply the double of a Gluck twist is standard, i.e., is diffeomorphic to the 4-sphere. This is based on joint work with Dave Gabai and Hannah Schwartz.

7. **Kai Nakamura,** Thursday 3:30pm

   Title: **Annulus twisting a disk: Standard and exotic**

   Abstract: We will discuss and compare two recent results of the author. First will be a family of homotopy 4-spheres constructed by Manolescu and Piccirillo by annulus twisting a ribbon disk. These we show are standard by visualizing the associated trace embedding by a Kirby diagram. To contrast this, we construct a family of exotic elliptic surfaces by annulus twisting an H-slice disk. This provides important evidence for the viability of the Manolescu-Piccirillo approach to disproving the smooth 4-dimensional Poincare conjecture by giving the first examples of their construction successfully producing exotic 4-manifolds.

8. **Irving Dai,** Thursday 4:30pm

   Title: **The (2,1)-cable of the figure-eight knot is not smoothly slice**

   Abstract: We prove that the (2,1)-cable of the figure-eight knot is not smoothly slice by showing that its branched double cover bounds no equivariant homology ball. This answers a forty-year-old question posed by Kawauchi. (Joint with Sungkyung Kang, Abhishek Mallick, JungHwan Park, and Matthew Stoffregen.)

9. **Ryan Budney,** Friday 9am

   Title: **How to show a barbell diffeomorphism is non-trivial**

   Abstract: I will describe a few different scanning arguments, allowing one to show the non-triviality of some implanted barbell diffeomorphisms, as elements of the homotopy groups of Diff(S^1 x D^{n-1}) for n >= 4.

10. **Danica Kosanovic**, Friday 11am (Zoom)

    Title: **A new approach to light bulb tricks**

    Abstract: I will explain a new approach to settings with geometric dual spheres, which can not only classify isotopy classes of disks or spheres with such a dual, but also leads to some new insights into mapping class groups of 4-manifolds. This is joint work with Peter Teichner.

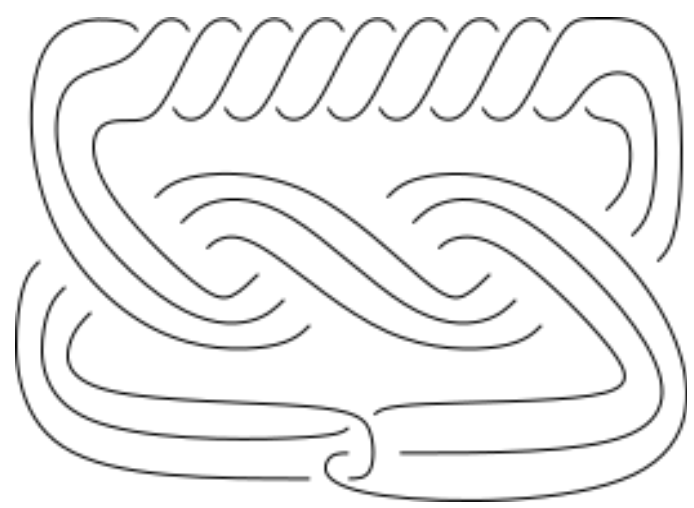25-minute "Picture this!" talks
(Each talk explains a figure)

1. **Isaac Sundberg,** Monday 2:30pm

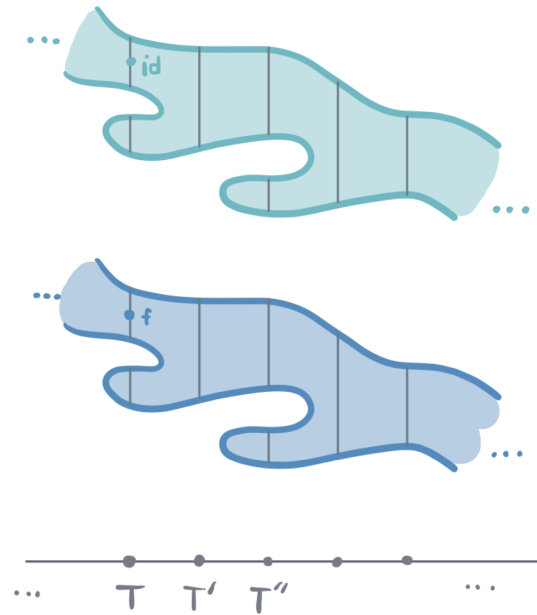   **"A non-detection result in Khovanov homology"**
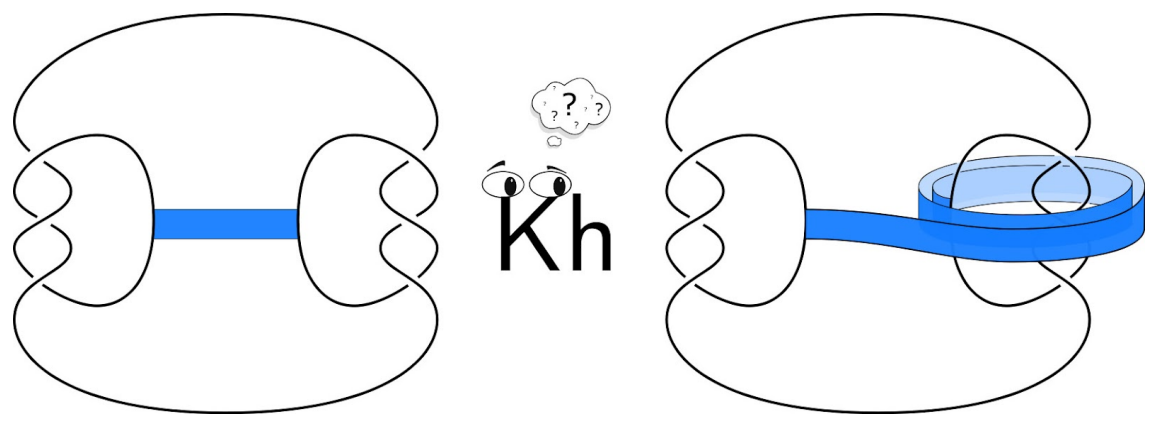
2. **Alex Manchester,** Tuesday 9am
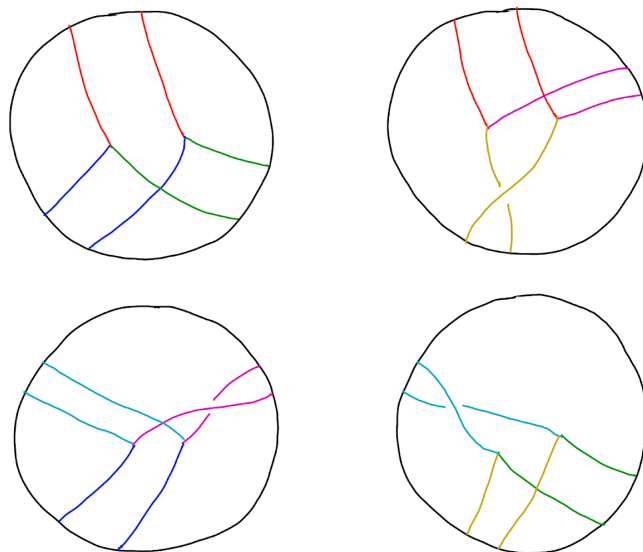
   "The Mazur pattern and concordance"

3. **Terrin Warren,** Tuesday 9:30am

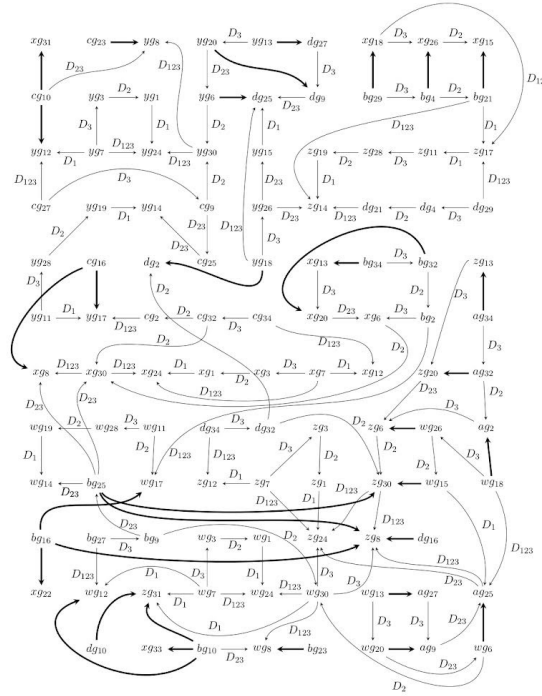**"Diffeomorphisms and the Goeritz group of a trisection"**

4. **Shintaro Fushida-Hardy,** Tuesday 10:30am
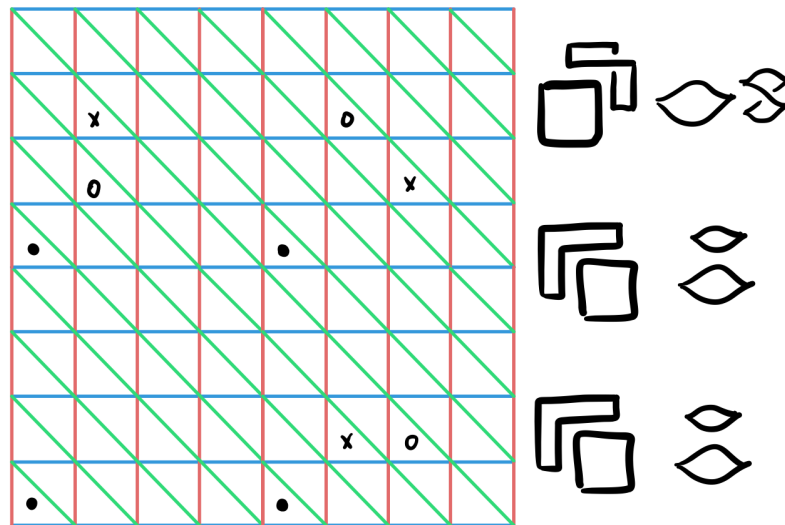
"Pseudo bridge trisections"

5. **Sally Collins,** Tuesday 11am
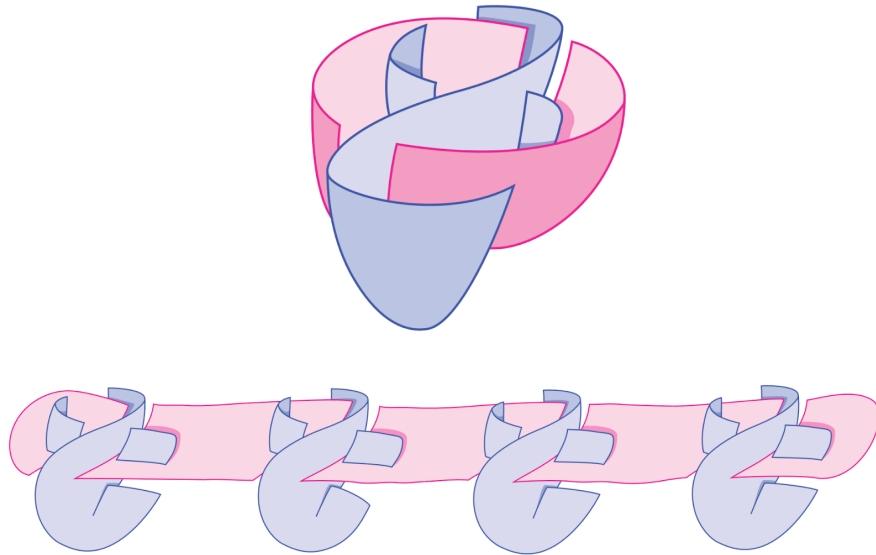
"Satellite knots & Local Equivalence"

6. **Sarah Blackwell,** Tuesday 2:30pm

"Triple Grid Diagrams"

7. **Nicholas Cazet ,** Thursday 2:30pm

"Broken Sheet Diagrams of Knot Cobordisms"

8. **Peter Teichner,** Friday 10:30am (Zoom)

"Isotopy classification of half-disks in 4-manifolds"