

Fall 2021

▪ September 2nd

Speaker: **Daniel Studenmund** (Binghamton)

Title: **Homotopy equivalences of full solenoids** *Abstract:* Solenoids, inverse limits of self-coverings of the circle, are important examples of compact connected metrizable spaces. They were studied by topologists Mayer and van Dantzig, and arise in the theory of hyperbolic dynamical systems as the Smale-Williams attractor. We will use ideas from shape theory to show that homotopy equivalences of a solenoid naturally correspond to certain rational numbers. The full solenoid over a space X is the inverse limit of all finite covers of X . We will state a generalization of the 1-dimensional result, relating homotopy equivalences of the full solenoid over a finite CW complex X to isomorphisms between finite-index subgroups of $\pi_1(X)$. If time permits, we will say a word on the Teichmüller theory of the full solenoid over a closed hyperbolic surface.

▪ September 9th

Speaker: **José Román Aranda Cuevas** (Binghamton)

Title: **Trisecting objects in dimension four** *Abstract:* In 2012, D. Gay and R. Kirby proved that every closed oriented 4-manifold admits a trisection: a decomposition of the space into three standard pieces. Since then, many mathematicians have used trisections to study 4-manifolds from various perspectives: from Morse functions, complexes of curves, group theory, to mention some. The goal of this talk is to survey recent ideas and results surrounding the theory of trisections. No specialized background will be assumed.

▪ September 23rd

Speaker: **Michael Dobbins** (Binghamton)

Title: **A strong equivariant deformation retraction from the homeomorphism group of the projective plane to the special orthogonal group** *Abstract:* I will present the construction of a strong G -equivariant deformation retraction from the homeomorphism group of the 2-sphere to the orthogonal group, where G acts on the left by isometry and on the right by reflection through the origin. This induces a strong G -equivariant deformation retraction from the homeomorphism group of the projective plane to the special orthogonal group, where G is the special orthogonal group acting on the projective plane. The same holds for subgroups of homeomorphisms that preserve the system of null sets. This confirms a conjecture of Mary-Elizabeth Hamstrom.

▪ September 30th

Speaker: **Ulysses Alvarez** (Binghamton)

Title: **The topology of a corank 1 matroid over \mathbb{F}_4** *Abstract:* Topological posets allow for the construction of a space which can be viewed as a generalization of the order complex of a discrete poset. We will discuss how this structure can be used to understand the topology of a corank 1 matroid over the tropical phase hyperfield on 4 elements.

▪ October 7th

Speaker: **Cary Malkiewich** (Binghamton)

Title: **The higher characteristic polynomial** *Abstract:* In this talk I will discuss various lifts of the characteristic polynomial to the setting of algebraic K -theory, and describe the relationship to trace methods and to topological fixed-point theory.

▪ October 21st

Speaker: **Nima Rasekh** (EPFL) (virtual talk, streamed in WH100E)

Title: **THH and Shadows of Bicatagories** *Abstract:* Topological Hochschild homology (THH), first defined for

ring spectra and then later dg-categories and spectrally enriched categories, is an important invariant with connections to algebraic K-theory and fixed point methods. The existence of THH in such diverse contexts motivated Ponto to introduce a notion that can encompass the various perspectives: a shadow of bicategories. On the other side, many versions of THH have been generalized to the homotopy coherent setting providing us with motivation to develop an analogous homotopy coherent notion of shadows. The goal of this talk is to use an appropriate bicategorical notion of THH to prove that a shadow on a bicategory is equivalent to a functor out of THH of that bicategory. We then use this result to give an alternative conceptual understanding of shadows as well as an appropriate definition of a homotopy coherent shadow. This is joint work with Kathryn Hess.

▪ **October 28th**

Speaker: **Jonathan Williams** (Binghamton)

Title: **Turning a Lefschetz fibration into a crown map** *Abstract:* A rich source of examples of smooth 4-manifolds comes from finding a composition of Dehn twists on a closed surface which is isotopic to the identity map. I'll describe how to turn this into a source of examples of crown diagrams of smooth 4-manifolds.

▪ **November 4th**

No seminar this week

▪ **November 11th**

Speaker: **Tim Susse** (Bard) (virtual talk, streamed in WH100E)

Title: **When is a RACG QI to a RAAG: a probabilistic approach.** *Abstract:* A celebrated theorem of Davis and Januszkiewicz shows that every right-angled Artin group (RAAG) is isomorphic to a finite index subgroup of some right-angled Coxeter group (RACG). The converse, however, is not true and the question of which RACGs are quasi-isometric to RAAGs has achieved folk status. In this talk we will discuss the state of the art on this question, which uses some of the most powerful tools in Geometric Group Theory. We will focus on the generic version of this question, using random graphs to model random right-angled Coxeter groups and show that at low enough density the answer is (almost surely) never.

▪ **November 18th**

No seminar this week (cancellation)

▪ **December 2nd**

Speaker: **Jonathan Williams** (Binghamton)

Title: **The salient sequence of a crown diagram** *Abstract:* I will discuss a very concrete and elementary construction allowing one to associate a pair of numbers to each crossing in a crown diagram, and discuss invariance properties for a particular "salient sequence" of these numbers. If time permits, I'll point out a few promising directions in which one could take the construction.

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