Redbud Triangulations 2016
Titles and Abstracts

Speaker: Mark Bell
Title: *Polynomial-time curve reduction*

Abstract: A pair of curves on a surface can appear extremely complicated and so it can be difficult to determine properties such as their intersection number.

We will discuss a new argument that, when the curve is given by its intersections with the edges of an ideal triangulation, there is always a "reduction" to a simpler configuration in which such calculations are straightforward. This relies on finding an edge flip or a (power of a) Dehn twist that decreases the complexity of a curve by a definite fraction.

Speaker: Marc Culler
Title: *Orderability and Dehn filling*

Abstract: I will discuss joint work with Nathan Dunfield. We give a general framework, based on character varieties, for identifying Dehn fillings on a one-cusped hyperbolic manifold which give rise to a closed manifold with left-orderable fundamental group. The techniques produce non-trivial intervals of slopes for which the associated filled manifold has orderable fundamental group. This work is motivated by open conjectures about the relationship between Floer homology, the existence of taut foliations and orderability of the fundamental group of an irreducible rational homology sphere.

Speaker: Dave Futer
Title: *The geometry of veering triangulations: theory and experiment*

Abstract: I will recall Agol's construction of veering triangulations on fibered hyperbolic 3-manifolds, and investigate the question of how much geometric information the triangulations can "see". Extensive numerical experiments by Will Worden suggest that combinatorial data encoded in the triangulation can give two-sided bounds on the the volume of the manifold, and yield some information about the location of short geodesics. I will summarize these experimental results and describe some preliminary efforts to turn them into theorems.

Speaker: Ahmad Issa
Title: *Triangulating Cappell-Shaneson homotopy 4-spheres*

The smooth 4-dimensional Poincare conjecture states that a smooth 4-manifold homotopy equivalent to the 4-sphere must be diffeomorphic to the standard 4-sphere. Historically, perhaps the most promising potential counterexamples to this conjecture are the Cappell-Shaneson homotopy 4-spheres. Over time many Cappell-Shaneson homotopy 4-spheres were shown to be standard (diffeomorphic to the 4-sphere). In this talk I'll describe how to construct triangulations of Cappell-Shaneson homotopy 4-spheres, which we can use to computationally show that certain Cappell-Shaneson homotopy 4-spheres are standard.

Speaker: Saul Schleimer
Title: *Circular orderings from veering triangulations*

Abstract - This is joint work with Henry Segerman. Suppose that (M,T) is a cusped three-manifold equipped with a veering triangulation. We show that there is an essentially unique associated invariant circular ordering on the cusps of the universal cover of M. After giving necessary background and sketching the proof, I will wildly speculate about possible applications.

Speaker: Anastasiia Tsvietkova
Title: *Isotopy classes of crossing arcs in hyperbolic alternating links.*

Abstract: For hyperbolic alternating links, it has been suspected for many years that every arc in the reduced alternating diagram running from an overcrossing to an undercrossing is isotopic to a geodesic. This was conjectured by Sakuma and Weeks in 1995. Since then, it has been proved only for several families of links. We obtain conditions that guarantee that a link complement has a complete hyperbolic structure (without using Geometrization), and every such arc is isotopic to a simple geodesic. Our conditions also ensure that crossing arcs are the edges of an ideal geodesic triangulation. We provide new infinite families of links for which this holds.

Speaker: Will Worden
Title: *Hidden Symmetries and Commensurability of 2-bridge link complements.*

Abstract:
The canonical triangulations and symmetry groups of 2-bridge link complements are well understood and relatively easy to describe. We leverage this fact to show that non-arithmetic 2-bridge link complements have no hidden symmetries (i.e., symmetries of a finite cover that do not descend to symmetries of the link complement itself), and are pairwise incommensurable. I will discuss the relevant background material, and give a rough sketch of the proof. This is joint work with Christian Millichap.