Workshop Schedule

Events for: Monday, January 11th - Friday, January 15th

Monday, January 11th

1:00pm Andras Juhasz

Speaker: Andras Juhasz

Title: Transverse invariants and exotic surfaces in the 4-ball

Abstract: Using 1-twist rim surgery, we construct infinitely many smoothly embedded, orientable surfaces in the 4-ball bounding a knot in the 3-sphere that are pairwise topologically isotopic, but not ambient diffeomorphic. We distinguish the surfaces using the maps they induce on perturbed sutured Floer homology. Along the way, we show that the cobordism map induced by an ascending surface in a Weinstein cobordism preserves the transverse invariant in knot Floer homology. This is joint work with Ian Zemke.

3:00pm Claudius Zibrowius

Speaker: Claudius Zibrowius

Title: L-space knots have no essential Conway spheres

Abstract: In 2013, Allison Moore and Tye Lidman conjectured that any knot in S³ that admits a nontrivial surgery to an L-space does not contain an essential Conway sphere. In recent joint work (arXiv preprint 2006.03521), we prove this conjecture. Our proof is based on a certain Heegaard Floer invariant HFT for 2-strand tangles that I developed in earlier work. I will discuss the main ideas of our proof with particular focus on symmetries of HFT.

Tuesday, January 12th

1:00pm Masaki Taniguchi

Speaker: Masaki Taniguchi

Title: Filtered instanton Floer homology and the homology cobordism group

Abstract: We introduce a family of real-valued homology cobordisminvariants $r_s(Y)$ of oriented homology 3-spheres. The invariants $r_s(Y)$ arebased on a quantitative construction of filtered instanton Floer homology.Using our invariants $r_s(Y)$, we give several new constraints of the set ofsmooth compact 4-manifolds bounded by homology 3-spheres. As one of the corollaries, we give infinitely many homology 3-spheres which cannot boundary definite 4-manifold. As another corollary, we show that if the1-surgery of a knot has negative Froyshov invariant, then the 1/n-surgeries(n>0) of the knot are linearly independent in the homology cobordism group. This is joint work with Yuta Nozaki and Kouki Sato.

3:00pm John Baldwin

Speaker: John Baldwin

Title: Sutured instanton homology and Heegaard diagrams

Abstract: It is an open question how instanton Floer homology is related to the other main Floerhomological invariants of 3-manifolds, those being Heegaard Floer homology, monopole Floer homology, and embedded contact homology, which are all known to be isomorphic to one another. I'll describe recent work with Zhenkun Li and Fan Ye motivated by this question, in which we prove that the dimension of the sutured instanton homology of a balanced sutured manifold is bounded above by the number of generators in any sutured Heegaard Floer complex for the manifold. Among other things, it follows that strong L-spaces are instanton L-spaces

Wednesday, January 13th

1:00pm Jen Hom

Speaker: Jen Hom

Title: Infinite order rationally slice knots

Abstract: A knot in S^3 is rationally slice if it bounds a disk in a rational homology ball. We give an infinite family of rationally slice knots that are linearly independent in the knot concordance group. In particular, our examples are all infinite order. All previously known examples of rationally slice knots were order two. The proof relies on bordered and involutive Heegaard Floer homology. This is joint work with Sungkyung Kang, JungHwan Park, and Matt Stoffregen.

3:00pm Donghao Wang

Speaker: Donghao Wang

Title: Monopole Floer homology for 3-manifolds with toroidal boundary

Abstract: The monopole Floer homology of an oriented closed 3-manifold was defined by Kronheimer-Mrowka and has greatly influenced the study of 3-manifold topology since its inception. In this talk, we will generalize their construction and define the monopole Floer homology for any pair pY, ?q, where Y is a compact oriented 3-manifold with toroidal boundary and ? is a suitable closed 2-form, which satisfies a reasonable (3+1) TQFT property. Its graded Euler characteristic recovers the Milnor-Turaev torsion invariant by a classical theorem of Meng-Taubes. We will explain its relation with gauged Landau-Ginzburg models, and how this framework leads to a tentative bordered monopole theory.

Thursday, January 14th

1:00pm Zhenkun Li

Speaker: Zhenkun Li

Title: Instanton Floer homology of (1,1)-knot

Abstract: Instanton knot homology was first introduced by Floer and was revisited byKronheimer and Mrowka via sutured instanton Floer homology. As the nature of instanton theory, the computation of instanton knot homology is in general very difficult. In this talk, we present the computations of some families of (1,1)-knots, including all torus knots. The computation involves two technical results, which are also interesting on their own. The first is to extract information about instanton theory from the Heegaard diagrams of 3-manifolds and knots. The second is to relate the Euler characteristics of sutured Instanton Floer homology and sutured Floer homology that was introduced by Juhász. This is a joint work with Fan Ye.

3:00pm Ian Zemke

Speaker: Ian Zemke

Title: A few refinements of Heegaard Floer genus bounds

Abstract: In this talk, we will discuss some improvements to known Heegaard Floer genus and clasp number bounds. We define a family of concordance invariants $Y_n(K)$ which sometimes give better slice genus bounds than the best previous known bounds from Rasmussen's $V_n(K)$. The invariants $Y_n(K)$ have a simple description in terms of the existence of local maps between knot-like complexes. Using similar techniques, we are also able to show that Hendricks and Manolescu's involutive correction terms also give a slice genus bound. This project is joint work with Andras Juhasz.

Speaker: Sherry Gong

Title: Non-orientable cobordisms and torsion in Floer homology

Abstract: We use unoriented versions of instanton and knot Floer homology to give bounds on the number of critical points appearing in not-necessarily orientable cobordisms, extending results of a recent paper by Juhasz, Miller, and Zemke concerning orientable cobordisms. The versions of instanton and knot Floer homology that induce maps for non-orientable cobordisms require a decoration-much of the subtlety in our arguments lies in choosing the necessary decorations. We introduce unoriented versions of the band unknotting number and the refined cobordism distance and use our results to give bounds on these based on the torsion orders of the Floer homologies.

3:00pm Kristen Hendricks

Speaker: Kristen Hendricks

Title: Surgery formulas for involutive Heegaard Floer homology

Abstract: We prove a surgery formula for the involutive variant of Heegaard Floer homology, and use it to show that the integer homology cobordism group is not generated by Seifert fibred spaces. This is joint work with J. Hom, M. Stoffregen, and I. Zemke.