Workshop: Gauge Theory and Low Dimensional Topology

Events for:
Monday, April 24th - Friday, April 28th

Monday, April 24th

10:30am **Registration - SCGP Cafe**

11:00am **Daniel Ruberman - SCGP 102**

Title: Heegaard Floer invariants in codimension one

Abstract: Using Heegaard Floer homology, we construct a numerical invariant for any smooth, oriented 4-manifold X with the homology of a product of circle and 3-sphere. Specifically, we show that for any smoothly embedded, non-separating 3-manifold , a suitable version of the Heegaard Floer d invariant of Y, defined using twisted coefficients, is a diffeomorphism invariant of X. We show how this invariant can be used to obstruct embeddings of certain types of 3-manifolds. This is joint work with Adam Levine.

12:00pm **Lunch - SCGP Cafe**

2:00pm **Matt Stoffregen - SCGP 102**

Title: Pin(2)-equivariant Floer homology and the homology cobordism group

3:15pm **Tea - SCGP Lobby**

3:45pm **Paul Feehan - SCGP 102**

Title: SO(3) monopoles and relations between Donaldson and Seiberg-Witten invariants

Abstract:

Tuesday, April 25th

9:30am **Jake Rasmussen - SCGP 102**

Title: Heegaard Floer homology of manifolds with torus boundary

10:30am **Coffee Break - SCGP Cafe**

11:00am **Henry Horton - SCGP 102**

Title: A Symplectic Instanton Homology via Traceless Character Varieties

12:00pm **Lunch - SCGP Cafe**

2:00pm **SCGP Weekly Talk: Hiraku Nakajima (Colloquim) - SCGP 102**

Title: Coulomb branches of 4d N=2 SUSY gauge theories for $\mathbb R^3\times S^1$

3:15pm **Tea - SCGP Lobby**

3:45pm **Problem session (Chaired by Simon Donaldson) - SCGP 102**

Wednesday, April 26th

10:00am **Sergei Gukov - SCGP 102**

Title: What categorification of knot and 3-manifold invariants can tell us about 4-manifolds

11:00am **Coffee Break - SCGP Cafe**

11:30am **Mikhaylov Victor - SCGP 102**

Title: Teichmuller TQFT and a Conjecture for Kapustin-Witten Equations

12:30pm **Lunch - SCGP Cafe**

2:30pm **Gregory Moore - SCGP 102**

Title: The u-Plane Integral As A Tool In The Theory Of Four-Manifolds

Abstract: This talk should be viewed as the final part of a lecture series I recently gave at the SCGP on the physical approach to the theory of four-manifold invariants. The first three lectures can be viewed on the SCGP video portal http://scgp.stonybrook.edu/video_portal/ In addition, lecture notes can be found on my home page http://www.physics.rutgers.edu/~gmoore/SCGP-FourManifoldsNotes-2017.pdf I will assume some passing familiarity with that material, but I will review the essential points in the physical derivation of the Witten conjecture relating Donaldson and Seiberg-Witten invariants. Then I will continue to review work from about 20 years ago: I will sketch the analog of the Witten conjecture for Donaldson invariants associated to any compact simple Lie group. I will also outline the physical reasoning that led to the notion of "superconformal simple type." Finally, time permitting, I will briefly sketch some ideas that might lead to future progress in this field.

3:30pm **Tea - SCGP Lobby**

5:30pm **WS Banquet**

Thursday, April 27th

10:00am **Kenji Fukaya - SCGP 102**

Title: A candidate for symplectic side of Atiyah-Floer Conjecture

11:00am **Coffee Break - SCGP Cafe**

11:30am **Daemi Aliakbar - SCGP 102**

Title: Admissible Bundles and Atiyah-Floer Conjecture

12:30pm **Lunch - SCGP Cafe**

2:15pm **David Duncan - SCGP 102**

Title: From instantons to holomorphic curves

3:15pm **Tea - SCGP Lobby**

3:45pm **Guillem Cazassus - SCGP 102**

Title: Towards extended Floer Field theories

Friday, April 28th

9:00am **Francesco Lin - SCGP 102**

Title: Bar Natan's deformation of Khovanov homology and involutive monopole Floer homology

Abstract: We study the conjugation involution in Seiberg-Witten theory in the context of the Ozsvath-Szabo and Bloom's spectral sequence for the branched double cover of a link L in S^3. We show that there exists a spectral sequence of F[Q]/Q^2-modules (where Q has degree ?1) which converges to an involutive version of the monopole Floer homology of the branched double cover, and whose E^2-page is a version of Bar Natan's deformation of Khovanov homology in characteristic two of the mirror of L. We conjecture that an analogous result holds in the setting of Pin(2)-monopole Floer homology.

10:00am **Coffee Break - SCGP Cafe**

10:30am **Paul Kirk - SCGP 102**

Title: Traceless SU(2) character varieties of tangles in 3-manifolds

Abstract: I'll discuss symplectic/lagrangian properties of the traceless SU(2) character varieties of punctured 2-spheres and tangles in 3-manifolds with 2-sphere boundary, with an emphasis on 4-punctured 2-spheres and 2-tangles. I'll outline connections to the singular instanton homology of knots and links.

11:30am **Christopher Scaduto - SCGP 102**

Title: The mod 2 cohomology of some SU(2) representation spaces for a surface

Abstract: Consider the space of representations from the fundamental group of a punctured surface to SU(2) that are -1 around the puncture. We study the 2-torsion in the cohomology of this space. This is a by-product of our investigation into the mod 2 cohomology ring of the space of representations modulo conjugation. This is joint work with Matt Stoffregen.

12:30pm **Lunch - SCGP Cafe**

3:15pm **Tea - SCGP Lobby**