

Northern California Symplectic Geometry Seminar

BERKELEY – DAVIS – SANTA CRUZ – STANFORD

Monday, Oct 7, at **Stanford**

2:30–3:30pm, room 383N, **Andreas Floer Memorial Lecture**

Katrin Wehrheim (UC Berkeley)

Atiyah-Floer conjectures in 3 and 4 dimensions

Abstract: In the late 1980s, Atiyah and Floer conjectured that Floer’s instanton homology for (certain) 3-manifolds should be isomorphic to a symplectic Floer homology of a pair of Lagrangians that arise from representation spaces associated to a Heegard splitting of the 3-manifold. Progress has been limited due to the singularities of representation spaces. However, the conjecture can be rephrased in purely symplectic terms: Heegard decomposition and suitable representation of the pieces by Lagrangians yields a Floer homology that is a topological invariant, i.e. independent of the choice of decomposition. The Heegard Floer homology by Ozsvath-Szabo is an example of such a theory, related via a dimensional reduction to Seiberg-Witten gauge theory. After sketching the progress on the original Yang-Mills case of this conjecture, I will show how any reasonable 3-dimensional theory of the “decompose, associate Lagrangians, and take Floer homology” type automatically induces 4-manifold invariants. In fact, the corresponding 2+1 field theory extends canonically to 2+1+1 dimensions.

3:30–4:00pm — Tea Break, 2nd floor lounge

4:00–5:00pm, room 383N

Thomas H. Parker (Michigan State University)

The Gopakumar-Vafa conjecture for Symplectic Manifolds

Abstract: In 1998 R. Gopakumar and C. Vafa used String Theory to predict that the Gromov-Witten invariants of a Calabi-Yau 3-fold can be expressed as a particular combination of integer invariants called BPS numbers. In the first half of this talk I will describe the context (which is actually an especially simple instance of Gromov-Witten theory) and give some intuition. I will then outline a proof of the GV conjecture (joint work with E. Ionel) based on the idea of counting the contributions of “clusters” of curves.

There will be a dinner at 6pm.