

Algebraic and Symplectic Geometry of Uniruled and Rationally Connected Manifolds

Stony Brook University, March 1,2
Math Bldg, S-240

Saturday, March 1

9:00-10:00 Registration and Coffee

10:00-11:00 Yongbin Ruan (Michigan/MIT)

Uniruled Symplectic Manifolds and Their Birational Invariance

One of the early applications of GW-theory was an extension of some elements of the Mori program to symplectic geometry. We will start the talk by presenting these early evidences of "symplectic birational geometry". Then, we will use Guillemin-Sternberg's notion of Hamiltonian S^1 -cobordism to set up the symplectic birational equivalence and sketch the proof of birational invariance of uniruledness. In the end of the talk, we will speculate a conjectural generalization of uniruledness to the open string category and its invariance under transition.

11:30-12:30 Tian-Jun Li (Minnesota)

Dichotomy of uniruled submanifolds

In this talk we discuss uniruled submanifolds, especially those with real codimension 2, in symplectic manifolds. If they are non-negative in an appropriate sense, we show that the ambient manifold must be uniruled as well. We also show that many negative ones can be contracted in a 6 dimension symplectic manifold. If times permits we will speculate on the notion of minimality. This is a joint work with Yongbin Ruan.

2:00-3:00 Dusa McDuff (Stony Brook/Barnard)

Hamiltonian S^1 -manifolds Are Uniruled

I will try to explain the result and its proof, without assuming the audience knows much symplectic geometry. So I will start by describing the structure of symplectic manifolds that support a Hamiltonian circle action, and the structure of the quantum homology of non-uniruled symplectic manifolds and their pointwise blowups. Then I will talk about the image of a circle action under the Seidel representation in quantum homology, and show how one can use it to prove the theorem.

4:00-5:00 Jason Starr (Stony Brook)

Report on a Theorem of Claire Voisin

Unfortunately Claire Voisin could not participate in this workshop. This will be a report on Voisin's recent article *Rationally Connected 3-folds and Symplectic Geometry*.

5:15-6:15 Discussion Session

7:00-9:00 Banquet at Eastern Pavilion (*advanced registration required*)

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Sunday, March 2

9:00-10:00 Coffee

10:00-11:00 Chenyang Xu (Princeton)

Fundamental Groups of Smooth Loci of Log del Pezzo Surfaces

Log del Pezzo surfaces have interesting arithmetic and geometry properties. In particular, it is known that the fundamental groups of their smooth loci are finite groups. In this talk, based on the classification results of Dolgachev and Iskovskikh on finite subgroups of Cremona groups, we study these finite groups. We will describe a short table containing these groups and how we get it.

11:30-12:30 Rahul Pandharipande (Princeton)

Rational Curves, Relative Invariants, and the Vertex Group

I will discuss rational curve enumeration on surfaces in the log Calabi-Yau setting. I will explain a peculiar new multiple cover formula for all such relative geometries. My motivation comes from the Gross-Siebert program and in particular recent conjectures relating the multiplication in their vertex group to rational curve counts. The lecture will make contact with both classical and modern questions.

For more details, including abstracts for all talks, see

<http://www.math.sunysb.edu/~jstarr/FRG/index.html>

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