

University of Notre Dame Department of Mathematics

# FELIX KLEIN SEMINAR

**Jo Nelson**

Institute for Advanced Study

*Will give a lecture entitled:*

## **Invariants of contact structures and Reeb dynamics**

*On*

Thursday, March 26, 2015

*At*

2:00 PM

*In*

125 Hayes-Healy Hall

### ***Abstract***

Contact geometry is the study of the geometric structures on odd dimensional smooth manifolds given by a hyperplane field specified by a one form which satisfies a maximum nondegeneracy condition called complete non-integrability; these hyperplane fields are called contact structures. The associated one form is called a contact form and uniquely determines a vector field called the Reeb vector field on the manifold. Contact and symplectic geometry are closely intertwined and as in symplectic topology one can make use of J-holomorphic curves to provide one with a topological approach known as contact homology to obtaining invariants. Despite the many analytic pitfalls along the way to defining contact homology we explain how recent work of Hutchings and Nelson has managed to redeem this theory in dimension 3 for dynamically convex contact manifolds. Additionally this talk will have lots of cool pictures and animations illustrating these fascinating concepts in ! contact geometry and many concrete examples will be given.