Gordana Matic

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Will present the Seventh
Virginia L. Chatelain Memorial Lecture

Title of Talk:

"Contact Structures and Automorphisms of Surfaces"

Thursday, October 18, 2007
2:30 PM
102 Cardwell Hall
Kansas State University
Manhattan, Kansas

All are invited

Contact structure on a 3-manifold is nowhere integrable plane field - in simple words, plane fields that twist a lot. There is a fundamental dichotomy in the world of contact structures - they are either tight or overtwisted. Overtwisted structures exist in every homotopy class of plane fields. It is the tight structures that reflect the finer topology of the manifold. Contact structures on three-manifolds and open book decompositions of the same were related by the fundamental work of Giroux. In this talk we explain the connection and then explore some of the consequences.

We will first explain how a contact structure can be analyzed by cutting it along convex surfaces, then show how this leads to open book decompositions. We will see how properties of the monodromy automorphism of an open book decomposition can tell us a lot about the related contact structures. For example we can recognize when a contact structures is Stein fillable, i.e. when it appears as a boundary of a complex Stein domain, and when it is overtwisted or tight.

Ozsvath and Szabo have introduced an invariant of contact structures that lives in Heegaard-Floer homology, and that can detect tightness. We will explain a way to define it in terms of an open book decomposition, state some consequences, and then give a generalization to the case of manifolds with boundary.

Gordana Matic, October 4, 2007