

Friday, January 30, 2015, 4:10 pm

COLLOQUIUM TALK

Speaker: Charles Delman

Old Main 2231

# Persistently Foliar Knots, Branched Coverings, and Heegard-Floer Homology

## Abstract:

I discuss joint work with Rachel Roberts on persistently foliar knots, by which we mean knots for which every non-trivial Dehn surgery produces a manifold containing a taut, transversely orientable foliation.

The relationship of taut, transversely orientable foliations to Heegard-Floer homology, a new invariant introduced by Peter Ozsváth and Zoltán Szabó, has brought to the fore the question of which manifolds admit them. In particular, by a recent result of Kazez and Roberts, the existence of a taut, transversely oriented topological foliation (with a mild smoothness condition on the leaves) is an obstruction to a manifold being an L-space. An L-space, which one may think of as a generalized lens space, is a rational homology sphere whose Heegard-Floer homology has minimal rank.

An interesting aspect of our constructions is that the foliations they produce in the manifolds obtained by surgery lift to finite branched covers, branched over the core of the filling torus. Since many of the knots we show to be persistently foliar are universal, in the sense that every 3-manifold is a finite cover of  $S^3$  branched over that knot, this circumstance raises the question of the relationship between the finite branched covers of a universal knot, some of which are obviously L-spaces, and those “once removed by surgery,” which cannot be L-spaces in these cases.

*Although this topic sounds rather intimidating, I will, following the tradition of our colloquium, explain all of the background concepts sufficiently to make the context comprehensible to a general mathematical audience, and I will illustrate the constructions with simple examples.*

SNACKS IN FACULTY LOUNGE AT 3:30 PM.  
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)

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