

# Stanford Department of Mathematics Colloquium

Contact structures, Heegaard Floer homology, and triangulated categories

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## Abstract

The goal of this talk is to associate a category  $\mathcal{C}(\Sigma)$  to a surface  $\Sigma$ , called the *contact category* and constructed from contact structures on  $\Sigma \times [0, 1]$ . The category  $\mathcal{C}(\Sigma)$ , although not even additive, satisfies many of the axioms of a triangulated category (a notion whose meaning we will explain). In particular, there are distinguished triangles (called the *bypass exact triangles*) and the octahedral axiom is satisfied. (We will even show a nice octahedron which "proves" the octahedral axiom!) We then review some basic notions in Heegaard/sutured Floer homology, which give powerful invariants of knots, 3-manifolds, and 4-manifolds. This will be used to construct an "exact" functor from  $\mathcal{C}(\Sigma)$  to the category of vector spaces

Thursday, February 5  
4:15 p.m.  
Bldg. 380, Room 380-W.

<http://math.stanford.edu/coll/0809/>