

FRG: Holomorphic Curves in Low Dimensional Topology

Principal Investigator : Yakov Eliashberg

Co-PIs : John B. Etnyre,
Michael Hutchings,
Wu-Chung Hsiang,
Tomasz S. Mrowka,
Peter Ozsváth,
Ronald J. Stern,
Zoltan Szabó

Project Summary

Holomorphic curves recently have emerged as a powerful tool in low-dimensional topology. The goal of this project is to unite and coordinate research in the area of applications of holomorphic curves to low-dimensional topology in order to:

- construct new invariants of manifolds of dimension 3 and 4;
- develop new methods for proving diffeomorphism between the manifolds;
- find new relations between String Theory and Symplectic Geometry on the one side, and Knot Theory on the other.

The core of this project, *Embedded Symplectic Field Theory*, is expected to provide a unified approach to many seemingly different problems in low-dimensional topology.

The impact of the project will be much broader than its immediate goal of developing low-dimensional topology. It is expected that newly created methods will open new horizons in our understanding of links between Topology and Theoretical Physics, and in particular String Theory. The proposal describes several new innovative modes of cooperation and new ways of training of graduate students. In particular, under this project there will be developed a Dissertation Subject Database, an actively managed and supported list of problems, which will serve as sources for topics of PhD dissertations for the graduate students of senior personnel involved in this project.