

# The Oliver Club

[www.math.cornell.edu/~oliver/](http://www.math.cornell.edu/~oliver/)

## ***Hénon Family, Persistent Tangencies, and Celestial Mechanics***

*Celestial mechanics is a main “parent” of the modern theory of dynamical systems. Poincaré proved non-integrability of the three body problem when he discovered the homoclinic picture. Alexeev explained the existence of the oscillatory motions (a planet approaches infinity always returning to a bounded domain) in Sitnikov model (one of the restricted versions of the three body problem) using methods of hyperbolic dynamics.*

*We show that the structures related to the most recent works in the smooth dynamical systems (e.g. conservative Hénon family, lateral thickness of a Cantor set, persistent tangencies, splitting of separatrices) also appear in the three body problem. After we get some new results in smooth dynamics (parameterized version of conservative Newhouse phenomena, relation between lateral thicknesses and Hausdorff dimension of a Cantor set, etc), we prove that in many cases the set of oscillatory motions has a full Hausdorff dimension. This is a joint work with V.Kaloshin.*



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Refreshments will be served at 3:55 PM in the Mathematics Department lounge (532 Malott Hall).

**Thursday, September 28, 2006  
at 4:25 PM in 406 Malott Hall**