Symplectic topology and free loop spaces

Abstract:
Symplectic geometry is the study of symplectic manifolds endowed with a closed nondegenerate 2-form. Unlike Riemannian manifolds, symplectic manifolds have no local invariants. Instead, they feature a rich global theory which is commonly referred to as "symplectic topology". The main idea that I wish to convey in this talk is that spaces of free loops play a fundamental role in symplectic topology. On the one hand, algebraic invariants of symplectic manifolds are often extensions to free loop spaces of invariants familiar from differential topology. On the other hand, this is a manifestation of the close and somewhat mysterious relationship between symplectic rigidity phenomena and dynamical properties of Hamiltonian systems.

Prof. Dr. Alexandru Oancea