C1 Algebraic Topology: Rigidity and Dynamics

It is a fundamental problem to classify manifolds and to determine their symmetries. In favorable cases, i.e., for aspherical manifolds, one expects topological rigidity phenomena: The Borel conjecture says that for an aspherical manifold the homotopy type already determines the manifold up to homeomorphism. Moreover the group of homeomorphisms and the monoid of self-homotopy equivalences of such a manifold should be closely related.
The Farrell-Jones Conjecture about the algebraic K- and L-theory of group rings implies these topological rigidity conjectures and plays the central role in this project. The Baum-Connes Conjecture is the analytical counterpart of this conjecture in noncommutative geometry.
[The project intends to prove new cases of the Farrell-Jones Conjecture and hence topological rigidity results. In particular mapping class groups and automorphism groups of free groups will be investigated. Furthermore the project tries to derive new consequences, to study generalizations of the conjecture and to investigate the relation to the Baum-Connes Conjecture.]