Coarse non-positive curvature in groups

Advisor: Christopher Cashen, Privatdoz. PhD
Co-advisor: Univ. Prof. Goulnara Arzhantseva

This research theme is about understanding the structure of algebraic objects, infinite discrete groups, using tools from metric geometry, asymptotic topology, and dynamical systems. One possible direction would be classifying topological types of *hyperbolic-like boundaries at infinity* (Morse/SLC boundaries) for interesting families of groups such as right-angled Artin and Coxeter groups and free-by-cyclic groups, and understanding connections between these boundaries and the behavior of random walks in the group. A second possibility would be systematizing the notion of coarse non-positive curvature described by *coarse median groups* and using this to analyze their subgroup structure. Median groups are closely related to CAT(0) cubical groups, which include the right-angled Artin and Coxeter groups mentioned above. Coarse median groups include these examples, and anything quasi-isometric to such a group, but also include other fundamental examples such as mapping class groups of hyperbolic surfaces.

The candidate should have a strong background in algebra and interest and experience in some combination of geometry, topology, and dynamics.