

Brief research description

Ashot Minasyan, University of Southampton

The area of my research is Geometric and Combinatorial Group Theory. I like studying algebraic properties of groups using a combination of both classical combinatorial and more modern geometric techniques. Most of my research focuses on ‘non-positively curved groups’ (i.e., groups that come equipped with a geometric structure resembling that of a non-positively curved space), and their automorphisms. Examples of such groups include hyperbolic groups, relatively hyperbolic groups, acylindrically hyperbolic groups, subgroups of right angled Artin groups and graph products of groups.

Recall that a group is *residually finite* if for every non-trivial element $g \in G$ there exists a finite quotient K of G such that the image of g in K is still non-trivial. Residual finiteness is a basic property of a group and has some useful applications: according to classical results of Mal’cev, a finitely presented residually finite group has solvable word problem, and a finitely generated residually finite group is Hopfian.

Many of the groups that Geometric Group theorists currently study naturally arise as *outer automorphism groups* $Out(G) := Aut(G)/Inn(G)$ of other groups (e.g., $Out(F_n)$, mapping class groups, $GL_n(\mathbb{Z})$). This motivates much of my recent research, which has been devoted to proving that the outer automorphism group is residually finite whenever the group G belongs to one of the classes of non-positively curved groups above. One example of such a result is the following theorem:

Theorem. *Let G be a hyperbolic group (or, more generally, hyperbolic relative to a finite family of virtually polycyclic subgroups). Suppose that G is either one-ended or residually finite, then $Out(G)$ is residually finite.*

The one-ended case in the above theorem has been obtained in a recent joint work with Gilbert Levitt (see [arXiv:1305.5403](#)), and the residually finite case (with 0, 2 or infinitely many ends) was considered in the joint work with Denis Osin (see [arXiv:0809.2408](#)). Similar results for other classes of groups will be discussed during my talk.