Translation-like actions on nilpotent groups

Abstract
Whyte introduced translation-like actions of groups which as a geometric generalization of subgroup containment. He then proved a geometric reformulation of the von Neumann conjecture by demonstrating a finitely generated group is non amenable if and only if it admits a translation-like action by a non-abelian free group. This provides motivation for the study of what groups can act translation-like on other groups. As a consequence of Gromov’s polynomial growth theorem, virtually nilpotent groups can act translation-like on other nilpotent groups. In joint work with David Cohen, we demonstrate that if two nilpotent groups have the same growth, but non-isomorphic Carnot completions, then they can't act translation-like on each other.