Elia Fioravanti: Automorphisms of special groups (3)

Outer automorphism groups can display a wide range of behaviours: from the beautiful structure of arithmetic groups, mapping class groups and $\mathrm{Out}(F_n)$, all the way to the near-wildness of automorphisms of certain Baumslag-Solitar groups. To this day, there remain essentially only two general classes of groups whose automorphisms are both well-behaved and well-understood: relatively hyperbolic groups on the one side (based on techniques introduced by Rips and Sela), and virtually polycyclic groups on the other (after Auslander, Baumslag, Baues and Grunewald). Much less is known on automorphisms of non-positively curved groups. The goal of the mini-course will be to motivate why Haglund and Wise's compact special groups should be the"right" place to look for structure. After giving a survey of what is known on their automorphisms, I plan to give a fairly faithful account of the recent result that $\mathrm{Out}(G)$ is finitely generated for every compact special group G. I will discuss all the key concepts and techniques that go into the proof: Dehn twists, uniformly WWPD trees, the Bestvina-Paulin construction, the structure of R-trees arising from automorphisms of special groups, and the "hierarchical" shortening argument.

Lamine Messaci: On a particular class of infinite rank median spaces

Median spaces provide a common framework for studying actions on real trees and CAT(0) cube complexes.

In this talk, we focus on a particular class of infinite-rank median spaces, namely those in which every pair of points is separated by the interior of a half-space. Many interesting examples fall into this category, including the 0-skeleton of finite or infinite dimensional CAT(0) cube complexes endowed with the combinatorial metric, the median spaces associated with real hyperbolic spaces, as well as locally convex median spaces.

We will discuss several structural properties that follow from this topological separation assumption and discuss superrigidity results for actions of higher-rank lattices on such spaces.

This talk is based on joint work with I. Chatterji.

Anne Lonjou: Regularizable subgroups for the Cremona group

The Cremona group is the group of birational transformations of the projective plane, namely isomorphisms between two dense open subsets. This group acts on a CAT(0) cube complex that we constructed with Urech. After an introduction on Cremona group and CAT(0) cube complexes, I will focus on a fixed-point property for actions on CAT(0) cube complexes that we obtained with Genevois and Urech, and I will explain how it is related to regularization in the Cremona group.

Anthony Genevois: Polynomial hyperbolicity

Given a function f, a graph X is said f-polynomially hyperbolic essentially if it can be mapped to some hyperbolic space through a Lipschitz map such that pre-images of balls of radius R have polynomial growth of degree $f(R)$. Loosely speaking, the function f quantifies how brutal we have to be in order to turn X into a hyperbolic space. In this talk, I will explain how polynomial hyperbolicity can be used in order to show that containing a product of non-abelian free products is preserved by quasi-isometries among cocompact special groups.