Title: Groups acting on trees and related topics in geometric group theory

Type: PhD course (fondamentale).

Sector: algebra and geometry.

Lecturer: Giuseppe Bargagnati and Francesco Milizia

Membro del collegio proponente: Martino Lupini

Number of lectures: between 20 and 30, divided equally among the two lecturers.

Period: November 2025 - January 2026.

Exams: oral presentation of a related topic, in the form of a seminar.

Preliminaries: basics of group theory and algebraic topology (fundamental group, coverings)

Abstract: The main topic of the course is the study of groups via their actions on trees (graphs without closed loops). Understanding such actions often gives great insights about the algebraic "structure" of the acting group; a classical application is a theorem of Kurosh, which provides a description of subgroups of free products. After having presented the general theory, the last part of the course will focus on its applications and on related topics in geometric group theory.