University at Buffalo
Spring Lectures
in Geometry and Topology

April 27-28, 2023

Speaker: Bena Tshishiku (Brown University)

Lecture 1: Mapping class groups and Nielsen realization problems
April 27 at 4 pm in 250 Mathematics Building

The mapping class group Mod(M) of a smooth manifold M is the group of diffeomorphisms of M, modulo isotopy. The study of mapping class groups interacts with many areas, including geometric topology, group theory, dynamics, and algebraic geometry. We explain some of these connections from the point-of-view of the Nielsen realization question. This problem, versions of which were posed by Nielsen (1932) and Thurston (1977), asks when a subgroup $G < \mathrm{Mod}(M)$ can be lifted to Diff(M) under the natural projection from Diff(M) onto Mod(M).

Lecture 2: Pseudo-Anosov theory in the Goeritz group
April 28 at 4 pm in 122 Mathematics Building

For a surface S_g of genus g, the Goeritz group is the subgroup of the mapping class group $\mathrm{Mod}(S_g)$ consisting of isotopy classes that extend to the handlebodies in the genus-g Heegaard splitting of the 3-sphere. There are many open questions about the algebra of this group, including whether or not it's finitely generated when $g \geq 4$. This talk will focus on geometric aspects of the genus-2 Goeritz group. I will explain a refinement of the Nielsen-Thurston classification for this group and will show that its purely pseudo-Anosov subgroups are convex cocompact, which answers a question of Farb-Mosher in a special case.

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