

## Anosov Representations and Higher Teichmüller Theory Special Session A24

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The conference aims to bring together senior researchers and early career mathematicians from the areas of hyperbolic geometry and higher Teichmüller theory to explore the interplay between these two areas and highlight the recent breakthroughs and connections between them.

The fields of hyperbolic geometry and of higher Teichmüller theory are major directions of current and ongoing mathematical research. Starting in the 70's, Thurston's work had a revolutionary impact on low-dimensional geometry and topology, with hyperbolic geometry playing a central role. In particular, the study of Teichmüller space, the space of (marked) complex structures on a surface  $S$ , played an important role as the moduli space of convex cocompact hyperbolic structures on 3-manifolds with boundary  $S$ . Work of Goldman, Choi and others on Thurston's  $(G, X)$ -structures generalized this to study more general geometric structures, including convex projective structures. From a completely different direction, Hitchin used a gauge theoretic approach to study the moduli space  $R(S, G) = \text{Hom}(\pi_1(S), G) // G$  of representations of the fundamental group of a surface into higher rank Lie groups  $G$ . In particular Hitchin showed that certain components  $H_n(S)$  of  $R(S, PSL_n(\mathbb{R}))$ , now called Hitchin components, are natural generalizations of such examples. Infact,  $H_2(S)$  is the Teichmüller space  $\text{Teich}(S)$ , and  $H_3(S)$  is the space of convex projective structures. Work of Fock and Goncharov used methods from cluster algebras and algebraic geometry to describe moduli spaces of positive representations which they named higher Teichmüller spaces and included Hitchin components.

In his seminal work, Labourie used a dynamical approach to define the notion of Anosov representations and prove many of their important properties. Anosov groups incorporate the prior examples of higher Teichmüller spaces, generalize them, and are now a major field of study, combining elements of the theory of Higgs bundles, hyperbolic geometry, the theory of Lie groups, and dynamics. The theory has been further developed in papers by Bochi-Potrie-Sambarino, Danciger-Gueritaud-Kassel, Gueritaud-Guichard-Kassel-Wienhard, Guichard-Wienhard, Guichard-Labourie-Wienhard, Kapovich-Leeb-Porti, and others. In particular this work showed that Anosov groups are the natural analogue in higher rank of convex cocompact representations into rank one Lie groups. Over the past two decades much work has shown that phenomena for cocompact hyperbolic manifolds persist for Anosov subgroups.

A major theme of the conference is to explore this further and consider to what extent phenomena for cocompact hyperbolic manifolds persist for Anosov subgroups.

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