Discrete subgroups of Lie groups play an important role in various areas of mathematics. Lattices and discrete subgroups of finite covolume are fairly well understood and reveal a dichotomy of flexibility and rigidity. Lattices in $\mathrm{SL}(2,\mathbb{R})$ are flexible. Each lattice has a deformation space of positive dimension, which is closely related to the Teichmüller space of a surface. Lattices in $\mathrm{SL}(n,\mathbb{R})$ with $n>2$ are super-rigid due to a celebrated theorem of Margulis. It is rather difficult to comprehend discrete subgroups that are not lattices.

In her talk, Wienhard will discuss new developments in geometry, low-dimensional topology, number theory, analysis and representation theory that led to the discovery of several interesting families of discrete subgroups. These are not lattices, but – quite surprisingly – admit an interesting structure theory, which arises from a combination of flexibility and rigidity. A particularly exciting aspect is the discovery of higher Teichmüller spaces and their relation to various areas of mathematics.

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