Berlin Mathematics Research Center



## MATH+ Friday Colloquium



## Friday 7 February 2020 at 14:15

*Tea & Cookies starting at 13:00* 

Loft, Urania, An der Urania 17, 10787 Berlin





## Building bridges between Geometry and Algebra

Groups like  $GL_n$ ,  $SL_n$  or  $SP_n$  play an important role in many areas of mathematics. Some of their properties (when studied over the real or complex numbers) are best understood via the associated symmetric spaces. Later buildings were introduced to study the respective groups over other fields. This theory also captures reductive groups over non-archimedian local fields with discrete valuation, like the *p*-adic numbers.

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This talk will examine how some of the subgroup structures of such groups can be explained via Coxeter combinatorics and the geometry of (affine) Bruhat-Tits buildings. The building for example simultaneously encodes the (affine) flag variety and (affine) Grassmannian associated to the group. But it also explains more complicated structures. Two examples showing the interesting Coxeter combinatorics as well as the close connection between geometric/combinatorial and algebraic structures will be presented: reflection length in Coxeter groups and the computation of dimensions of affine Deligne-Lusztig varieties.

Petra Schwer is professor for geometry at the Otto-von-Guericke University Magdeburg. She works in geometric group theory and some of her research focuses on combinatorial aspects of Coxeter groups and buildings and applications thereof in neighbouring fields. She received her PhD in Münster in 2009, held a lecturer position at Tufts (Boston) in 2007 and post-doc positions at UC Davis (USA) and in Nancy (France). After working as a commodity risk controller at RWE Power AG in Essen, she became a Junior Professor at KIT in 2014.