## Tiling spaces with congruent polyhedra

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## Abstract

A classical open problem going back to Fëdorov and Voronoy asks whether a polytope which tiles  $\mathbb{R}^3$  can have an unbounded number of faces. Hilbert's 18th problem asks (in part) what polytopes arise as fundamental regions of group actions. I will give a selective survey of over a hundred years worth of progress on these problems and their variations, emphasizing tiling constructions in the spherical and the hyperbolic spaces. I will then present our new tiling constructions, notably of the neighborly spherical tilings.

Joint work with Danny Nguyen.