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*Hyperbolic multiscale tilings, partitions and numeration systems*

**Abstract:** Substitution rules provide a classical method for constructing aperiodic tilings via a substitution-inflation procedure. When distinct incommensurable scales are allowed in the substitution rule a different approach is required, and new geometric objects emerge. In my talk I will introduce multiscale substitution tilings and their hyperbolic liftings into the upper-half space $\mathbb{H}^{d+1}$, which may be viewed as extensions of constructions previously considered by, among others, Penrose, Kakutani and Kamae, who studied related objects in the context of numeration systems, and essentially illustrated by Escher. I will then describe recent results about such tilings and about the geodesic and horospheric actions on the associated tiling spaces, including a prime orbit theorem for the geodesic flow. Based on joint work with Yaar Solomon.