James Rickards (University of Colorado, Boulder)

The not-so-local-global conjecture

I will introduce Apollonian circle packings, and describe the local-global conjecture, which predicts the set of curvatures of circles occurring in a packing. I will then describe reciprocity obstructions, a phenomenon rooted in reciprocity laws (for instance, quadratic reciprocity), that disproves the conjecture in most cases. If time permits, I will also describe follow-up work, where we obtain a similar result in a situation related to Zaremba's conjecture on continued fraction expansions. This talk will be accessible to advanced undergraduates who have seen modular arithmetic.