Title: Markov type and the multi-scale geometry of metric spaces

Abstract: Markov type and the multi-scale geometry of metric spaces It is now well-understood that the behavior of Markov chains in metric spaces can be used to capture many facets of their geometric structure. In 1992, K. Ball introduced the Markov type of a metric space which measures the rate of drift of reversible chains in the space. This notion has since seen many geometric applications. While Markov type is a bi-Lipschitz invariant, there were a number of spaces conjectured to have Markov type 2 that do not bi-Lipschitz embed into any known space with Markov type 2. We show that, at least for embeddings into L_p spaces, a much weaker sort of embedding suffices. This allows us to exhibit Markov type 2 for many spaces, including planar graph metrics and doubling metrics, answering questions of Naor, Peres, Schramm, and Sheffield (2004). The main technical obstacle involves jointly controlling a family of martingales whose difference sequences are all dominated by a single random variable.

This is joint work with James Lee and Yuval Peres.