Shiwen Zhang* (zhangshiwen@math.msu.edu). The Projection of some Random Cantor sets and the Decay Rate of the Favard length.

The Favard length of a set $E$ has a probabilistic interpretation: up to a constant factor, it is the probability that the “Buffon’s needle,” a long line segment dropped at random, hits $E$. In this talk, we study the Favard length of some random Cantor sets of dimension 1. Replace the unit disc by 4 disjoint sub-discs of radius 1/4 inside. By repeating this operation in a self-similar manner and adding a random rotation in each step, we can generate a random Cantor set $D(\omega)$. Let $D_n$ be the n-th generation in the construction, which is comparable to the $4^{-n}$-neighborhood of $D$. We are interested in the decay rate of the Favard length of these sets $D_n$ as $n \to \infty$, which is the likelihood (up to a constant) that the “Buffon’s needle” will fall into the $4^{-n}$-neighborhood of $D$. It is well known that the lower bound for such 1-dimensional set is constant multiple of $n^{-1}$. We show that the upper bound of the Favard length of $D_n$ is also constant multiple of $n^{-1}$ in the average sense. (Received September 19, 2017)