

# VCU Discrete Mathematics Seminar

## *Sampling via Markov Chains*

**Prof Prateek Bhakta**  
**University of Richmond**

Tuesday, Apr. 3  
12:30-1:20  
(SPECIAL DAY AND TIME!)  
4145 Harris Hall



Sometimes the best way to learn about complex sets and distributions is by studying the properties of average elements obtained via random sampling. When there's no good way to combinatorially obtain a sample, we can often use a well-designed Markov chain to perform a random walk through our sample space and arrive at an appropriately random element after sufficiently many steps. Our main focus is on studying the "mixing time, which bounds the number of steps needed for the Markov chain to approach its stationary distribution. Bounding the mixing time is the key component of analyzing the running time of algorithms based on Markov Chains.

In this survey talk, we will discuss some of the combinatorial tools and theorems that are used to bound the mixing time of a Markov chain as well as the relationship between the growth rate of the mixing time and the geometry of the underlying distribution. We will look at some of the key results in the field and select examples of recent work.

For the DM seminar schedule, see:

<http://www.people.vcu.edu/~dcranston/DM-seminar>