

# MANY CHEERFUL FACTS

presents

## Markov Chains, and the Graphs and Trees That Love Them

a talk by Jomy Alappattu

1:10 pm - 2:00 on Wednesday, October 19th, in room  
1015.

Abstract: After introducing some basic notions and results about Markov chains taking values in a finite set, we will show how such a Markov chain corresponds in a natural way to a weighted directed graph with vertices in the same set. We will then discuss three probabilistic algorithms which use the Markov chain to form a random tree on the graph which spans all of the graph's vertices. It turns out that each of these three algorithms, the random trees so formed are in some sense "uniformly distributed" among all possible spanning trees on the graph. This uniformity principle has some interesting applications, which we will look into as time permits.

*I am the very model of a modern Major General,  
I've information vegetable, animal, and mineral,  
I know the kings of England, and I quote the fights historical  
From Marathon to Waterloo, in order categorical;  
I'm very well acquainted, too, with matters mathematical,  
I understand equations, both the simple and quadratical,  
About binomial theorem I'm teeming with a lot o' news,  
With many cheerful facts about the square of the hypotenuse!*

- Gilbert & Sullivan  $P \circ P$