# Michigan Math Club

Text Generation with Markov Chains and Recurrent Neural Networks (RNN)
Eric Khiu

This talk delves into the use of Markov chains in text generation, exploring their theoretical foundation and practical applications in generating coherent text. To demonstrate this process, we will showcase a Python program that uses the n-grams data structure to generate sentences. Additionally, we will explore how RNNs can be used for text generation by leveraging their ability to model sequential dependencies in data, resulting in more coherent and contextually relevant outputs.

Mentor: Tejaswi Tripathi
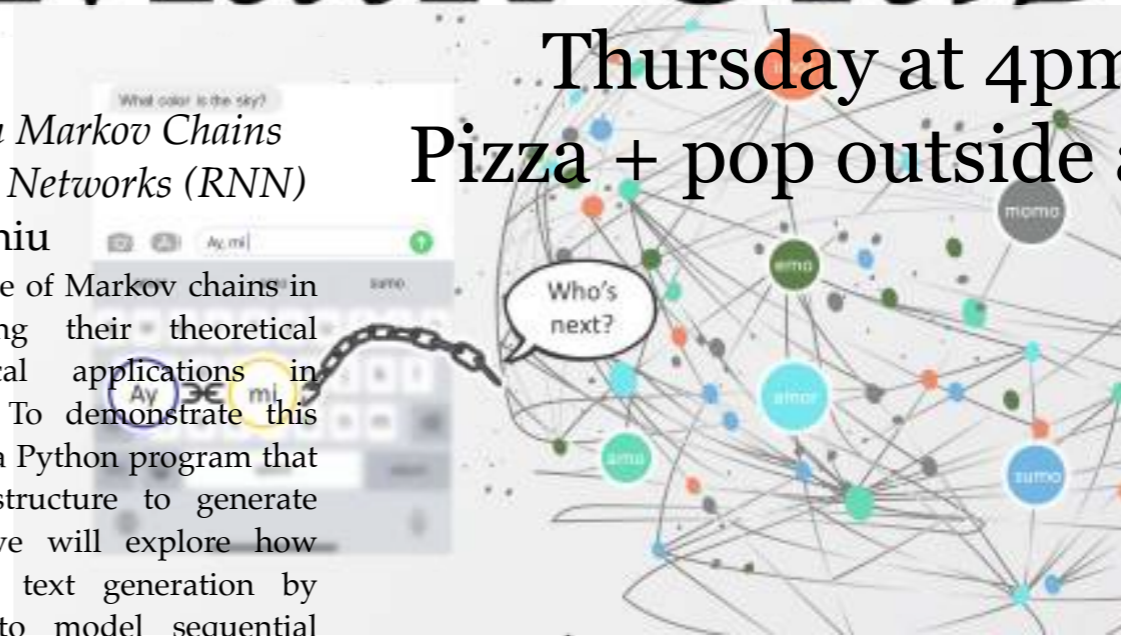
# Directed Reading Program Presentations
13 April 2023

An Introduction to the Algebra-Geometry Dictionary
Rose Gerson

In my talk, I will define two fundamental objects: radical ideals and affine varieties. I will then explore the connection between these two objects, and how this connection can be used to translate between problems in algebra and problems in geometry. Along the way I will define prime and maximal ideals and discuss how they translate to geometric concepts.

Mentor: Kaya Lakein

$\langle f_1, \ldots, f_s \rangle$
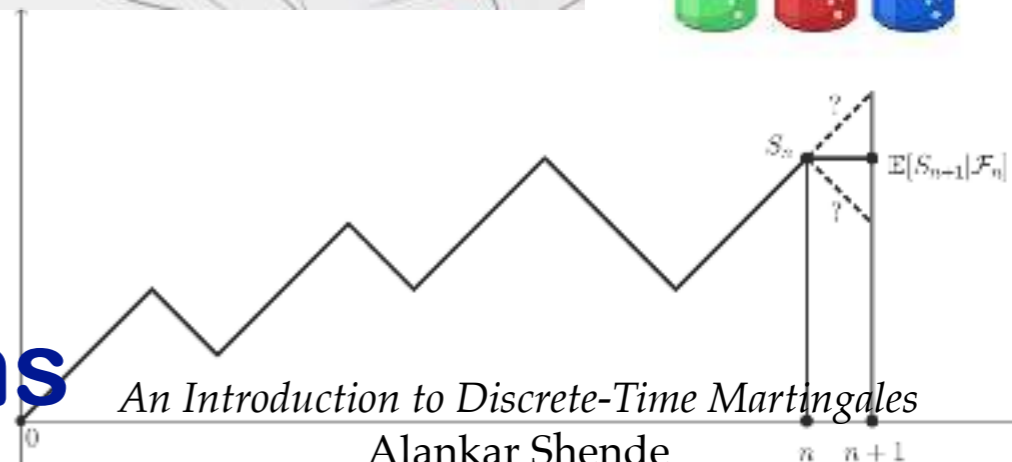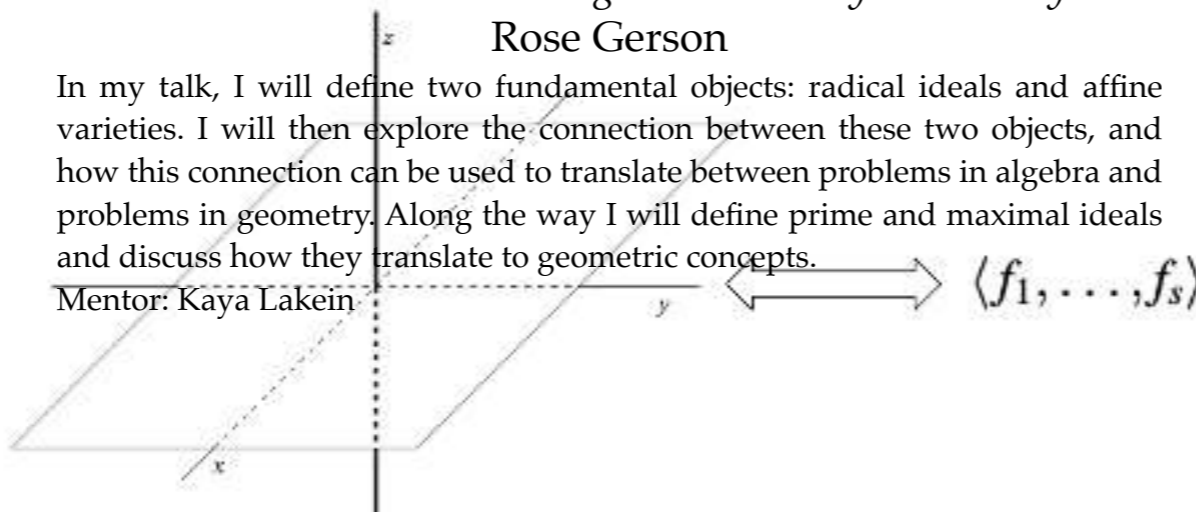
An Introduction to Discrete-Time Martingales
Alankar Shende

Martingales are a type of stochastic process that have a variety of applications. For instance, this type of process can be used to study properties of "fair games" in probability theory, to price options in financial markets, and to derive important methods in dimensionality reduction. In this talk, we will build a foundational understanding of discrete-time martingales and martingale convergence, and we will finally apply this tool to prove the long-run behavior in the Pólya's Urn model. Pólya's Urn is a classic problem in probability theory in which an urn initially contains two balls of different colors. During each turn, one ball is randomly chosen, and then that ball alongside another ball of the same color are both placed into the urn. Martingales can neatly characterize the limiting proportion of either color in the urn.

Mentor: Sameer Kailasa