3-D Random Walk with Obstacles

# Introduction

In this project, I hope to explore 3rd dimensional random walks, and more specifically how they interact with random obstacles. This problem is particularly interesting because it models many real-life behaviors, from baseball teams winning records to how bacteria move to how particles move in the air. By adding weighted averages, we are then able to model how things move relative to a particular goal. For instance, if an animal with a sense of smell is looking for food, we can describe the way that it moves toward that food by using a random walk that incorporates the rising probability as the animal moves toward the food while avoiding obstacles in the way.

# Concept

In this project I hope to explore how 3-D self-avoiding random walks interact with random obstacles placed in the environment. I additionally would like to be able to model how this would then change if the environment were to change the probability of each choice based on location in Euclidean space.

# Method

I will be using NumPy and several other packages within the PyCharm IDE in order to write this project. I will also be using a GitHub repository in order to share the project. I will also be using some introductory statistics in order to show what the most probable outcome will be for the environment provided.

To begin with, I should be able to start with the code that I have written previously for the random walk done in the homework. This will provide me with a framework in order to see how I should be changing my code as the project evolves. Next, I will be making the random object generator. This part will be particularly interesting, because the objects cannot be truly random. They will have to be closed, without internal cul-de-sacs, and within a reasonable size. After that I will be having to be focused on storing the previous positions so as to keep it from cutting its own tail of (sort of like the snake game). Then I should be able to focus on just making the program neater and adding things that I find interesting.