## Comparison of Movement Patterns Between Herbivores, Omnivores, and Carnivores of Various Species - Proposal

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## A description of the problem and its significance

The problem that we are trying to solve is to determine differences between random search walks of various animals from herbivores to omnivores and to carnivores. This project is based on previous work by Auger‐Méthé et al. 2016, who looked at different search strategies between caribous, grizzlies, and polar bears.

Our goal is to closely examine various species to determine if there is a correlation between their feeding habits and search patterns. The significance of our project is that we will be using random search models that span from uni-search pattern to multi-search patterns behavior on a wide variety of species.

## A description of background and related work

Strong evidence has been suggested by Auger‐Méthé et al. 2016 for using ‘multiphasic’ movement search patterns. We want to investigate the finding by comparing this suggestion to additional datasets that accumulated over the years.

The method that we will be using to determine the best fit model is going to be similar to that of Auger‐Méthé et al. 2016 who had a set of four different random search patterns. Where each search pattern movement in the set represents a search strategy. We will assess if the species movement patterns are consistent with our set of search patterns by comparing the relative fits of each model then find the ‘best fit model’. Verification of the ‘best fit model’ will be done by evaluating its absolute fit to the real data set movement pattern.

The four different random searches we will be using is the Brownian walk (BW), composite correlated random walk (CCRW), correlated random walk (CRW), and truncated Lévy walk (TLW). Two different CCRW will be used: CCRWA and CCRWL.

**A plan of execution, along with a list of weekly milestones**

## Plan of Execution:

### Find additional datasets for:

* Herbivores:
  + [Caribou](https://era.library.ualberta.ca/files/bv405s9467#.V1sxSNcZ5lQ)
* Omnivores:
  + [Grizzly](https://era.library.ualberta.ca/files/b4b29b605j#.V1sxl9cZ5lQ)
* Carnivores:
  + [Polar Bear (12)](https://era.library.ualberta.ca/files/ms35tc50t#.V1sxt9cZ5lQ).

### Build Simulator for Search Strategies:

* BW
* TLW
* CRW
* CCRWA
* CCRWL
* Calc: Step length & Turning angle dataset

### Make Presentation (~10 mins + ~5 mins questions)

* Overview/Outline
* Background/Review? (Quick?)
* Graphs/Simulations
* Finding so far
* Additional work to do

### Write Paper: Submit a 5-10 page conference style paper describing your project (PDF)

* Abstract
* Introduction
* Related work
* "Project Contributions" section that explains what parts of the project were done by which team members.
* If you have movies to go with your project, then you should put them on youtube and include links in your paper

## Weekly Milestones:

### March 28 - April 03:

* Turn in proposal (Mon March 29)
* Find more datasets
* Build code to simulate four/five models

### April 04 - April 10:

* Run random walks of data
* Evaluate gathered information

### April 11 - April 17:

* Evaluate gathered information
* Make presentation

### April 18 - April 24:

* April 20 (Tues): Present final project
* Draft of final project paper

### April 25 - May 01:

* Rerun/Revise paper

### May 02 - May 05\*:

* May 05 (Wed): Turn in final paper

## Bibliography

* Auger‐Méthé, M., Derocher, A.E., DeMars, C.A., Plank, M.J., Codling, E.A., & Lewis, M.A. (2016). Evaluating random search strategies in three mammals from distinct feeding guilds. Journal of Animal Ecology, 85(5), 1411– 1421. [https://doi-org.colorado.idm.oclc.org/10.1111/1365‐2656.12562](https://doi-org.colorado.idm.oclc.org/10.1111/1365-2656.12562)
* <https://www.movebank.org/cms/movebank-main>