Project summary

Research overview

Understanding the spatial and temporal scales that are organismally relevant will provide a better guide for the spatial and temporal scale a study needs to identify mechanisms affecting species richness and abundance for a variety of taxa. My overarching research goal is to use a highly computational, data-intensive approach to identify which **1)** spatial and temporal scales are organismally relevant and provide a framework for future ecological studies by **2)** determining the scales at which space-for-time substitutions are appropriate and **3)** identifying relative strengths of ecological processes at different spatial and temporal scales. Timothée Poisot (University of Montreal) is an ideal mentor for his expertise in scientific programming and working with large spatial and temporal datasets.

Intellectual Merit

Different ecological mechanisms operate at different scales, and thus the scale at which a study is conducted is central to understanding those mechanisms [1]. While ecology has addressed the problems of spatial scale for some time now, it has been only recently that the data have become available to rigorously address the problem of temporal scale. Because temporal scale ecology is still in its infancy, the problem of synthesizing the relationship between space and scale has not yet been thoroughly addressed. However, gaining a better understanding of the spatial and temporal scales that are organismally relevant is central to understanding over which scales space-for-time substitutions are effective, and the relative importance of space and time in identifying pattern generating ecological mechanisms.

Broader impacts

I will use currently existing tools and technology to improve access for chronically ill/ disabled people through **1)** creating a framework for remote collaboration as well as **2)** partner with the Data & Software Carpentry organizations to develop remote options for teaching and learning to use those tools. Open science is also a powerful tool for increasing the accessibility of science for many different underrepresented groups, not only chronically ill/disabled researchers, and all of my research products, including data, code, publications and presentations, as well as project development and this proposal will be fully open. I will also serve as a mentor for K-12 students with a disability/chronic illness interested in pursuing a career in science through the AccessSTEM DO-IT program.

1. Levin, S. A. "**The Problem of Pattern and Scale in Ecology: the Robert H. MacArthur Award Lecture**" *Ecology* 73, no. 6 (1992): 1943–1967.