As a paleobiologist working in the disciplines of macroevolution and macroecology, I study fossils in order to understand biological processes specifically the emergent patterns wihin the evolutionary histories or ecological properties of multiple species. In my dissertation I analyze patterns of trait-dependent extinction and how the demography of a regional species pool changes over time. In order to understand how these patterns result from various interacting factors across multiple levels of organization, I use Bayesian multi-level modeling strategies to analyze how different biological and environmental factors are correlated with these emergent patterns.

I study on two very different biological systems: Cenozoic mammals of North America, and Paleozoic brachiopods from across the globe. The Cenozoic describes the time from the extinction of the dinosaurs 65 million years ago to the present and is characterized as the "age of mammals" and known for the rise of modern biodiversity. Brachiopods, in contrast, are a group of sessile marine invertebrates that play a minor part of modern biodiversity but were an extremely common part of post-Cambrian Paleozoic marine environments 485-252 million years ago.

The biological and geological differences between these groups of organisms means that making good evolutionary and ecological inferences about similar questions requires accounting for a diverse set of nuanced modeling considerations. One of the of the principal advantages of the Bayesian multi-level modeling strategy used throughout my dissertation is that it allows me to easily incorporate important domain knowledge about the structure, biases, and limitations of paleontological systems into statistical models.

The Committee on Evolutionary Biology has afforded me invaluable resources and support. My dissertation experience has been improved by both the computing resources and conference travel support, and I've certainly taken advantage of the overall freedom in choosing a research topic afforded to CEB students, which is at the core of this unique program.

For more information about me and my research, you can check out my [website](http://home.uchicago.edu/~psmits/home.html) or view the YouTube videos of some recent conference talks of mine:

* [Death and Taxa: time-invariant differences in mammal species duration](https://youtu.be/bgKbctUJGuI) presented at Evolution 2015 in Guaruja, Brazil.
* [The interplay between extinction intensity and trait-dependent extinction in brachiopods](https://youtu.be/tCbLbQg5mr0) presented at Evolution 2016 in Austin, Texas.