DEPARTMENT OF BIOLOGY | UNIVERSITY of WASHINGTON

# Biology Seminar

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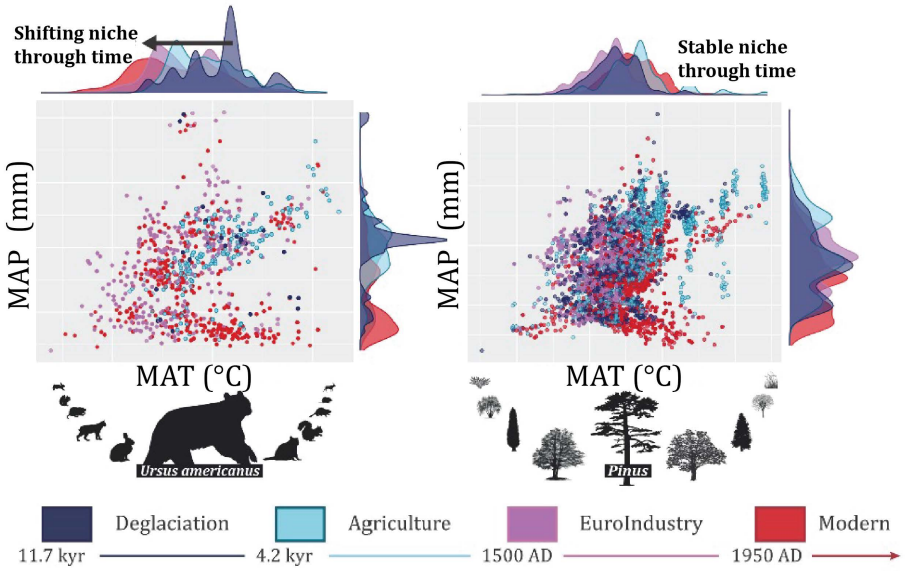
## Using niche dynamics to explore how animals and plants respond to global change

**Monday Oct 13, 2025 | 12:00 PM PST | HCK 132**




Both climate and land-use change have accelerated over the past decades. The cumulative effects of these disruptions are not additive or systematic; rather, they pose complex, dynamic environmental challenges to ecological systems. To survive, terrestrial plants and animals will need to shift their distributions to track habitable regions or exhibit the flexibility to survive these shifting environmental regimes. However, we do not know the extent to which plant and animal species individually track climate, nor do we understand the implications of imperfect climate tracking for community structure. We use a paleontological framework to evaluate the historical strength of climate tracking, measuring the constancy of the realized climatic niches of species through time. We then assess whether functional trait-environment relationships may more effectively predict responses to changing climates.

We first use the late Quaternary fossil record (from 14,000 years ago to the present) of North America to ask whether plants and animals have historically exhibited climate fidelity, tracking their climatic niches closely even in the face of shifting climates. Since the last deglaciation, plants generally exhibit higher climate fidelity than mammals. The arrival of Europeans and the industrialization of North America profoundly changed the climatic niches of mammals, but not those of plants, illustrating that mammals respond individualistically and do not simply track plants across the landscape.

These individualistic, dynamic responses to changing climates observed in mammals will necessarily lead to the restructuring of their communities. Turning to Africa, we use select mammalian traits that have relatively low intraspecific variability, but a strong tie to environmental conditions, to evaluate how and where mammalian communities will need to reshuffle under projected climate change. We find that over 50% of modern mammal communities exhibit weak future relationships with respect to at least one trait, putting them at risk of depleted function. The species comprising these communities will need to shift across space so that trait-environment relationships remain undisturbed. Evaluating landscape connectivity across Africa, we identify regions where these community reconfigurations will be facilitated or obstructed.

Seminar Speaker Host: Gregory Wilson