Research

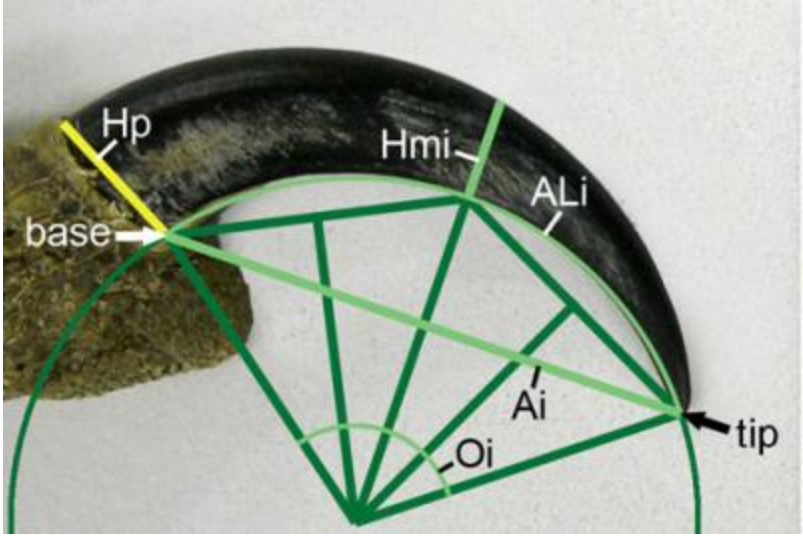
Our research is conducted primarily by Dr. Denver Fowler and Dr. Elizabeth Freedman Fowler and focuses on dinosaur paleobiology: combining fieldwork and specimen based studies with more theoretical or laboratory based analyses.

New Discoveries From The Field

With an active field program, we frequently discover new specimens of scientific importance. Once they have been brought back to the museum and prepared, the process of studying and describing the fossils begins. Sometimes these specimens are entire skeletons; other times just occasional bones of a rare species or unusual growth stage.

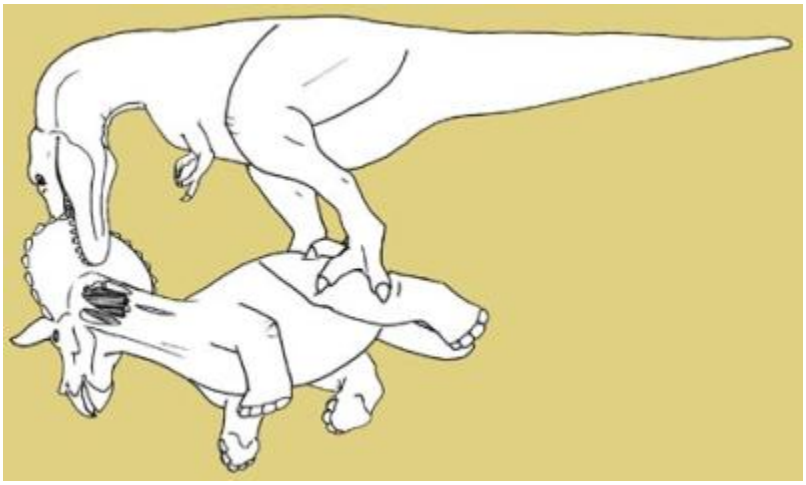
For example, "**Ankylomania**" is a skeleton of an armored dinosaur from the Judith River Formation of Montana. It is probably a new species, because dinosaurs of its kind have not been discovered in the Judith River Formation before.

We also have some very fragmentary remains of young *Tyrannosaurus* from the Hell Creek Formation. The rarity of fossils of juvenile dinosaurs means that we can learn a lot even from mere fragments.



Functional Morphology & Behavior

Our work on functional morphology and behavior looks at the shapes of dinosaur bones, how they fit together, and how much movement there is at joints. We can then make comparisons to the behavior of living animals with similar shaped bones, allowing us to make inferences about extinct forms.



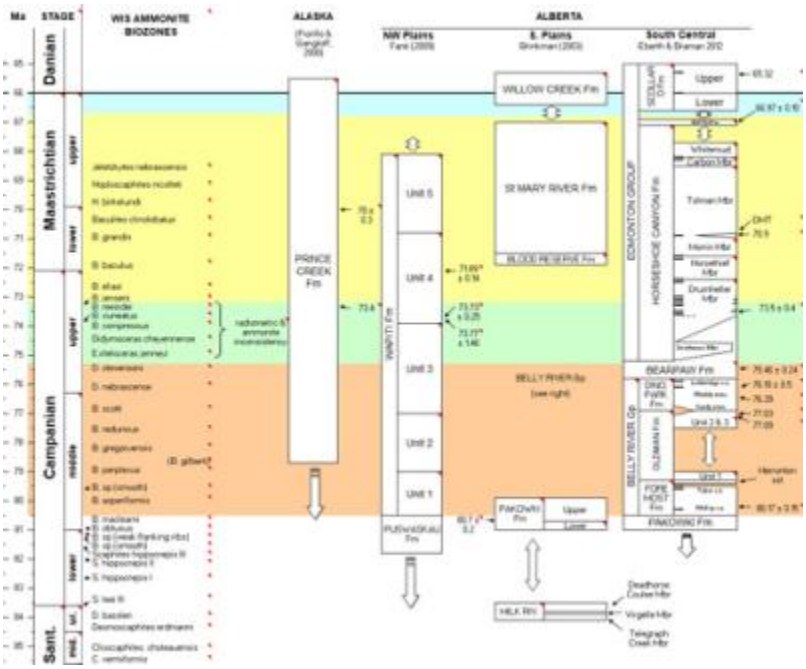
Our research includes two studies comparing claw use in modern birds of prey to "raptor" dinosaurs. We suggested that the enlarged claw seen on the foot of *Velociraptor* (and other raptor species) was not the right shape to be used for slashing (as had been previously suggested), but rather was probably used for holding on to prey, pinning them down. This was part of what we called the "Raptor Prey Restraint" behavior model.

We have also recently studied patterns of toothmarks made by *Tyrannosaurus* biting into *Triceratops* bones. This allowed us to reconstruct the exact head movements of a *T. rex* as it bit into and shook its food!

Dinosaur Evolution & Diversity

The Late Cretaceous rocks of western North America preserve one of the richest dinosaur fossil records anywhere in the world. These same rocks often contain layers of ancient volcanic ash, and sometimes also fossils of ancient sea creatures like ammonites and clams. This is fortunate as volcanic ashes and marine fossils can both be used to accurately date the rocks that they are found in. This means that we can precisely track the ages of the rocks in which we find our dinosaur fossils, letting us study the evolution of Cretaceous dinosaurs in unprecedented detail.

Within this framework, our research covers two areas "stratigraphy" and description of new dinosaurs and fossils:



First, we work on how these fossil-bearing rock formations line up against each other; this is called "stratigraphy". Some of our stratigraphy research focuses on single formations like the Hell Creek or Judith River. Our other larger project investigates how many formations fit together across North America, recalculating ash dates, comparing between different methods of dating rocks, then plotting the time-ranges of the different rock formations and the dinosaurs found within.

Second, we also study new dinosaur specimens, often new species, which fit into gaps in the fossil record. We continue to target our fossil collecting in these gaps, making sure that when we collect dinosaur specimens in the field we do so with stratigraphic data so that their position in time can be accurately determined.

Publications