

## Alberta Palaeontological Society

### Reading the Fossil Record: how fossils from China reveal the origin and evolutionary history of the last primate in North America before the arrival of humans

Main Speaker: Kathleen Rust is a PhD Candidate researching early primate evolution and systematics at the University of Kansas Biodiversity Institute and department of Ecology and Evolutionary Biology

Location: B108, Mount Royal University

Time: January 19, 2024, 7:30 pm MST

#### Abstract:

*Ekgmowechashala* is a poorly documented but very distinctive primate known only from the late early Oligocene (early Arikareean) of western North America. Because of its unique dental anatomy and spatiotemporal isolation, the evolutionary and biogeographic affinities of *Ekgmowechashala* have long been debated. Here, I will present the oldest known fossils of *Ekgmowechashala* from the Brown Siltstone Beds of the Brule Formation, White River Group of western Nebraska and a new fossil species, *Palaeohodites*, from the Nadu Formation (late Eocene) in the Baise Basin of Guangxi Zhuang Autonomous Region in southern China. Despite being widely separated through time and space, I will demonstrate how these two fossil species are closely related. Specifically, I will explain results from two independent phylogenetic analyses that unequivocally demonstrate that North American *Ekgmowechashala* and *Palaeohodites* are sister species that belong to a larger group of southern Asian adapiform primates called ekgmowechashalids. The discovery of *Palaeohodites* not only elucidates the origin of *Ekgmowechashala* as an immigrant taxon from Asia, but also helps fill the considerable disparity in dental evolution between *Ekgmowechashala* and other extinct ekgmowechashalids known from southern Asia. I will also explain how this study of *Ekgmowechashala* and *Palaeohodites* underscores the fundamental role of southern Asia as a refugium for multiple primate groups during the cooler and drier climatic regime that prevailed after the Eocene–Oligocene transition. The colonization of North America by *Ekgmowechashala* corresponds to an example of the Lazarus effect, whereby a taxon (in this case, the order Primates) reappears suddenly in the fossil record after a lengthy hiatus.

#### Biography:

Kathleen Rust is a PhD Candidate researching early primate evolution and systematics at the University of Kansas Biodiversity Institute and department of Ecology and Evolutionary Biology. She received a B.A. (2012) with high honors in anthropology and German from the University of Texas at Austin. She earned an M.A. in anthropology (2018) from Hunter College City University of New York. Her master's thesis work involved collecting data from fossils to investigate the phylogenetic affinities and origins of sivaladapids – an extinct group of adapiform primates. Her thesis research suggests a new possible evolutionary scenario for the origins and evolution of Sivaladapidae. During her graduate studies in New York City, she was recruited as a biological anthropology educator at the American Museum of Natural history (AMNH). As a doctoral

student, she conducts paleontological fieldwork with her colleagues, collecting mammalian fossils from late Paleocene rock formations in Wyoming and Eocene rock formations in Turkey. She continues to study and publish on adapiform systematics, and her dissertation research investigates the purported evolutionary trade-off between vision and olfaction in early primate evolution. By studying the fossils of primates and genomes of living mammals, her research explores morphological integration of the maxillofacial skeleton to test if changes in the facial anatomy reflect this trade-off between the visual and olfactory sensory systems in the fossil record of primates. In addition to research, Rust remains active in outreach and education for local audiences through the KU Museum of Natural History and Biodiversity Institute.

Information:

This event is presented jointly by the Alberta Palaeontological Society, the Department of Earth and Environmental Sciences at Mount Royal University, and the Palaeontology Division of the Canadian Energy Geoscience Association. For details or to present a talk in the future, please contact CSPG Palaeontology Division Chair Jon Noad at [jonnoad@hotmail.com](mailto:jonnoad@hotmail.com) or APS Coordinator Lacey Holoboff at [lhoboff@gmail.com](mailto:lhoboff@gmail.com) or contact [programs1@albertapaleo.org](mailto:programs1@albertapaleo.org). Visit the APS website for confirmation of event times and upcoming speakers: <http://www.albertapaleo.org/>.