

3D Digitization of Yellowstone Wolf Skulls for Research, Education and Outreach (Poster)

Madeline Jackson*, W.A. Franke College of Forestry and Conservation, University of Montana, Missoula
Jonathan Keller, Department of Biology, University of New Mexico, Albuquerque
Douglas Smith, Yellowstone Center for Resources, Yellowstone National Park, Mammoth, WY

*Indicates Presenter

**Indicates Student Presentation

Recent innovations in imaging software and virtual platforms have made it possible for museums to make virtual 3D models of biological specimens available to a wider audience for research, education, and outreach. The Yellowstone National Park Heritage and Research Center (HRC) houses one of the best-studied collections of wolf skulls (*Canis lupus*; n>225) in the world. Long-term research conducted by the Yellowstone Wolf Project has produced an extensive volume of ecological metadata associated with each skull specimen. Here, we used photogrammetry to digitize the HRC wolf skull collection (crania and mandibles) and uploaded the virtual 3D models to MorphoSource, an online 3D data repository. We will use these 3D models and landmark-based geometric morphometric methods to answer questions about how skull shape varies as a function of age, sex, social status, disease, mortality type, and relative prey availability. We will also analyze Yellowstone wolf skull shape variation through time and quantify the occurrence of dental malocclusion in Yellowstone wolves as a result of hunting large prey. In addition to answering these questions, the 3D models will be made available for use as online educational tools and as tangible educational aids by 3D printing individual specimens. Individuals and organizations will be able to download these data and their derivatives for collaborative research to answer new questions about wolf cranial and mandibular morphology. With the absence of a physical gallery in the HRC, this new medium will increase accessibility and public engagement with the natural history of Yellowstone National Park.