RESEARCH QUESTION
Can variations in 3-D micromorphological features discriminate between the anvil and hammerstone percussion marks on bone and the raw material of the hammerstone?

BACKGROUND
The presence of percussion marks on faunal remains demonstrates that hominins used a hammerstone-on-anvil technique to process animal carcasses with the intention of extracting and consuming fat-rich bone marrow. The analysis of such marks holds important implications for both the evolution of stone tool technologies, as well as hominin encephalization, which roughly coincides with the appearance of percussion marks in the archaeological record [1,2]. Zooarchaeologists have typically utilized low-power hand lenses or 2-D microscopic techniques to discern percussion marks on faunal remains [2-3], but these methods are difficult to reproduce between researchers and are limited in the behavioral inferences they can produce [4]. Here, we provide a new approach that applies high-resolution 3-D scanning to identify the unique characteristics and quantify the micromorphology of percussion marks inflicted on limb bones.

METHODS
- Experimental percussion marks were produced by MCP with raw materials from Olduvai Gorge, Tanzania using a hammerstone-on-anvil technique controlling for animal species, bone type, and raw material of the lithics used to break the bones [5].
- 3-D reconstructions of percussion marks were produced using a Nanovea® ST400 white-light confocal profilometer.
- Percussion marks were processed and measured using Digital Surf’s Mountains® software.

REFERENCES CITED

ACKNOWLEDGEMENTS
We thank the European Research Council (European Union’s Seventh Framework Programme FP7/2007-2013)ERC grant agreement n 283366 (ORACEAF), which provided funding for the percussion experiments. We also thank Colorado State University for providing funding for AMT’s participation in this conference. MCP acknowledges the College of Liberal Arts at Colorado State University for the generous funding that granted the purchase of the Nanovea® white-light confocal profilometer used in this research.