



AMAAZE Update

Anthropological and Mathematical Analysis of Archaeological and Zooarchaeological Evidence

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Starting a New Year by Reflecting on the Last Few

By KATRINA YEZZI-WOODLEY

As we all know, the world was turned upside down by COVID and, for many of us, it was a challenge to adjust to the new landscape personally and professionally. As we begin 2023, we want to reflect on some positive moments experienced within AMAAZE over the past couple of years. Throughout the next few updates we will share many of the accomplishments and activities of [AMAAZE collaborators](#). We acknowledge their efforts and contributions to not only their field of expertise but the disciplinary fields of their collaborators. We look forward with great anticipation for all that is to come in 2023 as we all continue to work together to further analytical approaches and to use advanced mathematical methods to address important questions within archaeology, zooarchaeology, and paleoanthropology.

AMAAZE CO-FOUNDER PETER OLVER CELEBRATED AT CONFERENCE HOSTED IN HIS HONOR

In August 2022, Dalhousie University hosted a conference in Halifax, Nova Scotia to honor one of AMAAZE's co-founders, [Dr. Peter Olver](#), entitled *Symmetry, Invariants, and their Applications: A Celebration of Peter Olver's 70th Birthday*. In addition to Dalhousie University, this event was organized by representatives from Memorial University, Utah State, North Carolina State, and Monmouth University and received support from the [Atlantic Association for Research in the Mathematical Sciences](#), [Komorebi](#), and [the National Science Foundation](#). It goes without saying that Dr. Olver is a well-established and

highly accomplished mathematician who has made major contributions to the field. And now, the field of anthropology is benefiting from his expertise as well. Thank you, Peter for all that you have done and all you continue to do.



Dr. Olver with Dr. Cheri Shakiban

COMMUNITY ENGAGEMENT

In 2021, [Dr. Cheri Shakiban](#) volunteered her time to advanced math students at Wayzata High School. As a result of her efforts and that of Dr. Olver, a couple of the students, Emily Liu and Eric Chen, were invited to participate in AMAAZE research projects where they were given the opportunity to engage in active research with graduate students and faculty. Emily Liu worked closely with PhD candidate, [Annie Melton](#), on her research on cultural transmissions through the analysis of stone tools. She has since graduated and now attends Stanford University. Eric Chen worked closely with Dr. Jeff Calder and the research team developing methods to apply machine learning to classify bone fragments based on the agents that broke the bones. In fact, Eric is a co-author on a paper that is currently under review.

FELLOWSHIPS, GRANTS, AND AWARDS

We are proud to say that several AMAAZE researchers have been awarded funding for their projects.



Riley experimentally breaks elk bone.

Riley O'Neill, a doctoral student in the department of mathematics at the University of Minnesota, was awarded the [National Science Foundation Graduate Research Fellowship](#). As part of his research, Riley

will be working on developing a convolutional neural network to classify 3D meshes of bone fragments for the purpose of identifying agents of bone breakage. This work will be applied to experimentally broken bone assemblages as well as fossil assemblages from important archaeological sites in the countries of Georgia and Tanzania as part of a larger project examining early human subsistence patterns.



Experimentally breaking bones for research.

AMAAZE co-founder, [Katrina Yezzi-Woodley](#), graduated with her PhD in Biological Anthropology and was awarded a [NSF SBE Post-doctoral Research Fellowship](#) to conduct research on the importance of bone marrow consumption in human evolution. Over the next two years, Katrina will be working with faculty mentor, [Dr. Michael Pante](#), at Colorado State University.

[Dr. Kieran McNulty](#) and [Dr. Reed Coil](#) received [Leakey Grants](#) in 2021 for their respective research on *New excavations at Meswa Bridge, Kenya* and *Neanderthal and modern human spatial behavior in the Southern Caucasus*.

Contact Us

amaaze@umn.edu
www.amaaze.umn.edu