Astragalus bones identification via Topological Data Analysis

D. Adamo, **M. Corneli**, M. Vuillien, and I. Théry,
Université Côte d'Azur
CEPAM and INRIA, MAASAI Team, LJAD
Nice, France
marco.corneli@univ-cotedazur.fr

Archaeozoology is a discipline that documents human-animal relationships in the past based on faunal remains found in archaeological contexts. One of the main challenges in this field is to distinguish morphologically close species through archaeological bones. Often, some species belonging to the same family or genus share common morphological features that are difficult to differentiate. We propose a novel approach using topological data analysis (TDA) on the 3D models of astragalus bones of the Caprinae's family. By analyzing the geometric information of the bones, including connected components, cycles and holes, we are able to identify interspecies morphological features that can help distinguish closely related species. We detail the proposed approach and compare it with state of the art methods.