

Monrepos

Archaeological Research Centre and Museum
for Human Behavioural Evolution

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich



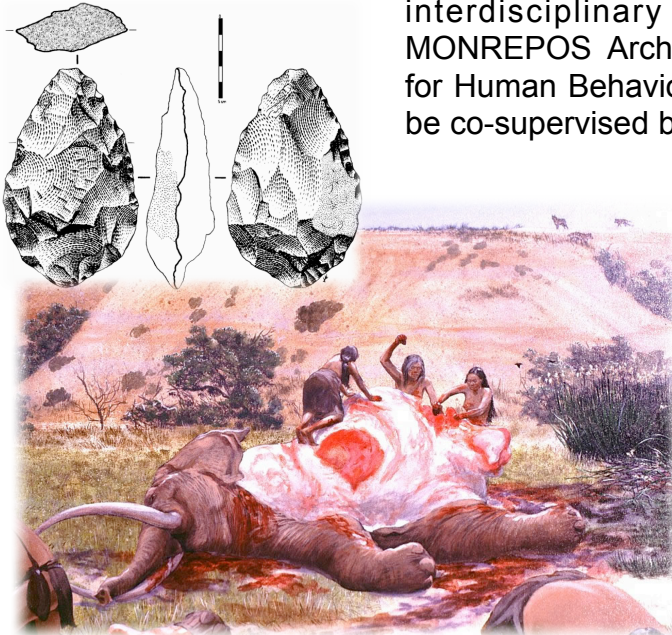
<http://www.adrl.ethz.ch>

**INTERDISCIPLINARY MASTER PROJECT
for Mech Eng. or Electrical Eng. Student**



Robotic imitation of human tool use

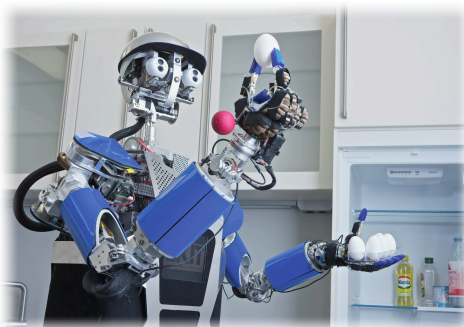
The Agile & Dexterous Robotics Lab (ADRL) is offering an interdisciplinary master thesis in collaboration with MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution in Germany. The project will be co-supervised by the two laboratories and large parts of the work are expected to be completed at the idyllic Castle Monrepos in Germany (close to Cologne). You work in an interdisciplinary collaboration with archaeologists to measure the relevant physical parameters of a simple human tool action (e.g., scraping/cutting). In order to understand how tools have been used in the stone age you will design a robot to replicate the human motion. Your task will be the mechanical design as well as the implementation of the control of a first prototype of this robot.



Background: Being able to imitate human tool behavior using a machine is important both for testing hypotheses about how tool use in humans evolved, and, at the same time for industrial applications. On the archaeological side, we can try to reconstruct human action by examining microscopic traces left behind on the edges of stone tools used to cut, scrape, or pierce. Unfortunately, experiments using human subjects are not sufficiently well-controlled to produce adequate reference collections.



A solution to produce such reference collections is to replicate the relevant parts of the tasks done through machine imitation. On the engineering side, the challenge is to create a simple tool-using robot that can respond to changes in the material properties of the worked material. The coincidence of these interests provides a rare opportunity to carry out research that is relevant to both the past and the future.



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