



Geoarchaeology, Archaeometry, Technology & Environment (GATE) Liaison Group

The Geoarchaeology, Archaeometry, Technology and Environment (GATE) Liaison Group comprises a range of scientific disciplines and specialised approaches - from disciplines like geology, geomorphology, pedology, palaeontology, geophysics, materials science, absolute dating, etc. - that contribute to the study of archaeological cultures. The GATE LG aims to further scientific research and to promote collaboration between archaeologists working in the west and central Asian region.

In pursuing such research, the ARWA GATE liaison group recognises key shared interests and overlaps in research promoted by other ARWA liaison groups, particularly the Archaeology, Methodology, Bioarchaeology and Heritage LGs, and the possibilities for creative collaboration that arise from these.

1. Relationship with Archaeology

More and more scientific disciplines have come to the aid of archaeology in understanding the human past, from remote prehistory to recent times. This liaison group takes an inclusive view of the disciplines that are critical to archaeology; all scientific approaches that aid the understanding of past societies are welcomed. The principles drawn from these disciplines have helped in understanding the formation of archaeological sites, the duration and rate of change in ancient societies, adaptation and resilience to climate and environmental change, human and animal mobility, exchange systems, chronological and cultural variability in technical traditions for the manufacture and exploitation of different kind of tools, artefact production, function and use, and modification of past landscapes by humans, to name a few, thereby helping archaeology in a holistic manner. Geophysical tools help in understanding buried remains without excavation and can be complemented by other remote sensing approaches. Similarly, petrological analysis of ceramics, rocks and minerals from archaeological contexts contribute to our knowledge of the acquisition, distribution and processing of raw materials.

2. Principles of the GATE Liaison Group

The primary objective of this liaison group is to promote and support high quality, collaborative archaeological science research in west and central Asia, so as to enhance interpretation of the human past. This includes guidance for potential investigators on the incorporation of best-practice archaeological science in their basic research structure and design, and support for palaeo-scientists working on topics of archaeological interest. This group seeks to facilitate research through collaboration between specialised laboratories and the development of new laboratories and research programmes. The liaison group will support future research by promoting the collation, integration, and appropriate sharing of past and ongoing research data and analytical procedures with other interested groups of ARWA. These goals will be achieved through a range of activities, including conducting workshops within the group to share and discuss current research and knowledge, and promoting opportunities for training and collaboration related to activities of the liaison group.

3. Broad themes and areas of research

- Understanding the formation and modification of the archaeological record at all scales, from the level of the landscape down to the individual deposit, using LiDAR, Remote Sensing and Aerial Photography (conventional and UAV), geomorphology, soil micromorphology, etc.;
- Reconstructing past climate and environments, and human adaptations and contributions to environmental change, through palaeoclimatic and isotopic analyses;
- Non-invasive exploration of the archaeological record using geophysical tools (including GPR, Magnetic Survey, Thermal Survey, Electricity Resistivity Survey);
- Building archaeological chronologies using scientific absolute dating techniques, and further developing the application of such techniques to the archaeological record;
- Exploring human and animal mobility through scientific analyses, including isotopic and compositional studies;
- Reconstructing past exchange systems through geological provenancing of raw materials and archaeological artefacts (including metals, ceramics, glass, stone, etc.);
- Identify ancient sources, raw materials and technologies used in the manufacture of different types of artifacts, using scientific and experimental approaches in order to characterize past production systems and reconstruct their evolution;
- Understanding object function and use through scientific and experimental assessment of material characteristics and chemical analysis of residues (including lipid analysis);
- Computer aided research in simulation, tomography, predictive analysis, GIS, and statistical analysis of archaeological data;
- Human and animal fossils from the archaeological time period with the aid of palaeontology;
- 3D modelling of archaeological materials, including photogrammetry and 3D scanning and morphometric analysis;
- Data creation, curation, and access.