



NFDI4Objects

Research Data Infrastructure
for the Material Remains of
Human History

Temporary Working Group (TWG)

Metadata profiles for analytical methods in Archaeometry

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Duration

10 Months from the first of September 2024

Bodies involved

Task Area 3: NFDI4Objects for Analytics and Experiments

Openness and Transparency

Information about the TWG (including details of outcomes, issues, actions, status of the TWG, participants and meetings) is publicly available.

Discussions in this TWG are held in public: Meeting minutes of video-, teleconferences and face-to-face meetings are archived and available for public review. Technical discussions and problem-solving paths are documented in such a way that they can be traced by the public. Working documents are developed on a public repository.

However, the meetings themselves are not open to the public. The TWG is free to choose its means of communication for coordinating and conducting meetings, as well as to set the time and place for face-to-face meetings or video- or telephone conferences. The public is invited to follow the work of the TWG and contribute to its content during the public comment period.

Aims and Objectives

The application of scientific techniques to the analysis of archaeological materials has become an integral part of archaeological inquiry. With the continual development of advanced methods and instrumentation, the amount of analytical data generated has grown substantially. However, an ongoing challenge lies in the underdeveloped and non-standardised nature of metadata information pertaining to instrument configurations. This lack of standardised metadata poses a formidable obstacle for researchers seeking to replicate specific analytical programs and evaluate data quality. In response to this, our Temporary Working Group (TWG) is dedicated to the harmonisation of existing schemas and relevant controlled vocabularies for the analysis of archaeological materials. We will concentrate on a specific range of analytical methods commonly employed in artefact studies, including the optical microscopy, X-ray fluorescence, electron microscopy, Raman spectroscopy, X-ray diffraction, Fourier-transform infrared spectroscopy, and inductively coupled plasma mass spectrometry. These techniques are chosen due to their active operation in the participating laboratories (DBM, LEIZA, and Rathgen). We are particularly keen to develop a metadata profile for instrument parameters that are used to control the activity, might influence subsequent interpretations and/or will be important for data comparison and discovery.

Out of Scope

As a proof of concept, this TWG will only develop a metadata profile for selected analytical methods. Our scope excludes the techniques employed by field archaeology, bioarchaeology, and conservation science. Furthermore, required

tools or servers to implement the developed schemas and vocabularies will be undertaken in a subsequent phase beyond this TWG.

Intended Work Results

The TWG will last ten months and comprise both archaeological scientists and laboratory practitioners who will systematically assess and modify existing standards to fit the needs for the archaeometry community. We plan to actively engage with other similar initiatives from other scientific disciplines who have been developing metadata profiles for instruments. These include from IG Metadata Standards for Geochemical Data from NFDI4Earth, Chemotion Electronic Notebook from NFDI4Chem, European research infrastructure for Heritage Science (E-RIHS), AusGeoChem, and GeoX from Helmholtz-Zentrum Potsdam. We will ultimately deliver a JSON schema for the instrument parameters associated with each chosen analytical technique. This schema will encompass key elements such as property (parameter), data type, reporting level (minimal/recommended/ideal), description, and a comprehensive list of controlled vocabularies.

A metadata profile will be developed for each analytical method to be stored as a JSON format. Each profile will be allocated a digital object identifier (DOI) and archived in Zenodo. Meanwhile, we will utilise the open-source registration tool (<https://e-rihs.io/register-services/>) to disseminate the schema among various archaeometric laboratories. Their feedback and contribution will help us to establish a robust set of user cases that can serve as practical guidelines for the broader community.

Envisaged Commons Contributions

The JSON schema developed by the TWG will serve as a foundation for linking other ongoing initiatives within NFDI consortia. It can potentially be mapped to the high-level ontologies such as NFDI core ontology, CIDOC-CRM, and Schema.org through the efforts of Task Area 6 in NFDI4Object. This will effectively transform the schema into the Linked Open Data for the semantic network. Moreover, the schema can seamlessly integrate into the metadata template in Chemotion, an electronic lab notebook developed by NFDI4Chem. Ultimately, collected instances can be deployed as a service search platform, empowering researchers to discover appropriate techniques for their archaeological samples.

In the next phase, we plan to use the developed schemas to set up a vocabulary server with the API endpoint, allowing the information to be extracted by other research software.

External Linking

Knowledge base working group, European research infrastructure for heritage science (E-RIHS) (<https://github.com/E-RIHS/hs-interoperability>)

AusGeochem (<https://ausgeochem.auscope.org.au/>)

Chemotion electronic lab notebook (<https://chemotion-repository.net/home/genericHub>)

GeoX (<https://www.geo-x.net/>)

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