WRENCH

Whispers of Time
Heritage as Narratives of Climate Change

D1.3 Data Management Plan

created using DMPonline,
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Contents

A Belmont Forum Project

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Overview

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Project abstract:
WRENCH aims to address the effects of climate change on tangible and intangible heritage while widening the mainstream understanding of heritage to include storytelling, narratives, and ephemeral legacies. Even more than ruination, abandonment, or major disruption, it is when it becomes mute, unable to tell any story that heritage is lost forever. WRENCH envisions heritage as both something at risk and something able to tell a story about the risk we are all running. Interpreting heritage as a key ingredient of community identities, WRENCH proposes to shift from a user-driven approach to a living heritage approach, that is, from a consumerist idea of heritage (something to be used by clients) to a citizens' idea of heritage (something to inhabit, co-create, and shape). WRENCH has the twofold goal of (a) developing a transdisciplinary methodology involving environmental sciences, engineering, and humanities to investigate the impact of climate change on tangible and intangible heritage; (b) employing heritage as storytelling tools to enhance awareness of climate change. This transdisciplinary innovative methodology will entail:- Applying advanced generation climate models to carry out data analysis related to climate change, including retrieving historical and future projections of hydro-meteorological variables. - Investigating the effect of extreme environmental conditions on historical materials, and structures by in-situ physical testing, development of rheological models accounting for them and advanced structural modelling. - Assessing the effect of climate change on immaterial heritage by historical methodologies and participatory research. - Developing a holistic framework for the evaluation of climate change on cultural heritage. Objective(b) is based on the capability of heritage to enhance climate change awareness through the use of innovative methods of representation, which will make visible the present and future impacts of extreme climate actions on heritage.

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Data Collection

Typology of data collected or generated during the project

This Data Management Plan (DMP) outlines how research and research-related data will be handled during and after the WRENCH project, describing what data will be collected, processed or generated and following what methodology and standards, whether and how this data will be shared with whom and/or made openly available under an open license in a specified trusted repository, and how it will be curated and preserved. The plan provides details on how the datasets produced by the project will be managed and released according to the FAIR principles (where possible as open data), and how questions of reproducibility will be handled during analytical and publication processes (e.g. tools used, publication of code).
The Consortium adheres to the principle of the Open Science movement to make scientific research (including publications, data, and software) and its dissemination accessible and developed through collaborative networks. To meet this goal, this Data Management Plan will be regularly updated. Major revisions of the Plan will be performed whenever important changes to the project occur due to the inclusion of new data sets, the uptake of new technologies, changes in consortium policies, or other external factors.
This plan considers the FAIR principles and the current "Guidelines on Data Management in Horizon Europe" template. Nevertheless, the Consortium will comply with the requirements of Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals regarding the processing of personal data and on the free movement of such data.

The main sources of collected and generated data are:

1. **Historic documentation.** This data will include documentation collected from the archive and historical research conducted concerning the pilot cases (100 GB)

2. **Structural health monitoring data from heritage sites.** This data will include a numerical series of structural response parameters like acceleration, deformations, and the results of in-situ and laboratory post-processing, allowing for a reduction in the amount of data to be collected over a long period (1TB/year - 3 TB in total)

3. **Time series datasets of hydrometeorological variables.** This data will include a numerical series of time history of relevant environmental parameters (like temperature and humidity) resulting from numerical simulations and in-situ environment monitoring of case studies. Data format: Word, Excel, text file. Volume: Estimated 100 GB.

4. **Laboratory tests and numerical simulations on material samples**. This data will include a numerical series of experimental responses from laboratory tests and numerical simulations adopting the newly developed constitutive laws. Data format: Word, Excel, text file. Volume: Estimated 100 GB

5. **Numerical Models and Analyses.** This data will include files of numerical models, backup files, and the results at the main project milestones. These are nonstandard files, and the expected volume is 1TB.

6. **Data collected from questionnaires and interviews, ethnography and participatory methodologies**. This will include people's answers and relative statistical and narrative elaborations. Data included in this section will be anonymous/anonymized and therefore will not be classified as sensible. Data format: Word, Pdf, Excel, text file. Volume: Estimated 100GB

7. **Digital multimedia products.** This data will include structural digital surveys (cloud points and pictures collected from drones), virtual reality products, and videos of cultural heritage sites. Data format: Text, PNG, JPEG, MP4, MPEG-4, MOV, AVI. Volume: Estimated 100GB

8. **Living Heritage Platform** will be an online platform for peer-to-peer sharing of inspiring practices in heritage conservation.

Data from 1) to 7) will be stored using Durham Shared Research Storage (SRS), provided by the Durham IT Service Team. The data will be accessible to all team members by setting a visitor account for each institution. Automatic backups will be performed to keep the data safe. The Living Heritage Platform is hosted in the UAB web portal.

Sensitive data will be stored in a separate folder with restricted access and level of protection according to EU and national GDPR requirements. Confidential information will not be stored in the Shared Research Storage (SRS).

The person responsible for the DMP will specify the users who have read and write access and those who have read-only access for each top-level folder and discuss this with the entire team. Access is set at the top-level folder level—any folder beneath this inherits access rules from the top-level folder above.

All the servers containing the data will be located in Europe. The storage will be available until 6 months after the duration of the project

How will data be collected or generated

Data from numerical simulations and structural health monitoring will be collected by developing appropriate scripts in Matlab or Python to organise data in specific layouts agreed upon by the different partners involved in numerical/engineering tasks.

Qualitative data will be mainly (but not only) collected through specific online forms, ethnographic research, interviews, questionnaires and their transcriptions. A Google account and a related email have been created to manage communication with the participants and the general public (wrench.coord@gmail.com).

The files will be hierarchically organised by:

- Topic
- Task
- Partner responsible for the collection and pre-processing
- Number of versions

For example:
The first version of a file relative to the topic Monitoring (MON) and task 3.1, prepared by Durham University (DU) will be named:
MON_T31_DU_v01.
A legend of topics and tasks will be included in an Excel file stored in the project's main folder. This file will be constantly updated when a new topic or task is included. To avoid confusion and mistakes, Durham will be responsible for updating this "legend" file at the request of the involved partner. A complete explanation of the meaning of each table and part of it will be included in the folder. Before storing data in the shared system, each Team will ensure the correctness and consistency of data by performing redundant checks and tests, and an internal peer-review approach will be used, including each document stored, the Team and researchers involved in its preparation and the name of the proof-reviewer with the data when the review was performed.

The data manager (Prof. Ashraf Osman) will periodically control the consistency and quality of the data collected.

Periodic data management meetings will be organised to check data consistency against the needs of all partners and discuss potential corrections and improvements.

Documentation and Metadata

What documentation and metadata will accompany the data?

The elaboration, update, and implementation of the DMP will be carried out by a Data Management Team that will operate in close collaboration with all partners involved in the project to ensure a timely and effective management of the data. To ensure maximum adherence to the principle of Open Science, 1) Relevant data and information used or produced within the scope of the project will be documented according to international metadata standards and best practices and will be published on the Project platform in open, structured, and machine-readable formats together with the relevant metadata. Data will be made accessible, easily discoverable, usable, and -wherever possible- interoperable to specific standards, through the implementation of a Data Catalogue; 2) All scientific publications will be peer-reviewed and published in open-access journals. Where this is not possible, scientific publications will be deposited in an online repository.

For each document, a cover sheet will be prepared and attached to the file in the case of a Word or PDF file or stored in the same folder in the case of text or Excel files. The cover sheet will include:

- title
- the format and file type of the data
- the list of symbols used with a brief description
- basic description of the methodology
- details that will help people to find the data
- the team that created or contributed to the data
- date of creation, last update
- location and equipment used (in the case of output monitoring)
- under what conditions it can be accessed

For software script, detailed technical documentation describing the script functionality and its main parts (definitions of variables, output, links to external libraries embedded, new functions implemented, etc.).
A benchmark will be included to give the reader an idea of the correct software functionality with examples of the final output, including pictures and screenshots.

Ethics and Legal Compliance

Ethical issues

1- Consent for data preservation and sharing
All participants involved in interviews and questionnaires will be asked to provide their formal consent to use the information within the project's scope only. All the participants will be 18+
2- Protection of the identity of participants
All the interviews and questionnaires will be anonymous/anonymized. No data regarding the personal information of participants will be collected nor stored by the consortium.
3- Safety store and transfer sensitive data
Any possible sensitive data collected during the interview and questionnaires will be processed, stored and transferred according to the General Data Protection Regulation (GDPR).

Copyright and Intellectual Property Rights (IPR)

The consortium will own the copyright and IPR of any data generated and collected during the project. The consortium IPR will be covered by the consortium agreement.
Publications and data released by the website/living platform and public repositories will be covered by an open-access CC-BY license, which requires attribution but allows others to adapt and build on the work.

Storage and Backup

Data storage and back-ups during the research

Data will be stored using the Durham central hub by activating a Share Research Storage (SRS), allowing the teams to save, share, and collaborate on documents, web content, lists, and forms. SharePoint allows for easy research of files and metadata attached to them.
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Protection features:

- One snapshot per day at 20:30, kept for 7 days.
- One snapshot per week on Sunday at 21:00, kept for 4 weeks.
- One backup per week, kept for up to 90 days.

Data access and security

Research data management and management of research outputs will ensure that only researchers working on the project have access to primary data and that it is safely stored and shared (e.g. not on public shared drives) in line with data protection policies of the respective research institutions. In line with the Open Science practices, the research data management and management of other research outputs will follow the "FAIR data principles", making data findable, including provisions for metadata, openly accessible, interoperable, and increased data reuse through clarifying licenses. Sensitive data will be stored in a folder titled "WRENCH_sensitive data". This folder will be protected by a password and encrypted. The responsible for DM will have the grant to access and modify data. They will grant the necessary level of access (read and modify/read-only) to the minimum number of partners involved in collecting sensitive data. This grant will last for the minimum period necessary to store data. Sensitive data will be managed in compliance with the EU and national GDPR and the best practice tips for data retention. Only collect data that is necessary for WRENCH purposes, and data is kept until they are necessary for further postprocessing tasks (and no longer). The responsible for DM will discuss the data retention policies with the entire group and revise them periodically. Durham University has implemented a cyber-security strategy, and staff members are trained to manage sensitive data. Moreover, any doubts will be discussed with the Data Protection Officer at Durham University, which is responsible for advising the university on compliance with Data Protection legislation and monitoring its performance. Institutional responses to Freedom of Information requests and GDPR individual rights requests, including subject access, will be discussed with the Information Governance Team, who will advise us on how to manage the request.

Selection and Preservation

Data that are of long-term value and should be retained, shared, and/or preserved

Data collected from the fieldwork data (ethnography, spatial data), interviews/questionnaires, numerical models and analysis results, and monitoring data will be kept for the entire project duration and beyond that period until this information has been used to finish the publication plan. This period is estimated to be 6 months after the end of the project.
The team will use public and institutional repositories and the newly developed living platform for long-term conservation periods.

Long-term preservation plan for the dataset

The following repositories are identified :

- Github
- UAB Digital Repository of Documents
- Durham Research Online (DRO)
- OpenAIRE
- Arxiv
- https://www.europeana.eu/en

The data sets (e.g. legal database, focus group data, survey data) will be deposited into the institutional repository identified by each partner (see Open Research Data at UAB).

In addition, agreements between the involved institutions and the main publishers, like that between ELSEVIER and the UK institutions (https://www.elsevier.com/en-gb/open-access/agreements/jisc) will be exploited to publish the research outcomes without additional costs. No specific costs are considered to cover open-access publications in the identified repositories.

Data Sharing

How will the data be shared

All partners will draw the attention of relevant journals and publishers to this requirement for making research funded by public money freely available after a short period from initial publication. Enforcing an 'open-access policy', publication fees for 'green access' and 'gold access' publications will be part of the project budget.
Consortium partners undertake to make their published versions freely available no later than 12 months after their work is published in a scientific journal. Additionally, the project website will contain an up-to-date overview and archive of all published information: scientific articles, publications, press releases, conference papers, etc.
Confidential data related to processes will remain restricted and will not be published unless permission is granted, in writing, by the data owner.
Commercial Exploitation: The project does not raise issues of commercial exploitation of its work or patent issues. All its products and other dissemination output will be available free of charge on the Internet, as well as in hard copy through the project's website and institutional repositories.
Potential users will find out about our data by:

- research database. In this regard, the team will select high-impact international journals indexed by the main research database (e.g., SCOPUS).
- online repositories
- personal and institutional social media (e.g., ResearchGate, Linkedin)
- project website and the Living Heritage Platform (instruction on how to cite the source of data will be provided)

Specific download sections will be prepared in the platform to share data, including PDF, Excel, Text, and multimedia files. The download will be free after registration into the Living Heritage Platform.

Required restrictions on data sharing

No restrictions are considered when sharing research outcomes. Releasing data from questionnaires and interviews will not include any personal data to avoid confidentiality issues. Finally, any stakeholder and organisation sharing data will be preventively informed and asked to consent, indicating any possible restrictions according to their policies.

Responsibilities and Resources

Responsible for data management

- Prof. Osman (Durham University) will be responsible for ensuring that relevant policies will be respected.
- Dr. Pantò (Durham University) will be responsible for data storage and backup.
- Prof. Armiero (UAB) will be responsible for sharing
- All the team members will be responsible, relative to the specific competencies, for ensuring quality and consistency with relevant policies.

More specifically:

- Dr. Chisari (Univ. Campania Vanvitelli) will be responsible for digital surveys and virtual reality tools
- Dr. Pantò (Durham University) will be responsible for durability laboratory tests
- Dr. Pantò (Durham University) and Dr. Chisari (Univ. Campania Vanvitelli) will be responsible for numerical models
- Prof. Yilmaz (METU) will be responsible for multimedia production (videos at cultural heritage sites)

Resources to deliver the DMP

- The team possesses all the technical skills to collect and process data.
- Technical assistance in storage and backup data will be guaranteed by the IT Durham Team
- Additional competencies will be needed to develop the living platform.
- Charges associated with storage service (SRS): the cost is approximately £100/TB/year. The total amount is estimated at **£1,000**, considering 2TB for the first year, 3TB for the second, and 5TB for the third year. Further, £1,000 could be used to store the data for an additional 2 years after the end of the project.
- No charges are requested for public data repositories.

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