PATTERN.
Empowering Open and Responsible Research and Innovation

FAIR Research Data Management course:

Project Based Learning use cases.

During the FAIR Research Data Management training course, we will ask you to do some exercises that are based on real research projects that produced and archived data some time in the past.

What we ask you to do now:

The projects come from a wide range of disciplines and we ask you to read the project descriptions below and choose a project that matches your interests and that you will be working on for the duration of that course.

What we will do during the course:

In the first session you will be assigned to a group with other participants based on the project of your choice. We will also take time in that session to explain exactly how the project will work. In between sessions you can work individually on these exercises, and we will schedule time for you to discuss the outcomes within your group in the next session.

Please note that the FAIR principles are guidelines that together represent an 'ideal', and researchers can make small steps towards 'FAIRness' based on the state of the art of technological developments over time, and on available resources such as time, money and personnel. The aim of the exercises will be to explore which steps for further FAIRification you could take with these data, not to judge previously performed work.

Project 1: The history of cat ownership

You are a researcher developing a new project on the history of cat ownership from the 1300s until 1700. Your research methodology will be to study literary depictions of cat ownership along with an art historical approach to the depictions of cat ownership in portraiture 1300-1700. The sources used in the project will include digitised manuscripts; digitised art works; literary texts and digital databases. Your proposed funders need a Data Management Plan from you as the first deliverable of the project, and you are instructed to make your data 'as open as possible, as closed as necessary', with consideration of the FAIR Principles.

You will have one PhD student working with you on the project for approx. 3 years, who will start in Month 6 of the 4-year project, and a Postdoctoral Research Assistant who will start in Month 12 of the project and work with you for 10 months. An example of the types of data that you will create is a spreadsheet of literary references to cat ownership in texts ranging from 1300-1700. Format xlsx. Rows: 500.

DOI: 10.5281/zenodo.15316306

Project 2: Open Science Practices

You are interested in Open Science practices and in this project you seek to explore the trends in open access publishing around the world, and especially in Croatia. You will collect data on publications by Croatian authors from scientific citation indexes, such as Web of Science Core Collection indexs (SCIE, SSCI, AHCI, and ESCI). Your aim is to analyze any challenges faced by authors from the less prominent scientific (semi-)periphery, and to compare their publishing practices with authors from more prominent scientific centers.
The results will be filtered by document type limiting the study to article and review papers, and what remains is a spreadsheet as a primary dataset that you use as the basis for further analysis.

In the spririt of Open Science, you seek to share your dataset openly, but collecting author data means that you are processing personal data and you will have to discuss with the privacy officer at your institute how you can best reach your goals whilst complying with the GDPR and institutional regulations.

Project 3: Phytoplankton in the Northwest Adriatic Sea

In this project, you will examine the ability of different types of phytoplankton in the Northwest Adriatic Sea to adjust to climate change. Faced with climate change, these plankton cope at multiple levels: their accommodation strategies include a change in the timing of high abundance and blooms in the surface layer and successful blooming in the deeper layers during warm months. Apart from the observed in situ accommodation, physiological acclimation to warming may involve changes in photosynthesis, respiration, growth, and cell biochemistry.
Earlier research has indicated that some species seem to be able to adapt more successfully than others, and this project aims to explore the causes of these differences.

Your research will be based on long-term in situ observations as well as on short-term biochemical experiments in a laboratory setting, but you also seek to make use of previously collected data in order to make a meaningful comparion with past developments.

In order to combat the effects of climate change on a meaningful schale, wide sharing and promotion of and reuse of relevant data is imperative and you seek to maximize the findabilty of your dataset.

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Project 4: The evolutionary origin Altai Falcon

You are writing a grant proposal to perform a study on the evolutionary origin of the Altai falcons from Central Asia. This large-bodied and mighty bird of prey with a rare and unique look has always attracted the attention of humans. After decades of illegal harvesting for falconry, the Altai falcon is on the brink of extinction and the aim of your project is to contribute to effective conservation priorities and strategies based on a genomic approach to investigate the genetic status and phylogenetic position of this species.

In this study you propose a genome-wide approach, Restriction-site Associated DNA sequencing, using sympatric eastern sakers falcons, allopatric western saker falcons and gyrfalcons as outgroup to explore the evolutionary relationships between the the Altai falcon and other populations.

A data management section is a mandatory part of your research proposal; in this section, you will
consider in advance how you will manage the data that this project will generate and to plan which data will be preserved and made publicly available. Whilst doing this, you should also consider costs for your data management. These costs are eligible for funding, if you include them in the project budget under the budget module ‘material budget’.

Project 5: The role of septin proteins in skeletal muscle regeneration

This project studies the role of septin proteins, and more specifically septin7 in skeletal muscle regeneration. Skeletal muscle injury occurs frequently whether in the form of to day-to-day wear and tear stress or as complete disruption. An injury will firstly lead to muscle degeneration that should then be followed by muscle regeneration to facilitate recovery of patients.
The importance of septin7 in different intracellular processes was already confirmed, but we know little so far about its role in skeletal muscle regeneration.

In this project you use a septin7 conditional knock-down mouse model to explore the possible role of septin7 in this process. You will induce sterile inflammation in skeletal muscle and monitor the following regeneration process after partial knock-down of septin7.

In order get get the required approval to perform mouse experiments, you need to provide an elaborate description of the necessity for this type of research, which includes a statement that you safeguard your data carefully so as to prevent data loss and unwanted repetition of animal sacrifices.

You yourself are keen to keep animal testing to a minimum and to prevent fellow researchers from having to repeat such experiments, you are seeking to share your data with them in a meaningful way. You are therefore looking to maximize the FAIRness of our

dataset and to document it thoroughly to enhance the possibilities for reuse. You are considering to employ a part-time data manager.

Project 6: Diversity in Activities of Daily Living (ADL)

In biomedical engineering, implants are designed to support patients in performing the motions and loading patterns that are part of the so called Activities of Daily Living (ADL). We have databases that cover ADL for the Western population, but a database that contains these diverse activities for the Eastern world is non-existent.

Your research focuses on creating such a database that will include diverse ADL activities such as salat, yoga rituals, and different style sitting postures that you cannot yet expect to find in current databases, but that are key to understanding the kinematics and kinetics of these activities.
The tasks are defined and listed in a table to create a database to make a query based on age, gender, BMI, type of activity and motion capture system. The data is collected from a population of 200 healthy subjects to understand healthy motion patterns. The collected data is to be used for designing implants to allow these sorts of activities to be performed without compromising the quality of life of patients performing these activities in the future.

Your seek to draft a data collection protocol and on to create an online database according to the FAIR principles. You wish to share yor results, as these data are specifically applicable across the globe and outside of your own research network. You are not working with sensitive patient data but will nonetheless have to protect any personal data of your participants.

Project 7: Iron Age rock art

Your research group investigates Iron Age rock art and you are planning a specific project, a 3D survey of rock motifs from the Vermelhosa site in Foz Côa, Portugal.
The methodology of your research will include:

- Study of the Rocks - 3D and ortho models of the rocks; studying rock art motifs
- Landscape Analysis - Occupation maps, visibility maps, communication routes
- Archaeological Context - Archaeological interventions on sites with protohistoric occupation
- Site Study - 3D and ortho models of rock art sites and cores

You wish to add the dataset that will result from this project to the Rock Art Open Access Repository (RARAA). RARAA is part of the Repository of the University of Minho, that has dedicated a separate section to the Faculty of Archaeology’s research on rock art motifs, the surrounding landscape, archaeological context, and sites themselves to elucidate cultural, social, and environmental aspects of ancient civilizations and therefore a perfect match with your project.

RARAA, being a Faculty based facility, is exactly the place where your colleagues would come to find your type of research and where they themselves archive their own work.
Your project has to deliver a data management plan (DMP) within 6 months after the start. In that DMP you already want to plan for the tasks that your group needs to perform to select appropriate data and to document and prepare these data for public archiving, according to the requirements of the repository of your choice and documentation practices common in your discipline.

Project 8: Sediment remediation

You are a member of a group of an environmental researchers setting up an experimental project that will study the effect of seawater in a setting of pollution.
Salinity affects the equilibrium and kinetics of the sorption process of an organic pollutant (phenanthrene) on various sorbents. These sorbents include carbonaceous particles and heterogeneous materials, such as charcoal, lignite and marine sediments from the area of Aliveri, Lavrio and the Saronic Gulf (Loutropyrgos) that have been contaminated by the above carbonaceous particles.

You will deal with multiple types of data and data formats, comprised by files in tabular format, images, and microscopy recordings and documentation in electronic lab notebooks, that need to be shared within the group. Your dataset does not contain any personal or otherwise sensitive information.
You are keen to share your data more widely after your project is finished, not only with other researchers in your field, but also with societal partners, inhabitants of the affected areas as well as agencies employed in the disposal of environmental waste.