Research data management plan

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| General information |
|  | Name and surname of the proposer  | Yuki Utsumi Boucher  |
|  | Parent organization | Institute of Physics |
|  | Name of the project | **P**ressure- **a**nd **T**emperature-driven **P**hase transitions **i**n **S**trongly **C**orrelated **E**lectron **S**ystems (PaT PiSCES) |
|  | Data manager | Yuki Utsumi Boucher, yutsumi@ifs.hr |
| 1. | Data collection and documentation |
|  | What will you collect, process, create or reuse data? (specify the format, type and extent of the data) | The data collected by the research can be classified into four categories: **1**. Different experimental parameters during the measurements and optimizing material synthesis (.txt, .docx, .pdf files)**2**. Spectroscopic data and electrical resistivity data obtained directly from the instrument (.txt, .dat, .ascii, .nxs files)Collected data will be analyzed by using commercial software (IgorPro, Origin, xcel) and the process will generate data (.pxp, .opj, .xlsx files) including analysis process (e.g. fitting functions, background subtraction).**3**. X-ray diffraction 2D image file obtained directly from the instrument (.tif, .mccd files)The 2D image files will be further processed to generate “Intensity vs diffraction angles” spectra data (.dat, .xy, .txt files) for data analysis. Results of data analysis will produce crystal structure (.cif file). During the structural refinement, existing structural model in the Crystallography Open Database (<http://qiserver.ugr.es/cod/index.php>) might be used.**4**. optical microscope image of the samples obtained directly from the instrument (.jpg, .png files) Data collected during the project will require between 100 GB and 1 TB. |
|  | How will the data be collected, processed or created? (briefly state the methodology and processes of quality assurance and ways of organizing data) | **1.** Experimental conditions will be typed manually in text file and will be stored with each experimental data. Manually written experimental conditions of material synthesis will be scanned and will be stored in PDF format.**2.** Data will be collected by standardized data acquisition programs on the instrument. Data consistency will be assessed by comparing repeated measurements. Analytical data will be accompanied by *README* documents describing the analytical procedures and the directory hierarchy.**3.** Data will be collected by standardized data acquisition programs on the instrument. Data consistency will be assessed by comparing repeated measurements. Analytical data will be accompanied by *README* documents describing the analytical procedures and the directory hierarchy.**4.** Microscope images will be named according to each material as follows: *Date*-*sample name*-*magnification*.jpg or .png.The quality of analytical data (2 and 3) will be ensured by calibration of instruments, repetition of experiments, and comparison with literature data/internal standards/previously obtained data, peer review. |
|  | What documentation and metadata will you hand over in addition to data? (specify what information users need to be able to read and interpret the data in the future and what standards will be used to interpret the data) | **1.** All data will be accompanied by explanatory documentation, according to the standards for synthesis methodology: text or pdf documents describing all the details of the experimental procedure/condition and material synthesis. **2**. Data will be accompanied by Metadata (creator, date, type of instruments used for the measurement, experimental conditions, hierarchy of data folder). The final analytical data sets will be stored in the chosen repository, accompanied by a README document with the contents of all the files as well as what analytical procedure was used to generate them.**3**. Data will be accompanied by Metadata (creator, date, type of instruments used for the measurement, experimental conditions, hierarchy of data folder, description which are needed to convert 2D image to 1D spectral data).**4.** Microscope images will be accompanied by README file describing the content of the data and other additional information |
| 2. | Legal and security issues |
|  | Are you bound by a confidentiality agreement? Do you have the necessary permissions to collect, process, store and share data? Have the persons whose data is stored been informed about it and have they given their consent? What methods will you use to protect sensitive data (GDPR - special categories of personal data)? | The implementation of this project will not violate ethical principles. |
|  | How will access to data and its security be regulated? What are the potential risks to consider? How will you ensure the security of sensitive data storage?  | Data will be processed and managed in a protected environment using PC provided by the Institute of Physics. Data will be stored in a centralized storage system managed by the IT Department of the Institute of Physics. Access to data is managed through Institutional Identity, which is a secure system and follows best practices in terms of identity management. |
|  | How will you manage copyright and intellectual property protection? Who will own the data? What licenses will apply to the data? What restrictions will apply to the reuse of personal data? | The research result is not expected to lead to a patent. Other intellectual property problems will be solved according to the recommendations of the Institute of Physics. Since the data is not subject to a contract, and will not be patented, it will be published as open data under the Creative Commons CC0 license. |
| 3. | Storage and preservation of data |
|  | How will the data be stored and how will the data be backed*up*during the research? What are the capacities data storage at your disposal? What procedures do you use for*backup*? | Data will be stored and back upped in the desktop PC of principle investigator, a protected offline environment laboratory PC, data storage server provided by the IT department of the Institute of Physics. The principle investigator will be responsible for storage and backups, which will be done weekly. Laboratory logs and hard copies are kept in the laboratory and will be scanned monthly to create digital data and stored in the Institutional data storage server. The principle investigators desktop PC has 7 TB of data storage space, which will be sufficient to store data collected during the project. |
|  | What is your data retention plan? In what formats will it be stored? | We will keep the data for 10 years on a virtual server that Institute of Physics and also store it in a suitable data archive at the end of the project. Where possible, we will store files in open archive formats, for example, word documents will be converted to PDF or encoded plain text files. Excel files will be converted to CSV format. When possible, we will also include information about the software used and its version number. |
| 4. | Sharing and reuse of data |
|  | How and where will the data be shared? On which repository do you plan to share the data? How will potential users find out about the data? | The project manager will share the final version of the data set via the institutional repository established in the national Dabar system where publications and other project documentation will be stored. The data will be published under the CC0 license. We chose the institutional repository in the Dabar system because it supports the FAIR principles: it assigns the groups a permanent identifier URN:NBN, ensures data visibility through the OpenAIRE portal and Google Scholar and the search engine dabar.srce.hr, and at the same time contributes to the visibility and transparency of the [institution's] work.  |
|  | If there are data that must not be shared (reporters bound by legal, ethical, copyright rules, confidentiality, etc.), explain the reasons for the restriction. | The data necessary for any publication will be available at the time of publication. All unpublished data will be stored in the repository for 12 months from the end of the project. |
|  | Confirm that you will use a digital repository that complies with the principles of *FAIR*. | We will use a digital repository that complies with the principles of *FAIR*. |
|  | Confirm that you will be using a digital repository maintained by a non-profit organization (if not, explain why you cannot share data on a non-commercial digital repository). | We will use digital repository maintained by a non-profit organization. |

Ref:

[1] Celjak, D., Dorotić Malič, I., Matijević, M., Poljak, Lj., Posavec K. and Turk, I.: "Research data - what to do with them?" [Research data - what to do with them ? : a handbook on research data management | Digital Repository of the Heart (unizg.hr)](https://repozitorij.srce.unizg.hr/islandora/object/srce%3A327)