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BioQantSense

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Twinning for excellence of the Serbian Research Center for quantum biophotonics

Work Package 4

Project management, coordination and monitoring

Deliverable 4.3

Data Management Plan

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1 Introduction

BioQantSense is funded through the HORIZON Coordination and Support Action, grant number 101064124. The coordinator of this project is the Institute of Physics Belgrade (IPB), National Institute of the Republic of Serbia. The aim of the BioQantSense is to promote quantum biophotonics research capacity and management skills at IPB, and to fill networking gaps by establishing a consortium with leading research institutions from Germany – Friedrich Schiller University in Jena, and from Italy – Consiglio Nazionale Delle Richerce in Florence.

Twining projects are implemented with a view to achieve scientific results, the raise of excellence and reputation of research and management level of the institution of the low-performing European country.

Purpose of data generation and collection is administration and organization of project activities, dissemination and communication to realize objectives of BioQantSense. As the support and coordination project, within BioQantSense the following data will be collected and generated in order to achieve the project objectives:

1) Increase research excellence and management skills at IPB as a result of twinning exercises: short and long-term exchanges, expert visits, joint summer schools, seminars and workshops to increase mobility of qualified scientists, upgrade competences and raise the experience level of existing personnel;

2) Enhance the reputation, attractiveness and networking channels of the coordinating institution by participation and organisation of international conferences, seminars, workshops, networking and other events, as well as increase percentage of scientific articles published;

3) Enhance the scientific and technological capacity of IPB with a principal focus on the research organisation culminating with the foundation of the multidisciplinary research center, Center for quantum biophotonics.

4) Develop and test research procedures, models and methods of the exploratory project.

2 Data Summary

CNR partner configured an internal cloud on OneDrive dedicated to BioQantSense (with access restricted to the project team partners) project for sharing documentation and dataset

In the BioQantSense project the data flow is characterize by the following:

- *documentation* on management and scientific training generated and exchanged within exchange visits:
    - management procedures of partners' Grant offices;
    - protocols and procedures to build bioquantum set-ups in IPB laboratories.

  During the project, the implementation these documents will be shared on the dedicated project cloud and then will be reported in the relative project deliverables.
- scientific *datasets* from bioquantum set-ups:
    - **imaging datasets** from micro and nano fabrication processes of photo-curable and photo-responsive material for biological applications. The format of images is in one of image standard formats as Tiff, JPG, etc.
    - **quantum correlation sets** from the interferometric setup. The format will be machine-readable files such as .csv or .txt
    - **quantum coherence images or movies** extracted from the interferometric superposition of quantum light paths with an object. The format of these files will be standard image or video clip formats.

  During the project implementation intermediate datasets will be produced and shared between partners in the dedicated project cloud and used for transferring knowledge to IPB.

  Dataset generated within the exploratory project phase, in the last year of the project, will be shared among the scientific community and main scientific results will be presented in international conferences and object of peer-reviewed scientific publications. The data sharing of these datasets, after eventually an embargo period, will be shared on European Open Science Cloud (EOSC) Portal.

2.1 Description of data

Characteristics of the twininig project are variety of different research datasets, both of experimental, theoretical, numerical and administrative nature, taken within BioQantSense. The BioQantSense project will generate two types of data, *documentation* from project activities and research results in form of protocols and scientific papers, and *datasets* generating from experimental sessions.

Project activites *documentation* concern reports such as:

- Material on workshops, summer schools and conferences,
- Reports on visits to expert's laboratories and expert visits to IPB,
- Reports on participation in international conferences,

- Communication, media monitoring and webpage reports,
- Outreach of the project (flyer, brochure, logo and visual identity guidelines),
- Risk assessment reports,
- Project Management Board feedback.

Research results and outcomes will be results joint research, e.g. based on mutual research visits, and of joint exploratory projects. These scientific results will generally reported as research publications in peer-reviewed journals as well as conference papers/proceedings. Moreover, this research data plan mainly concerns also original acquired *datasets* and includes:

- Measurement data: Data obtained through measurement via various instruments
- Visual information: Images and video recordings
- Methodological test procedure: Protocols to prepare samples, record observations or perform an experiment
- Computations and simulations
- Objects/Samples: From an external source or prepared in the lab
- Software to be used for the exepriment

The above information will constitute the called "metadata" of the shared datasets.

2.2 Documentation and data quality

All of the above-mentioned data will be documented following the Data management Plan guidelines from EC and shared on the basis of FAIR principles, where applicable. Therefore, all BioQantSense scientists are responsible for the data and proper documentation produced by them during the full duration of the project. This includes keeping records of all project activites data and performed experiments.

To maximize access to the data, it will be assigned by number of activity (deliverable), project acronym and number, name of file content, date. For open access publications, standard naming conventions will be applied according to editors of scientific journals.

In the second phase of the funding period, in the time of the exploratory project, the consortium will take concerted efforts on the harmonization and standardization of the documentation according to the FAIR (findable, accessible, interoperable, and reusable) principles of data management.

PMB will decide later in the project about the definititon of tools, information and standards to build metadata to be shared. Updates on this process will be reported in the upadtaed DMP deliverable.

2.3 Making data openly accessible

The BioQantSense consortium supports open and openly available free access to scientific information and will implement the EOSC using OpenAIRE services. The project will produce scientific research reports, conference proceedings, presentations, material for social networks, monitoring reports, strategy planning documents and other materials that will be disseminated with a partially open publication. Material dissemination, which has been limited through non-disclosure agreements with research partners and governmental

institutions and in cases where the research results may affect a project partner's commercial plans, national/EU security or public safety, will be confidential.

Dissemination level of project governance plan, risk assessment report, PMB feedback, part of information on a new project proposal preparation and management, media monitoring report and visual identity guidelines is planned to be confidential, available only for members of the consortium.

Knowledge management, ownership and access to key project information will follow to best practices principles in the research field and will depend on each respective item, and be treated accordingly. The intellectual property produced within this project will be subject to certain restrictions, as specifically mentioned in agreements between the project coordinator and partner organization. Project results intended for public use will be communicated with partner organizations and government institutions.

The data repository will enable making the data accessible for other researchers and public. Open ac-acess to the full text articles in peer-reviewed journals after the end of the embargo period will be accessible in an open resource like Zenodo webpage, journals webpages and related sites. The data will remain available and findable for the lifetime of the publicly accessible repository. In case of Zenodo, which is operated by CERN, this is expected to be at least 20 years. Metadata will be made openly available and licensed under a public domain, as per the Grant Agreement. This is guaranteed by uploading the data to Zenodo. The metadata access will enable the user to access all research data, in particular a description of the data and summary data for each file from the model output in each dataset.

2.4 Storage and technical backup

All research data sets are stored electronically at both the apparatus and personal computers of each BioQantSense researcher. As mentioned earlier, CNR has configured an internal cloud on OneDrive dedicated to BioQantSense for sharing documentation and datasets.

In the BioQantSense project the data flow is characterize by the following:

Additionally, all processed data, which include publications together with their underlying original data, presentations, posters, seminar as well as Master and doctoral theses, are stored centrally with access for all BioQantSense scientists on the One Drive storage dedicated to BioQantSense project.

2.5 Legal obligations and framework

As mentioned already above, all BioQantSense scientists are share a common responsibility for the raised data and metadata during the full duration of the project. This includes proper documentation and storage. The respective employer (IPB, FSU, CNR and FBUB)) is the owner of the data, but any usage of the data is executed by the BioQantSense scientist(s) who produced the data. In a case of PhD student, i.e. when an individual finishes his/her thesis and will leave BioQantSense, he or she must hand out permanent carriers of their obtained data to the scientist of the respective research group, who then becomes responsible. This includes e.g. presentations, posters, theses and reports. Also this data is physically stored as described earlier.

2.6 Data exchange and permanent accessibility of data

The most valuable research is processed to theses, publications, reports or/and seminars. All this data is stored or linked at by the project website. The underlying metadata will be made accessible on a long-term basis based on OpenAIRE, as described above.

2.7 Accountability and resources

Dusan Arsenović, the Principal Investigator of BioQuantSense, presiding also on PMB will continue to be responsible for all steps of the data management for the duration of project. He will be strongly supported by the project coordinator Brana Jelenković who has already long-lasting experience on coordination of research projects and data management.

Financial requirement aspects have been considered and reflected into the budget for each partner of BioQantSense. Peer-reviewed publications costs related to open access to research data are eligible aspart of the Horizon Europe grant therefore will be covered by the project budget. Costs for long term preservation of open access papers will be covered before publication in a journal.