Contribution ID: **133** Type: **Poster**

Annual Meeting DAPHNE4NFDI for Synchrotron Bio-imaging: the LMU activities

Advances in synchrotron imaging and computed tomography (CT) enable non-invasive, high-resolution 3D visualization of samples, including biological tissues, surpassing standard methods. This innovation generates massive data volumes, requiring tailored solutions for data capture, management, storage, and repositories for processed data and analysis code. These solutions enhance transparency and maximize data reuse in biomedical research. We have been collaborating closely with scientists and IT experts from various synchrotron facilities, primarily at ESRF and PETRA III. We have established a consistent vocabulary and compiled a comprehensive list of parameters applicable across different imaging beamlines. The results of this work will be shared with other imaging beamlines and facilities. The LMU team, together with the tomography-user teams of Göttingen University and HZB, has finalized a metadata table and its description for generic (bio)synchrotron imaging and CT experiments for the white paper. Currently, the implemented or in-progress metadata recording is focused mainly on storing parameters up to the data acquisition phase. In collaboration with ESRF IT experts, we are currently discussing the extension of this list to include comprehensive post-processing metadata, at least up to CT data reconstruction, which is a common component of all CT experiments. Additionally, ESRF does not provide detailed sample metadata information. We are in the process of discussing with the ESRF IT team to integrate the IGSN link with ICAT to connect the corresponding experiments. The subsequent steps of image processing, data analysis, and quantification require significant collaboration within the community, as each application demands specific processing pipelines and tools. We aim to identify the common components of this workflow and propose a suitable metadata scheme. As part of our commitment to TA3, we are developing an image processing workflow tailored for the analysis of biological tissues, incorporating machine learning-based models for segmentation, analysis, and quantification. This processing pipeline will be shared with the broader user community (https://github.com/hfahad/U-NET-Synchrotron_CT-image_segmentation.git). Through collaboration among user groups, scientists, and IT experts from synchrotron facilities, the LMU team is working to establish a general FAIR data workflow for synchrotron imaging and CT experiments. The LMU team has finalizing the installation process of SciCAT on the LMU machine with coordinated efforts from LMU IT Services, the Leibniz Supercomputing Centre (LRZ), and the Helmholtz Centre Dresden-Rossendorf. Currently, SciCAT is undergoing further processing and will be initially available for our group and subsequently for our collaborators. The purpose of this implementation is to install and interface SciCAT with the existing catalog system, enhancing overall data management.

Primary authors: FAHAD, Hafiz Muhammad (LMU); Prof. COAN, Paola (Ludwig Maximilian University of Munich University in Germany)

Presenter: FAHAD, Hafiz Muhammad (LMU)

Session Classification: Poster