Commissioning call for Serial cryoFIB/SEM volume imaging data collection on the Helios Hydra cryoPFIB/SEM

In collaboration Rosalind Franklin Institute & Diamond are pleased to announce a commissioning call for researchers to access the cryo volume imaging capabilities of the Helios hydra cryoPFIB/SEM housed at Diamond.

The Helios Hydra is the latest generation plasma FIB/SEM from Thermofisher and has some unique capabilities Helios Hydra 5 DualBeam:

- Optimised for cryo temperatures.
- Latest generation multi-gas species plasma FIB (argon, nitrogen, oxygen and xenon) source greatly increases the processivity of the instrument.
- Equipped with the Elstar electron column, which is optimised for low kV imaging and in combination with the ETD and TLD detectors operated in immersion mode provides highest quality SEM images (Dumoux et al, 2022)
- SerialFIB and Auto-Slice and View software for automated volume data collection (Klumpe et al., 2021, eLife)

These capabilities are being developed through a tripartite collaboration between the Rosalind Franklin Institute, Diamond and Thermofisher Scientific funded by the Wellcome Trust and EPSRC. This call aims to provide a platform for the wider user community to experience serial cryoPFIB/SEM volume imaging on the Helios Hydra (Dumoux, 2022) and will help inform the collaboration partners on the wider user requirements/desire for this type of experiment in the future.

Please select the Rapid access route and the Helios instrument when you submit your proposal. Proposals are also open to existing BAG PIs.

Proposals will be reviewed by eBIC staff (the Rosalind Franklin Institute has no part in the review process) with a view to schedule beamtime from August/September 2023.

Requirements

The successful applicants will have a strong science case outlining why they think volume imaging would benefit their project and have preliminary data showing that they have suitable samples. The number of sessions allocated per project will be assessed by eBIC in discussion with RFI staff and the applicants.

The Helios Hydra can accept both standard cryoEM grids clipped into auto-grid rims and Leica 3mm HPF planchets. Two samples can be loaded into the Helios Hydra at any one time and as such we would expect at least 2 grids/planchets per microscope session (see below). The user will have to confirm that the samples in the machine are BSL1.

Visit structure

The visit will be 24 hours in duration. Sample loading and targeting will be performed during the day with the expectation that the optimal area be set up for volume imaging by the end of the working day. Approximately 150um^3 area can be imaged during an overnight collection. Fiji is available on the Diamond system for initial alignment of the slices in the volume.

After the visit the user will be required to provide feedback in the form of comments on their user experience and on the visit structure, workflow, results and areas for improvement.

Follow up information, including details of publications, must also be provided with acknowledgements to both Diamond and the RFI (using the format described on the Diamomnd web-site – see Publications). This will help develop and improve workflows for future visits and provide feedback on the performance of the Helios hydra pFIB in this mode of operation to the collaboration partners.

Kind regards,

eBIC and RFI Teams