# Cryo-correlative and multimodal characterization of biological samples for imaging


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(Lignes DISCO et PROXIMA 1, Synchrotron SOLEIL, Saint Aubin)


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### Amphithéâtre Synchrotron SOLEIL

THÈSE


This thesis is part of the Marie Sklodowska-Curie Doctoral Networks Action (MSCA-DN) CLEXM, funded by the European Union under Horizon Europe. CLEXM (Correlative, Light, Electron and Xray Microscopy) addresses an urgent need for collaborations in the field of correlative multimodal imaging. It will gather and integrate information from complementary imaging modalities to create a more complete view of biomedical processes of disease and drug therapy research.
The doctoral thesis presented by Harisa Rista investigates biological structures at the mesoscale using correlative and multimodal cryo-imaging techniques. It explores liquid-liquid phase separation, liquid-crystalline transitions and cellular stress in HEK293-f cells, as well as virus-induced membrane remodeling and mitochondrial swelling in Huh7 cells infected with hepatitis C virus. Reliable vitrification is essential to preserve samples in a hydrated, near-native state and prevent ice-crystal damage. To ensure sample quality, three complementary cryo-triage techniques are combined: light interferometry, micro-Fourier transform infrared spectroscopy (micro-FTIR), and X-ray diffraction (XRD). Interferometry provides 3D surface topography of TEM grids, helping assess ice thickness, grid uniformity and transfer reliability. Micro-FTIR and XRD identify the phase of water (vitreous or crystalline), with XRD providing direct confirmation of crystallinity. While interferometry and micro-FTIR are non-destructive, XRD is used to validate vitrification protocols on dedicated grids. Together, these methods establish a robust quality-control workflow, validate sample vitrification and demonstrate its reproducibility across HEK293-f and Huh7 cells.


***Les membres du jury sont :***

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Vous êtes cordialement invités au pot qui suivra

**Formalités d'entrée** : accès libre dans l'amphi du pavillon d'Accueil.
Si la manifestation a lieu dans le Grand Amphi SOLEIL du Bâtiment Central merci de vous munir d'une piece d'identité (à échanger à l'accueil contre un badge d'accès).


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