

Advanced Imaging Technologies from Formulatrix for Macromolecular Crystallization

Jian Xu, Ph.D., Formulatrix, Inc.

Recent advances in protein crystallography has shifted the bottleneck to detection of difficult crystals, such as sub-micron protein crystals in heavy precipitates or in lipidic cubic phase (LCP). In this presentation, we will illustrate the advantages of three complementary imaging technologies: SONICC (Second Order Non-linear Imaging of Chiral Crystals), FRAP (Fluorescence Recovery After Photo-bleaching) and MFI (Multi-Fluorescence Imaging). While serving as hits for further optimization to grow larger crystals, small crystals can now be measured by the synchrotron advancement. X-ray free electron laser (XFEL) specifically needs nanocrystals and LCP crystallization of membrane proteins often only generates such small crystals. SONICC has lately received increased attention from the scientific community due to its capability of detecting sub-micron crystals with built-in Second Harmonic Generation (SHG) detection and Two Photon Excited UV Fluorescence (UV-TPEF). Using FRAP to prescreen the probable crystallization conditions in LCP not only reduces the cost of LCP experiments but also increases the likelihood of success in LCP crystallization. Finally, MFI supporting three different fluorescence wavelengths in a large plate storage unit with automatically scheduled imaging allows for the detection of crystals of protein-protein complexes as well as those proteins without tryptophan.