**Structural Dynamics in Biology using LCLS**

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The resolution revolution of cryo-EM for experimental structure determination of biomacromolecules combined with the breakthrough results of AlphaFold and its derivatives for structure prediction of biomacromolecules have ushered in a new era in structural biology. This poses the question of what is the place for x-ray crystallography and x-ray Free Electron Lasers (xFELs) such as the Linac Coherent Light Source (LCLS) in structural biology moving forward? We believe that one compelling area of research using LCLS is studying the structural dynamics of biomacromolecules. LCLS and other xFELs offer very high temporal resolution combined with atomic spatial resolution while eliminating the ill effects of conventional radiation damage. This unique combination will facilitate the study of both triggered and stochastic biological dynamics. For example, the spatiotemporal resolving power of LCLS can be used to study the initial photophysics and photochemistry in light-sensitive proteins as well as short time points in an enzymatic reaction between a biomacromolecule and substrate. The structural methods can also be combined with powerful complimentary techniques, such as x-ray absorption and emission spectroscopies, to understand the structure and chemical environment of biomacromolecules. The presentation will cover the unique properties of LCLS and the upcoming upgrades to LCLS-II and LCLS-II-HE and how we can use a variety of additional technologies and methodologies to access a myriad of biologically relevant time scales.