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Keynote 1: Serial diffraction of macromolecular systems

Monday, 15 May 2023 11:15 (45 minutes)

The femtosecond-duration pulses of X-ray free-electron lasers overcome the limitations of exposures of biological materials by outrunning radiation damage. In this way, it has become possible to obtain meaningful data from samples too small for conventional analyses, at the expense of measuring only a single exposure from a single object. Diffraction data collected in a serial fashion from a stream of randomly oriented crystals or particles can be merged into a 3D dataset by discovering the latent parameters of orientation, crystal twin component, or structural evolution. This measurement paradigm enables 3D images to be obtained from ensembles of structures, even in the limit of extremely low signal per object. Current developments continue to improve serial diffraction experiments with the goal to image even smaller and weaker scatterers.

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Computational Biology

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