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**Time-Resolved Crystallography and Optical Studies of Single Crystals at Biocars: Present Capabilities and Future Directions**, R. Pahl, V. Srajer, K. Moffat, Consortium for Advanced Radiation Sources, The Univ. of Chicago, Chicago, USA.

Time-resolved crystallography is a unique technique for determining the structures of intermediates and excited states in biomolecular and chemical reactions. Using the Laue x-ray diffraction technique at the high-brilliance third-generation x-ray sources (ESRF, APS, SPring-8, etc.) snapshots are taken of molecules in action with a time resolution of about 100ps, the typical duration of a single x-ray pulse at synchrotron sources. We present the status of the user facility for time-resolved studies at BioCARS, an NIH/NCRR funded Synchrotron Structural Biology Resource at the Advanced Photon Source. During the past years a continuously growing time-resolved user community has developed; projects under investigation include light and chemically triggered reaction mechanism. Results from most recent studies of photo-sensitive proteins will be discussed. An overview will also be given on the current efforts in enhancing the technical capabilities for time-resolved diffraction experiments and spectrophotometry at BioCARS. The technical upgrades will improve resources for complementary optical monitoring of reactions in crystals, update the laser systems, and most importantly improve the x-ray optics to enable single x-ray pulse experiments.