Wednesday, March 30, 2022
4:00 P.M.

Ackert Hall, Room 120

Biochemistry & Molecular Biophysics **Seminar**

New Light on an Old Problem: Time-resolved X-ray Crystallography of Enzymes in Action

Mark Wilson

Biochemistry Department
Redox Biology Center
University of Nebraska, Lincoln

A vast number of enzymes rely on cysteine modification for function. Transient covalent modification of enzyme active sites during catalysis can be coupled to catalytically important conformational changes. In this talk, I will describe how modification of the active site cysteine residue in isocyanide hydratase (ICH) triggers a cascade of conformational changes that are important enzyme turnover. X-ray free electron laser (XFEL) crystallography allows the direct visualization of the proposed thioimidate intermediate and the resulting enzyme conformational variability, elucidating the ICH mechanism. Because most enzymes that form catalytic intermediates will experience similar transient changes in active site interactions, modification-gated conformational dynamics may be a widespread means for regulating protein conformational dynamics. I will also briefly describe the new cryo-electron microscopy center at the University of Nebraska, which will offer a regional resource for cutting edge structural biology.