



HAVERFORD COLLEGE

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Title: *"Capturing transient interactions of proteins involved in natural product biosynthesis"*

Abstract:

How do microorganisms produce chemically diverse and structurally complex molecules? How can humans harness this energy to better human health and the environment? These questions inspire our lab to study acyl carrier proteins (ACPs), which are central hubs in polyketide and fatty acid pathways. This class of proteins is notoriously challenging to study because the fast motions of the ACP's phosphopantetheine (Ppant) arm make its conformational dynamics difficult to capture using traditional spectroscopic approaches. In this talk, I will present how the synthetic modification of the terminal thiol of ACP's Ppant arm into a thiocyanate transforms the ACP's reactive site into a vibrational spectroscopic probe that can report on the local environment of the Ppant arm. I will share a story about how we leveraged this probe to resolve Ppant conformations on the picosecond time scale and visualize ACP complex formation with functional catalytic partners. We anticipate that these methods will be valuable in future structural and biosynthetic engineering studies because our approach is generalizable, practical, and scalable. Our studies combine concepts and techniques spanning biochemistry, organic chemistry, bioinformatics, and physical chemistry, and therefore I hope this talk will be of interest to a broad audience.