

MARIE HEFFERN

Associate Professor

UC Davis



Thursday, February 12th

10:30 AM - 11:30 AM

Steele 006

“Building an Extracellular Metal Profile Towards Biomarker Discovery”

Abstract: Trace metal micronutrients, such as copper, iron, and zinc are vital to a host of biological processes, but their dyshomeostasis is associated with a number of disease states. The context in which a metal resides within a biological environment significantly influences its activity and function. Recent years have seen a rise in tools for monitoring metal ions and have illuminated the diversity in metal speciation in biology, but many of these tools are focused on probing metals in the intracellular space. The state-of-the-art methods for assessing metal status in extracellular fluids such as blood plasma focus either on absolute quantitation or evaluate a limited number of metal-containing species. While these methods have offered important insight into extreme cases of metal deficiency or overload, subtle imbalances are more challenging to diagnose and understand with the available methods. In this talk, I will describe our efforts to expand and elucidate the metal speciation of the extracellular space, with an immediate focus on blood-based fluids due to their clinical importance in biomarker assessment. Our work spans the development of new detection methods for this milieu, approaches for integration into proteomics-based studies, and targeted molecular investigations of clinically relevant biomolecules. I will further discuss how insights gained from these approaches impact nutritional treatments, therapeutic peptide development, and biomarker discovery for metabolic disorders.

Bio: Marie Heffern is an Associate Professor of Chemistry at the University of California, Davis, where her research focuses on developing chemical tools to uncover how endogenous and nutritionally available metals regulate hormone function and metabolic health. Her group integrates synthetic and peptide chemistry, imaging, analytical methods, and biological models to probe metal–hormone interactions in the extracellular space and in vivo. She earned her Ph.D. at Northwestern University as an NSF Graduate Research Fellow with Professor Thomas J. Meade and completed postdoctoral training as a UC President’s Postdoctoral Fellow at UC Berkeley with Professor Christopher Chang. Her work has been recognized with honors including an NSF CAREER Award, the Agilent Research Catalyst Award, the Jonathan L. Sessler Fellowship for Emerging Leaders in Bioinorganic and Medicinal Inorganic Chemistry, the Paul Saltman Young Investigator Award, and selection as one of *Chemical & Engineering News*’ Talented 12.