



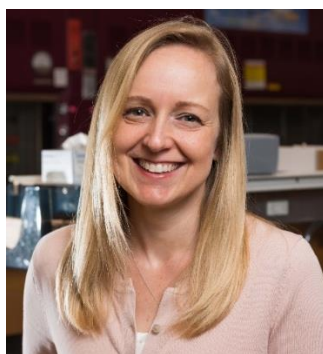
Department of Chemistry

University of Central Florida

Department of Chemistry Seminar Series – Fall Semester 2023

Monday November 13th, 9:00 am, Location CB2 105

Insights into the Development of NMR Interpretation Ability



Dr. Ginger Shultz

University of Michigan

Host: [Dr. Erin Saitta](#)

Abstract: Most curriculum for teaching NMR spectroscopy draws on idealized spectra and does not fully engage learners with authentic data analysis. To better understand how chemists learn to interpret spectra, we investigated the development of NMR interpretation ability when participants responded to tasks that better resemble the actual practices of professional chemists. We monitored undergraduate and graduate students as they evaluated the success of chemical syntheses through IR and ^1H NMR spectral interpretation. Participants completed a series of interpretation tasks while having their eye movements tracked and then participated in semi-structured, cued retrospective think-aloud interviews about their reasoning during spectral interpretation. These interviews were analyzed qualitatively to characterize chemical assumptions and heuristic reasoning strategies used by participants. Undergraduate participants exhibited uninformed bidirectional processing of all information, whereas doctoral participants exhibited informed unidirectional processing of relevant information. These findings imply that the community can support novices' development of expertise by encouraging informed interpretation strategies, including the preliminary evaluation of relevant variables, prediction of expected spectral features, and search for complementary data across spectra.

Bio: Ginger Shultz is an Associate Professor of Chemistry at the University of Michigan. Her interest in education began when she was an undergraduate at the Evergreen State College, where the progressive curriculum shaped her early views on learning. Professor Shultz earned a Ph.D. in polymer chemistry at the University of Oregon and taught hands-on science to elementary school children through a National Science Foundation GK-12 Fellowship. After graduate school, she transitioned to education-focused research through a teaching postdoc at the University of Michigan. In 2013 she was named a UM Presidents Postdoctoral Fellow and began pursuing educational research full time. She joined the faculty as an Assistant Professor in 2016 and was promoted to Associate Professor with tenure in 2022. Her research program focuses on understanding how college-level chemistry instructors learn to teach, how writing supports learning and reasoning in science, and using community-based design to operationalize culturally relevant educational methods in STEM.