

### ***Research-based insights into chemistry student learning and professional development.***

Our chemistry education research group has two foci: (1) research on chemistry learning and instructional practices; and (2) equity and inclusiveness in chemistry professional training. In this seminar, I will highlight one narrative from each. First, identifying reflectional and rotational symmetry is a fundamental concept across STEM fields and is essential in inorganic chemistry where identification of symmetry elements and point groups are leveraged to predict molecular properties. Students' knowledge of symmetry is often assessed using a single representation of a molecule. Evidence in cognitive science suggests an object's orientation can impact how symmetry elements are perceived. We have leveraged a cognitive resources-based perspective to investigate how molecular orientation impacts the ways rotational and reflectional elements are activated for inorganic students. Second, while the number of women participating in both undergraduate and graduate education programs in chemistry have risen near to parity with men in recent years, a disproportionately low number of women still apply for faculty positions. In order to explore what factors contribute to this seemingly low interest in faculty positions in chemistry, we developed a survey based in Social Cognitive Career Theory. The survey, informed by interviews and existing literature, was distributed to women across the United States and Canada. Following dissemination, the results were analyzed through a QuantCrit lens to identify themes in women's interests, expectations, experiences, and confidence, as well as which of those items had the largest correlations to interest in a faculty career. This seminar will describe the findings from each study and provide suggestions for (1) inorganic instructors to more holistically assess student understanding of symmetry; and (2) departments to reduce the exclusion of women in their departments at both the graduate and faculty levels.