

Introducing undergraduate students to single crystal X-ray diffraction through a course-based undergraduate research experience

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The integration of active learning strategies within introductory STEM courses is an effective paradigm for improving student engagement and performance. The objective of this project was to introduce students to chemical crystallography and increase their desire to conduct undergraduate research. To accomplish these goals, a course-based research experience (CURE) utilizing X-ray instrumentation was developed and implemented across a diverse undergraduate student population at Florida Gulf Coast University. The students in CHM 3610 Inorganic Chemistry were given a list containing dozens of organic compounds that had not had their crystal structure published in the Cambridge Structural Database (CSD). The students were able to select their own individual chemical from this list and research information associated with that chemical (i.e. properties, hazardous, applications). They researched what solvent systems they should use to grow single crystals of their chemical via slow evaporation. If the students obtain suitable crystals, they will be analyzed on the new single crystal X-ray diffractometer that FGCU has recently obtained through an NSF-MRI grant. An outline of the CURE activities implemented in this course and the results obtained will be presented herein.