Integrating Undergraduate Interns Into an X-ray Diffraction Infrastructure

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Florida Polytechnic University – a predominantly undergraduate institution and the newest member of the State University System of Florida – has recently entered into a strategic agreement with Rigaku Americas to develop an X-ray analytical capability that will enrich this new environment. A major component of this installation is the Rigaku SmartLab, a high-resolution state-of-the-art X-ray diffractometer that is capable of performing a wide variety of analytical functions. At Florida Poly, we have instituted a unique internship program where undergraduate students (either individually or in two-student teams) are each given ownership of one specific capability of the SmartLab instrument. In this ongoing process, students will be documenting (1) the scientific basis of their specific X-ray analytical method; (2) the specific laboratory methods (instrument setup and sample requirements) required for a particular analysis; (3) the details of their data collection strategy; (4) data analysis methods and procedures; and (5) a critical assessment of the capabilities (and limitations) of their chosen technique. Besides producing a uniform “user’s guide” to the use of the multitude capabilities of the SmartLab system, this process will allow each student (or pair of students) to develop an understanding in depth of a specific approach to crystallographic analysis, as well as gaining a broader appreciation of the demands of modern scientific instrumentation. Here, we will discuss the current progress of our student interns in this approach as well as the challenges and opportunities that are presented.