



Analytical Seminar

Thursday, October 20, 2016

12:15 pm 1315 Chemistry

Professor Garth Simpson
Purdue University



“Nonlinear optics off the laser table: Transitioning fundamental studies of chirality to benchtop tools for structural biology and pharmaceutical analysis”

The unique symmetry properties of second harmonic generation (SHG) provide access to novel light-matter interactions inaccessible through conventional linear spectroscopy. In particular, crystals of chiral molecules routinely exhibit bright SHG, while those same molecules produce no coherent signal in solution or in amorphous form. The physical origins of the polarization-dependent SHG signals produced can be understood through relatively simple models bridging molecular and macromolecular structure to polarization-dependent nonlinear optical processes. Two applications of SHG microscopy will be discussed in detail: i) efforts to produce protein crystals to aid in structural biology efforts, and ii) efforts to prevent small molecule crystallization in the design of pharmaceutical formulations. Discussion will include assessment of future prospects and challenges for routine benchtop nonlinear optical measurements.