MEMORIAL UNIVERSITY

Chemistry Departmental Seminar

Anderson Award Lecture - Dr. Danielle Tokarz

Associate Professor, Department of Chemistry, St. Mary's University

Tuesday, May 21, 2024 at 1:00 p.m. (Room: CSF-1302)

Title: Polarization Resolved Second Harmonic Generation Microscopy for Biomedical Applications

Abstract: Information regarding the structure and function of living tissues and cells is instrumental to the advancement of biochemistry and biophysics. Nonlinear optical microscopy, in particular, second harmonic generation (SHG), can provide such information. For instance, SHG microscopy can be used to visualize several biological tissues while polarization-resolved SHG imaging can be used to extract several parameters related to the ultrastructure of biological tissues. In this talk, I will discuss the use of polarization-resolved SHG microscopy to investigate the ultrastructure of collagen in diseased tissues as well as model systems to understand collagen disorganization in these tissues. I will also discuss the use of polarization-resolved SHG microscopy to investigate other biological tissues including the degradation of otoconia, inner ear calcite crystals which act as linear acceleration sensors.

Biography: Danielle Tokarz obtained her H.B.Sc. degree in 2008 and Ph.D. in 2014 from the University of Toronto where she studied the nonlinear optical properties of conjugated molecules. She completed a postdoctoral fellowship in 2015 at the University Health Network, and undertook an NSERC postdoctoral fellowship at Harvard Medical School, using nonlinear optical microscopy for biomedical applications. In 2017, Danielle started as an assistant professor in the Department of Chemistry at Saint Mary's University. She is now an associate professor there honoured with the title of Santamarian professor. Her current research program is geared towards characterizing ultrastructural alterations during natural as well as artificial synthesis and degradation reactions in carbohydrate- and protein-dense model systems via development of nonlinear optical microscopy imaging analysis techniques