

## BME SUMMER LECTURE



### "Oncologic Applications of Quantitative Biophotonics"

**Stephen Chad Kanick, Ph.D.**  
Profusa Inc. | Dartmouth College

August 9, 2018 at 11:00 a.m.  
Harut Barsamian Colloquia room, Engineering Hall, room 2430

**Abstract:** Optical measurements of tissue provide sensitivity to both biological structure and physiological function. Measurements of reflected white light provide descriptions of the local tissue microenvironment, including metrics of vascular physiology (e.g. blood content and microvascular saturation) and morphology (e.g. cellular density, intracellular machinery, and fibril orientation). This information can be used diagnostically to sense differences between healthy tissue and dysregulated malignant tissue. Measurements of fluorescent light can be used to sample the biodistribution of administered therapeutics or to identify targeted receptors expressed in a tissue of interest. These measurements can be used to monitor cancer therapies to multiple end points: to verify the therapeutic dose delivered, elucidate therapeutic mechanisms, or identify indications to optimize administration methods. This talk will discuss the development of a few novel biophotonic approaches that return clinically relevant quantitative tissue parameters. These approaches range from the use of fiber optic probes that are small enough to fit through a biopsy needle for the staging of lung cancer, to the use of wide-field scatter and fluorescence imaging to quickly sample microstructure and function of tissue over large areas and guide surgical choices during resections of breast and brain cancers. This talk will present progress of these approaches from concept identification to pilot clinical translation.

**Bio:** Stephen Chad Kanick is the Director of Data Science for Profusa Inc., a startup that develops biocompatible subcutaneous biosensors that continuously monitor tissue analytes. Previously, he was an Assistant Professor of Engineering in the Thayer School of Engineering at Dartmouth College, where he still currently holds an adjunct appointment. He completed a post-doctoral appointment in the Center for Optical Diagnostics and Therapy at the Erasmus Medical Center in Rotterdam, the Netherlands. He holds a B.S. degree in Chemical Engineering from West Virginia University, and both M.S. and Ph.D. degrees in Chemical Engineering from the University of Pittsburgh. Chad's research focuses on the development of new quantitative spectroscopy approaches that are used for diagnosing pathologies, guiding surgeries, and monitoring administered therapies. Chad has authored 50 peer-reviewed publications and has received a Career Development Award (K25) from the National Cancer Institute.