



Department of Physics Seminar

Tissue Optics: Spectroscopy and Imaging of Living Systems

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Abstract: Light interactions with matter forms the bedrock of how we've uncovered the fundamental aspects of our living universe. From understanding our own vision to detecting elements and molecules present in space, spectroscopy and imaging have played pivotal roles in the history of science. Here, I will discuss the basic physical models we use to study light propagation in turbid (multiply scattering) media such as biological tissues. I will discuss how such methods have facilitated development of optical approaches for non-invasive, dynamic and quantitative sensing in biology and how they can be used practically to determine structural and functional properties of living tissues in their native states. I will provide an overview of the field of tissue optics and describe experimental approaches that leverage theoretical techniques to quantitatively measure biological systems, discuss active projects within my research group at Miami, and highlight some results of ongoing and previously completed studies. Particularly, this talk will seek to highlight the utility, applicability and practicality of these optical techniques to interface with fields of clinical medicine, psychology and biology. I will conclude by talking about the potential of biophotonic sensing as an integral component of medicine, especially by leveraging the rapid advances in low-cost computing and optoelectronic components achieved over the last decade.

Bio: Dr. Vishwanath received a MS in Physics from Dartmouth College in 2003 and completed Ph.D. from the University of Michigan with Dr. Mary-Ann Mycek in 2005. Then he conducted post-doctoral research at Michigan and Duke. Dr. Vishwanath also spent years working in industries as a senior research scientist till he joined Miami University in 2014. Dr. Vishwanath is directing the OSIM lab and exploring the use of optics to understand and solve biomedical problems. He like working with students and researchers across disciplinary boundaries toward applying science and technology for improving quality of human life.

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Seminar begins at 2:30 PM in Science Center 128

Refreshments will be served