



**MON, APR 4, 2016**  
**10:00am-11:00am**  
**EGR BLDG 2 RM W122**

## LENS VS ALGORITHM: OPTICAL IMAGING IN THE AGE OF COMPUTERS

### Abstract:

Optical coherence tomography (OCT) has provided an alternative to physical sectioning that allows for imaging of living samples and even in vivo examination of cell structure and dynamics. The sectional imaging of OCT is achieved by direct visualization of raw data obtained in focused optical range finding. As a result, there is, in the OCT community, a widely held belief that there exists a trade-off between transverse resolution and the thickness of the volume that may be imaged with a fixed focal plane. In this talk I will show that solution of the inverse scattering problem enables a new method we call interferometric synthetic aperture microscopy (ISAM) that provides a spatially invariant point-spread function for the system with resolution everywhere equal to the best resolution in the raw data (in the focal plane). Moreover, aberrations and other supposed flaws in the optical system are eliminated by the same method. I will give several examples of the method in use in biological systems and some recent clinical results in breast cancer.

### Dr. Scott Carney

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### Biography:

Prof Carney holds a BS in Engineering Physics from UIUC (1994), and a PhD in Physics from the University of Rochester (1999). He was a post-doctoral associate at Washington University from 1999 to 2001 when he joined the faculty of UIUC ECE. He is a theorist with research interests in inverse problems, imaging, coherence theory and other branches of optical physics. He is also the cofounder of Diagnostic Photonics, Inc., a company bringing innovations in computed imaging to the surgical market. He is active in the community beyond his research, serving as the editor-in-chief of the Journal of the Optical Society of America A and General Co-Chair of the 2016 Frontiers in Optics conference.

# ECE SPEAKER SERIES

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