Department of Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Fall 2022
Seminar Series

Super-resolution and hyperspectral imaging with spatio-temporally modulated illumination light

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Professor of Electrical and Computer Engineering and Biomedical Engineering
Colorado State University

Co-sponsored by Morgridge Institute for Research and the UW SPIE/Optica Chapter

Coherent nonlinear microscopic imaging is a powerful method for studying specimens without the introduction of external labels. Nonlinear optical imaging is particularly useful in complex environments that suffer from significant optical scattering and absorption where conventional camera-based methods fail. Optical imaging with single pixel detection enables imaging detailed structures in specimens by scanning a point focus of light in three dimensions. Simple point scanning provides limited information relative to the bandwidth of a single pixel detector. I will discuss recent advances in multiplexed imaging where dynamically structured illumination light is able to extract significantly more spectroscopic and spatial information from a specimen. Application of dynamic light structuring to super resolution microscopy, hyperspectral imaging, and Raman microscopy will be discussed.

ABOUT the SPEAKER

Randy A. Bartels is a Professor of Electrical and Computer Engineering and Biomedical Engineering at Colorado State University (CSU). Prof. Bartels has been awarded the Adolph Lomb Medal from the Optical Society of America, a National Science Foundation CAREER award, a Sloan Research Fellowship in physics, an Office of Naval Research Young Investigator Award, a Beckman Young Investigator Award, an IEEE-LEOS (now Photonics Society) Young Investigator Award, a Kavli Fellow of the National Academy of Sciences, and a Presidential Early Career Award for Science and Engineering (PECASE). His research involves the development of novel spectroscopy and microscopy techniques and ultrafast fiber lasers for use in these applications. He is a Fellow of the Optical Society of America and of the American Physical Society (APS). He serves on the Editorial Board of Applied Physics Letters, Photonics and is an editor for Optics Communications and for Science Advances.

Monday, October 3 at noon
1003 Engineering Centers (Tong Auditorium)