SPIE Student Seminar Series

Dr. Kevin Eliceiri

(University of Wisconsin-Madison)

Computational Optics of the Tumor Microenvironment

Tuesday, August 25th, 2020

11:00 am ~ 12:00 pm (CDT)

ZOOM ID: 870 0733 3005

Abstract: The cellular microenvironment in disease models is increasingly being recognized as a key contributing factor in disease onset and progression. Particularly in cancer, key features of the cellular microenvironment such as metabolic fluxes and organization of the collagen rich extracellular matrix (ECM) have been demonstrated to be candidate image based biomarkers for cancer invasion and progression. However despite the great promise of these microenvironment image features, their application to pathology has been limited for several reasons including a lack of computational methods for extracting these signatures. We will overview our collaborative work to quantitate metabolism and ECM organization in a range of pathology models all using a combination of both intrinsic and extrinsic multiparametric optical signals. These signals include polarization, fluorescence intensity, spectra and lifetime. We will discuss technical approaches and advances for each also present the computational tools being used for this work including open source software we are developing specifically for this.

Bio: Dr. Kevin Eliceiri is the Walter H. Helmerich Research Chair and Professor of Medical Physics and Biomedical Engineering at the University of Wisconsin at Madison. He is an Investigator in the Morgridge Institute for Research and member of the Carbone Cancer Center and McPherson Eye Research Institute. He is director of the Laboratory for Optical and Computational Instrumentation, a biophotonics laboratory dedicated to the development and application of optical and computational technologies for cell studies. The Eliceiri lab is the lead developer of several open source imaging packages including FIJI and ImageJ. His instrumentation efforts involve novel forms of polarization, laser scanning and multiscale imaging. Dr. Eliceiri has authored more than 200 scientific papers on various aspects of optical imaging, image analysis, cancer and live cell imaging. He is also faculty advisor for the UW Madison SPIE/OSA student chapter.

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