Title: Advancing cancer diagnosis and screening with biomarker-specific multispectral imaging

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Abstract:
White light imaging (WLI) remains indispensable as the standard of care during surgery and therapy, from ophthalmoscopy to endoscopy. The primary purpose of WLI is to guide the operator by faithfully replicating the human vision system. Yet in doing so, valuable biological information about the tissue is subsequently lost, with tissue contrast perceived solely by the human eye. Multispectral imaging (MSI) captures spatial information across a number of spectral (or color) bands. Selecting spectral bands to target specific spectral biomarkers could enhance the sensitivity and specificity of imaging diagnostic methods. Multispectral filter arrays (MSFAs) based on thin-film optical components can be monolithically integrated with image sensors and are proposed as a key enabler for MSI in biomedical imaging. In this presentation, I will discuss ongoing work focused on biomarker-specific MSFAs including computational methods to design MSFAs, fabricate techniques for manufacturing, and preliminary prototypes of MSFAs for medical imaging applications including cancer diagnosis and screening.

Biography: Travis Sawyer is an Assistant Professor of Optical Sciences at the University of Arizona (UA). He received his BS in Optical Sciences from the UA (2017) before attending the University of Cambridge to receive his MPhil in Physics (2019). He then returned to the UA to obtain his PhD in Optical Sciences (2021) where he focused on developing novel imaging techniques for ovarian cancer detection. He joined the faculty at the College of Optical Sciences, where his team's research interests include developing optical imaging technology for applications in gastrointestinal and pancreatic cancers, as well as brain imaging. His lab primarily applies optical imaging modalities including optical coherence tomography, multi- and hyperspectral imaging, fluorescence imaging, and polarized light imaging, with a focus on image analysis through machine learning techniques. Previously, he developed visual recognition software for detailed image capture, enabling discoveries in astronomy, art preservation, and the biomedical sciences.