

THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

PRESENTS

Nanophotonic biosensors: from plasmonic to dielectric metasurfaces



Filiz Yesilkoy
Assistant Professor
Department of Biomedical Engineering
University of Wisconsin, Madison

Monday, 11/2, 9:55 am

Join Zoom Meeting

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LECTURE ABSTRACT

Mobile, affordable and reliable biochemical sensors that can drastically reduce the detection time by enabling multiple biomarker detection from small sample volumes are essential for effective next-generation healthcare. Unfortunately, current bioanalytical methods require laboratory infrastructure, trained personnel, complex and costly bioassay protocols. Therefore, they are not suitable for point-of-care and lab-on-a-chip applications. Nanophotonic biosensors can detect biomolecules in a label-free and non-destructive manner based on the enhanced light-matter interactions at nanoengineered surfaces. In this talk, first, I will give an overview on the plasmonic biosensors, introducing different optical interrogation scenarios including the intensity-based imaging and phase-based interferometric optics. In particular, I will present miniaturized portable bioanalytical platforms that enable on-site applications, highlighting the results from a clinical study designed to detect Sepsis biomarkers from patient samples. Second, I will demonstrate the use of high-Q dielectric metasurfaces for ultrasensitive biomolecule detection. Here, I will emphasize the importance of the hyperspectral imaging optics enabling the spatially resolved spectral data acquisition.

SPEAKER BIOSKETCH

Dr. Filiz Yesilkoy received her Ph.D. in Electrical Engineering from the University of Maryland, College Park, USA in 2013. While pursuing her PhD degree, Dr. Yesilkoy received UMD Ann G. Wylie Dissertation Fellowship, Future Faculty Fellowship, Distinguished Teaching Assistant Award and Graduate Student Service Award for her efforts to support female students and contributing to the diversity of the ECE Department. Dr. Yesilkoy worked as a postdoctoral researcher in Prof. Altug's and Prof. Brugger's laboratories at the École polytechnique fédérale de Lausanne (EPFL) from 2013 until 2019, during which time she spent one year at the University of Tokyo as a guest researcher in Prof. Kim's group. She has joined the faculty of the Biomedical Engineering Department at the University of Wisconsin-Madison in January 2020 as a tenure-track Assistant Professor. Her research interests include development of nanophotonic systems for sensing and spectroscopy, experimental and theoretical aspects of nano-electronic and nano-photonics devices, scalable nanofabrication methods for low-cost and high-throughput manufacturing, biosensors and bioimaging for biomedical applications.

Contact Dr. Wei-Chuan Shih (wshih@uh.edu) for additional information