



Light up the path toward smart and precision chem/bio sensing and imaging

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Light matter interactions can provide rich compositional information from various samples in a non-invasive fashion. Our laboratory has developed opto-analytical spectroscopy, imaging, and sensing technologies to address unmet needs across various biological length scale including molecules, vesicles, cells, and tissue. The central innovations in our work include nano and micro engineering, imaging and spectroscopy instrumentation, and machine learning techniques. I will discuss some examples in this seminar. Harnessing localized surface plasmons (LSP) and coupling modes, we have engineered enhanced light-matter interactions near nanostructured surfaces for molecular sensing, catalysis, photothermal manipulation, and superresolution imaging. We have also developed an “inkjet-printing” method for fabricating flexible polymers lenses suitable for smartphone microscopy with applications in biomedical imaging, environmental sensing, STEM education, and citizen science. Finally, I will briefly discuss a non-invasive glucose sensing technology based on Raman spectroscopy and machine learning.



ABOUT the SPEAKER

Wei-Chuan Shih is Cullen Professor of Electrical & Computer Engineering, Biomedical Engineering, Materials Science & Engineering, and Chemistry at the University of Houston. He earned his Ph.D. from MIT in 2007, and joined University of Houston in 2009 after a stint as Schlumberger research fellow. He received MIT Martin Fellowship, NSF CAREER Award, NASA Early CAREER Faculty Award, and several research and innovation awards at UH. He is SPIE Fellow and SM of NAI, OSA, and IEEE. He has published ~80 journal papers, and holds 18 granted US patents. He is Associate Editor for OSA Optics Express and SPIE Journal of Nanophotonics, and OSA Applied Optics previously. His research interests are biophotonics, nanobiophotonics, imaging & spectroscopy, micro/nanofabrication, and machine learning. His current research focus is on exosome-based cancer diagnostics supported by a recent \$2.7M NIH Ro1. His company has been selected for the Texas Medical Center Innovation Accelerator for Cancer Therapeutics 2022 cohort. Website: <http://www.ee.uh.edu/faculty/shih>

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1003 Engineering Centers (Tong Auditorium)