



“Opto-Analytical Sensing, Imaging and Stimulation (OASIS)”

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Abstract: Light matter interaction can provide rich compositional information from various types of samples in a non-invasive fashion. Our laboratory has developed a broad range of opto-analytical sensing, imaging and stimulation (OASIS) technologies with core innovations in nanomaterials, device, and instrumentation. In this talk, I will first report our work in spectroscopic sensing and imaging using various light-matter interactions as contrast mechanisms. I will then report a novel class of nanoporous plasmonic sensors for ultrasensitive molecular sensing – in some cases at the single molecule level. I will discuss their potential uses in biomedical and environmental applications. Next, I will present a novel multi-modal neural probe designed for optical stimulation and in situ electrophysiology. I will close by mentioning our recent exciting journey with DotLens Smartphone Microscopy in terms of the invention and potential impact in formal and informal K-12 STEM education, citizen science, as well as other practical and research applications.

Bio: Wei-Chuan Shih earned his Ph.D. from MIT Spectroscopy Laboratory/NIH Laser Biomedical Research Center under late laser physicist Michael S. Feld, developing novel optical spectroscopy techniques for non-invasive chemical/biomedical sensing and disease diagnosis. He also worked extensively on MEMS design and nanofabrication under Sang-Gook Kim and George Barbastathis. Prior to joining the University of Houston, he was a Schlumberger research fellow, developing optical analysis of hydrocarbon fluids and optical offshore oil spill monitoring. Dr. Shih is an Associate Professor of Electrical & Computer Engineering, Biomedical Engineering, Materials Science & Engineering and Chemistry at the University of Houston. He was a MIT Martin Fellow, and received NSF CAREER Award in Biophotonics, inaugural NASA Early CAREER Faculty Award, UH Award for Excellence in Research and Scholarship, and UH Cullen College of Engineering Faculty Research Excellence Award. His recent PhD graduate was the Best Dissertation Award winner by the Cullen College of Engineering. He has published more than 60 articles in books, journals and conference proceedings, including ~40 peer-reviewed journal papers. He has more than 10 patents, one of which has been licensed. His research has been featured on CNBC, HoustonPBS, UH Moment and numerous other media outlets. Besides NSF and NASA, his research is also supported by NIH, DOI, and GoMRI.



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