

UNIVERSITY OF CALIFORNIA, IRVINE

## THE DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

Is Proud to Host a Seminar by:

**ASSOCIATE PROFESSOR TIM YEH**

Department of Biomedical Engineering  
University of Texas at Austin

**Thursday, February 23, 2023**

**2:00-3:20 PM**

**Location:**

McDonnell Douglas Engineering Auditorium

### **NEW SENSING AND MEASUREMENT TECHNIQUES BASED ON FLUORESCENT NANOMATERIALS AND 3D TRACKING MICROSCOPES**

**Abstract:** My research is focused on developing new fluorescence techniques that can be used to study complex biological systems and quantify specific molecules of interest. On one hand, we built a feedback-control 3D single-particle tracking microscope termed TSUNAMI (Tracking Single particles Using Nonlinear And Multiplexed Illumination) that is capable of monitoring the receptor internalization process in a highly scattering environment (*Nature Communications* 2015, US patent). On the other hand, we created new fluorescence nanobiosensors that do not rely on Förster energy transfer as on/off switching mechanism for biosensing. By taking advantage of repurposed next generation sequencing technique, we recently screened 40,000 fluorescent species prepared in DNA and elucidated the design rules for creating bright silver nanoclusters (*Advanced Materials* 2022). We have also invented a new molecular probe that changes color from green to red upon nuclease digestion (US patent pending).

**Bio:** Dr. Yeh obtained his BS degree from National Taiwan University, MS degree from University of California, Los Angeles, and PhD degree from Johns Hopkins University. He worked at Optical Micro Machines Inc. in San Diego from 98-03 as an R&D engineer, developing MEMS-based photonic switches for telecommunications. At Johns Hopkins, his research focused on single-molecule spectroscopy, BioMEMS and nanobiosensors. Dr. Yeh received his postdoctoral training at Los Alamos National Laboratory from 09-12, in the Center for Integrated Nanotechnologies. While at LANL, he won a 2011 R&D 100 Award and a 2013 Postdoctoral Publication Prize in Experimental Sciences. Dr. Yeh is now an associate professor in the Biomedical Engineering Department at the University of Texas at Austin. His research interests include nanobiosensor development, advanced fluorescence techniques and massively parallel selection of fluorogenic aptamers.