

IQSE AMO QO Seminar Series

Tuesday, March 28th, 11:30 am ZOOM & IQSE
seminar room (MPHY 578)

Pizza will be served for IQSE members at 11:00 am. The talk will start around 11:30 am

Dr. Alan Wang

(Baylor University)

Biological Photonic Crystal Sensors: Materials, Applications, and Fusion with Machine Learning

EVENT DETAILS: Diatoms are microalgae with unique photonic crystal structures, which can be found in every habitat where water is present. Their abundance and wide distribution make them ideal materials for a wide range of applications as living organisms. We have developed hybrid diatom photonic crystals with plasmonic nanoparticles (NPs) as ultra-sensitive, low-cost substrates for surface-enhanced Raman scattering (SERS) sensing. The enhancement comes from the photonic crystal enhancement of diatom frustules that could improve the hot-spots of plasmonic NPs. Recently, we reported the unique micro-fluidic flow, analyte concentration effect, and thin layer chromatography (TLC) on diatom biosilica, which enables selection, separation, detection, and analysis of complex chemical and biological samples. Especially, we developed a lab-on-a-chip technology based on TLC-SERS sensing and successfully applied it to various applications including food safety, illicit drug residue sensing, and biomarker detection. As a relatively new analytical tool, SERS techniques face tremendous challenges in quantitative sensing due to the intrinsic variation of the enhancement factors. In the last topic, we will discuss our efforts of applying machine learning including support vector regression and convolutional neural network to analyze the data collected by diatom photonic crystal biosensors, which showed superior performance in quantitative sensing.

ZOOM information:

<https://tamu.zoom.us/j/98156251523?pwd=QVdSdGxtL1UyY0g1L083SU5QR0QrUT09>

Meeting ID: 981 5625 1523

Passcode: 297578

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