Department of
ELECTRICAL & COMPUTER ENGINEERING
George Washington University

ECE TALK

Sensing of Single-Molecules and their Dynamics with Optoplasmonic Microcavities

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Thursday, October 4th 2018, 11:00 am - 12:00 pm
Science & Engineering Hall, Room B1220, 800 22nd Street, NW

Abstract

Single-molecule techniques continue to transform imaging, biophysics and, more recently, optical sensing. I will introduce a new class of label-free micro and nanosensors that are starting to emerge and that allow us to observe dynamic processes at the single molecule level directly with light, with unprecedented spatial- and temporal resolution, and without significantly affecting the natural and functional movements of the molecules. Initial demonstration include single ion sensing, and visualisation of functional movements of enzymes directly with light.

This new class of sensors combine optically resonant dielectric microcavities with plasmonically resonant metal nanostructures to enable detection at the nanoscale with extraordinary sensitivity. These optoplasmonic sensors by virtue of their small interaction length probe light–matter interactions over a dynamic range often inaccessible by other optical techniques. They can be used to study dynamic processes that can span a range from less than 10−9s to more than 103s.

Biography

Frank Vollmer is a Professor of Biophysics at the Living Systems Institute at the University of Exeter. Prof Vollmer pioneers optical technology to study processes at the nanoscale. He held several appointments at leading US institutions including Rowland Fellow at Harvard University and Instructor in Medicine at Harvard Medical School. Before moving to the LSI in 2016, he held the position of Research Group Leader at the Max Planck Institute for the Science of Light (DE). In 2017 Prof Vollmer was awarded the Royal Society Wolfson Research Merit Award.