

THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

PRESENTS

Meeting - and preventing - new challenges in bio(chemical) sensing



Svetlana V. Boriskina, MIT

Monday, 2/8, 9:55 am

Join Zoom Meeting

<https://uofh.zoom.us/j/97473247234?pwd=d05iZDVVTcDNHSnptVnAwUWhqRFRmdz09>

Meeting ID: 974 7324 7234

Passcode: 011787

LECTURE ABSTRACT

Bio(chemical) sensors play an outsized role in medical care, biological research, drug development, national security, and environmental monitoring, as exemplified by the current need for SARS-CoV-2 virus detection. I will outline the inherent challenges associated with the development and large-scale deployment of reliable sensors for detection of new viral and bacterial pathogens and environmental pollutants. I will also discuss the approaches we are exploring to meet these challenges by combining photonic amplification, biological recognition & nano-mechanical forces on nano-photonic and nano-plasmonic chips.



As one of the examples, I will introduce a concept of the High Contrast Probe Cleavage Detection mechanism, which makes use of the dramatic optical signal amplification caused by *cleavage* of large numbers of high-contrast nanoparticle labels. This method is drastically different from the common photonic biosensing approach based on recognizing and amplifying the signal caused by the *adsorption* of low-index biological molecules, and holds promise for rapid development of new sensors for detecting SARS-CoV-2 virus and other yet-unknown harmful pathogens.

I will also discuss our work on the development of new textile-based materials aimed at preventing future environmental pollution and reducing risks of transmission of bacterial and viral infections. The SVETEX fabrics technology that originated in my lab provides a pathway to engineering sustainable single-material fabrics and garments that help to reduce energy and water usage, prevent water pollution by dyes and microfibers, inhibit bacterial growth, and help to close the material lifecycle.

SPEAKER BIOSKETCH

Svetlana V. Boriskina is a physicist and engineer who studies light-matter interactions on nanoscale and develops new smart materials and devices for solar energy harvesting, personal thermal comfort, night vision, space exploration, and bio-chemical sensing. She leads a research group at MIT, which engineers smart and sustainable fabrics, photonic meta-materials with structural colors, wearable high-efficiency sensors, and solar and waste heat harvesting platforms for clean energy generation. As the Lead Editor of the Energy and Environmental Optics Express, Svetlana is helping to disseminate the scientific knowledge and encourage the international collaborative effort to address challenges in the water-energy nexus, photonics, metamaterials, and environmental sensing. More info: <http://sboriskina.mit.edu>; Contact: sborisk@mit.edu

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