ICFO

L4H SEMINAR: Frontiers in Nanophotonics: Enabling Technology for Next-Generation Optical Biosensors and Bioimaging

HATICE ALTUG

November 09, 2022
12:00 to 13:00
Online (Zoom)

Abstract:
Emerging healthcare needs and initiatives, including global health crisis, personalized medicine, and point-of-care applications are demanding breakthrough advancements in diagnostic tools. Biosensors play an essential role in bioanalytics, but traditional methods are limited in precision, affordability, integration or portability. Furthermore, they require long detection times, sophisticated infrastructure, and trained personnel. Our research group addresses these challenges by developing next-generation nanophotonic biosensors, spectroscopy and bioimaging technologies. Our lab's expertise covers a variety of techniques, including nanophotonics, nanofabrication, microfluidics, surface chemistry, and data science. We exploit nanoplasmonics and metasurfaces, which can confine light below the fundamental diffraction limit and generate strong electromagnetic fields at nanometric volumes for increasing light-matter interaction and sensitivity. We develop new nanofabrication methods for high-throughput and low-cost manufacturing of nanophotonic chips. We integrate our sensors with microfluidic systems for sample handling. We also use smart data science tools with hyperspectral and bioimaging to achieve high device performance. In this talk, I will present some of our recent work and provide their prospects in biomedical and clinical applications.

Bio:
Hatice Altug is full professor in the Institute of Bioengineering at Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland. She is also the director of EPFL Doctoral School in Photonics. Between 2007 and 2013, she has been professor in the Electrical and Computer Engineering Department at Boston University, U.S. She received her Ph.D. in Applied Physics from Stanford University (U.S.) in 2007 and her B.S. in Physics from Bilkent University (Turkey) in 2000. Prof. Altug is the recipient of European Physical Society Emmy Noether Distinction, Optical Society of America Adolph Lomb Medal, and U.S. Presidential Early Career Award for Scientists and Engineers. She received European Research Council (ERC) Consolidator Grant, ERC Proof of Concept Grant, U.S. Office of Naval Research Young Investigator Award, U.S.

National Science Foundation CAREER Award, Massachusetts Life Science Center New Investigator Award, IEEE Photonics Society Young Investigator Award. She is the winner of the Inventors' Challenge competition of Silicon Valley in 2005 and elected fellow of Optical (formerly Optical Society of America). She has been named to Popular Science Magazine's "Brilliant 10" list in 2011.

Hosted by: Valerio Pruneri