



The Department of
Mechanical Engineering
PRESENTS

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Biophotonics and the Future of Personal Health Care

Abstract:

Biophotonics technologies can be designed to provide unique, dynamic information about tissue structure and biochemical composition. Their impact spans from medical diagnostic and therapeutic devices to consumer-based wearable sensors. With advances in device miniaturization and high performance photonics components, the line between conventional medical instruments and consumer devices is becoming increasingly blurred. Health care economic pressures are further accelerating this ambiguity by shifting clinical attention from expensive disease treatments to strategies for cost-effective disease management and prevention. This talk introduces emerging Biophotonics technologies that are capable of characterizing tissue structure and biochemical composition spanning from micro- to macroscopic regimes. We will illustrate the power of both wearable and non-contact optical devices for assessing tissue functional parameters including: tissue blood, water and lipid content; tissue oxygenation and oxygen consumption, heart and respiration rate, and tissue blood flow. Finally, we will consider projected trends in development that are expected to impact how we generate, access, and manage this complex information and improve outcomes for individual patients.

About the Speaker:

Dr. Tromberg is the Director of the Beckman Laser Institute and Medical Clinic (BLI) at the University of California, Irvine (UCI) and principal investigator of the Laser Microbeam and Medical Program (LAMMP), an NIH National Biomedical Technology Research Center. He is a Professor in the departments of Biomedical Engineering and Surgery, co-leads the Onco-imaging and Biotechnology Program in UCI's Chao Family Comprehensive Cancer Center, and has been a member of the BLI faculty since 1990. His research interests are in the development of quantitative, broadband Biophotonics technologies for characterizing and imaging tissue structure, function and composition across spatial scales. He has pioneered model-based methods that utilize spatially and temporally modulated light sources for diffuse optical spectroscopy and imaging, non-linear optical microscopy, and multi-modality imaging.