Camera-Based Mapping of Blood Flow Using Laser Speckle Imaging

Abstract

There is a critical need in studying the status of the microcirculation, in studies of normal physiology and disease progression, and response to microvascular-targeted therapies. Altered microvascular blood flow is a causal factor or resultant state in several diseases, such as arthritis, cancer, diabetes, hypertension, neurodegenerative disorders, obesity, and retinopathies. We use Laser Speckle Imaging (LSI), a low-cost, camera-based technology, to image blood flow and tissue perfusion with both high spatial and temporal resolution. The objectives of my talk are to 1) provide a primer on LSI basics; 2) present snapshots of recent work from my research team, that highlights several preclinical and clinical applications for which LSI integration has enabled important advances; and 3) introduce a new LSI-based method that enables absolute quantitation of Brownian motion.

Biography

Bernard Choi currently is an Associate Professor of Biomedical Engineering and Surgery at University of California, Irvine, with a primary appointment at Beckman Laser Institute and an affiliated appointment in the Edwards Lifesciences Center for Advanced Cardiovascular Technology. Dr. Choi received a B.S. from Northwestern University and M.S.E. and Ph.D. degrees with The University of Texas at Austin, all in Biomedical Engineering. His current research is in the field of vascular biophotonics, with current emphases in optical hemodynamic monitoring, microvascular dynamics of tissue in normal and proliferative states, and optical clearing. Dr. Choi has authored 76 peer-reviewed journal publications and two book chapters. He currently serves as Associate Chair for Undergraduate Studies for the Department of Biomedical Engineering, University of California, Irvine.