Physics
AT QUEENS COLLEGE

Colloquium Notice

Bahram Javidi

University of Connecticut

Automated Disease Identification with Multidimensional Optical Imaging

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This seminar is an overview of recent and reported research in rapid automated disease identification with low-cost field portable bio-photonics systems through the analysis of blood cells using multidimensional digital holographic systems. Statistical and/or deep learning algorithms are used to analyze the spatial and temporal characteristics of the reconstructed blood cells for automated disease identification. Recent applications of digital holography and dedicated algorithms for rapid COVID-19 detection will be presented. We present a variety of bio-photonics sensors including 3D printed thin lensless sensors using pseudo-random phase encoding. Conventional holographic systems require a stable optical table for reliable performance. Self-referencing holographic systems show much greater stability and are field portable. Experimental results are presented to illustrate the performance of these instruments in the field such as health clinics for COVID-19 detection, Sickle Cell disease detection, etc. Dedicated algorithms to inspect and classify cells such as blood cells using field portable holographic systems for automated disease identification will be presented. Recent advances in the proposed bio-photonics sensors give this approach agreat potential for success.

Bio:
Prof. Bahram Javidi is Board of Trustees Distinguished Professor at University of Connecticut. His interests are in a broad range of transformative imaging approaches using optics and photonics, and he has made seminal contributions to passive and active multidimensional imaging from nano to micro and macro scales. His recent research activities include digital holography, polarimetric 3D imaging at low light, 3D visualization and recognition of objects in photon-starved environments; automated disease identification using biophotonics with compact digital holographic sensors for use in developing countries; and optical cyber physical security. He has 35 patents some of which have been licensed by industry. He has been awarded The Optica (OSA) Emmett Leith medal (2021), Optica C. E. K. Mees Medal (2019), and Optica Joseph Fraunhofer Award / Robert M. Burley Prize (2018); The IEEE Photonics Society William Streifer Scientific Achievement Award (2019); and the European Physical Society (EPS) Prize for Applied Aspects of Quantum Electronics and Optics (2015). He was awarded the IEEE Donald G. Fink Paper Prize (2008); the John Simon Guggenheim Foundation Fellow Award (2008); the Alexander von Humboldt Foundation Prize (2007); the SPIE Technology Achievement Award (2008); and the SPIE Dennis Gabor Award (2005). He was named an IEEE Photonics Society Distinguished Lecturer in 2004 and 2005; and was the 2010 recipient of the George Washington University's Distinguished Alumni Scholar Award. He has been named Fellow of IEEE, OSA, SPIE, AIMBE, National Academy of Inventors, and Inst. of Physics.

Monday

December 11, 2023

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326

This talk is accessible via **Zoom** or use

meeting ID 829 2687 2594 and **passcode 866995** to join
