ADVANCED IMAGE RECONSTRUCTION METHODS FOR PHOTOACOUSTIC COMPUTED TOMOGRAPHY

Abstract: Photoacoustic computed tomography (PACT) is an emerging soft-tissue imaging modality that has great potential for a wide range of preclinical and clinical imaging applications. It can be viewed as a hybrid imaging modality in the sense that it utilizes an optical contrast mechanism combined with ultrasonic detection principles, thereby combining the advantages of optical and ultrasonic imaging while circumventing their primary limitations. In this talk, we review our recent advancements in practical image reconstruction approaches for PACT. Such advancements include physics-based models of the measurement process and associated inversion methods for reconstructing images from limited data sets in acoustically heterogeneous media. Applications of PACT to transcranial brain imaging and breast cancer detection will be discussed.

Bio: Dr. Anastasio earned his PhD degree at the University of Chicago in 2001 and was on the faculty at Illinois Institute of Technology from 2001-2010. He is currently a Professor of Biomedical Engineering at Washington University in St. Louis. Dr. Anastasio is an expert on tomographic image reconstruction, imaging physics, and the development of novel computed biomedical imaging systems, and has published 100 journal articles on these topics. He has conducted pioneering research in the fields of photoacoustic computed tomography, diffraction tomography, and X-ray phase-contrast imaging. He received an NSF CAREER award for research related to image reconstruction topics. He is on the editorial boards of the Journal of Biomedical Optics and Medical Physics, and is on the organizing committee for the SPIE Photonics West Photon Plus Ultrasound Conference and serves on the OSA FiO program committee.