

Department of Electrical and Computer Engineering

Title: «Getting more from Optical Coherence Tomography»

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Room KENTP. E116, Old Campus - University of Cyprus

Abstract:

Optical Coherence Tomography (OCT) is an emerging medical imaging technique with application in many fields, including ophthalmology, cardiology, oncology, etc. OCT can achieve imaging at depths of ~ 2-3 mm with a resolution in the micrometer scale (~ 2- 15 μm) and can, thus, adequately display microstructural changes in normal and dysplastic tissues. However, many of the hallmark changes associated with early cancer are not discernible even at this high resolution. This presentation will focus on methods to enhance the axial and lateral resolution of OCT and extract scatterer information from the OCT signal. To achieve this goal a combination of both optical enhancements and post-processing are employed. These methodologies were also assessed in a clinical setting for the detection of cancer of the colon. The proposed methodologies will result in new technology which will significantly improve the resolution of OCT images revealing sub-cellular level features. In addition, scatterer size changes will be detected which correspond to the nuclear variations characteristic of very early cancer. When these results are incorporated into clinical OCT systems, they will offer unprecedented imaging resolution thus increasing the effectiveness of OCT as a tool for the diagnosis of very early cancer and other disease processes. Such a tool can have significantly positive effects on the treatment and prognosis of cancer patients.

Biography:

Dr. Constantinos Pitris is currently an Associate Professor in the Department of Electrical and Computer Engineering of the University of Cyprus. He is heading the "Biomedical Imaging and Applied Optics Laboratory" which he established in 2004. Dr. Pitris has completed his studies at the University of Texas at Austin (BS Honors in Electrical Engineering, 1993, MS in Electrical Engineering, 1995), Massachusetts Institute of Technology (Ph.D. in Electrical and Medical Engineering, 2000), and Harvard Medical School (MD Magna Cum Laude in Medicine, 2002). His main research interests cover the areas of optical diagnostics and biomedical imaging. Dr. Pitris has served as PI and co-PI in a number of competitive research grants. He is also one of the co-founders and a member of the executive committee of the "KIOS Research Center for Intelligent Systems and Networks." Dr. Pitris has published 39 peer reviewed journal publications, 119 conference proceedings, 4 book chapters, 1 book, and 8 US and other patents. The citations to this work have reached more than 4400 according to the Scopus Citation Report (with an h-index of 27.) Dr. Pitris is a grant reviewer for the European Commission (FP7 - Nanomedicine), National Institutes of Health, USA (Biomedical Optics), the Cyprus Ministry of Commerce, Industry and Tourism (Start-up Incubators.) He is an active member of IEEE, OSA, SPIE and a reviewer for Optics Letters, Applied Optics, Journal of Biomedical Optics and Nature Publications.