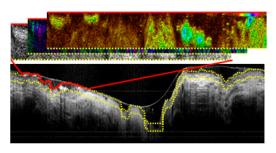# Extending Optical Coherence
Tomography for Accurate Diagnosis

Dr. Constantinos Pitris, Professor

Abstract

Recently, the application of Optical Coherence Tomography (OCT) in oncology has advanced significantly as is evident by the technological advances, preclinical research, and human studies. This burgeoning interest demonstrates the potential of OCT for cancer detection, diagnosis, and monitoring of therapy. However, OCT has not been as widely adopted in clinical oncology. In addition to technical hurdles, adoption of OCT is further hindered by: (i) difficulties in image interpretation and (ii) lack of demonstrable stratification and prediction capabilities. OCT image interpretation is often challenging for clinicians, who are more familiar with organ- or body-scale images. In addition, OCT images may approach the scales of histology but do not necessarily reveal familiar cellular features and cannot, currently, reliably stratify risk or predict prognosis. For OCT to have a significant impact in the field of oncology, information must be extracted from the images and converted to knowledge which can be easily accessed and assessed by clinicians. The Optical Diagnostics Laboratory promotes the development of OCT-derived biomarkers of cancer. These biomarkers can be primary, e.g. 3D morphological or textural features, scatterer size, dispersion, index of refraction, etc., or secondary, i.e. combination of multiscale data that correlate with disease stage/diagnosis. Preliminary studies to confirm a correlation between OCT-derived biomarkers and diagnosis or therapeutic response in esophageal cancer are being pursued.

Bio

Prof. Constantinos Pitris is currently a Professor at the KIOS Research and Innovation Center of Excellence, Department of Electrical and Computer Engineering, University of Cyprus. He is heading the "Optical Diagnostics Laboratory" which he established in 2004 (www.eng.ucy.ac.cy/biaolab). Prof. 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 include the areas of optical diagnostics, biomedical imaging and spectroscopy, as well as signal/image analysis and computational intelligence. Prof. Pitris has served as a PI or a co-PI in competitive research grants totaling over € 8.5 mil including a highly prestigious EU H2020 FET Open Grant, the first to be coordinated by a Cypriot institution. He is also one of the co-founders and a member of the executive committee of the KIOS Center of Excellence, which was the recipient of an EU H2020 TEMAING grant of over € 40 mil. Prof. Pitris has published 51 peer reviewed journal publications, 134 conference proceedings, 5 book chapters, and 1 book. He also holds 12 US, European and other patents, and is the cofounder of two start-up companies aiming to commercialize important research findings. The citations to his work have reached more than 13,700 (with an h-index of 37) according to Google Scholar.

University of Cyprus
Faculty of Engineering