FIU Engineering & Computing
Biomedical Engineering

Wallace H. Coulter Foundation
Biomedical Engineering Seminar Series

DR. TATIANA NOVIKOVA leads the Characterization and Modeling Division of the Laboratory of Physics of Interfaces and Thin Films of CNRS, Ecole polytechnique, Institut Polytechnique de Paris, Palaiseau, France. She obtained MSc degree in applied mathematics from the Moscow State University (Russia), PhD in applied mathematics and physics from the Moscow Institute of Mathematical Modelling (Russia), and Habilitation in Physics from the University Paris-Sud (France). Her research interests and area of expertise include polarimetry, optical metrology, biomedical applications of polarimetric imaging, and computational modeling of electromagnetic wave interaction with structured and random media.

Dr. Novikova is OSA Senior member, she has served as a Guest Editor of the Journal of Biomedical Optics in 2016. Dr Novikova's research was featured in SPIE "Women in Optics" Planner 2018. Dr. Novikova is a recipient of 2020 SPIE G. G. Stokes Award in Optical Polarization in recognition of her research in Mueller polarimetry for the development of techniques used in predicting and measuring the transfer of polarized light through a turbid media, in particular polarized light propagation via atmospheric transmission and biological tissue.

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THE DEVELOPMENT AND EXPANSION OF THE NEURAL DUST CONCEPT

ABSTRACT: Imaging Mueller polarimetry represents an emerging optical technique that makes use of light polarization for a non-invasive diagnostics of tissue. This optical imaging modality explores the extreme sensitivity of polarized light to the microstructure of a sample and provides the most complete information on sample polarimetric properties that can be used for tissue diagnostics. It is known that the malignancies of epithelial tissue represent the majority (80 to 90 %) of all cancers. Hence, probing a superficial epithelial layer of tissue with visible polarized light for early detection of pre-cancerous changes will not be hampered by its shallow penetration depth within scattering tissue and will not make any harm to a patient. Moreover, imaging Mueller polarimetry does not require tissue staining or using contrast enhancement agents for the detection of pathological zones of tissue and, thus, can be implemented in vivo.

The results of the studies of different types of human tissue (colon, uterine cervix, brain) with the custom-built multi-wavelength wide-field imaging Mueller polarimeter will be presented and discussed. Our findings demonstrate that both polarization (the scalar retardance and the azimuth of the optical axis of uniaxial linear birefringent medium) and depolarization parameters can serve as the reliable optical markers of tissue pathology (e. g. pre-cancer conditions or tumor visualization).

FRIDAY, OCTOBER 23 / 9:00 AM / VIA ZOOM

Zoom Registration ▸ https://bme.fiu.edu/seminars

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Through the generous support of the Wallace H. Coulter Foundation the Department of Biomedical Engineering facilitates weekly lectures each year during academic terms. Experts in all areas of Biomedical Engineering are invited to campus to provide a research seminar and to meet with faculty and students and to tour our academic and research facilities.

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