

## SPIE/OSA Student Chapter Seminar Series

**Tatjana Gric**  
(Aston University)

### Applications of the metamaterial formalism



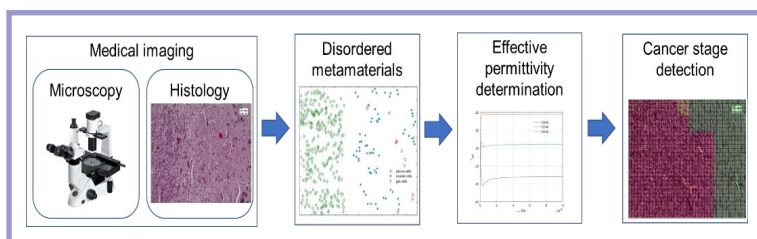
**Tuesday, August 11th, 2020**

**10:00 am ~ 11:00 am (CDT)**

**16:00-17:00 (UK TIME)**

**ZOOM ID: 984 2436 0533**

**Abstract:** Early detection of a tumor makes it more probable that the patient will, finally, beat the cancer and recover. The main goal of broadly defined cancer diagnostics is to determine whether a patient has a tumor, where it is located, and what is its histological type and severity. Here, we present, in the first time to our knowledge, the studies on metamaterial properties of biological tissues to identify healthy and cancerous areas in the brain tissue. The results show, that the metamaterial properties strongly differ depending on the tissue type, if it is healthy or unhealthy one. The obtained effective permittivity values were dependent on various factors, like the amount of different cell types in the sample and their distribution. Based on these findings, the identification of the cancer affected areas based on their effective medium properties was performed. These results proved the metamaterial model capability in recognition of the cancer affected areas. The presented approach can have a significant impact on the development of methodological approaches toward precise identification of pathological tissues and would allow for more effective detection of cancer-related changes. We suggest the highly effective recognition of the cancerous specimens in stained brain biopsies.



**Bio:** Dr. Tatjana Gric received her PhD degree from Vilnius Gediminas Technical University, and pursued her postdoctoral researches at Dalhousie University and Technical University of Ostrava. Currently, She is a Marie Curies research fellow at the AIPT (Aston Institute of Photonic Technologies). Her research interests include plasmonics, metamaterials. She has published extensively in her research field, i. e. more than 50 papers in reputed journals. Her Marie Curie project is related to cancer detection by means of the metamaterial formalism that has not been witnessed directly. This project will herald a new era where the presented idea becomes a regular research tool and translates to a clinical and diagnostic technology in the future.

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