



Shining light on new diagnostic pathways: An introduction to biophotonics and spectral analysis

Lecturer: prof. Ishan Barman (Johns Hopkins University, USA)

Course description:

The lectures will be focused on discussing the development of photonics solutions to complex problems in biological research and medical diagnosis. The field of biomedical optics and spectroscopy has expanded greatly due to the technological advances in optical instrumentation and the development of label-free imaging methodologies for clinical applications. These photonics approaches provide deeper insight into molecular, cellular and even into tissue level processes. We will discuss a diverse array of spectroscopic modalities that exploit the intrinsic contrast in biological media along with rigorous analytical methods in order to elucidate latent information about different health conditions. By incorporating expert clinical insights into the overall analysis framework, we will try to identify and analyze the relevant biochemical information contained in the myriad of available spectroscopic data. The discussed tools can also be suitably extended to a number of other exciting applications including remote sensing of gasoline fuels, adulterants, and surfactants; investigation of pharmaceutical drugs and their interaction with biological systems; and rapid measurements in microfluidic platforms.

Syllabus of the lecture:

1. Molecular and structural measurements using spectroscopy
2. Fundamentals of microscopy and optics
3. Numerical methods in image and spectral processing
4. Characterization of noise in spectral measurements
5. Emerging applications of spectroscopy in point-of-care diagnostics, in material characterization and in understanding fundamental biophysical systems

TERMINY WYKŁADÓW			
Data	Dzień tygodnia	Godzina	Sala
2 czerwiec 2014	Poniedziałek	9.15-12.00	208 NE (Nowy Gmach WETI)
3 czerwiec 2014	Wtorek	9.15-12.00	208 NE (Nowy Gmach WETI)
4 czerwiec 2014	Środa	9.15-12.00	208 NE (Nowy Gmach WETI)
5 czerwiec 2014	Czwartek	9.15-12.00	208 NE (Nowy Gmach WETI)
6 czerwiec 2014	Piątek	9.15-12.00	208 NE (Nowy Gmach WETI)