



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

TRINITY CENTRE FOR BIOENGINEERING SEMINAR SERIES 2018

## Sensors and probes for multi-parametric FLIM microscopy of 3D tissue models

- Speaker:** Dr. Ruslan Dmitriev, Research Fellow, SFI Starting Investigator, School of Biochemistry and Cell Biology, University College Cork
- When:** 2pm on Wednesday 5<sup>th</sup> of December 2018
- Where:** B2.36 & B2.37, Trinity Biomedical Sciences Institute

Successfully engineered 3D tissues such as organoids and spheroids often display micro-heterogeneity and dynamic gradients of metabolites, excretion products and O<sub>2</sub>, which are hard to predict, control or analyze by western blotting, next generation genome, RNA sequencing and related assays. My group addresses the challenge of non-invasive quantitative multi-parametric imaging of 3D tissue models by using high-performance phosphorescent probes, nanoparticles, new sensor chemistries, biosensor scaffolds and fluorescence (FLIM) and phosphorescence (PLIM) lifetime imaging microscopies. In my talk I will discuss how the imaging of hypoxia, proliferation and temperature can be performed in stem cell-derived intestinal organoids and cancer spheroid models. This approach can be also complemented by the use of biosensor scaffold materials enabling alternative 'label-free' FLIM measurements of the engineered tissues.



**Ruslan Dmitriev** is a Starting Investigator at University College Cork leading the Metabolic Imaging Group. He received Ph.D. from Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russia) and further trained as a postdoc at the Laboratory of Biophysics and Bionalysis (University College Cork) under mentorship of Prof. D. Papkovsky. Dr. Dmitriev's work included design of high-performance intracellular O<sub>2</sub> sensors and probes, studies of intracellular oxygen gradients, molecular mechanisms of cell adaptation to ischemia and physiological levels of hypoxia and pioneered the area of FLIM imaging of 3D tissue models, resulting in 49 publications to date. His work is supported by the Science Foundation Ireland, Russian Science Foundation and the Agilent Technologies.