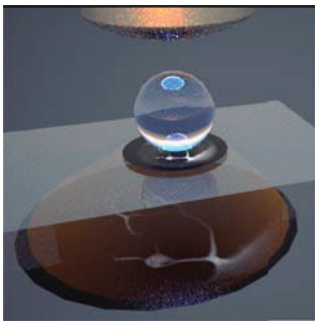

Scope of the 2nd Workshop on Label-Free Super-Resolution and Sensing (LFSRS) in conjunction with ICTON 20th International Conference on Transparent Optical Networks Bucharest, Romania, July 1-5, 2018

With the recent 2014 Nobel Prize in Chemistry awarded for fluorescence super-resolution imaging, the interest in the mechanisms and techniques of optical nanoscopy is growing tremendously. This interest shifts towards a *label-free* nanoscopy which does not rely on fluorescent labeling for increasing the optical contrast of nanoscale dielectric, metallic or biomedical structures. The ultimate goal in this field is to beat the diffraction limit by using the physical principles which go beyond the classical far-field diffraction optics. These principles include near-field optical scanning, nonlinear reduction of point-spread function, use of surface plasmon-polariton lenses, metamaterial superlenses and hyperlenes, superoscillatory lenses, application of structured illumination and approaches based on information theory. Label-free detection and sensing of truly nanoscale objects such as proteins, biological molecules, or plasmonic nanoparticles is increasingly important in laboratory medicine, clinical diagnostics, biological microanalyses and nanoscience. One of the challenges is that physicists and biomedical researchers have different approaches. The goal of this Workshop is to provide an in-depth discussion of the mechanisms of label-free super-resolution and sensing by the groups interested in developing fundamental understanding and biomedical applications of these technologies. Topics of relevance include:

- Near-field optical scanning
- Electromagnetic mapping using SNOM or optical forces
- Nonlinear reduction of the point-spread function
- Transient absorption
- Saturated emission
- Photomodulated reflectivity
- High-resolution CARS, SRS and Raman microscopy
- Surface plasmon-polariton lens
- Eaton and Maxwell fish-eye lenses
- Far-field superlenses and hyperlenses
- Adiabatic super-resolution lens designs
- Super-oscillation lens
- Structured illumination
- Plasmonic structured illumination
- Interferometric Scattering Microscopy
- Tomographic diffraction microscopy
- Sparse imaging
- Microspherical nanoscopy
- Contact microlenses
- Biomedical label-free nanoscopy
- Imaging and sensing of bio-nanoparticles in live cells
- Super-resolution imaging of subcellular structures

Workshop Organizer: Vasily Astratov, University of North Carolina at Charlotte, Charlotte, USA

Invited Speakers (more speakers to be added):

Paola Borri, Cardiff University, a) Imaging and tracking single plasmonic nanoparticles in 3D background-free with four-wave mixing interferometry, b) Coherent Raman Scattering microscopy: Technology developments and biological applications

Peter Bienstman and Alessio Lugnan, UGent, Integrated dielectric scatterers for speeding up classification of cell diffraction patterns

Juergen Volz and Arno Rauschenbeutel, TU Wien, Systematic wavelength-scale errors in the localization of elliptically polarized emitters

Christina Grigorescu, National Institute of Research and Development for Optoelectronics, Magurele, Romania, Nanoplasmonics and Surface Enhanced Raman Scattering for in vivo label free diagnosis in oncologic surgery

Paul Montgomery, 3D microsphere assisted super resolution microscopy, Unistra-CNRS, Strasbourg, France

Radu Malureanu, Elucidating the functionality of dark-field hyperlens and initial experimental results, Technical University of Denmark, Lyngby, Denmark