



**Scope of the 3rd Workshop  
on Label-Free Super-Resolution and Sensing (LFSRS)  
in conjunction with ICTON  
21<sup>st</sup> International Conference on Transparent Optical Networks  
Angers, France, July 9-13, 2019**

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 hyperlenses, 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
- Nonlinear reduction of the point-spread function
- Transient absorption
- Saturated emission
- Photomodulated reflectivity
- High-resolution CARS, SRS and Raman microscopy
- Interferometric Scattering Microscopy
- Tomographic diffraction microscopy
- Ultrahigh resolution optical coherence tomography
- Surface plasmon-polariton lens
- Far-field superlenses and hyperlenses
- Super-oscillation lens
- Structured illumination
- Plasmonic structured illumination
- High resolution imaging through strongly scattering media
- 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
- Whispering gallery mode biosensors
- Optoplasmonic sensors
- Single molecule micro- and nanosensors

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

**Invited Speakers:**

1. **Sergey Alexandrov**, National University of Ireland, Galway, Ireland
2. **Shi-Wei Chu**, National Taiwan University, Taipei, Taiwan
3. **Javier Garcia de Abajo**, ICFO, Barcelona, Spain
4. **Cristiana Grigorescu**, INOE 2000, Magurele, Romania
5. **Mikko Huttunen**, Tampere University, Finland
6. **Konstantinos Iliopoulos**, Aix-Marseille Université, France
7. **Femius Koenderink**, AMOLF, Amsterdam, The Netherlands
8. **Sylvain Lecler**, Université de Strasbourg, Illkirch, France
9. **Igor Minin**, Tomsk Polytechnic University, Russia
10. **Oleg Minin**, Tomsk Polytechnic University, Russia
11. **Evgenii Narimanov**, Purdue University, West Lafayette, USA
12. **Zeev Zalevsky**, Bar Ilan University, Ramat-Gan, Israel