# Workshop of Local Cluster Saratov (LCS)
# Photonics4Life FP-7

## Organized by

Saratov State University named after N.G. Chernyshevsky

Photonics4Life Consortium of EC FP7: Network of Excellence for Biophotonics

Institute of Precision Mechanics and Control, Russian Academy of Sciences

Research-Educational Institute of Optics and Biophotonics at Saratov State University

Saratov State Medical University

SPIE Saratov State University Student Chapter

OSA Saratov State University Student Chapter

## Chairs

**Valery V. Tuchin,** Saratov State University

**Alexey N. Bashkatov,** Saratov State University

## Secretaries

**Maxim A. Vilensky**, Saratov State University

**Natalia A. Trunina**, Saratov State University

## *Friday 11 March*

### *ORAL SESSION*

**14.00-14.15**
**Local Cluster Saratov: goals and perspectives**
Valery V. Tuchin, *Saratov State University, Institute of Precise Mechanics and Control RAS*

**14.15-14.25**
**Plasmonic nanoparticles: towards biomedical applications**
Boris N. Khlebtsov, *Institute of Biochemistry and Physiology of Plants and Microorganisms RAS*

**14.25-14.35**
**Glass micro- and nano-structures in biomedical investigations**
Yulia S. Skibina, *SPE "Nanostructure Glass Technology"*

**14.35-14.45**
**Circulation and Atherothrombosis: a Call for Collaboration**
Lidia I. Malinova, *Saratov Scientific Research Institute of Cardiology*

**14.45-14.55**
**Scientific and Educational Centre of Fundamental Medicine and Nanotechnologies of Saratov State Medical University of V.I. Razumovsky: development prospects**
Alla B. Bucharskaya**,** *Saratov State Medical University*

**14.55-15.05**
**Advanced semiconductor laser emitters prospective for biomedical applications**
Sergey N. Sokolov, *SPE "Inject"*

**15.05-15.15**
**Hemorrhagic stress and emergency surgery: experimental justification of new diagnostic and treatment methods**
Oxana V. Semaychkina-Glushkovskaya, *Saratov State University*

**15.15-15.25**
**Scientific research at the Department of Eye Diseases SSMU**
Vladimir A. Galanzha, Tatyana G. Kamenskikh, *Saratov State Medical University*

**15.25-15.35**
**Photodynamic action on microorganisms: the future prospects**
Elena S. Tuchina, *Saratov State University, Biological Department, Laboratory of Bacteriology*

**15.35-15.50**
**Coffee break**

**15.50-16.10**
**Discussion of local and international collaboration**

## *Friday 11 March*

## *POSTER SESSION*

## 16.10-17.30

**1. The kinetics of mesenterial lymphatic node cell populatins at prolonged exposure of gold nanoparticles**
Olga V. Zlobina[1], Irina O. Bugaeva[1], Galina N. Maslyakova[1], Svetlana S. Firsova[1], Alla B. Bucharskaya[1], Nikolay G. Khlebtsov[2], Boris N. Khlebtsov[2], Lev A. Dykman[2] ,1-*Saratov State Medical University,* 2-*Institute of Biochemistry and Physiology of Plants and Microorganisms RAS*

**2. The morphological changes of hemopoesis organs and blood indicators at prolonged gold nanoparticle exposure**
Svetlana S. Firsova[1], Galina N. Maslyakova[1], Alla B. Bucharskaya[1], Olga V. Zlobina[1], Irina O. Bugaeva[1], Nikolay G. Khlebtsov[2], Boris N. Khlebtsov[2], Vladimir A. Bogatyrev[2], 1-*Saratov State Medical University,* 2-*Institute of Biochemistry and Physiology of Plants and Microorganisms RAS*

**3. Colorimetric and dynamic light scattering detection of DNA sequences by using positively charged gold nanorods and nanospheres**
Timofey E. Pylaev, *Institute of Biochemistry and Physiology of Plants and Microorganisms RAS*

**4. Silver nanocubes and gold nanocages. Synthesis and optical properties**
L. Panfilova, *Institute of Biochemistry and Physiology of Plants and Microorganisms RAS*

**5. A research study of endocytosis and viability of cancer cells by using the plasmon-resonant and fluorescent labels**
Olga A. Bibikova, *Institute of Biochemistry and Physiology of Plants and Microorganisms RAS*

**6. Electrically tunable diffuser on the base of multidomain nematic LC layers**
Maria M. Sherman, *Saratov State University*

**7. Optical properties of photon-crystalline waveguide**
Igor U. Silohin[1], Anton V. Malinin[1,2], Anastasia V. Zanishevskaja[1,2], Yulia S. Skibina[1], Valery V. Tuchin[2,3], Mikhail.V. Chainikov[1], 1- *SPE "Nanostructure glass technology"*, 2-*Saratov State University*, 3-*Institute of Precise Mechanics and Control RAS*

**8. Chirped waveguides application for definition of the blood group**
Anton V. Malinin[1,2], Anastasia V. Zanishevskaja[1,2], Igor U. Silohin[1], Yulia S. Skibina[1], Valery V. Tuchin[2,3], Valery A. Dubrovskiy[4], Alexey A.Dolmashkin[4], 1-*SPE "Nanostructure glass technology"*, 2-*Saratov State University*, 3-*Institute of Precise Mechanics and Control RAS,* 4-*Saratov State Medical University*

**9. The photon-crystalline biosensor**
Anton V. Malinin[1,2], Anastasia V. Zanishevskaja [1,2], Igor U. Silohin[1], Yulia S. Skibina[1], Valery V.Tuchin[2,3], 1-*SPE "Nanostructure glass technology"*, 2-*Saratov State University*, 3-*Institute of Precise Mechanics and Control RAS*

**10. Vascular remodeling and blood flow pattern in elderly patients with arterial hypertension**
Lilia A. Sadjaya[1], Georgy V. Simonenko[2], Lidia I. Malinova[1], 1-*Saratov Scientific Research institute of cardiology*, 2-*Saratov State University*

**11. Coronary atherothombosis: blood coagulation activity within different types of blood flow patterns**
Leisan G. Akhmadullina[1], Polina V. Dolotovskaya[1], Nikolay V. Furman[1],Tatyana P. Denisova[3], Georgy V. Simonenko[2], Lidia I. Malinova[1], Valery V. Tuchin[2,4], 1-*Saratov Scientific Research institute of cardiology,* 2-*Saratov State University,* 3-*Saratov State Medical University*, 4-*Institute of Precise Mechanics and Control RAS*

**12. Digital holographic microscopy**
Sergey A. Savonin, *Saratov State University*

**13. Visualization of penetration of $TiO_2$ nanoparticles into tooth tissues samples using optical coherence tomography**
Natalia A. Trunina[1], Vyacheslav V. Lychagov[1], Valery V. Tuchin[1,2], 1-*Saratov State University*, 2-*Institute of Precise Mechanics and Control RAS*

**14. Senthesis of semiconductor nanoparticles in emulsions**
Elena K. Volkova, Vyacheslav I. Kochubey, *Saratov State University*

**15. Immunohystological and immunocytochemical investigations of human eye lens in different forms of the cataract**
Tatiana G. Kamenskih[1], A.S. Tishkova[1], Vladimir A. Galanzha[1], Alla B. Bucharskaya[1], Galina N. Maslyakova[1], A.M. Burov[2], A.A. Shirokov[2], Alexey N. Bashkatov[3], Elina A. Genina[3], 1-*Saratov State Medical University*, 2-*Institute of Biochemistry and Physiology of Plants and Microorganisms RAS,*3-*Saratov State University*

**16. Tissue diffuse backscattering of spectrum dependence on experiment's**
Elena M. Revzina, *Saratov State University*

**17. Calibrating of the full-field speckle-correlation system by absolute values of the scatters particle mobility**
Polina A.Timoshina[1], Dmitry N. Agafonov D.N.[1], Maxim A. Vilensky[1], Valery V. Tuchin[1,2], 1-*Saratov State University*, 2-*Institute of Precise Mechanics and Control RAS*

**18. The study of microcirculatory nail bed by speckle-imaging technique**
Dmitry N. Agafonov[1], Polina A. Timoshina[1], Maxim A. Vilensky[1], Valery V. Tuchin[1,2], 1-*Saratov State University*, 2-*Institute of Precise Mechanics and Control RAS*

**19. Full-field speckle correlation technique as applied to blood flow monitoring**
Maxim A. Vilensky, *Saratov State University*

**20. Hyperproducation of nitric oxide in blood and epithelium of stomach as an effective indicator of hemorrhagic stress**
Igor A. Semaychkin-Glushkovskij, Oxana V. Semaychkina-Glushkovskaya, Sergey V. Kapralov, Ilya A. Frolov, Sergey S. Sindeev, *Saratov State University*

**21. Disorders in adrenodepended vasodilation is associated with high risk of development of acute bleeding**,
Veronika A. Berdnikova, Oxana V. Semaychkina-Glushkovskaya, Yana Kuznetsova, Olga A. Bibikova, *Saratov State University*

**22. Optical clearing of eye tissues**
Ekaterina A. Zubkina, Anastasiya M. Parkheychuk, Alexey N. Bashkatov, Elina A. Genina, Valery V. Tuchin, *Saratov State University*

**23. Optical clearing of skin by 40%-glucose solution**
Darya K. Tuchina, Oxana V. Khomenko, Alexey N. Bashkatov, Elina

A. Genina, Valery V. Tuchin, *Saratov State University*

**24. Estimation of biotissue subsurface temperature induced by laser heating mediated by nanoparticles**

Alexander A. Skaptsov, Tatyana L. Travina, *Saratov State University*

**25. Monte Carlo simulation of light delivery from skin surface to maxillary sinus at laser treatment of sinusitis**

Ruslan A. Razdelkin, Alexey N. Bashkatov, Elina A. Genina, Valery V. Tuchin, *Saratov State University*

**26. Diffusion of 35%-glucose solution in skin**

Elena Bogomolova, Ekaterina Kosoruchkina, Alexey N. Bashkatov, Elina A. Genina, Valery V. Tuchin, *Saratov State University*

27. **Optical clearing of muscle tissue by glucose solution**

Marina Kozintseva, Elena Bogomolova, Ekaterina Kosoruchkina, Alexey N. Bashkatov, Elina A. Genina, Valery V. Tuchin, *Saratov State University*

**28. Transcutaneous electrical stimulation with biofeedback and magnetic sympathetic correction in the treatment of patients with primary open-angle glaucoma**

Tatyana G. Kamenskih, E.V. Veselova, *Saratov State Medical University*

**29. Condition of the corneal transplantate after penetrating optical keratoplasty**

Tatyana G. Kamenskih, N.M. Khaibulina, I.Y. Goryunova, I.O. Kolbenev, N.R. Lopatinskaya, *Saratov State Medical University*

**30. Photodynamic lipolysis with Indocyanine Green**

Alexandra M. Kozina, Irina Yu. Yanina, Yulia I. Svenskaya, Elina A. Genina, Sergey A. Portnov, Alexey N. Bashkatov, Dmitry A. Gorin, Valery V. Tuchin, *Saratov State University*

**31. The system for the microscopical polarization mapping of birefringent media**

Andrey V. Spivak, Dmitry A. Yakovlev, Yury P. Sinichkin, *Saratov State University*

**32. Visualization of magnetic microcapsules in liquid using optical coherent tomography and controlling their arrangement via magnetic field**

Garif G. Akchurin[1,5], Georgy G. Akchurin[1,5], Dmitry A. Gorin[1], T.A. Kolesnikova[1], G.B. Khomutov[2], V.Yu. Maksimov[3], Sergey A. Portnov[1], Gleb B. Sukhorukov[4], Valery V. Tuchin[1,5], *[1] Saratov State University, [2] Moscow State University, [3] Eye-hospital, Saratov, [4] IRS at Biomaterials, Queen Mary University of London, [5] Institute of Precise Mechanics and Control of RAS Saratov*

**33. Full-field low coherence optical tomography using white light source**

Ilya V. Smirnov, Elena V. Bogolyubova, Alexander L. Kalyanov , Vladislav V. Lychagov, Vladimir P. Ryabukho, *Saratov State University*

**34. The influence of superparamagnetic nanoparticles on the internal organs of laboratory animals at intramuscular introduction**

Nikita A. Navolokin[1], X.M. Kong[1], Galina N. Maslyakova[1], Alla B. Bucharskaya[1], O.V. Matveeva[1], Boris A. Medvedev[2], Alexander A. Ignatiev[2], *1 - Saratov State Medical University, 2 - Saratov State University*

**35. Fractal properties of biospeckles: computer simulation**

Alexander S. Ulyanov, *Saratov State University*

**36. Subcutaneous adipose tissue histological study at laser treatment of the human skin *in vitro***

Irina Yu. Yanina[1], Valery V. Tuchin[1,2], Nikita A. Navolokin[3], Leyla V. Suleymanova[3], Alla B. Bycharskaya[3], Galina N. Maslyakova[3], *1 - Saratov State University, Russia; 2 - Institute of Precise Mechanics and Control RAS, Russia, 3 - Saratov State Medical University, Russia*

**37. Combination of nanoparticles and photosensitizers in photodynamic action on microorganisms**

Pavel O. Petrov, Nadezda M. Abaeva, Elena S. Tuchina, *Saratov State University, Biological Department, Laboratory of Bacteriology*