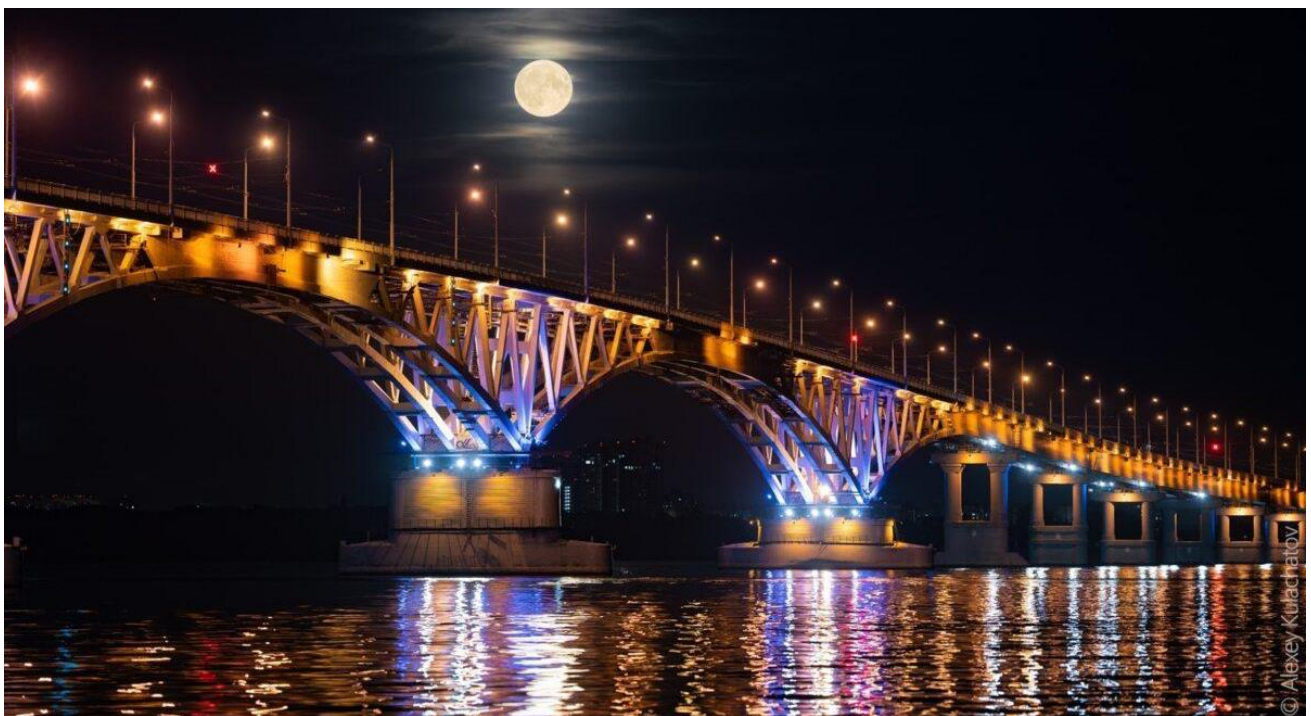


# Saratov Fall Meeting

# SFM'26

**14<sup>th</sup> International Symposium “Optics and Biophotonics”**

**30<sup>th</sup> International School for Junior Scientists and Students on Optics, Laser Physics & Biophotonics**



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ИНЖЕКТ  
РОСАТОМ

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# Schedule of SFM-26

## September 21, Monday

| Saratov<br>time UTC+4 |                                                                                                                                                                                                                                                                      |                                             |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| 11.00-13.00           | <b>REGISTRATION</b>                                                                                                                                                                                                                                                  | <i>Building 3,<br/>1<sup>st</sup> floor</i> |
| 14.00-14.45           | <b>MODERN OPTICS: PUBLIC LECTURE SESSION I</b><br><b>SHORT COURSE SFM-26</b><br><b>Chairs: Ekaterina Lazareva</b> , Saratov State Univ., Russia, <b>Dmitry A. Gorin</b> , Skolkovo Institute of Science and Technology, Skoltech; Central University, Moscow, Russia | <i>Building 8,<br/>Room 420</i>             |
|                       | <b>CREATION OF BIOMATERIALS WITH CONTROLLED PROPERTIES: HOW CAN NATURE HELP US?</b><br><b>Gleb B. Sukhorukov</b> , Skolkovo Institute of Science and Technology, Skoltech; Life Improvement by Future Technologies, LIFT Center, Moscow, Russia                      |                                             |

## September 22, Tuesday

|             |                                                                                                                                                                                                                                                                                                                                                 |                                       |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 9.30-13.00  | <b>REGISTRATION</b>                                                                                                                                                                                                                                                                                                                             | <i>Building 10</i>                    |
| 10.30-11.00 | <b>Coffee break</b>                                                                                                                                                                                                                                                                                                                             |                                       |
| 11.00-12.30 | <b>PLENARY SESSION I</b><br><b>Chairs: Valery V. Tuchin</b> , Saratov State Univ.; <b>Alexander V. Priezzhev</b> , Lomonosov Moscow State Univ., Russia                                                                                                                                                                                         | <i>Building<br/>10,<br/>Main Hall</i> |
| 11.00-11.10 | <b>WORDS OF WELCOME TO THE PARTICIPANTS OF SFM-26</b><br><b>Valery V. Tuchin</b> , Saratov State Univ.                                                                                                                                                                                                                                          |                                       |
| 11.10-11.50 | <b>CELL STIMULATION AND DELIVERY VIA REMOTE CONTROLLED COLLOIDS</b><br><b>Gleb B. Sukhorukov</b> , Skolkovo Institute of Science and Technology, Skoltech; Life Improvement by Future Technologies, LIFT Center, Moscow, Russia                                                                                                                 |                                       |
| 11.50-12.30 | <b>MULTIMODAL NONLINEAR OPTICAL IMAGING: INTEGRATING FLIM, SUPER-RESOLUTION, AND LABEL-FREE CONTRAST FOR BIOMEDICAL APPLICATIONS</b><br><b>Junle Qu</b> , Medical Photonics Innovation Institute, College of Physics and Optoelectronic Engineering, Shenzhen University, Shenzhen, China; Ioffe Institute, Russian Academy of Sciences, Russia |                                       |

|             |                                                                                                                                                                                                            |                                    |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
|             | <b>SPONSOR SESSION I</b><br>Chairs: Valery V. Tuchin, Saratov State Univ.; Alexander V. Priezzhev, Lomonosov Moscow State Univ., Russia                                                                    |                                    |
| 12.30-12.50 | <b>CUSTOMIZATION OF FLIM SYSTEMS: SELECTION OF HARDWARE CONFIGURATIONS FOR SPECIFIC SCIENTIFIC TASKS</b><br>Anton I. Pavlikov, Scientific Microscopy, Biovitrum LLC, Moscow, Russia                        |                                    |
| 12.50       | <b>GENERAL PHOTO OF THE PARTICIPANTS</b>                                                                                                                                                                   | <i>In front of the Building 10</i> |
| 13.00-14.00 | <b>A TOUR OF THE RESEARCH LABORATORIES OF THE DEPARTMENT OF OPTICS AND BIOPHOTONICS AND THE SCIENCE MEDICAL CENTER</b>                                                                                     | <i>Buildings 3, 5 and 8</i>        |
| 14.00-16.00 | <b>LUNCH</b>                                                                                                                                                                                               |                                    |
| 16.00-18.20 | <b>PLENARY SESSION II</b><br>Chairs: Valery V. Tuchin, Saratov State Univ.; Alexander V. Priezzhev, Lomonosov Moscow State Univ., Russia                                                                   | <i>Building 10, Main Hall</i>      |
| 16.00-16.40 | <b>MULTIFUNCTIONAL IRON OXIDE NANOPARTICLES: MRI CONTRAST AND LIGHT INDUCED DISSOLUTION</b><br>Dmitry A. Gorin, Skolkovo Institute of Science and Technology, Skoltech; Central University, Moscow, Russia |                                    |
| 16.40-17.20 | <b>SPECTROSCOPY OF ASTROPHYSICAL ICE ANALOGUES: FROM THE MOST COMMON MOLECULES TOWARD SEEDS OF LIFE IN SPACE</b><br>Kirill Zaytsev, Prokhorov General Physics Institute of RAS, Moscow, Russia             |                                    |
| 17.20-17.50 | <b>Coffee break</b>                                                                                                                                                                                        |                                    |
| 17.50-18.30 | <b>ENDOGENOUS FLUORESCENCE OF TISSUES: NEW MECHANISMS AND CLINICAL TRANSLATION</b><br>Evgeny Shirshin, Lomonosov Moscow State University, Moscow, Russia                                                   |                                    |
| 18.30-18.50 | <b>SPONSOR SESSION II</b>                                                                                                                                                                                  |                                    |
| 18.30-18.50 | <b>IN VIVO OPTICAL IMAGING SYSTEMS</b><br>Sergey E. Chalov, LUMINON™ IE Chalov S.E., Moscow, Russia; Wuhan BIOVIVO Biotechnology Co., Ltd., China                                                          | <i>Building 11</i>                 |
| 19.00-22.00 | <b>WELCOME PARTY</b>                                                                                                                                                                                       |                                    |

## September 23, Wednesday

|             |                                                                                                                                                                                                                                                                                |                               |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 10.00-13.00 | <b>PLENARY SESSION III</b><br><b>Chairs:</b> Dmitry A. Gorin, Skoltech, Central University, Moscow, Russia, Evgeny A. Shirshin, Lomonosov Moscow State University, Moscow, Russia                                                                                              | <i>Building 10, Main Hall</i> |
| 10.00-10.40 | <b>COMPUTING WITH QUANTUM FLUIDS OF LIGHT</b><br><b>Pavlos Lagoudakis</b> , Skolkovo Institute of Science and Technology, Skoltech, Moscow, Russia                                                                                                                             |                               |
| 10.40-11.20 | <b>ADVANCES IN OPTICAL AND OPTOACOUSTIC IMAGING</b><br><b>Vasilis Ntziachristos</b> , Technical University of Munich, Munich, Germany                                                                                                                                          |                               |
| 11.20-13.00 | <b>INVITED LECTURE/ORAL/ON-LINE SESSION BIOPHYSICS I / INTERNET BIOPHOTONICS I</b><br><b>Chairs:</b> Ivan A. Bratchenko, Immanuel Kant Baltic Federal University, Russia; Andrey Dunaev, Orel State University, Orel, Russia                                                   |                               |
| 10.00-15.30 | <b>INVITED LECTURE/ORAL SESSIONS</b><br><b>TERAHERTZ OPTICS &amp; BIOPHOTONICS/ ADVANCED MATERIALS</b><br><b>Chairs:</b> Kirill I. Zaytsev, Arsenii A. Gvdush, Nikita V. Chernomyrdin, Prokhorov General Physics Institute of RAS, Bauman Moscow State Technical Univ., Russia | <i>Online</i>                 |
| 11.30-18.30 | <b>INVITED LECTURE/ ORAL SESSIONS OPTICAL AND BIOMEDICAL ENGINEERING</b><br><b>Chairs:</b> Igor Fufurin, Igor Golyak, Bauman Moscow State Technical Univ., Russia                                                                                                              | <i>Building 8, Room 201</i>   |
| 11.00-12.30 | <b>ON-LINE / ORAL SESSION LOW- DIMENSIONAL STRUCTURES I</b><br><b>Chair:</b> Olga Glukhova, Saratov State Univ., Russia                                                                                                                                                        | <i>Building 8, Room 318</i>   |
| 12.00-19.00 | <b>INVITED LECTURE/ORAL SESSION NANOBIPHOTONICS I</b><br><b>Chair:</b> Nikolai G. Khlebtsov, IBPPM RAS, Saratov State Univ., Russia                                                                                                                                            | <i>Building 9, Conf. Hall</i> |
| 12.00-13.00 | <b>ROUND TABLE OF HIGH TECHNOLOGIES COMMERCIALIZATION AND REGIONAL INNOVATION SYSTEMS XX</b><br><b>Chairs:</b> Daniil N. Bratashov, MIPT and Saratov State Univ., Russia; Andrey P. Rytic Saratov State Univ., Russia                                                          | <i>Building 6, Room 204</i>   |
| 13.00-14.30 | <b>INVITED LECTURE/ ORAL SESSION MACHINE LEARNING I</b><br><b>Chairs:</b> Igor K. Lednev, Univ. at Albany, USA, Yury V.Kistenev, Tomsk State Univ., Russian Federation                                                                                                         | <i>Online</i>                 |
| 13.00-14.00 | <b>LUNCH</b>                                                                                                                                                                                                                                                                   |                               |
| 14.00-18.00 | <b>INVITED LECTURE/ORAL/ON-LINE SESSION LASER PHYSICS AND PHOTONICS</b><br><b>Chair:</b> Vladimir L. Derbov, Saratov State Univ., Russia                                                                                                                                       | <i>Building 10, Hall 503</i>  |
| 14.00-18.15 | <b>INVITED LECTURE/ORAL/ON-LINE SESSION BRILLOUIN SPECTROSCOPY</b><br><b>Chair:</b> Alexander V. Sadovnikov, Saratov State Univ., Russia                                                                                                                                       | <i>Building 8, Room 005</i>   |

|                               |                                                                                                                                                                                                                                                                                                                                                                      |                                                  |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 14.00-16.00                   | <b>INVITED LECTURE/ORAL/ON-LINE SESSION BIOPHYSICS II / INTERNET BIOPHOTONICS II</b><br><b>Chairs:</b> Alexander V. Priezzhev, Andrei E. Lugovtsov, M.V. Lomonosov Moscow State University, Russia                                                                                                                                                                   | <i>Building 10,<br/>Main Hall</i>                |
| 14.00-17.30                   | <b>INVITED LECTURE/ ORAL SESSIONS HISTORY, METHODOLOGY AND PHILOSOPHY OF THE OPTICAL EDUCATION</b><br>Chair: <b>Boris A. Medvedev</b> , Saratov State Univ., Russia                                                                                                                                                                                                  | <i>Scientific<br/>Library<br/>Conf. Hall</i>     |
| 15.00-18.30                   | <b>ON-LINE INVITED LECTURE /ORAL SESSION SPECTROSCOPY AND MOLECULAR MODELING I</b><br><b>Chair:</b> Kirill V. Berezin, Saratov State Univ., Inna L. Plastun, Saratov State Technical Univ., Russia                                                                                                                                                                   | <i>Building 8,<br/>Room 216</i>                  |
| 16.00-16.30                   | <b>Coffee break</b>                                                                                                                                                                                                                                                                                                                                                  | <i>Building 10,<br/>2nd floor</i>                |
| 16.30-19.00                   | <b>INVITED LECTURE/ORAL/ON-LINE SESSION BIOPHYSICS III</b><br><b>Chairs:</b> Nikolay A. Gippius; Skoltech, Moscow, Russia; <b>Sergey I. Kudryashov</b> , Lebedev Physical Institute, Moscow, Russia                                                                                                                                                                  | <i>Building 10,<br/>Main Hall</i>                |
| 20.00-23.00                   | <b>EVENING BOAT TRIP - THE LIGHTS OF SARATOV</b>                                                                                                                                                                                                                                                                                                                     |                                                  |
| <b>September 24, Thursday</b> |                                                                                                                                                                                                                                                                                                                                                                      |                                                  |
| 9.40-13.15                    | <b>INVITED LECTURE/ ORAL SESSIONS BIOPHYSICS IV</b><br><b>Chairs:</b> Valery V. Tuchin, Saratov State Univ., Russia; <b>Dmitry A. Gorin</b> , Skolkovo Institute of Science and Technology, Skoltech; Central University, Moscow, Russia                                                                                                                             | <i>Building 10,<br/>Room 503</i>                 |
| 10.00-14.15                   | <b>INVITED LECTURE/ORAL SESSIONS<br/>TERAHERTZ OPTICS &amp; BIOPHOTONICS/ ADVANCED MATERIALS</b><br><b>Chairs:</b> Kirill I. Zaytsev, Arsenii A. Gavdush, Nikita V. Chernomyrdin, Prokhorov General Physics Institute of RAS, Bauman Moscow State Technical Univ., Russia                                                                                            | <i>Online</i>                                    |
| 11.00-12.30                   | <b>ON-LINE / ORAL SESSION LOW-DIMENSIONAL STRUCTURES II</b><br><b>Chair:</b> Olga Glukhova, Saratov State Univ., Russia                                                                                                                                                                                                                                              | <i>Building 8,<br/>Room 318</i>                  |
| 11.30-12.00                   | <b>Coffee break</b>                                                                                                                                                                                                                                                                                                                                                  | <i>Building 10,<br/>2nd floor</i>                |
| 13.00-14.00                   | <b>LUNCH</b>                                                                                                                                                                                                                                                                                                                                                         |                                                  |
| 14.00-15.00                   | <b>MODERN OPTICS: PUBLIC LECTURE SESSION II</b><br><b>Chairs:</b> Georgy V. Simonenko, Ekaterina N. Lazareva, Saratov State Univ., Russia<br><b>THE ADVENTURE OF PHOTONS IN THE SKY AND ON EARTH: WHO IS STRONGER THAN LIGHT SCATTERING OR ABSORPTION?</b><br><b>Dmitry Gorin</b> , Skolkovo Institute of Science and Technology, Central University, Moscow, Russia | <i>Building 3,<br/>Big<br/>Physical<br/>Hall</i> |

|                      |                                                                                                                                                                                                                                                            |                         |                                                                                                                                                                                                                                                                                  |                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 14.00-17.30          | <b>ROUND-TABLE DISCUSSION EDUCATION</b><br><b>Chair:</b> Boris Medvedev, Saratov State Univ., Russia                                                                                                                                                       |                         |                                                                                                                                                                                                                                                                                  | Scientific Library<br>Conf. Hall |
| 14.00-16.45          | <b>ORAL SESSION ELECTROMAGNETICS</b><br><b>Chair:</b> Michael V. Davidovich, Saratov State Univ., Russia                                                                                                                                                   |                         |                                                                                                                                                                                                                                                                                  | Building 8,<br>Room 318          |
| 14.00-16.00          | <b>ORAL SESSION NONLINEAR DYNAMICS</b><br><b>Chairs:</b> Galina I. Strelkova, Andrei V. Slepnev, Saratov State Univ., Russia                                                                                                                               |                         |                                                                                                                                                                                                                                                                                  | Building 3,<br>Room 38           |
| 15.00-18.00          | <b>ON-LINE INVITED LECTURE /ORAL SESSION SPECTROSCOPY AND MOLECULAR MODELING I</b><br><b>Chair:</b> Kirill V. Berezin, Saratov State Univ., Russia                                                                                                         | Building 8,<br>Room 216 | <b>INVITED LECTURE/ ORAL SESSIONS BIOPHYSICS V</b><br><b>Chairs:</b> Mikhail Yu. Kirillin; Gaponov-Grekhov Institute of Applied Physics of the Russian Academy of Sciences, Nizhny Novgorod, <b>Andrei E. Lugovtsov</b> ; M.V. Lomonosov Moscow State University, Moscow, Russia | Building 10,<br>Room 503         |
| 18.00-18.30          | Coffee break                                                                                                                                                                                                                                               |                         |                                                                                                                                                                                                                                                                                  | Building 3,<br>2nd floor         |
| 18.15-20.30          | <b>JOINT POSTER/INTERNET SESSION</b><br><b>Chairs:</b> Ivan V. Fedosov, Daria K. Tuchina, Saratov State Univ., Russia<br>Moderators: Ivan V. Fedosov, Michael M. Slepchenkov, Arseniy P. Fashchevskiy, Alexander I. Dubrovsky, Saratov State Univ., Russia |                         |                                                                                                                                                                                                                                                                                  | Building 3                       |
| September 25, Friday |                                                                                                                                                                                                                                                            |                         |                                                                                                                                                                                                                                                                                  |                                  |
| 9.30-12.45           | <b>INVITED LECTURE/ ORAL SESSIONS BIOPHYSICS VI</b><br><b>Chairs:</b> Elina Genina, Saratov State Univ., Russia                                                                                                                                            |                         |                                                                                                                                                                                                                                                                                  | Building 10,<br>Room 503         |
| 11.00-14.20          | <b>ON-LINE INVITED LECTURE/ORAL SESSION QUANTUM SCIENCE AND TECHNOLOGIES</b><br><b>Chairs:</b> Aleksey K. Fedorov, Evgeniy O. Kiktenko, Russian Quantum Center, Russia; National University of Science and Technology “MISIS” (Russia)                     |                         |                                                                                                                                                                                                                                                                                  | Online                           |
| 14.00-18.00          | <b>OUTDOOR ROUND-TABLE DISCUSSIONS AND THE CONCLUSION OF SFM-25</b>                                                                                                                                                                                        |                         |                                                                                                                                                                                                                                                                                  | Open Air Meeting                 |

# PLENARY SESSIONS

Saratov time/Moscow time

**September 22, Tuesday**

**PLENARY SESSION I**



**11.10-11.50/10:10-10:50**

**CELL STIMULATION AND DELIVERY VIA REMOTE CONTROLLED COLLOIDS**

**Gleb B. Sukhorukov, Skolkovo Institute of Science and Technology, Skoltech; Life Improvement by Future Technologies, LIFT Center, Moscow, Russia**



**11.50-12.30/10:50-11:30**

**MULTIMODAL NONLINEAR OPTICAL IMAGING: INTEGRATING FLIM, SUPER-RESOLUTION, AND LABEL-FREE CONTRAST FOR BIOMEDICAL APPLICATIONS**

**Junle Qu, Medical Photonics Innovation Institute, College of Physics and Optoelectronic Engineering, Shenzhen University, Shenzhen, China; Ioffe Institute, Russian Academy of Sciences, Russia**

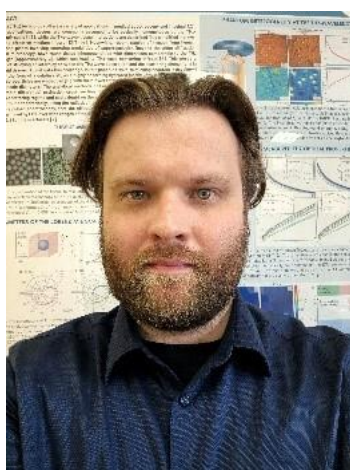
**PLENARY SESSION II**



**16.00-16.40/15.00-15.40**

**MULTIFUNCTIONAL IRON OXIDE NANOPARTICLES: MRI CONTRAST AND LIGHT INDUCED DISSOLUTION**

**Dmitry A. Gorin, Skolkovo Institute of Science and Technology, Skoltech, Central University, Moscow, Russia**



**16.40-17.20/ 15.40-16.20**

**THZ-IR SPECTROSCOPY OF ASTROPHYSICAL ICE ANALOGUES: FROM THE MOST COMMON MOLECULES TOWARD SEEDS OF LIFE IN SPACE**

**Kirill Zaytsev, Prokhorov General Physics Institute of RAS, Moscow, Russia**



**17.40-18.20/ 16.40-17.20**

**ENDOGENOUS FLUORESCENCE OF TISSUES: NEW MECHANISMS AND CLINICAL TRANSLATION**

**Evgeny Shirshin , Lomonosov Moscow State University, Moscow, Russia**

**September 23, Wednesday  
PLENARY SESSION III**



**10.00-10.40/9.00-9.40**

**COMPUTING WITH QUANTUM FLUIDS OF LIGHT**

**Pavlos Lagoudakis, Skolkovo Institute of Science and Technology, Skoltech, Moscow, Russia**



**10.40-11.20/9.40-10.20**

**ADVANCES IN OPTICAL AND OPTOACOUSTIC IMAGING**

**Vasilis Ntziachristos, Technical University of Munich, Munich, Germany**

# Conference on Optical Technologies in Biophysics & Medicine XXVII

**Chairs:** Valery V. Tuchin, Saratov State University, Institute of Precision Mechanics and Control of FRC "Saratov Scientific Centre of the RAS", Tomsk State University, Polina A. Timoshina, Elina A. Genina, Saratov State University; Tomsk State University (Russia)

**Secretary:** Isabella A. Serebryakova, Saratov State University (Russia)

**International Program Committee:** Vanderlei Salvador Bagnato, University of São Paulo (Brazil); Ivan A. Bratchenko, Samara University (Russia); Santhosh Chidangil, Manipal Academy of Higher Education (India); Elina A. Genina, Saratov State University (Russia); Mikhail Yu. Kirillin, Institute of Applied Physics RAS, Nizhny Novgorod (Russia); Yury V. Kistenev, Tomsk State University (Russia); Kirill V. Larin, University of Houston (USA); Ekaterina N. Lazareva, Saratov State University (Russia); Luís M. Oliveira, Polytechnic of Porto – School of Engineering (Porto, Portugal); Alexander V. Priezzhev, Moscow State University (Russia); Vladislav Shcheslavskiy, Privolzhsky Research Medical University, Nizhny Novgorod (Russia); Evgeny A. Shirshin, Research and Educational School "Photonic and Quantum Technologies. Digital Medicine," Lomonosov Moscow State University (Russia); Lihong Wang, Caltech (USA); Vladimir Yu. Zaitsev, FRC A.V. Gaponov-Grekhov Institute of Applied Physics of the RAS, Nizhny Novgorod (Russia); Valery P. Zakharov, Samara State University (Russia).

## September 23, Wednesday

### INVITED LECTURE/ORAL/ ON-LINE SESSION BIOPHYSICS I (Building 10, Main Hall)

**Chairs:** Ivan A. Bratchenko, Immanuel Kant Baltic Federal University, Russia; Andrey Dunaev, Orel State University, Orel, Russia  
**Moderator:** Isabella Serebryakova, Saratov State University, Russia

### Saratov time/Moscow time

11:20-11:40/10:20-10:40

Invited

**Features of light modulation caused by a pulse wave of blood pressure**

**Natalia P. Podolyan**, Mariya A. Asalkhanova, Timofey A. Efimov, Roman V. Romashko, Alexei A. Kamshilin; Institute of Automation and Control Processes of Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia

11:40-12:00/10:40-11:00

Invited

**QPI, FLIM and AI in analysis of cell response to photodynamic treatment**

**Irina Semenova**; Ioffe Institute, St. Petersburg, Russia

12:00-12:20/11:00-11:20

Invited online

**Polarized femtosecond spectroscopy as a tool for understanding of the mechanisms of intercellular reactions**

**Oleg Vasyutinskii**; Ioffe Institute, St. Petersburg, Russia

12:20-12:40/11:20-11:40

Invited

**Optical biopsy in oncology: the promise of macroscopic fluorescence lifetime imaging**

**Marina V. Shirmanova**; Institute of Experimental Oncology and Biomedical Technologies, Privolzhsky Research Medical University, Nizhny Novgorod

12:40-13:00/11:40-12:00

Invited

**Advancing biomedical optoacoustic tomography: from 3D vascular imaging to deep-tissue 5D functional imaging**

**Pavel Subochev**; Laboratory of Ultrasound and Optoacoustic Diagnostics, Department of Radiophysical Methods in Medicine, Federal Research Center A.V. Gaponov-Grekhov Institute of Applied Physics of the Russian Academy of Sciences, Nizhny Novgorod, Russia

**13:00-14:00/12:00-13:00**

**LUNCH**

### INVITED LECTURE/ORAL/ ON-LINE SESSION BIOPHYSICS II (Building 10, Main Hall)

**Chairs:** Alexander V. Priezzhev, Andrei E. Lugovtsov, M.V. Lomonosov Moscow State University, Russia

**Moderator:** Isabella Serebryakova, Saratov State University, Russia

14:00-14:20/13:00-13:20

Invited

**Optical resonances in photonic structures**

**Nikolay A. Gippius**; Skoltech, Moscow, Russia

14:20-14:40/13:20-13:40

Invited

**Quantum state dynamics in organic dyes and bacterial macromolecules excited by ultrashort resonant laser pulses**

**Sergey I. Kudryashov**, Lebedev Physical Institute, Moscow, Russia

14:40-15:00/13:40-14:00

Invited

**Mesoscopic fluorescence molecular tomography: a numerical study of the optical clearing effect**

**Alexander B. Konovalov**<sup>1</sup>, V. V. Vlasov<sup>1</sup>, S. I. Samarin<sup>1</sup>, D. K. Tuchina<sup>2</sup>, V. V. Tuchin<sup>2,3,4</sup>;

<sup>1</sup>Russian Federal Nuclear Center – E. I. Zababakhin Institute of Technical Physics, Snezhinsk, Russia, <sup>2</sup>Saratov State University, Saratov, Russia, <sup>3</sup>Tomsk State University, Tomsk, Russia, <sup>4</sup>FRC “Saratov Scientific Research Centre of the Russian Academy of Sciences”, Saratov

15:00-15:20/14:00-14:20

Invited

**Optical multisensor wearable systems for non-invasive diagnostics of human functional state**

**Anna Zaitseva**; Institute for Analytical Instrumentation of the Russian Academy of Sciences, Saint-Petersburg, Russia

15:20-15:40/14:20-14:40

Invited

**Optical biopsy of human skin for the detection of neurological diseases and other non-infectious diseases**

**Ivan A. Bratchenko**<sup>1</sup>, Lyudmila A. Bratchenko<sup>1</sup>, Yulia A. Khristoforova<sup>2</sup>, Petr A. Lebedev<sup>3</sup>, Maria A. Skuratova<sup>4</sup>, Alexandr V. Zakharov<sup>3</sup>; <sup>1</sup>Immanuel Kant Baltic Federal University; <sup>2</sup>Samara university; <sup>3</sup>Samara state medical university; <sup>4</sup>Samara City Clinical Hospital No.1 named after N.I.Pirogov

15:40-16:00/14:40-15:00

Invited

**Sharpness enhancement of transmission imaging of structural objects in thick scattering media**

Svetlana Shmavonyan<sup>1</sup>, Aleksandr Khanbekyan<sup>1</sup>, Marina Movsisyan<sup>1</sup>, **Aram Papoyan**<sup>1</sup>; <sup>1</sup>Institute for Physical Research, NAS of Armenia, Ashtarak-2, 0204, Armenia

**16:00-16:30/15:00-15:30**  
**Coffee break**

## INVITED LECTURE/ORAL/ ON-LINE SESSION BIOPHYSICS III (Building 10, Main Hall)

**Chairs:** Nikolay A. Gippius; Skoltech, Moscow, Russia; **Sergey I. Kudryashov**, Lebedev Physical Institute, Moscow, Russia

**Moderator:** **Isabella Serebryakova**, Saratov State University, Russia

16:30-16:50/15:30-15:50

Invited

**Wearable Multimodal Optical Analyzers: opportunities, problems and development prospects**

**Andrey Dunaev**; Orel State University, Orel, Russia

16:50-17:10/15:50-16:10

Invited

**Advances in Monte Carlo simulations for various optical diagnostics modalities**

**Mikhail Yu. Kirillin**; Gaponov-Grekhov Institute of Applied Physics of the Russian Academy of Sciences, Nizhny Novgorod, Russia

17:10-17:30/16:10-16:30

Invited

**Laser-optical evaluation of blood microrheology preconditioning effect *in vitro***

**Alexander V. Priezzhev**<sup>1</sup>, Matvei K. Maksimov<sup>1</sup>, Danila A. Umerenkov<sup>1</sup>, Pavel A. Moldon<sup>1</sup>, Alexei V. Muravyov<sup>2</sup>, Andrei E. Lugovtsov<sup>1</sup>; <sup>1</sup>Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>Ushinsky Yaroslavl State Pedagogical University, Yaroslavl, Russia

17:30-17:50/16:30-16:50

Invited

**Physics-based adaptation of foundation models for applications in optical coherence tomography**

**Lev Matveev**<sup>1</sup>, Denis Nikoshin<sup>1,2</sup>, Daniil Mikhailenko<sup>2</sup>, Nataliya Matveeva<sup>1,2</sup>, Konstantin Yashin<sup>3</sup>, Elena Kiseleva<sup>3</sup>, Sovetsky Alexander<sup>1</sup>, Radik Zinatullin<sup>3</sup>, Olga Streltsova<sup>3</sup>, Petrova Ksenia<sup>4</sup>, Mariam Novgorodskaya<sup>3</sup>, Maria Kulagina<sup>1,4</sup>, Kulagin Pavel<sup>1,4</sup>, Artem Grishin<sup>3</sup>, Liudmila Kukhnina<sup>3</sup>, Svetlana Korikova<sup>3</sup>, Maxim Ryabkov<sup>3</sup>, Vladimir Y. Zaitsev<sup>1</sup>, Alexander Matveyev<sup>1</sup>; <sup>1</sup>Institute of Applied Sciences RAS, Nizhny Novgorod, Russia; <sup>2</sup>HSE University, Nizhny Novgorod, Russia; <sup>3</sup>Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>4</sup>N.I. Lobachevsky Research State University, Nizhny Novgorod, Russia

17:50-18:10/16:50-17:10

Invited

**Photonics in Advanced Drug Delivery Systems**

**Arkady S. Abdurashitov**<sup>1,2</sup>, Olga A. Sindeeva<sup>1</sup>, Pavel I. Proshin<sup>1,2</sup>, Alexandra Y. Sain<sup>1</sup>, Alexey S. Sokolov<sup>1</sup>, Gleb B. Sukhorukov<sup>1,2</sup>; <sup>1</sup>Center for Bio- and Medical Technologies, Skoltech; <sup>2</sup>Life Improvement by Future Technology (LIFT) Center, Moscow, Russia

## September 24, Thursday

### INVITED LECTURE/ ORAL REPORT SESSIONS BIOPHYSICS IV (Building 10, Room 503)

**Chairs:** Valery V. Tuchin, Saratov State Univ., Russia; **Dmitry A. Gorin**, Skolkovo Institute of Science and Technology, Skoltech; Central University, Moscow, Russia  
**Moderator:** Isabella Serebryakova, Saratov State University, Russia

09:40-10:00/08:40-09:00

Invited

**Leaves are more than green: photonic crystal effects in photosynthesis and crop productivity**  
**Eugene Bukhanov**; Federal Research Center "Krasnoyarsk Science Center SB RAS", Krasnoyarsk, Russia

10:00-10:20/09:00-09:20

Invited

**Metabolically activated Raman contrast enhanced by optical clearing for label-assisted mapping of tissue pathology**  
**Olga Gusliakova**<sup>1</sup>, Ekaterina Prikhodzhenko<sup>2</sup>, Yury Surkov<sup>1</sup>, Isabella Serebryakova<sup>1</sup>, Natalia Shushunova<sup>1</sup>, Valery Tuchin<sup>1</sup>; <sup>1</sup>Science Medical Centre, Saratov State University, Russia; <sup>2</sup>Laboratory of medical equipment in the field of in vitro diagnostics, Moscow Institute of Physics and Technology, Russia

10:20-10:40/09:20-09:40

Invited

**Laser-assisted microfluidic analysis of red blood cell biomechanics and the effect of endothelial monolayer in the channel**  
**Andrei E. Lugovtsov**<sup>1</sup>, Matvey K. Maksimov<sup>1</sup>, Danila A. Umerenkov<sup>1</sup>, Alexey N. Semenov<sup>2</sup>, Olga N. Scheglovitova<sup>3</sup> and Alexander V. Priezzhev<sup>1</sup>; <sup>1</sup>M.V. Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>University of Science and Technology MISIS, Moscow, Russia; <sup>3</sup>N.F. Gamaleya National Research Center for Epidemiology and Microbiology, Moscow, Russia

10:40-11:00/09:40-10:00

Invited

**Macrophage-mediated photodynamic therapy for renal cancer**  
**Olga A. Sindeeva**<sup>1</sup>, Aleksandra Sain<sup>1</sup>, Olga I. Gusliakova<sup>1,2</sup>, Polina A. Demina<sup>1,2</sup>, Gleb B. Sukhorukov<sup>1,3</sup>; <sup>1</sup>Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>2</sup>Saratov State University, Saratov, Russia; <sup>3</sup>Life Improvement by Future Technologies Center, Moscow, Russia; <sup>4</sup>National Research Ogarev Mordovia State University, Saransk, Russia

11:00-11:15/10:00-10:15

Oral Report

**Photodynamic therapy in the trap of resistance: a path to overcoming through the induction of immunogenic cell death**

Ekaterina Sleptsova<sup>1</sup>, Alina Khuzina<sup>1</sup>, Daria Sachkova<sup>2,3</sup>, Diana Yuzhakova<sup>2</sup>, Yevgeniya Sannova<sup>1</sup>, Konstantin Yashin<sup>4</sup>, Nina Peskova<sup>3</sup>, Svetlana Lermontova<sup>5</sup>, Ilya Shchechkin<sup>2,6</sup>, Larisa Klapshina<sup>5</sup>, Irina Balalaeva<sup>3</sup>, **Victoria Turubanova**<sup>1,7</sup>; <sup>1</sup>Department of Genetics and Life Sciences, Sirius University, Sochi, Russia; <sup>2</sup>Institute of Experimental Oncology and Biomedical Technologies, Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>3</sup>Institute of Biology and Biomedicine, Lobachevsky State University, Nizhny Novgorod, Russia; <sup>4</sup>Department of Neurosurgery, Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>5</sup>Sector of Chromophors for Medicine, G.A. Razuvaev Institute of Organometallic Chemistry of the Russian Academy of Sciences, Nizhny Novgorod, Russia; <sup>6</sup>Institute of Information Technology, Mathematics and Mechanics, Lobachevsky State University, Nizhny Novgorod, Russia; <sup>7</sup>Institute of Neurosciences, Lobachevsky State University, Nizhny Novgorod, Russia

11:15-11:30/10:15-10:30

Oral Report

**Polarization-modulation pump-probe spectroscopy for biological molecules: Linear dichroism and birefringence**

**Denis A. Volkov**<sup>1</sup>, Maxim V. Belashov<sup>1,2</sup>, Anastasia V. Dmitrieva<sup>1,3</sup>, Maria A. Plotitsyna<sup>1,3</sup>, Maxim E. Sasin<sup>1</sup>, Oleg S. Vasutinskii<sup>1</sup>; <sup>1</sup>Ioffe Institute, St. Petersburg, Russia; <sup>2</sup>ITMO University, St. Petersburg, Russia; <sup>3</sup>Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia

**11:30-12:00/10:30-11:00**  
**Coffee break**

12:00-12:15/11:00-11:15

Oral Report

**Multispectral optical coherence tomography: longitudinal spatial resolution improvement and limitations**  
Ulyana A. Makarenko<sup>1</sup>, Zoya A. Erovenko<sup>1</sup>, Aleksandr V. Petrov<sup>1</sup>, **Nikolai A. Ushakov**<sup>1</sup>; <sup>1</sup>Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia

12:15-12:30/11:15-11:30

Oral Report

**Analysis of Spectral properties of DNA complexes with biological active dyes in vitro to establish the molecular mechanism of their action**

**Nina Kasyanenko**<sup>1</sup>, Boris Paponov<sup>2</sup>, Ariana Chuvakina<sup>1</sup>, Vladimir Bakulev<sup>1</sup>; <sup>1</sup>Saint Petersburg State University, Saint Petersburg, Russia; <sup>2</sup>Pavlov University, Saint Petersburg, Russia

**12:30-12:45/11:30-11:45**

**Oral Report**

**Numerical study of the effect of an external field on the synchronization of a small ensemble of nanooscillators**

**Kristina M. Stankevich<sup>1</sup>, Oleg Y. Butkovskiy<sup>1</sup>;**  
<sup>1</sup>Vladimir State University, Vladimir, Russia

**12:45-13:00/11:45-12:00**

**Oral Report**

**Time-Domain NIRS system for Deep Tissue Probing**

**Vladislav I. Sharov<sup>1</sup>;** <sup>1</sup>Joint Institute for Nuclear Research, Dubna, Russia

**13:00-13:15/12:00-12:15**

**Oral Report**

**Local heating of water by high-intensity laser radiation**

**Ivan S. Petrov<sup>1</sup>, Sergey A. Burikov<sup>1</sup>, Tatiana A. Dolgova<sup>1</sup>;** <sup>1</sup>Lomonosov Moscow State University, Moscow, Russia

**13:15-15:00/12:15-14:00**

**LUNCH**

**INVITED LECTURE/ ORAL REPORT  
SESSIONS BIOPHYSICS V  
(Building 10, Room 503)**

**Chairs:** **Mikhail Yu. Kirillin;** Gaponov-Grekhov  
Institute of Applied Physics of the Russian  
Academy of Sciences, Nizhny Novgorod, **Andrei  
E. Lugovtsov;** M.V. Lomonosov Moscow State  
University, Moscow, Russia

**Moderator:** **Isabella Serebryakova,** Saratov  
State University, Russia

**15:00-15:15/14:00-14:15**

**Oral Report**

**Fluorescence lifetime imaging microscopy and its biological applications**

**Fangrui Lin<sup>1,2</sup>, Xin Zhen<sup>1</sup>, Min Yi<sup>1</sup>, Junle Qu<sup>1</sup>;**  
<sup>1</sup>Shenzhen Key Laboratory of Photonics and Biophotonics, College of Physics and Optoelectronic Engineering, Shenzhen University, Shenzhen, China; <sup>2</sup>Department of Biomedical Engineering, the Hong Kong Polytechnic University, Hong Kong, China.

**15:15-15:30/14:15-14:30**

**Oral Report**

**Wearable optical devices for assessing cosmonauts microcirculatory-tissue system responses to simulated spaceflight factors**

**Yulia I. Loktionova<sup>1</sup>, Kireev K.S.<sup>1,2</sup>, Zharkikh E.V.<sup>1</sup>,  
Lutsevich D.N.<sup>2</sup>, Yanushin V.S.<sup>1</sup>, Sidorov V.V.<sup>3</sup>,  
Dunaev A.V.<sup>1</sup>;** <sup>1</sup>Orel State University named after  
I.S. Turgenev, Orel, Russia; <sup>2</sup>State Organization  
"Gagarin Research and Test Cosmonaut Training  
Center", Zvyozdny gorodok, Russia; <sup>3</sup>SPE "LAZMA"  
Ltd., Moscow, Russia

**15:30-15:45/14:30-14:45**

**Oral Report**

**Application of terahertz microscopy in biophotonics and microfluidics**

**V.A. Zhelnov<sup>1</sup>, D.R. Il'enkova<sup>1</sup>, D.D. Rybnikov<sup>1</sup>, D.S.  
Ustyantseva<sup>1</sup>, V.V. Koroleva<sup>1</sup>, K.I. Zaytsev<sup>1</sup>, N.V.  
Chernomyrdin<sup>1</sup>;** <sup>1</sup>Prokhorov General Physics  
Institute of the Russian Academy of Sciences,  
Moscow, Russia

**15:45-16:00/14:45-15:00**

**Oral Report**

**Optical methods of hydrodynamic cavitation validation: correlation with hydrodynamic parameters**

**Anna A. Pronchenko<sup>1</sup>, M.A. Zavyalova<sup>1e2</sup>, Eduard  
V. Arbuzov<sup>1e3</sup>, Igor F. Sekiro<sup>3</sup>, Aleksandr A.  
Drannikov<sup>1e4e5</sup>, Igor I. Korel<sup>1</sup>;** <sup>1</sup>Novosibirsk State  
Technical University, Novosibirsk, Russia; <sup>2</sup>Design  
and Technological Institute of Scientific  
Instrumentation SB RAS, Novosibirsk, Russia;  
<sup>3</sup>S.S. Kutateladze Institute of Thermophysics  
Siberian Branch of the Russian Academy of  
Sciences, Novosibirsk, Russia; <sup>4</sup>Novosibirsk State  
University, Novosibirsk, Russia; <sup>5</sup>N.N. Vorozhtsov  
Novosibirsk Institute of Organic Chemistry of  
Siberian Branch of Russian Academy of Sciences,  
Novosibirsk, Russia

**16:00-16:15/15:00-15:15**

**Oral Report**

**Development of a Photoacoustic Sensor Prototype for Non-Invasive In Vivo Glucose Concentration Measurement**

**Vladimir A. Kozlov<sup>1</sup>, Anna A. Kozlova<sup>1</sup>, Daniil N.  
Bratashov<sup>1</sup>;** <sup>1</sup>Moscow Institute of Physics and  
Technology (National Research University),  
Moscow, Russia

**16:15-16:30/15:15-15:30**

**Oral Report**

**Nonlinear thermal response of water-saturated tissue phantoms under IR laser heating: experiment and modelling**

**Alexey V. Konovalov<sup>1</sup>, Yulia K. Sedova<sup>1</sup>,  
Alexander P. Sviridov<sup>1</sup>;** <sup>1</sup>NRC "Kurchatov  
Institute", Moscow, Russia

**16:30-16:45/15:30-15:45**

**Oral Report**

**Determination of the Refractive Index Increment for Binary Mixtures of Albumin and Gamma-Globulin**

**Tamara M. Innokenteva<sup>1</sup>, Victoria V. Gibizova<sup>1</sup>;**  
<sup>1</sup>Federal State Budgetary Educational Institution of  
Higher Education "Lomonosov Moscow State  
University", Moscow, Russia

**16:45-17:00/15:45-16:00**

**Oral Report**

**Microcirculatory Response of Tumor and Healthy Tissues to Various Photodynamic Therapy Protocols**

**Irina V. Makarova<sup>1</sup>, A.V. Guryleva<sup>1</sup>, A.S.  
Machikhin<sup>1</sup>, T.G. Grishacheva<sup>2</sup>, S.G. Chefou<sup>2</sup>, A.S.**

Belyaeva<sup>1</sup>, E.D. Kulikova<sup>1</sup>; <sup>1</sup>Scientific and Technological Centre of Unique Instrumentation RAS, Moscow, Russia; <sup>2</sup>Pavlov University, Saint Petersburg, Russia

**17:00-17:15/16:00-16:15**

**Oral Report**

**Time-Resolved Fluorescence Polarization Spectroscopy Reveals the Origin of the Spectroscopic Properties of Natural Heterogeneous Molecular Systems**

**Egor V. Kvasov<sup>1</sup>**, Ioanna A. Gorbunova<sup>2</sup>, Yaroslav M. Beltukov<sup>3</sup>, Maxim E. Sasin<sup>3</sup>, Boris P. Yakimov<sup>1</sup>, Irina V. Perminova<sup>4</sup>, Peter S. Timashev<sup>2,5</sup>, Evgeny A. Shirshin<sup>1,2</sup>; <sup>1</sup>Faculty of Physics, M.V. Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>Institute for regenerative medicine, Sechenov First Moscow State Medical University, Moscow, Russia; <sup>3</sup>Ioffe Institute, Saint-Petersburg, Russia; <sup>4</sup>Department of Chemistry, Lomonosov Moscow State University, Moscow, Russia; <sup>5</sup>Department of Biological Chemistry, Sechenov First Moscow State Medical University, Moscow, Russia

**17:15-17:25/16:15-16:25**

**Online Report (recorded)**

**Synergy of LIFT- produced Metal Nanoparticles and antibiotics against clinical bacterial strains**

**Alena A. Nastulyavichus<sup>1</sup>**, Eteri R. Tolordava<sup>1</sup>, Evgenia V. Ulturgasheva<sup>1</sup>, Sofia P. Babina<sup>1</sup>, Sergey I. Kudryashov<sup>1</sup>; <sup>1</sup>P.N. Lebedev Physical Institute of the Russian Academy of Sciences, Russia

**17:25-17:35/16:25-16:35**

**Online Report (recorded)**

**Frontiers of Nano-Optics: Contemporary Research and Emerging Applications**

**Anastasia Vorobyova<sup>1</sup>**, Karolina Ilyenkova<sup>2</sup>; <sup>1</sup>Physics and Mathematics, Specialized Educational and Scientific Center URFU (SESC URFU), Ekaterinburg, Russian Federation; <sup>2</sup>Environmental protection and energy conservation, Gazprom Corporate Institute

**17:35-17:45/16:35-16:45**

**Online Report (recorded)**

**Correlation of Optical and Thermodynamic Methods for Detecting Skin Collagen Denaturation under IR Laser Heating**

**Yulia K. Sedova<sup>2</sup>**, Natalia Y. Ignatieva<sup>1</sup>, Olga L. Zakharkina<sup>2</sup>, Olga I. Baum<sup>2</sup>, Alexei V. Yuzhakov<sup>2</sup>, Alexander P. Sviridov<sup>2</sup>; <sup>1</sup>M. V. Lomonosov Moscow State University; <sup>2</sup>Institute of Photon Technologies Kurchatov Complex of Crystallography and Photonics NRC "Kurchatov Institute"

**17:45-17:55/16:45-16:55**

**Online Report (recorded)**

**Photocatalytic optical fibers with ZnO:Sn,Fe coatings for localized reactive oxygen species generation**

**Egor P. Bykov<sup>1</sup>**, Larisa L. Khomutinnikova<sup>1</sup>, Kirill V. Babaev<sup>1</sup>; <sup>1</sup>ITMO University, St. Petersburg, Russia

**17:55-18:05/16:55-17:05**

**Online Report (recorded)**

**Evaluation of laser-induced effects on multilayer tissues of hollow organs by determining their optical properties**

**Anna A. Krivetskaya<sup>1,2</sup>**, Daniil M. Kustov<sup>1</sup>, Vladimir V. Levkin<sup>3</sup>, Sergey S. Kharnas<sup>3</sup>, and Tatiana A. Savelieva<sup>1,2</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Institute of Engineering Physics for Biomedicine, National Research Nuclear University MEPhI, Moscow, Russia; <sup>3</sup>Department of Faculty Surgery No. 1, I.M. Sechenov First Moscow State Medical University, Moscow, Russia

## **JOINT INTERNET/POSTER SESSION**

### **BIOPHYSICS (B)**

**(Building 3, 3rd floor Hall)**

**Chairs (B): Ivan V. Fedosov,**  
Saratov State Univ., Russia

**18:00-20:00**

**1B. Raman Spectroscopy Method for Assessing the Quality of Buffer Solutions Used in Biotechnology Laboratories** Pavel E. Timchenko<sup>1</sup>, Artem D. Volov<sup>2,3</sup>, Elena V. Timchenko<sup>1,3</sup>, Larisa T. Volova<sup>3</sup>, Alexander K. Strelkov<sup>2</sup>, Andrei A. Chernukhin<sup>1</sup>; <sup>1</sup>Samara University, Samara, Russia; <sup>2</sup>Samara State Technical University, Samara, Russia; <sup>3</sup>Samara State Medical University, Samara, Russia

**2B. Raman spectroscopy method for differentiating streptococcal strains grown on agar media** E.V. Timchenko<sup>1,2</sup>, A.V. Lyamin<sup>2</sup>, K.A. Kayumov<sup>2</sup>, I.V. Bazhutova<sup>2</sup>, D.G. Glubokov<sup>2</sup>, L.T. Volova<sup>2</sup>, P.E. Timchenko<sup>1</sup>, Yu.D. Ityaksov<sup>1</sup>, F.R. Bazhutov<sup>3</sup>; <sup>1</sup>Samara University, Samara, Russia; <sup>2</sup>Samara State Medical University, Samara, Russia; <sup>3</sup>M.V. Lomonosov Moscow State University, Faculty of Chemistry, Moscow, Russia

**3B. Laser speckle-contrast imaging with light guidance by spatial light modulator for flow analysis (pilot study)** Igor O. Kozlov<sup>1</sup>, Dmitry D. Stavtsev<sup>1</sup>, Andrei A. Galiastov<sup>1</sup>, Dmitry V. Telyshev<sup>1,2</sup>; <sup>1</sup>Sechenov University, Moscow, Russia; <sup>2</sup>National Research University of Electronic Technology, Moscow, Zelenograd, Russia

**4B. Spectral Diagnostics of the Femoral Compact Bone Condition in Gangrene and Phlegmon** E.V. Timchenko<sup>1,2</sup>, D.G. Glubokov<sup>2</sup>, P.E. Timchenko<sup>1</sup>, I.V. Bazhutova<sup>2</sup>, L.T. Volova<sup>2</sup>, F.R. Bazhutov<sup>3</sup>; <sup>1</sup>Samara University, Samara, Russia; <sup>2</sup>Samara State Medical University, Samara, Russia; <sup>3</sup>Lomonosov Moscow State University, Faculty of Chemistry, Moscow, Russia

- 5B. Using infrared oculography with the GVS-1 scientific equipment to study galvanic vestibular stimulation** Grigoriy L. Grigoryan, Grigoriy S. Bugriy, Anna P. Krutchinina, Anastasia A. Gross, Oleg V. Morozov, Vasilii V. Sazonov, Matvey V. Egorov, David E. Kharabadze, Georgiy M. Nikoladze, Maksim A. Proshkin, Andrej V. Pravdivtsev, Denis G. Kim, Anna A. Ganitcheva, Yevgeniy A. Nabiulin, Andrey Ye. Sankin, Pavel Yu. Sukhotshev; Lomonosov Moscow State University
- 6B. Influence of microenvironmental parameters on the photophysical properties of protoporphyrin IX for bladder cancer diagnostics** Daria O. Suverneva<sup>1</sup>, Afraa A. Hasan<sup>1,5</sup>, Gleb S. Budylin<sup>2</sup>, Ivan D. Filippov<sup>1</sup>, Dmitry A. Davydov<sup>1,2</sup>, Natalia V. Korneva<sup>6</sup>, Dmitry A. Kislyakov<sup>3</sup>, Vladislav I. Shcheslavskiy<sup>4</sup>, Evgeny A. Shirshin<sup>1,2</sup>; <sup>1</sup>Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russia; <sup>3</sup>Voskresensk Hospital, Voskresensk, Russia; <sup>4</sup>Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>5</sup>VPG Laserone LLC, Fryazino, Russia; <sup>6</sup>University Clinic of the Medical Scientific and Educational Center of Lomonosov Moscow State University, Moscow, Russia
- 7B. Ensemble learning for melanoma detection in hyperspectral skin images using chromophore-based features** Artem A. Borovkov<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia
- 8B. Hybrid multiclass classification of dermatoscopic images based on clinically interpretable features and convolutional neural networks** Ekaterina S. Parfenova<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia
- 9B. Photoditazine-Loaded Polyelectrolyte Microcapsules for Differentiation-Enhanced Photodynamic Therapy of Neuroblastoma** Alexandra Yu. Sain<sup>1</sup>, Sofia A. Kreshchanovskaya<sup>1,2</sup>, Olga I. Efimova<sup>1</sup>, Vladimir P. Baklaushev<sup>3</sup>, Olga A. Sindeeva<sup>1</sup>; <sup>1</sup>Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>2</sup>National Research University Higher School of Economics, Moscow, Russia; <sup>3</sup>FSBI "Federal Center of Brain Research and Neurotechnologies", Moscow, Russia
- 10B. Mueller polarimetry for Alzheimer's disease analysis** Daria A. Kargina<sup>1</sup>, Aleksandr S. Dyatlov<sup>1</sup>, Dmitry V. Karlovets<sup>1</sup>; <sup>1</sup>School of Physics and Engineering, ITMO University, St. Petersburg, Russia
- 11B. Hyperspectral Medical Image Alignment Method for Extracting Spectral Features** Artem P. Nepovinnov<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia
- 12B. Raman spectroscopy of skin in predicting prognosis in patients with heart failure** Lyudmila A. Bratchenko<sup>1</sup>, Yulia A. Khristoforova<sup>2</sup>, Maria A. Skuratova<sup>3</sup>, Petr A. Lebedev<sup>4</sup>, Ivan A. Bratchenko<sup>1</sup>; <sup>1</sup>Immanuel Kant Baltic Federal University, Kaliningrad, Russia; <sup>2</sup>Samara University, Samara, Russia; <sup>3</sup>Samara City Clinical Hospital No 1 named after N. I. Pirogov, Samara, Russia; <sup>4</sup>Samara State Medical University, Samara, Russia
- 13B. The Influence of Feature-Space Similarity Between Original and Synthetic Dermoscopic Images on Classification Performance** Nikita K. Zakharov<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia
- 14B. Biophysical profiling of tissue hypoxia via delayed luminescence of erythrosine** Azamat Ishemgulov<sup>1</sup>, Sergey Letuta<sup>1</sup>, Marina Senchukova<sup>2</sup>; <sup>1</sup>Institute of Micro- and Nanotechnology, Orenburg State University, Orenburg, Russia; <sup>2</sup>Scientific and Clinical Center No. 3, Petrovsky National Research Centre of Surgery, Moscow, Russia
- 15B. Early Detection of Myocardial Infarction Based on Surface-Enhanced Raman Spectroscopy and Machine Learning** Irina A. Pimenova<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia
- 16B. Testing the hypothesis of the universality of the biochemical basis of the skin in the diagnosis of chronic kidney disease using Raman spectroscopy and artificial intelligence** Ksenia E. Tomnikova; Samara National Research University, Samara, Russia
- 17B. Comparative analysis of deep learning architectures and ensemble methods for semantic segmentation of breast cancer histopathological images** Igor N. Tyrin<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia
- 18B. Visualization of cardiac-related perfusion oscillations using a laparoscopic laser speckle contrast imaging system** Vadim N. Prizemin<sup>1</sup>, Nadezda V. Golubova<sup>1</sup>, Viktor V. Dremine<sup>1</sup>, Elena V. Potapova<sup>1</sup>; <sup>1</sup>Orel State University named after I.S. Turgenev, Orel, Russia
- 19B. Integrating Ultrasound and Optical Modalities to Characterize the Coupling Between Macrovascular and Microvascular Tone Dynamics** Andrey A. Sagaidachnyi<sup>1</sup>, Andrey V. Antonov<sup>1</sup>, Artyom S. Bakhmetyev<sup>1,2</sup>, Dmitry I. Mayskov<sup>1</sup>, Ivan S. Zaletov<sup>1</sup>, Anatoly V. Skripal<sup>1</sup>; <sup>1</sup>Saratov State University,

- Saratov, Russia; <sup>2</sup>Saratov State Medical University, Saratov, Russia
- 20B. Method of spatial scanning of modulated laser radiation for outline imaging of interphalangeal joints** Svetlana Shmavonyan<sup>1</sup>, Aleksandr Khanbekyan<sup>1</sup>, Marina Movsisyan<sup>1</sup>, Valery Tuchin<sup>2,3</sup>, Aram Papoyan<sup>1</sup>; <sup>1</sup>Institute for Physical Research of National Academy of Sciences of Armenia, Ashtarak-2, Armenia; <sup>2</sup>Saratov State University, Institute of Physics and Science Medical Center, Saratov, Russian Federation; <sup>3</sup>Institute of Precision Mechanics and Control, FRC "Saratov Scientific Centre of the RAS," Saratov, Russian Federation
- 21B. The effect of selecting the measuring volume under structured illumination using LED** Victoria P. Fomicheva, Ivan V. Fedosov; Saratov State University, Saratov, Russia
- 22B. Investigation of the Optical Properties of Rat Cholangiocarcinoma Tissue Using Upconversion Nanoparticles** Victoria A. Kovalenko<sup>1</sup>, Navolokin N.A.<sup>2</sup>, Mylnikov A.M.<sup>2</sup>, Yanina I.Yu.<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov State Medical University, Saratov, Russia
- 23B. Study of microhemodynamic parameters and characteristics of erythrocytes during the development of pathology during photodynamic therapy with submicron nanoparticles** Ekaterina N. Lazareva<sup>1</sup>, Arseniy P. Fashchevskiy<sup>1</sup>, Artyom M. Mylnikov<sup>2</sup>, Nikita A. Navolokin<sup>1,2,3</sup>, Natalia A. Shushunova<sup>2</sup>, Irina Yu. Yanina<sup>1</sup>; <sup>1</sup>Saratov National Research State University named after N. G. Chernyshevsky, Saratov, Russia; <sup>2</sup>Saratov State Medical University named after V. I. Razumovsky, Saratov, Russia; <sup>3</sup>Pathomorphology Department of the State Healthcare Institution "Saratov City Clinical Hospital No. 1 named after Yu.Ya. Gordeeva", Saratov, Russia;
- 24B. Experimental Comparison of Photodynamic Therapy Efficacy Using Indocyanine Green and Photosens in a Colorectal Cancer Model** Alena K. Shatenova<sup>1</sup>, Natalia A. Shushunova<sup>2</sup>, Vadim D. Genin<sup>1</sup>, Alla B. Bucharaskaya<sup>2</sup>, Elina A. Genina<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov State Medical University, Saratov, Russia
- 25B. Characteristics of Peripheral Blood Flow in Patients with Obstructive Sleep Apnea** Vyacheslav S. Yanushin<sup>1</sup>, Yulia I. Loktionova<sup>1</sup>, Elena V. Zharkikh<sup>1</sup>, Viktor V. Sidorov<sup>2</sup>, Viktoria K. Vorsina<sup>3</sup>, Yulia S. Kuznetsova<sup>3</sup>, Anastasia D. Solonina<sup>3</sup>, Alexander L. Kalinkin<sup>3</sup>, Andrei V. Dunaev<sup>1</sup>; <sup>1</sup>Research and Development Center of Biomedical Photonics, Orel State University Named After I.S. Turgenev, Orel, Russia; <sup>2</sup>"SPE LAZMA" Ltd., Moscow, Russia; <sup>3</sup>Sleep Medicine Center, University Clinic, Moscow Research and Education Institute, Lomonosov Moscow State University, Moscow, Russia.
- 26B. Numerical Simulation of Light Propagation in Blood Layer and Estimation of Wavelength Dependence of Absorbed Light Portion** Stepan Goncharov<sup>1</sup>, Andrei Lugovtsov<sup>1</sup>, Alexander Priezzhev<sup>1</sup>; <sup>1</sup>Lomonosov Moscow State University, Moscow, Russia
- 27B. Comparison of the effects of RBC manipulation with optical tweezers and with photonic nanojet** Lugovtsov A.E.<sup>1</sup>, Ermolinskiy P.B.<sup>1</sup>, Maksimov M.K.<sup>1</sup>, Yu-Xuan Ren<sup>2</sup>, Priezzhev A.V.<sup>1</sup>; <sup>1</sup>Faculty of Physics, M.V. Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>Institute for Translational Brain Research, Fudan University, Shanghai, China
- 28B. Investigation of Raman Signals from Healthy and Diabetic Animals** Asiedu Da-Costa Aboagye<sup>1</sup>, Natalia Shushunova<sup>1</sup>, D.N. Bratashov<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Moscow Institute of Physics and Technology, Dolgoprudny, Russia
- 29B. Changes in diochemical and biophysical characteristics of blood in rats with model diabetes** Angelina A. Avanesyan<sup>1</sup>, E.S. Tuchina<sup>1</sup>, A.A. Doronkina<sup>1</sup>, N.A. Shushunova<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia
- 30B. Development of photodynamic therapy for cancer using nanoconjugates and indocyanine green** Maria Afonina<sup>1</sup>, Elina Genina<sup>1</sup>, Alla Bucharaskaya<sup>2,3</sup>, Natalia Shushunova<sup>3</sup>, Vadim Genin<sup>1</sup>, Vladimir Bogatyrev<sup>4</sup>, Vitaly Khanadeev<sup>4</sup>, A. Simonenko<sup>4</sup>, Boris Khlebtsov<sup>4</sup>, Valery Tuchin<sup>1,6</sup>; <sup>1</sup>Optics and Biophotonics Department, Saratov State University, Russia; <sup>2</sup>Science Medical Center, Saratov State University, Russia; <sup>3</sup>Department of Pathological Anatomy, Saratov State Medical University named after V.I. Razumovsky, Russia; <sup>4</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms, FRC "Saratov Scientific Centre of the Russian Academy of Sciences" (IBPPM RAS), Russia; <sup>5</sup>Institute of Precision Mechanics and Control, FRC "Saratov Scientific Centre of the Russian Academy of Sciences", Russia; <sup>6</sup>Laboratory of laser molecular imaging and machine learning, National Research Tomsk State University, Russia
- 31B. Alterations of blood microrheology in patients with cardiovascular diseases** Danila A. Umerenkov<sup>1</sup>, Matvei K. Maksimov<sup>1</sup>, Pavel A. Moldon<sup>1</sup>, Larisa I. Dyachuk<sup>1</sup>, Andei E. Lugovtsov<sup>1</sup>, Alexander V. Priezzhev<sup>1</sup>; <sup>1</sup>M.V. Lomonosov Moscow State University

- 32B. Morphometric and Optical Density Alterations of Red Blood Cells under PC-1 Tumor Progression and Upconversion Nanoparticle-Mediated Laser Exposure** Irina Y. Yanina, Ekaterina N. Lazareva, Arseniy P. Fashchevskiy; Saratov State University, Saratov, Russia
- 33B. Optical transparency enhancement of biological tissue using tartrazine-based food dye** Serafim E. Solovev<sup>1</sup>, Valery V. Tuchin<sup>2,3,4</sup>; <sup>1</sup>High School Ivolgino, Saratov, Russia; <sup>2</sup>Saratov State University, <sup>3</sup>FRC «Saratov Research Centre of the RAS», Saratov, Russia; <sup>4</sup>Tomsk State University, Tomsk, Russia
- 34B. Analysis of Fluorescence Lifetime for the Characterization of the State of Dental Enamel** Varvara V. Dudenkova<sup>1</sup>, Svetlana I. Gazhva<sup>1</sup>, Anton A. Filimonov<sup>1</sup>, Vladislav I. Shcheslavskiy<sup>1</sup>; <sup>1</sup>Privolzhsky Research Medical University (PIMU)
- 35B. Application of a modified laser diffractometry method for assessing the morphological parameters of human and rat erythrocytes** Maria S. Lebedeva<sup>1</sup>, Evgeniy G. Tsybrov<sup>2</sup>, Sergey Yu. Nikitin<sup>1</sup>; <sup>1</sup>Lomonosov Moscow State University, Faculty of Physics; <sup>2</sup>Lomonosov Moscow State University, Faculty of Computational Mathematics and Cybernetics
- 36B. Data Augmentation and Machine Learning Classification of Serum SERS Spectra in Patients with Non-Infectious Diseases** Yulia Khristoforova<sup>1</sup>, Angelina Melnikova<sup>1</sup>, Lyudmila Bratchenko<sup>2</sup>, Maria Skuratova<sup>3</sup>, Petr Lebedev<sup>4</sup>, Ivan Bratchenko<sup>2</sup>; <sup>1</sup>Samara National Research University, Samara, Russian Federation; <sup>2</sup>Immanuel Kant Baltic Federal University, Kaliningrad, Russian Federation; <sup>3</sup>Samara City Clinical Hospital No. 1 named after N. I. Pirogov, Samara, Russian Federation; <sup>4</sup>Samara State Medical University, Samara, Russian Federation
- 37B. Optical Transparency Enhancement of Biological Tissue Using Tartrazine-Based Food Dye** Serafim Solovev, Valery V. Tuchin; Saratov State University, Russia
- 38B. Development of a Nailfold Capillaroscopy System and a Simple Lightsheet Mesoscopy System Based on the OpenSPIM Open Project** Mikhail A. Makhortov<sup>1</sup>, Ilya O. Kozhevnikov<sup>1</sup>, Daniil N. Bratashov<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia
- 39B. Age as a limiting factor for the effectiveness of photostimulation of brain drainage function and cognitive abilities** Andrey V. Terskov<sup>1</sup>, Viktoria V. Adushkina<sup>1</sup>, Daria A. Zlatogorskaya<sup>1</sup>, Alexander A. Shirokov<sup>1,2</sup>, Oxana V. Semyachkina-Glushkovskaya<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov, Russia
- 40B. Alterations of blood microrheology in patients with autoimmune diseases** Pavel A. Moldon<sup>1</sup>, Natalia A. Isaenko (Chernova)<sup>1</sup>, Danila A. Umerenkov<sup>1</sup>, Vera A. Podzolkova<sup>2</sup>, Andrey E. Lugovtsov<sup>1</sup>, Alexander V. Priezhev<sup>1</sup>, Pavel V. Berezhanskiy<sup>2</sup>; <sup>1</sup>M.V. Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University, Moscow, Russia
- 41B. Comparative analysis of simulation results for metal-enhanced fluorescence of fluorophore molecules using 0D and 3D approximations** Alexander N. Yakunin<sup>1</sup>, Sergey V. Zarkov<sup>1</sup>, Yuri A. Avetisyan<sup>1</sup>, Garif G. Akchurin<sup>1,2</sup>, Valery V. Tuchin<sup>1,2,3</sup>; <sup>1</sup>Institute of Precision Mechanics and Control, Federal Research Centre "Saratov Scientific Centre of the Russian Academy of Sciences", Saratov, Russia; <sup>2</sup>Department of Optics and Biophotonics and Science Medical Center, Saratov State University, Saratov, Russia; <sup>3</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Tomsk, Russia
- 42B. Effect of photobiomodulation on the contractility of cervical lymphatic vessels in mice of different ages** Inna A. Blokhina<sup>1</sup>, Anastasiia D. Kolabukhova<sup>1</sup>, Anastasiia Semiachkina-Glushkovskaia<sup>1</sup>, Dmitry V. Tuktarov<sup>2</sup>, Nikita A. Navolokin<sup>3</sup>; <sup>1</sup>Department of Biology, Saratov State University, Saratov, Russia; <sup>2</sup>Institute of Physics, Saratov State University, Saratov, Russia; <sup>3</sup>Department of Pathological Anatomy, Saratov State Medical University, Saratov, Russia.
- 43B. A study of the effects of photobiomodulation on the elimination of beta-amyloid and the correction of age-related cognitive impairments in mice** Daria A. Zlatogorskaya<sup>1</sup>, Victoria V. Adushkina<sup>1</sup>, Alexander A. Shirokov<sup>2</sup>; <sup>1</sup>Department of Biology, Saratov State University, Saratov, Russia; <sup>2</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms of the Russian Academy of Sciences, Saratov, Russia

- 44B. Methylene Blue as a Novel Optical Clearing Agent** Aleksandr A. Petrov, Elina A. Genina; Saratov State University, Saratov, Russia
- 45B. Therapeutic effects of photobiomodulation for traumatic brain injury** Arina S. Evsiukova, Oxana V. Semyachkina-Glushkovskaya; Department of Biology, Saratov State University, Saratov, Russia
- 46B. Mechanisms of Age Differences in the Effectiveness of Phototherapy of Glioblastoma** Anastasiia D. Kolabukhova<sup>1</sup>, Inna A. Blokhina<sup>1</sup>, Aleksander V. Dmitrenko<sup>1</sup>, Mohammad Reza Rashidian Vaziri<sup>2</sup>, Ameneh Sazgarnia<sup>3,4</sup>, Armin Imanparast<sup>3,4</sup>, Alexander Shiorkov<sup>5,6</sup>; <sup>1</sup>Department of Biology, Saratov State University, Astrakhanskaya 82, 410012 Saratov, Russia; <sup>2</sup>Department of Physics, Faculty of Sciences, Ferdowsi University of Mashhad, Mashhad, Iran; <sup>3</sup>Medical Physics Research Center, Basic Sciences Research Institute, Mashhad University of Medical Sciences, Mashhad, Iran; <sup>4</sup>Department of Medical Physics, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran; <sup>5</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms; <sup>6</sup>Saratov Scientific Centre of the Russian Academy of Sciences, Saratov, Russia
- 47B. Issues related to the optimization of plasmonic nanoparticles with enhanced hot electron generation for applications in biomedicine, photocatalysis, and technology** Sergey V. Zarkov<sup>1</sup>, Yuri A. Avetisyan<sup>1</sup>, Garif G. Akchurin<sup>1,2</sup>, Alexander N. Yakunin<sup>1</sup>, Valery V. Tuchin<sup>1,2,3</sup>; <sup>1</sup>Institute of Precision Mechanics and Control, Federal Research Centre "Saratov Scientific Centre of the Russian Academy of Sciences", Saratov, Russia; <sup>2</sup>Department of Optics and Biophotonics and Science Medical Center, Saratov State University, Saratov, Russia; <sup>3</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Tomsk, Russia
- 48B. On the nonlinearity of the process of generating nonequilibrium hot electrons in the biological tissues of the eye in optical Femto Lasik technologies during laser vision correction** Garif G. Akchurin<sup>1,2</sup>, George G. Akchurin<sup>1,3</sup>, Yuri A. Avetisyan<sup>1</sup>, Sergey V. Zarkov<sup>1</sup>, Alexander N. Yakunin<sup>1</sup>, Vladimir Yu. Maksimov<sup>3</sup>, Valery V. Tuchin<sup>1,2,4</sup>; <sup>1</sup>Institute of Precision Mechanics and Control, Federal Research Centre "Saratov Scientific Centre of the Russian Academy of Sciences", Saratov, Russia; <sup>2</sup>Department of Optics and Biophotonics and Science Medical Center, Saratov State University, Saratov, Russia; <sup>3</sup>Laser Vision Correction and Microsurgery Center, Saratov, Russia; <sup>4</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Tomsk, Russia
- 49B. Photobleaching fluorescent microscopy lymph flow velocimetry in lymphatic vessels associated with deep cervical lymph node in mice** Alexander I. Dubrovsky<sup>1</sup>, Inna A. Blokhina<sup>2</sup>, Alexander V. Dmitrenko<sup>2</sup>, Ivan V. Fedosov<sup>1</sup>, Oxana V. Semyachkina-Glushkovskaya<sup>2</sup>; <sup>1</sup>Institute of Physics, Saratov State University, Saratov, Russia; <sup>2</sup>Department of Biology, Saratov State University, Saratov, Russia
- 50B. Time-Resolved OCT Tracking of Diffusion Kinetics in Collagen Matrices and Gelatin Phantoms During Optical Clearing** Arseniy P. Fashchevskiy, Yuriy I. Surkov, Isabella A. Serebryakova, Valery V. Tuchin; Saratov State University, Russia
- 51B. Multimodal imaging for the control of melanocytic neoplasms** Isabella A. Serebryakova<sup>1</sup>, Yuriy I. Surkov<sup>1</sup>, Olga Gusliakova<sup>1</sup>, Natalia A. Shushunova<sup>1</sup>, Arseniy P. Fashchevskiy<sup>1</sup>, Elina A. Genina<sup>1</sup>, Valery V. Tuchin<sup>1</sup>; <sup>1</sup>Saratov State University named after N. G. Chernyshevsky, SSU, Saratov, Russia
- 52B. Multimodal Biophotonic Monitoring of Local Drug Delivery to the Kidney** Natalia A. Shushunova<sup>1</sup>, Arkady S. Abdurashitov<sup>2</sup>, Ekaterina S. Prikhodzhenko<sup>3</sup>, Oksana A. Mayorova<sup>1</sup>, Valentina O. Plastun<sup>1</sup>, Olga I. Gusliakova<sup>1</sup>, Oleg A. Kulikov<sup>4</sup>, Valery V. Tuchin<sup>1</sup>, Gleb B. Sukhorukov<sup>2</sup>, and Olga A. Sindeeva<sup>2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>3</sup>Moscow Institute of Physics and Technology (National Research University), Moscow, Russia; <sup>4</sup>Ogarev Mordovia State University, Saransk, Russia

**September 25, Friday**

**INVITED LECTURE/ ORAL REPORT  
SESSIONS BIOPHYSICS V  
(Building 3, Big Physical Hall)**

Chair: **Elina Genina**, Saratov State Univ., Russia

**Moderator: Isabella Serebryakova**, Saratov State University, Russia

**09:45-10:00/8:45-09:00**

**Oral Report**

**Combined method for characterization of biological phantoms using optical coherence tomography and a fiber-optic refractive index sensor**

**Liubov D. Zavalishina**<sup>1</sup>, Aleksandr A. Markvart<sup>1</sup>, Uliana A. Makarenko<sup>1</sup>, Leonid B. Liokumovich<sup>1</sup>, Nikolai A. Ushakov<sup>1</sup>; <sup>1</sup>Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia

**10:00-10:15/09:00-09:15**

**Oral Report**

**Laser vaccine adjuvants in mice: laser sources and biological mechanisms**

**Anna Khokhlova**<sup>1</sup>, Yury Saenko<sup>1</sup>, Anastasiia Spiridonova<sup>1</sup>, Dmitry Korobko<sup>1</sup>, Pavel Itrin<sup>1</sup>, Maxime Pribylov<sup>1</sup>, Aleksei Abanin<sup>1</sup>, Sergei Sokolovski<sup>2</sup>, Edik Rafailov<sup>2</sup> and Andrei Fotiadi<sup>1,3</sup>; <sup>1</sup>S.P. Kapitsa Scientific Technological Research Institute, Ulyanovsk State University, Ulyanovsk, Russia; <sup>2</sup>Optoelectronics and Biomedical Photonics Group, School of Engineering and Applied Science, Aston University, Birmingham, UK; <sup>3</sup>Electromagnetism and Telecommunication Department, University of Mons, Mons, Belgium

**10:15-10:30/09:15-09:30**

**Oral Report**

**Application of Dynamic Light Scattering to study microparticles in platelet concentrates**

**Peter A. Volkov**<sup>1</sup>, Alexander S. Gur'ev<sup>1</sup>, Gleb M. Perepelkin<sup>1</sup>, Alexander D. Levin<sup>1</sup>; <sup>1</sup>All-Russian Research Institute for Optical and Physical Measurements, Moscow, Russia

**10:30-10:45/09:30-09:46**

**Oral Report**

**Building an intelligent system for differential diagnosis of blood cancer through pattern recognition modules**

**Matvey V. Sedykh**<sup>1</sup>, Julia A. Brodskaya<sup>1</sup>; <sup>1</sup>Gagarin's State Technical University of Saratov, Saratov, Russia

**10:45-11:00/09:45-10:00**

**Oral Report**

**Intraoperative Diagnosis of Bladder Tumors Using Protoporphyrin IX (PpIX) Fluorescence Lifetime**

**Ivan D. Filippov**<sup>1</sup>, A. Hasan<sup>1,5</sup>, Gleb S. Budylin<sup>2</sup>, D. O. Suverneva<sup>1</sup>, Denis A. Davydov<sup>1,2</sup>, Nadezhda V. Korneva<sup>6</sup>, Dmitry A. Kislyakov<sup>3</sup>, Vladislav I. Shcheslavskiy<sup>4</sup>, Evgeny A. Shirshin<sup>1,2</sup>; <sup>1</sup>Lomonosov

Moscow State University, Moscow, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russia; <sup>3</sup>Voskresensk Hospital, Voskresensk, Moscow Region, Russia; <sup>4</sup>Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>5</sup>VPG LaserONE LLC, Fryazino, Moscow Region, Russia; <sup>6</sup>Lomonosov University Clinic, Moscow, Russia

**11:00-11:15/10:00-10:15**

**Oral Report**

**Modeling of Intermolecular Interactions between Cyanine 7 and TNF-Related Amino Acid Chains**

**Bogdan A. Mishunin**<sup>1</sup>, Inna L. Plastun<sup>1</sup>, Egor V. Nazariyev<sup>1</sup>, Kirill A. Laptinsky<sup>2</sup>, Tatyana A. Dolenko<sup>2</sup>, Ruslan Y. Yakovlev<sup>3</sup>; <sup>1</sup>Yuri Gagarin State Technical University of Saratov; <sup>2</sup>Lomonosov Moscow State University; <sup>3</sup>LLC «Protonica», cluster «Lomonosov», Moscow

**11:15-11:30/10:15-10:30**

**Oral Report**

**Phasor-based approach for resolving multicomponent fluorescence signals in frequency-domain FLIM**

**Ilya A. Goryunov**<sup>1</sup>, Daniil Y. Popov<sup>1</sup>, Andrey Y. Vinokurov<sup>1</sup>, Elena V. Potapova<sup>1</sup>, Viktor V. Dremin<sup>1</sup>; <sup>1</sup>Orel State University named after I.S. Turgenev, Orel, Russia

**11:30-11:45/10:30-10:45**

**Oral Report**

**Assessment of developmental stages of infantile hemangiomas using hyperspectral imaging**

**Valery V. Shupletsov**<sup>1</sup>, Ilya A. Goryunov<sup>1</sup>, Elena V. Potapova<sup>1</sup>, Ivan P. Zhurilo<sup>2</sup>, Andrey V. Dunaev<sup>1</sup>, Victor V. Dremin<sup>1</sup>; <sup>1</sup>Orel State University named after I.S. Turgenev, Orel, Russia; <sup>2</sup>Tochka Opory Medical Center, Orel, Russia

**11:45-12:00/10:45-11:00**

**Oral Report**

**Specific features of chromophore concentration estimation from multispectral data**

**Dariia Musaeva**<sup>1</sup>, T. Torokhov<sup>1,3</sup>, B. Sheludko<sup>2</sup>, S. German<sup>1</sup>, R. Korobeinikov<sup>1</sup>, M. Kuzyuk<sup>1</sup>, V. Shibaeva<sup>1</sup>, S. Korchagin<sup>2</sup>, D. Gorin<sup>1</sup>, S. Perkov<sup>1,2</sup>; <sup>1</sup>Skolkovo Institute of Science and Technology (Skoltech), Moscow, Russia; <sup>2</sup>Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia; <sup>3</sup>Kharkevich Institute for Information Transmission Problems, Russian Academy of Sciences, Moscow, Russia

# Conference on Internet Biophotonics XIX

**Chairs:** Daria K. Tuchina, Ivan V. Fedosov, Saratov State University, Saratov, Russia.

**Secretary:** Ksenia O. Merkulova, Saratov State University, Saratov, Russia.

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## INTERNET INVITED LECTURES

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### Physics-assisted light-field microscopy enables high temporal-spatial resolution 3D observation

Dongyu Li; Huazhong University of Science and Technology, Wuhan, China

[https://sfmconference.org/sfm26/conferences\\_workshops/internet-biophotonics-xix/preliminary/4139/](https://sfmconference.org/sfm26/conferences_workshops/internet-biophotonics-xix/preliminary/4139/)

### Physiological effects of photobiomodulation therapy in the treatment of multiple concussive traumatic brain injury

Denis E. Bragin<sup>1,2,3</sup>, Fazle Kibria<sup>1</sup>, Olga A. Bragina<sup>1</sup>, Eduardo Colombari<sup>4</sup>, Alexey Trofimo<sup>5</sup>, Dmitry Atochin<sup>6</sup>, Satoshi Kashiwagi<sup>6</sup>, Patric Stanton<sup>3</sup>, Edwin Nemoto<sup>2</sup>; <sup>1</sup>Lovelace Biomedical Research Institute, Albuquerque, NM, USA, <sup>2</sup>University of New Mexico School of Medicine, Albuquerque, NM, USA, <sup>3</sup>New York Medical College, Valhalla, NY, <sup>4</sup>São Paulo State University, Araraquara, Brazil, <sup>5</sup>Privolzhsky Research Medical University, Nizhny Novgorod, Russia, <sup>6</sup>Massachusetts General Hospital, Harvard University, Charlestown, MA, USA

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### Micro-Raman spectroscopy of extracellular vesicles derived from stored blood components: towards label-free molecular characterization

Mithun N<sup>1</sup>, Santhosh Chidangil<sup>1,2</sup>; <sup>1</sup>Centre of Excellence for Biophotonics, Manipal Institute of Applied Physics, Manipal Academy of Higher Education, Manipal, Karnataka, India, <sup>2</sup>Department of Physics, JSS Science and Technology University, Mysuru, Karnataka, India

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### Characterization of optical clearing mechanisms in kidney tissues: discrimination of clear cell renal cell carcinoma

Maria R. Pinheiro<sup>1,2</sup>, Maria I. Carvalho<sup>1,2</sup>, Valery V. Tuchin<sup>3,4,5</sup>, Luís M. Oliveira<sup>1,6</sup>; <sup>1</sup>Institute for Systems and Computer Engineering, Technology and Science (INESC TEC), Porto, Portugal, <sup>2</sup>Faculty of Engineering, University of Porto (FEUP), Porto, Portugal; <sup>3</sup>Saratov State University, Saratov, Russia, <sup>4</sup>Institute of Precision Mechanics and Control, Saratov Scientific Centre of the Russian Academy of Sciences, Saratov, Russia, <sup>5</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Tomsk, Russia, <sup>6</sup>School of Engineering, Polytechnic of Porto, Porto, Portugal

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### Sub-femtonewton force sensing and super-resolved temperature measuring

Fan Wang; Beihang University, Peking, China

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### Nonlinear optical microscopy for biomedical applications

Nirmal Mazumder; Department of Biophysics, Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal, India

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### Indocyanine green-mediated photodynamic therapy in combined chemotherapy of tsc cancer model

Afshan Shirkavand, Medical Laser Research Center, YARA institute, ACECR, Tehran, Iran

[https://sfmconference.org/sfm26/conferences\\_workshops/internet-biophotonics-xix/preliminary/4219/](https://sfmconference.org/sfm26/conferences_workshops/internet-biophotonics-xix/preliminary/4219/)

### Dual-wavelength laser system for skin vessels treatment: theory and experiments

Andrei V. Belikov<sup>1</sup>, Viktor Yu. Chuchin<sup>1,2</sup>; <sup>1</sup>ITMO University Saint Petersburg, Russia; <sup>2</sup>VOLO LLC, Saint Petersburg, Russia

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**Photosensitizer-free singlet oxygen release: from cancer treatment to cell bioenergetic stimulation**

Viktor V. Dremine, Orel State University, Orel, Russia; Aston University, UK

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**Hydration kinetics of the dorsal stratum corneum studied by ultra-high-resolution visible-light OCT**

Stephen J. Matcher<sup>1,2,3</sup>, M Duan<sup>1,2,\*</sup>, D Revin<sup>1</sup>;

<sup>1</sup>School of Electrical and Electronic Engineering, University of Sheffield, UK; <sup>2</sup>Sheffield Dermatology Research, University of Sheffield, UK; <sup>3</sup>INSIGNEO Institute, University of Sheffield, UK; \*current address: Department of Dermatology, West China Hospital, Sichuan University, China

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**The synergistic effect of light and sound waves on melanoma treatment**

Vanderlei S. Bagnato; University of São Paulo, IFSC, Brazil

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**Laser-induced graphene on a polyimide film for photothermal skin tumor therapy**

Lyubov S. Parshina, Alexey V. Kiselev, Dmitry S. Gusev, Maria R. Konnikova, Vladimir A. Mikhalevsky, Olga P. Cherkasova; National Research Centre «Kurchatov Institute», Moscow, Russia

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**1 T MRI and biophotonics methods: synergy of approaches in biomedical research**

Victoria Zherdeva; Research Center of Biotechnology Russian Academy of Sciences, Moscow, Russia

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**In vivo evaluation of dental restorations: colour image analysis vs low-coherent optical computer tomography**

Nadezda O. Bessudnova, Sergey B. Venig; Saratov State University, Saratov, Russia

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**Assessment of peripheral hemodynamics by diffuse reflectance spectroscopy in the visible and near-infrared range in the cuprizone-induced demyelination model**

Veronika N. Volodina<sup>1</sup>, Anastasia A. Chervakova<sup>1</sup>, Alexander V. Kolpakov<sup>2</sup>, Diana Yu. Sokolova<sup>2</sup>, Petr E. Zaitsev<sup>1</sup>, Ulyana A. Apukhtina<sup>1</sup>, Tatiana I. Yaremenko<sup>1</sup>, Mikhail S. Krasnov<sup>1</sup>, Nikolai N. Kuznetsov<sup>1,3</sup>, Viktoria V. Zherdeva<sup>1</sup>; <sup>1</sup>A.N. Bach Institute of Biochemistry, Research Center of Biotechnology of the Russian Academy of Sciences, Moscow, Russia, <sup>2</sup>Faculty of Biomedical Engineering, Department of Biomedical Technical Systems, Bauman Moscow State Technical University, Moscow, Russia, <sup>3</sup>FN 5 "Chemistry", Bauman Moscow State Technical University, Moscow, Russia

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**Optical stimulation of nerve cell growth on nanoparticles arrays**

Uliana E. Kurilova<sup>1,2</sup>, Denis V. Novikov<sup>1</sup>, Yulia V. Chumachenko<sup>1</sup>, Andrey M. Tarasov<sup>1</sup>, Sergey V. Dubkov<sup>1</sup>, Dmitry G. Gromov<sup>1</sup>, Irina A. Suetina<sup>3</sup>, Marina V. Mezentseva<sup>3</sup>, Alexander Yu. Gerasimenko<sup>1,2</sup>; <sup>1</sup>National Research University "MIET", Moscow, Russia, <sup>2</sup>Sechenov First Moscow State Medical University, Moscow, Russia, <sup>3</sup>National Research Center for Epidemiology and Microbiology named after Honorary Academician N.F. Gamaleya, Moscow, Russia

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**Detection of stromal collagen alterations in oral squamous cell carcinoma with ex vivo polarized light microscopy**

Vathsala Patil<sup>1</sup>, Adarsh Kudva<sup>2</sup>, Nirmal Mazumder<sup>3</sup>, Gagan Raju<sup>3</sup>, Albin Joseph<sup>3</sup>, Chetana Chandrashekar<sup>4</sup>; <sup>1</sup>Department of Oral Medicine and Radiology, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India; <sup>2</sup>Department of Oral and Maxillofacial Surgery, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India; <sup>3</sup>Department of Biophysics, Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India; <sup>4</sup>Department of Oral Pathology and Microbiology, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India

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**Combined method for characterization of biological phantoms using optical coherence tomography and a fiber-optic refractive index sensor**

Daniella L. Peres<sup>1,2</sup>, Joaquim C. Felipe<sup>2</sup>, Leandro L. Matos<sup>2</sup>, Thiago M. Pereira<sup>3</sup>, Denise M. Zezell<sup>1</sup>; <sup>1</sup>Nuclear and Energy Research Institute, Brazil; <sup>2</sup>University of São Paulo, Brazil; <sup>3</sup>Federal University of São Paulo, Brazil

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### **Deep Learning-Driven Preprocessing of FTIR Spectra via 1D-CNN for Antibiotic Monitoring**

Vinicius P. Anjos<sup>1</sup>, Daniela F. T. Silva<sup>1</sup>, Mario O. Menezes<sup>1</sup>, Denise M. Zezell<sup>1</sup>; <sup>1</sup>Instituto de Pesquisas Energéticas e Nucleares, Universidade de São Paulo, São Paulo, Brazil

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### **INTERNET POSTERS**

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### **1. Intelligent data analysis of electrophysical characteristics of nanocomposites for microelectronics and biosensors**

Sergey Korchagin; Financial University under the Government of the Russian Federation, Moscow, Russia

### **2. Comparison of morphological changes in organs and tumors in mice bearing CT-26 tumors and rats bearing PC-1 tumors during photodynamic therapy with a submicron-scale complex**

Artyom M. Mylnikov<sup>1</sup>, Nikita A. Navolokin<sup>1</sup>, Irina Yu. Yanina<sup>2</sup>; <sup>1</sup>Saratov State Medical University, Saratov, <sup>2</sup>Saratov State University, Saratov

### **3. Protein-like and humic fluorescence of CDOM in meromictic lakes of the White sea**

Anna A. Afanaseva<sup>1</sup>, Yulia G. Sokolovskaya<sup>1</sup>, Elena D. Krasnova<sup>2</sup>, Dmitry A. Voronov<sup>3</sup>, Svetlana V. Patsaeva<sup>1</sup>; <sup>1</sup>Department of Physics, Moscow State University, Moscow, Russia, <sup>2</sup>Department of Biology, Moscow State University, Moscow, Russia, <sup>3</sup>Kharkevich Institute for Information Transmission Problems, Russian Academy of Sciences, Moscow, Russia

### **4. Detection of fluoroquinolone antibiotics in water using spectrophotometry and fluorimetry**

Yulia G. Sokolovskaya, Svetlana V. Patsaeva; Lomonosov Moscow State University, Moscow, Russia

### **5. Optical characteristics of CDOM in meromictic water bodies (White Sea) and their relationship with salinity**

Anastasia I. Deeva<sup>1</sup>, Yulia G. Sokolovskaya<sup>1</sup>, Elena D. Krasnova<sup>2</sup>, Dmitry A. Voronov<sup>3</sup>, Svetlana V. Patsaeva<sup>1</sup>; <sup>1</sup>Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia, <sup>2</sup>Faculty of Biology, Lomonosov Moscow State University, Moscow, Russia, <sup>3</sup>Kharkevich Institute for Information Transmission Problems, Russian Academy of Sciences, Moscow, Russia

### **6. In vivo study of skin optical clearing in rats with alloxan diabetes of varying duration**

Daria K. Tuchina<sup>1,2</sup>, Alla B. Bucharskaya<sup>3</sup>, Valery V. Tuchin<sup>1,2,4</sup>; <sup>1</sup>Saratov State University, Saratov, Russia, <sup>2</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University,

Tomsk, Russia, <sup>3</sup>Saratov State Medical University, Saratov, Russia, <sup>4</sup>Institute of Precision Mechanics and Control, FRS "Saratov Scientific Centre of the RAS", Saratov, Russia

### **7. DNA binding with metallocomplexes of lanthanide (III) in solution**

Natalia A. Komolkina<sup>1</sup>, Marina A. Uvarova<sup>2</sup>, Nina A. Kasyanenko<sup>1</sup>; <sup>1</sup>Faculty of Physics of Saint Petersburg State University, Saint Petersburg, Russia; <sup>2</sup>Kurnakov Institute of General and Inorganic Chemistry of the Russian Academy of Sciences, Moscow, Russia

### **8. Spectral Analysis of Allogeneic Coatings of Combined Biosynthetic Mesh Implants**

Polina I. Pyataeva<sup>1</sup>, Pavel V. Shulepov<sup>2</sup>, Elena V. Timchenko<sup>1,2</sup>, Pavel E. Timchenko<sup>2</sup>, Nicolay A. Ryabov<sup>1,2</sup>, Larisa T. Volova<sup>1,2</sup>; <sup>1</sup>Samara University, Samara, Russia; <sup>2</sup>Samara State Medical University, Samara, Russia

### **9. Investigation of Combined Photodynamic and Plasmonic Photothermal Therapy in a Murine Model of Colorectal Carcinoma**

Alla B. Bucharskaya<sup>1,2\*</sup>, Vadim D. Genin<sup>2</sup>, Nikita A. Navolokin<sup>1,2</sup>, Vladimir A. Bogatyrev<sup>3</sup>, Natalya A. Shushunova<sup>1,2</sup>, Olga I. Gusliakova<sup>2</sup>, Boris N. Khlebtsov<sup>3</sup>, Nikolay G. Khlebtsov<sup>3</sup>, Elina A. Genina<sup>2</sup>, Valery V. Tuchin<sup>2</sup>; <sup>1</sup>Saratov State Medical University, Saratov, Russia; <sup>2</sup>Saratov State University, Saratov, Russia; <sup>3</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov, Russia

### **10. Combined disorders in the brain and heart at the early stages of the stress response in arterial hypertension (experimental study)**

Tatyana P. Romanova<sup>1</sup>, Olga V. Zlobina<sup>1</sup>, Ekaterina M. Kostromina<sup>1</sup>, Tatyana V. Perevoznikova<sup>1</sup>, Svetlana S. Pakhomy<sup>1</sup>, Oleg O. Zlobin<sup>2</sup>; <sup>1</sup>Saratov State Medical University named after V. I. Razumovsky, Saratov, Russia; <sup>2</sup>Saratov Medical University "Reaviz", Saratov, Russia

### **11. FEM solver for confined quantum system: hydrogen atom or ion in uniform magnetic**

Oleg O. Kovalev<sup>1,2</sup>, Vladimir L. Derbov<sup>3</sup>, Alexander A. Gusev<sup>2,3,4</sup>, Luong Le Hai<sup>5</sup>, Sergue I. Vinitisky<sup>1,2,6</sup>; <sup>1</sup>Joint Institute for Nuclear Research, Dubna, Russia; <sup>2</sup>Dubna State University, Dubna, Russian Federation; <sup>3</sup>N.G. Chernyshevsky Saratov State University, Saratov, Russia; <sup>4</sup>School of Applied Sciences, Mongolian University of Science and Technology, Ulaanbaatar, Mongolia; <sup>5</sup>Ho Chi Minh city University of Education, Ho Chi Minh City, Viet Nam; <sup>6</sup>RUDN University, Moscow, Russia.

### **12. Prevention and early diagnosis of diabetic skin complications using optical and biophotonic imaging in Niger**

Adamou Soli Idrissa<sup>1</sup>, Mahamane Sani M. Aminou<sup>1,4</sup>, Moussa Issoufou Djibrillou<sup>1,2</sup>, Mamane Barga Aboubacar<sup>1,4</sup>, Salissou Laouali<sup>2,3</sup>, Ali Ada<sup>5</sup>; <sup>1</sup>Radio-isotopes Institute, Abdou Moumouni University, Niamey, Niger; <sup>2</sup>Faculty of Health Sciences, Abdou Moumouni University, Niamey, Niger; <sup>3</sup>National Hospital of Niamey; <sup>4</sup>Reference General Hospital of Niamey; <sup>5</sup>Magori Policlinic of Niamey, Niger

# Workshop on Laser Physics and Photonics XXVIII

*Workshop Chair:* **Vladimir L. Derbov**, Saratov State University (Russia)

*Secretary:* **Svetlana V. Churochkina**, Saratov State University (Russia)

*Program Committee* **Vladimir L. Derbov** (Chair), Saratov State University (Russia), **Alexander V. Gorokhov**, Samara University (Russia), **Alexander P. Kuznetsov**, Institute of Radio-Engineering of RAS (Russia), **Leonid A. Melnikov**, Yuri Gagarin State Technical University of Saratov (Russia), **Yuri V. Popov**, Lomonosov Moscow State University (Russia), **Vladimir P. Ryabukho**, IPM&C RAS (Russia), **Sergue I. Vinitsky**, Joint Institute for Nuclear Research (Russia), **Aleksey M. Zheltikov**, Lomonosov Moscow State University (Russia), **Ivan A. Shcherbakov**, Prokhorov General Physics Institute of RAS (Russia), **Dmitry V. Churochkin**, Saratov State University (Russia)

**September 23, Wednesday**

**INVITED LECTURE / ORAL SESSION  
PHOTONICS / ONLINE ORAL REPORT  
PHOTONICS**

**(Building 10, Hall 503)**

Chair: **Vladimir L. Derbov**, Saratov State University, Russia

**Saratov time/Moscow time**

**14:00-14:25 / 13:00-13:25**

**Semiconductor lasers - new directions of development and applications: agrobiophotonics and laser medicine**

Sergey N. Sokolov, Gevork T. Mikaelyan; INJECT RME LLC, Saratov, Russia

**14:25-14:45 / 13:25-13:45**

**Pulse mode of electromagnetically induced transparency in a degenerate lambda-type energy level scheme**

Oleg M. Parshkov; Yuri Gagarin State Technical University of Saratov, Saratov, Russia

**14:45-15:05 / 13:45-14:05**

**The influence of sub-cycle electric field pulse parameters on the excitation spectrum in boron nitride and its model analogues**

Anatolii D. Panferov; Saratov State University, Saratov, Russia

**15:05-15:25 / 14:05-14:25**

**Evolution of Airy beams in a mixed carbon nanotube medium**

Natalia N. Yanyushkina; Volgograd State University, Volgograd, Russia

**15:25-15:45 / 14:25-14:45**

**Spatiotemporal dynamics of broad-area VCSELs under external optical injection: stabilization of emission, pattern formation, and dissipative soliton structures**

Elizaveta A. Yarovova<sup>1,2</sup>, Dmitrii S. Riashchikov<sup>1,2</sup>, Daria V. Agapova<sup>1,2</sup>; <sup>1</sup>Samara Branch, Lebedev Physical Institute, Russian Academy of Sciences, Samara, Russia; <sup>2</sup>Samara University, Samara, Russia

**16:00-16:30 / 15:00-15:30**

**Coffee break**

**16:30-16:50 / 15:30-15:50**

**Exact dynamics of three Tavis–Cummings atoms interacting with a coherent resonator field**

Alexander R. Bagrov, Eugene K. Bashkirov; Samara University, Samara, Russia

**16:50-17:10 / 15:50-16:10**

**Spatial coherence analysis of wave fields in 4f system in diffraction phase microscopy**

Natalia A. Talaikova; HSE University, Moscow, Russia

**17:10-17:30 / 16:10-16:30**

**Optical square waves in a Kerr-nonlinear resonator with two delayed feedback loops**

Anton A. Krents<sup>1,2</sup>; <sup>1</sup>Samara University, Samara, Russia; <sup>2</sup>Samara Branch, Lebedev Physical Institute, Russian Academy of Sciences, Samara, Russia

**17:30-17:50 / 16:30-16:50**

**Design of a thin-film waveguide Luneburg lens within the framework of the asymptotic model of electromagnetic radiation**

Danila A. Starikov<sup>1,2</sup>, Dmitriy V. Divakov<sup>2</sup>; <sup>1</sup>Joint Institute for Nuclear Research, Dubna, Russia; <sup>2</sup>Peoples' Friendship University of Russia, Moscow, Russia

**17:50-18:10 / 16:50-17:10**

**Non-contact assessment of coating thickness of metal products using hyperspectral imaging**

Kirill K. Nastepanin, Ilya A. Goryunov, Valera V. Shupletsov, Roman N. Polyakov; Orel State University named after I. S. Turgenev, Orel, Russia

## September 24, Thursday

### JOINT INTERNET/POSTER SESSION (Building 3, 3rd floor Hall)

Chair (P): Vladimir L. Derbov, Saratov State University, Russia

18:00-20:00 / 17:00-19:00

#### INTERNET POSTERS

- 1P. **Optically-integrated periodical micro- and nano-patterns in amorphous materials** Liubov I. Vostrikova<sup>1,2</sup>; <sup>1</sup>Rzhanov Institute of Semiconductor Physics SB RAS, Novosibirsk, Russia; <sup>2</sup>Department of Informational Technologies of NSUEM, Novosibirsk, Russia
- 2P. **Structural distributions of induced electrostatic field upon volumetric all-optical poling** Igor A. Kartashev, Liubov I. Vostrikova; Rzhanov Institute of Semiconductor Physics SB RAS, Novosibirsk, Russia
- 3P. **Atom-field entanglement in two-atom model with degenerate two-photon Raman transitions** Rodion K. Zakharov, Ali Othman, Eugene K. Bashkurov; Samara University, Samara, Russia
- 4P. **Study of caustics in the diffraction of a plane laser beam by a slit in form of a prescribed curve** Lyubov B. Dubman; Samara University, Samara, Russia
- 5P. **Dynamics of quantum and classical correlations in the three-qubit multiphoton Tavis-Cummings model with a vacuum resonator field** Eugene K. Bashkurov, Alexander R. Bagrov; Samara University, Samara, Russia
- 6P. **Raman spectroscopy for evaluating the effect of a paste based on allogeneic hydroxyapatite on the enamel of bovine molars** Nelly R. Valieva<sup>1</sup>, Polina I. Pyataeva<sup>1</sup>, Elena V. Pisareva<sup>1</sup>, Elena V. Timchenko<sup>1,2</sup>, Michael Yu. Vlasov<sup>1,2</sup>, Pavel E. Timchenko<sup>1</sup>, Larisa T. Volova<sup>1,2</sup>; <sup>1</sup>Samara University, Samara, Russia; <sup>2</sup>Samara State Medical University, Samara, Russia
- 7P. **Geometric analysis of the spiral intensity distribution to determine the order of the vortex phase component** Dmitry P. Serafimovich, Svetlana N. Khonina; Samara University, Samara, Russia
- 8P. **Non-coherent stimulation of all-optically created nonlinear polarizability in glass** Liubov I. Vostrikova<sup>1,2</sup>; <sup>1</sup>Rzhanov Institute of Semiconductor Physics SB RAS, Novosibirsk, Russia; <sup>2</sup>Department of Informational Technologies of NSUEM, Novosibirsk, Russia
- 9P. **Three-dimensional intensity distribution of beams under double phase quantization in**

**an asymmetric lens** Olga A. Dyukareva; Samara University, Samara, Russia

- 10P. **Formation of light fields with variable orbital angular momentum using a diffractive spiral-toroidal lens** Valentin I. Logachev, Svetlana N. Khonina; Samara University, Samara, Russia
- 11P. **Dynamics of manylevel atoms in nonideal cavities** Alexander V. Gorokhov; Samara University, Samara, Russia
- 12P. **High order schemes for solving the time-dependent Schrödinger equation** Diana A. Volobueva<sup>1,2</sup>, Alexandr A. Gusev<sup>1,3,4</sup>, Ochdadrakh Chuluunbaatar<sup>1,4,5</sup>, Vladimir L. Derbov<sup>6</sup>, Sergey I. Vinitsky<sup>1,7</sup>; <sup>1</sup>Joint Institute for Nuclear Research, Dubna, Russia; <sup>2</sup>Dubna branch of Lomonosov Moscow State University, Dubna, Russia; <sup>3</sup>Dubna State University, Dubna, Russia; <sup>4</sup>Mongolian University of Science and Technology, Ulaanbaatar, Mongolia; <sup>5</sup>Institute of Mathematics and Digital Technology, Ulaanbaatar, Mongolia; <sup>6</sup>Saratov State University, Saratov, Russia; <sup>7</sup>RUDN University, Moscow, Russia
- 13P. **A study using mathematical modeling the dependence of the longitudinal coherence length of wave field from the width of its angular and frequency spectra** Lyudmila A. Maksimova, Natalya Yu. Mysina, Vladimir P. Ryabukho; IPTMU RAS - Separate structural subdivision of FRC "Saratov Scientific Center of the Russian Academy of Sciences", Saratov, Russia
- 14P. **Multi-order diffractive optical element for parallel optical classification of corneal pathologies** Pavel A. Khorin; Samara University, Samara, Russia

#### POSTER SESSION

- 1P. **Derivation of effective classical Hamiltonian for a single particle bouncing on a 3D system of oscillating atomic mirrors** Svetlana V. Churochkina, Petr D. Baranovsky, Dmitry V. Churochkin; Saratov State University, Saratov, Russia
- 2P. **Laser-processed multifunctional titanium metasurfaces for optics and biophotonics** Michael S. Kuritskij<sup>1</sup>, Anna V. Tsibulnikova<sup>1</sup>, Ivan I. Lyatun<sup>1</sup>, Alena A. Kostrina<sup>1</sup>, Vasily A. Slezhkin<sup>1,2</sup>, Ilia G. Samusev<sup>1</sup>; <sup>1</sup>Immanuel Kant Baltic Federal University, Kaliningrad, Russia; <sup>2</sup>Kaliningrad State Technical University, Kaliningrad, Russia
- 3P. **Design of an effective refractive index for a generalized Luneburg lens with accuracy control** Enoel Arrokhó Ernandes, Dmitriy V. Divakov; RUDN University, Moscow, Russia
- 4P. **Influence of crystallographic orientation of diamond on the electrical and optical**

**properties of the laser-graphitized surface**

Kirill M. Dordzhiev, Yury I. Borisov; Prokhorov  
General Physics Institute of the Russian  
Academy of Sciences, Moscow, Russia

5P. **Optical properties of graphene in a  
quantum kinetic equation approach**

Vladislav A. Tseryupa, Stanislav A.  
Smolyansky, Vadim V. Dmitriev, Dmitry V.  
Churochkin; Saratov State University,  
Saratov, Russia

6P. **RIT technologies in light diffusion  
diagnostics: SCF against gaseous  
immersion**

Anastasia O. Nazarova, Maria A.  
Novikova, Dmitry A. Zimnyakov; Yuri Gagarin  
State Technical University of Saratov,  
Saratov, Russia

7P. **Single-wavelength photoacoustic  
tomography for in vivo assessment of  
polyelectrolyte carrier delivery**

Oksana A. Mayorova<sup>1</sup>, Polina A. Demina<sup>1</sup>, Natalia A.  
Shushunova<sup>1</sup>, Yulia I. Svenskaya<sup>1</sup>, Ekaterina  
S. Prikhodzhenko<sup>2</sup>, Svetlana A. Shevtsova<sup>1</sup>,  
Ilia O. Kozhevnikov<sup>1</sup>, Daniil N. Bratashov<sup>1,2</sup>;  
<sup>1</sup>Saratov State University, Saratov, Russia;  
<sup>2</sup>Moscow Institute of Physics and Technology,  
Dolgoprudnyy, Russia

# Conference on Low-Dimensional Structures XV

*Chair:* **Olga E. Glukhova**, Saratov State University (Russia)

*Secretaries:* **Pavel V. Barkov**, Saratov State University (Russia), **Dmitry A. Kolosov**, Saratov State University (Russia)

*International Program Committee:* **Albert G. Nasibulin**, Skolkovo Institute of Science and Technology, Russia, **Irina V. Zaporotskova**, Volgograd State University, Volgograd, Russia, **Galina N. Maslyakova**, Saratov State Medical University named after V.I. Razumovsky, Saratov, Russia

## September 23, Wednesday

### INVITED LECTURE/ORAL/ ON-LINE SESSION (Building 8, Room 318)

*Chair:* **Olga E. Glukhova**,  
Saratov State University,  
Russia

*Moderator:* **Pavel Barkov**, Saratov State  
University, Russia

### Saratov time/Moscow time

**11.00-11.30/10.00-10.30**

**Role of topology in electronic and electrical properties of hybrid graphene-carbon nanotube structures**

Mikhail M. Slepchenkov; Saratov State University, Saratov, Russia

**11.30-12.00/10.30-11.00**

**Unified deep potential model for hydrogen adsorption on pristine and Ti-decorated graphene**

Sergey A. Sozykin; South Ural State University, Chelabinsk, Russia

**11.00-11.15/10.00-10.15**

**Temperature effect on the resistivity of a photocurable biocompatible hydrogel based on a composite carbon nanomaterial with metallic nanoparticles and eosin y**

Mikhail S. Savelyev<sup>1</sup>; Alena A. Velchinskaya <sup>1</sup>; Ekaterina P. Otsupko<sup>1</sup>; Ulyana E. Kurilova <sup>1,2</sup>; Alexander Yu. Gerasimenko<sup>1,2</sup>; <sup>1</sup> National Research University of Electronic Technology, MIET, Zelenograd, Moscow, Russia, <sup>2</sup> I. M. Sechenov First Moscow State Medical University, Sechenovskiy University, Moscow, Russia

**11.15-11.30/10.15-10.30**

**Surface degradation of M-type cathodes modified with nanocarbon**

Tatyana M. Krachkovskaya<sup>1</sup>, Yuliya V. Yakimovich<sup>1,2</sup>, Anna A. Akst<sup>1,3</sup>, Olga E. Glukhova<sup>1,3,4</sup>, Aleksandr A. Petrunin<sup>3</sup>; <sup>1</sup>JSC "RPE "Almaz", Saratov, Russia; <sup>2</sup>Saratov State Technical University, Saratov, Russia; <sup>3</sup>Saratov State University, Saratov, Russia; <sup>4</sup>First Moscow State Medical University named after I. M. Sechenov, Moscow, Russia

**11.30-11.45/10.30-10.45**

**Unlocking the Dual-Functionality of G/LCO Cathodes: A DFT Study of Quantum Capacitance Evolution under Delithiation**

Vladislav V. Shunaev<sup>1</sup>, Alexander A. Petrunin<sup>1</sup>, Semen G. Levitskiy<sup>1</sup>, Olga E. Glukhova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>I. M. Sechenov First Moscow State Medical University

**11.45-12.00/10.45-11.00**

**Control of Electron Transport in Quasi-2D Layered ZnO and CuO Films via Surface Modification**

Pavel A. Kolesnichenko<sup>1</sup>, Olga E. Glukhova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup> I. M. Sechenov First Moscow State Medical University, Moscow, Russia

**12.00-12.15/11.00-11.15**

**Carbon nanotubes (6,6) modified with copper and nickel atoms for detecting CO, CO<sub>2</sub>, CH<sub>4</sub>, and C<sub>3</sub>H<sub>6</sub>O**

Dmitry F. Sergeev<sup>1,2</sup>; <sup>1</sup>Volgograd State University, Volgograd, Russia; <sup>2</sup>JSC All-Russian Research and Design Institute of Equipment for the Oil Refining and Petrochemical Industry, Volgograd, Russia

**12.15-12.30/11.15-11.30**

**Room-Temperature Hybrid Gas Sensor Based on InAs Nanowires and SWCNT Film**

Yatsyshen Valery Vasilyevich1, Godlyauskas Oleg Vladislavas1; 1Volgograd State University, Volgograd, Russia

**12.30-12.45/11.30-11.45**

**Calculation of ellipsometric parameters of reflected circularly polarized light from a dielectric film under surface plasmon resonance conditions**

Yatsyshen Valery Vasilyevich1, Ivanov Peter Sergeevich1; 1Volgograd State University, Volgograd, Russia

**September 24, Wednesday**

**INVITED LECTURE/ORAL/  
ON-LINE SESSION**

**(Building 8, Room 318)**

Chair: **Olga E. Glukhova**,  
Saratov State University,  
Russia

Moderator: **Pavel Barkov**, Saratov State  
University, Russia

**Saratov time/Moscow time**

**11.00-11.15/10.00-10.15**

**Laser-induced hybrids of carbon nanomaterials for the formation of wearable and implantable electronic biointerfaces**

Denis T. Murashko1, Boris M. Putrya1, Krisitina D. Efremova1,2, Ulyana E. Kurilova1,2, Pavel N. Vasilevsky1, Irina A. Suetina3, Marina V. Mezentseva3, Alexander Yu. Gerasimenko1,2; 1National Research University of Electronic Technology MIET, Shokin Square 1, 124498 Zelenograd, Moscow, Russia; 2I.M. Sechenov First Moscow State Medical University, Bolshaya Pirogovskaya street 2-4, 119991 Moscow, Russia; 3National Research Center for Epidemiology and Microbiology Named after the Honorary Academician N.F. Gamaleya, Gamaleya Street 18, 123098 Moscow, Russia

**11.15-11.30/10.15-10.30**

**Development of laser-induced thin-film hybrid carbon nanocomposites for neurointerfaces and stimulation of neuroregeneration**

Victoria V. Suchkova 1,2, Alexandra S. Ivanova 1, Ekaterina A. Demirskaya 1, Artem V. Kuksin 2, Alexander Yu. Gerasimenko 1,2; 1 Institute of Biomedical Systems, National Research University of Electronic Technology, Shokin Square 1, Zelenograd, 124498 Moscow, Russia; 2 Institute for Bionic Technologies and Engineering, I.M. Sechenov First Moscow State Medical University, Bolshaya Pirogovskaya Street 2-4, 119435 Moscow, Russia

**11.30-11.45/10.30-10.45**

**Carbon heterostructures based on carbon nanotubes and graphite formed by laser radiation**

Artem V. Kuksin1, Anastasia S. Morozova1, Alexander Yu. Gerasimenko1,2; 1National Research University of Electronic Technology MIET, Zelenograd, Russia; 2I.M. Sechenov First Moscow State Medical University, Moscow, Russia

**11.45-12.00/10.45-11.00**

**Investigation of the influence of the spatial structure of film strain-sensitive sensors on electromechanical properties**

Anastasia S. Morozova1, Ekaterina A. Demirskaya1, Alexander Yu. Gerasimenko1,2; 1National Research University of Electronic Technology, Moscow, Zelenograd, Russia; 2I.M. Sechenov First Moscow State Medical University, Moscow, Russia

**12.00-12.15/11.00-11.15**

**Experimental evaluation of the functional properties of carbon-based coatings for titanium biomedical devices**

Kristina D. Efremova1,2, Alexander Yu. Gerasimenko1,2; 1Institute of Biomedical Systems, National Research University "Moscow Institute of Electronic Technology," Zelenograd, Moscow, Russia; 2Institute of Bionic Technologies and Engineering, I.M. Sechenov First Moscow State Medical University, Moscow, Russia

**12.15-12.30/11.15-11.30**

**Optical passive limiting of composite carbon nanomaterial: multi-walled nanotubes, reduced graphene oxide sheets, and zinc phthalocyanine**

Pavel N. Vasilevsky1, Mikhail S. Savelyev1,2, Alexander Yu. Tolbin2, Alexander Yu. Gerasimenko1,3; 1Institute of Biomedical Systems, National Research University of Electronic Technology, Zelenograd, Moscow, 124498, Russian Federation; 2FSBIS Institute of Physiologically Active Compounds of the Russian Academy of Sciences, Russian Academy of Sciences, Chernogolovka, Moscow Region, 142432, Russian Federation; 3Institute for Bionic Technologies and Engineering, Sechenov University, Moscow, 119991, Russian Federation

**JOINT INTERNET/POSTER SESSION**  
**(Building 3, 3d floor Hall)**

Chair (L): **Olga E. Glukhova**, Saratov State University Russia

**Saratov time/Moscow time**

**18.00-20.00/17.00-19.00**

- 1L. **Investigation of the Morphology and Piezoelectric Properties of Mixed Langmuir Monolayers of PVDF and P(VDF:TFE)**

Gorbachev Ilya A.<sup>1</sup>, Kolesov Vladimir V.<sup>1</sup>;  
<sup>1</sup>IRE Kotelnikova RAS

- 2L. **The effect of iron doping of cadmium sulfide on the optical and photoelectric characteristics of the material**

Polina G. Kharitonova, Svetlana V. Stetsyura, Larisa D. Volkovoyanova, Saratov State University, Saratov, Russia

- 3L. **Key Parameters Screening of the Quantum Dot Synthesis**

Artyom K. Skvortsov, Victoria D. Gorlo, Danila A. Kornilov, Daniil D. Drozd, Pavel S. Pidenko, Irina Yu. Goryacheva, Natalia A. Burmistrova; Saratov State University, Saratov, Russia

- 4L. **Van der Waals heterostructures based on graphene and graphene-like materials: theoretical prediction**

Michael M. Slepchenkov<sup>1</sup>, Dmitry A. Kolosov<sup>1</sup>, Olga E. Glukhova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University, Moscow, Russia

- 5L. **Tunneling Current Control in Graphene-Nanotube Structures**

Michael M. Slepchenkov<sup>1</sup>, Dmitry A. Kolosov<sup>1</sup>, Olga E. Glukhova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University, Moscow, Russia

- 6L. **Patterns of influence of atomic network stretching on the electron-energy characteristics of thin films of perforated graphene**

Pavel V. Barkov<sup>1</sup>, Mikhail M. Slepchenkov<sup>1</sup>, Maria A. Davydova<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia

- 7L. **Effect of Surface Adsorption of Ba, O, and BaO on the Work Function of Different Hafnium Phases**

Dmitry A. Kolosov<sup>1</sup>, Olga E. Glukhova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University, Moscow, Russia

- 8L. **Adaptive Peptides as Promising Gas-Sensing Materials: Insights from Molecular Modeling**

Alexander A. Petrunin<sup>1</sup>, Olga E. Glukhova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University

- 9L. **Binding of HIF-1 $\alpha$  on COOH-N-MWCNTs: Effect of Local Curvature**

Tatyana A. Sapezhinskaya<sup>1</sup>, Nadezhda G. Bobenko<sup>1</sup>, Vladislav V. Shunaev<sup>2</sup>, Pavel A. Kolesnichenko<sup>1,2</sup>, Olga E. Glukhova<sup>2,3</sup>; <sup>1</sup>Institute of Strength Physics and Materials Science of SB RAS, Tomsk, Russia; <sup>2</sup>Saratov State University, Saratov, Russia; <sup>3</sup>Institute for Bionic Technologies and Engineering, I.M. Sechenov First Moscow State Medical University, Moscow, Russia

- 10L. **Formation of polyaniline Langmuir films in various solvents**

Andrey D. Taranenko<sup>1</sup>, Tatyana Ya. Karatyshova<sup>1</sup>, Mikhail S. Korolev<sup>1</sup>, Evgeny G. Glukhovskoy<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia

- 11L. **Speckle-Mediated Gain Localization and Random Lasing Threshold in Scattering Media: A Numerical Study**

Leonid A. Kochkurov Yuri Gagarin State Technical University of Saratov

# Workshop on Nonlinear Dynamics XVII

**Chair:** Galina I. Strelkova, Institute of Physics, Saratov State University (Russia)

**Secretary:** Tatiana R. Bogatenko, Institute of Physics, Saratov State University (Russia)

**International Program Committee:** Jürgen Kurths, Humboldt University (Germany); Alexander Neiman, Ohio University (USA); Igor Khovanov, Warwick University (UK); Olga Sosnovtseva, University of Copenhagen (Denmark); Alexey N. Pavlov, Saratov State University (Russia); Tatjana E. Vadivasova, Saratov State University, (Russia); Alexey V. Shabunin, Saratov State University, (Russia); Dmitry E. Postnov, Saratov State University, (Russia).

## September 24, Thursday

### ORAL SESSION NONLINEAR DYNAMICS XVII (Building 3, Room 38)

Chairs: **Galina I. Strelkova, Tatiana R. Bogatenko**, Saratov State University, Russia

#### Saratov time/Moscow time

**14:00-14:15/13:00-13:15**

##### Oral Report

**Impact of Power Fluctuations on Synchronization in a Power Grid Model with Hub Topology**

Vladislav D. Kuprijanov, Tatiana E. Vadivasova; Institute of Physics, Saratov State University, Saratov, Russia

**14:15-14:30/13:15-13:30**

##### Oral Report

**Impact of combined coupling on the dynamics of a self-sustained oscillatory system with two degrees of freedom**

Igor M. Nazin, Vladimir V. Astakhov, Galina I. Strelkova; Institute of Physics, Saratov State University, Saratov, Russia

**14:30-14:45/13:30-13:45**

##### Oral Report

**Peculiarities of Synchronization of Randomly Interlayer Coupled Networks of Chaotic Maps**

Vladislav M. Averyanov, Elena V. Rybalova, Galina I. Strelkova; Institute of Physics, Saratov State University, Saratov, Russia

**14:45-15:00/13:45-14:00**

##### Oral Report

**A Numerical Study of the Effect of an External Field on the Synchronization of a Small Ensemble of Nano-Oscillators**

Kristina M. Stankevich, Oleg Y. Butkovskiy; Vladimir State University, Vladimir, Russia

**15:00-15:15/14:00-14:15**

##### Oral Report

**The effect of nonlocal coupling on coherent resonance in an ensemble of oscillators**

Aleksey A. Ryabov, Vladimir V. Semenov; Institute of Physics, Saratov State University, Saratov, Russia

**15:15-15:30/14:15-14:30**

##### Oral Report

**Chimera and solitary states in the ring of nonlocally coupled FitzHugh-Nagumo neurons with Lévy noise**

Nataliia N. Nikishina, Elena V. Rybalova, Galina I. Strelkova; Institute of Physics, Saratov State University, Saratov, Russia

### JOINT INTERNET/POSTER SESSION NONLINEAR DYNAMICS (ND) (Building 3)

Chairs: **Tatiana R. Bogatenko**, Saratov State University, Russia

**18.15-20.30**

**1ND. Effects of coupling memristor noise on synchronization of periodic oscillators**

V. A. Leonenko, T. E. Vadivasova; Institute of Physics, Saratov State University, Saratov, Russia

**2ND. Impact of Internal Noise on the Performance of Trained Spiking Neural Networks**

D. A. Maksimov, V. M. Moskvitin, N. I. Semenova; Institute of Physics, Saratov State University, Saratov

# Conference on Nanobiophotonics XXII

**Chair:** **Nikolai G. Khlebtsov**, Institute of Biochemistry and Physiology of Plants and Microorganisms, Saratov Scientific Centre of the Russian Academy of Sciences (IBPPM RAS), Saratov State University (Russia)

**Secretary:** **Vitaly A. Khanadeev**, Institute of Biochemistry and Physiology of Plants and Microorganisms, Saratov Scientific Centre of the Russian Academy of Sciences (IBPPM RAS); Saratov State University of Genetics, Biotechnology, and Engineering named after N. I. Vavilov (Russia)

**International Program Committee:** **Roberto Pini**, Institute of Applied Physics (IFAC-CNR) National Research Council of Italy; **Jian Ye**, School of Biomedical Engineering & Med-X Research Institute Shanghai Jiao Tong University, China; **Boris Khlebtsov**, Saratov Scientific Centre of the Russian Academy of Sciences, Director (Russia); **Dmitry Gorin**, Scoltech, Saratov State University (Russia); **Irina Goryacheva**, Saratov State University (Russia); **Lev Dykman**, Institute of Biochemistry and Physiology of Plants and Microorganisms, Saratov Scientific Centre of the Russian Academy of Sciences (IBPPM RAS, Russia); **Alexey Kononov**, Department of Molecular Biophysics and Polymer Physics, Saint Petersburg State University (Russia).

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## September 22, Tuesday

### PLENARY SESSION (Building 10, Main Hall)

Chairs: **Valery V. Tuchin**, Saratov State Univ.; **Alexander V. Priezzhev**, Lomonosov Moscow State Univ., Russia;

16.00 – 16.40

#### Plenary Lecture

#### Multifunctional Iron Oxide Nanoparticles: MRI Contrast and Light Induced Dissolution

Ekaterina O. Moiseeva<sup>1</sup>, Vsevolod A. Skribitsky<sup>2</sup>, Dmitry E. Tsiurko<sup>1</sup>, Sergei V. German<sup>1,3</sup>, Alexey A. Lipengolts<sup>2</sup>, Dmitry A. Gorin<sup>1,3</sup>; <sup>1</sup>Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>2</sup>N.N. Blokhin National Medical Research Center of Oncology, Moscow, Russia; <sup>3</sup>Central University, Moscow, Russia

## September 23, Wednesday

### ORAL/INVITED SESSION NANOBIOPHOTONICS (Building 9, Conference Hall)

Chair: **Nikolai G. Khlebtsov**, IBPPM RAS, Saratov State University, Russia

12.00 – 12.20

#### Internet Invited

#### Mild metabolic imbalances rewiring the protein corona dictate albumin nanoparticle mechanics, cellular processing, and in vivo trafficking

Evgeniya R. Denisova<sup>a</sup>, Maya V. Voronina<sup>a</sup>, Daria S. Volkova<sup>a</sup>, Dmitry Kostyushev<sup>b,c,d,e</sup>, Andrey A. Zamyatnin Jr.<sup>e,f</sup>, Marina V. Serebryakova<sup>g</sup>, Andrey V. Zvyagin<sup>a</sup>, Yan Wang<sup>h</sup>, Neng Yan<sup>h</sup>, Veronika A. Dimitreva<sup>i</sup>, Anton V. Zalygin<sup>i</sup>, Elena N. Subcheva<sup>a</sup>, Sabrina Biancol<sup>j,k</sup>, Michele Costanzo<sup>k,l</sup>, Armando Cevenini<sup>k,l</sup>, Lyubov V. Krylova<sup>a,m</sup>, Alessandro Parodi<sup>a,e</sup>; <sup>a</sup>Scientific Center for Translation Medicine, Sirius University of Science and

Technology, Sirius, Russia; <sup>b</sup>Department of biotechnology, Sechenov University; <sup>c</sup>Laboratory of genetic technologies in drug development, Sechenov University; <sup>d</sup>Engelhardt Institute of Molecular Biology, RAS; <sup>e</sup>Faculty of Bioengineering and Bioinformatics, Lomonosov Moscow State University; <sup>f</sup>Department of Biological Chemistry, Sechenov First Moscow State Medical University; <sup>g</sup>Belozersky Institute of Physico-Chemical Biology, Lomonosov Moscow State University; <sup>h</sup>School of Environmental Studies, China University of Geosciences, Wuhan, China; <sup>i</sup>Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences, Moscow, Russia; <sup>j</sup>Department of Experimental and Clinical Medicine, University of Catanzaro Magna Graecia, Viale Europa, Catanzaro, Italy; <sup>k</sup>CEINGE – Biotechnologie Avanzate Franco Salvatore, Naples, Italy; <sup>l</sup>Department of Molecular Medicine and Medical Biotechnology, University of Naples Federico II, Naples, Italy; <sup>m</sup>Lobachevsky State University of Nizhny Novgorod, Russia

12.20 – 12.40

#### Invited

#### Bimetallic luminescent nanoclusters

Varvara G. Kubenko, Nikolay V. Shekhovtsov, Andrey A. Buglak, Alexei I. Kononov; Saint Petersburg State University, Saint Petersburg, Russia

**13.00–14.00  
LUNCH**

14.00 – 14.20

#### Invited

#### Luminescent composite diamonds with core-shell and film architecture based on diamond with nanoparticles for photonics

Sergey V. Kuznetsov, V.S. Sedov, A.K. Martyanov, I.A. Tiazhelov, R.V. Romashchenko, S.Ch. Batygov, A.A. Alexandrov, D.S. Yasyrkina, A.S. Zaharova, V.V. Voronov; Prokhorov General Physics Institute of the Russian Academy of Sciences, Russia

**14.20 – 14.35**

**Oral**

**Detection of the anti-tuberculosis antibiotic linezolid using AgInS/ZnS quantum dots**

Vera V. Rodionova, Goryacheva I. Yu.; Saratov State University, Saratov, Russia

**14.35 – 14.50**

**Oral**

**Application of machine learning methods for classification of biological tissue using the spectra of upconversion luminescence of NaYF<sub>4</sub>:Yb<sup>3+</sup>/Tm<sup>3+</sup> nanocomplexes**

Kirill A. Buzanov, Sergey A. Burikov, Tatiana A. Dolenko; Moscow State University, Faculty of Physics, Moscow, Russia

**14.50 – 15.05**

**Oral**

**CeYbF<sub>3</sub>–Photoran complex for X-ray-Induced photodynamic therapy: energy transfer and cellular toxicity**

Kamila E. Akhmetzyanova<sup>1</sup>, Nail I. Shamsutdinov<sup>1</sup>, Pavel V. Zelenikhin<sup>1</sup>, Sergey Kh. Batygov<sup>2</sup>, Sergey V. Kuznetsov<sup>2</sup>, Sergey V. Zinchenko<sup>1</sup>, Damir I. Safin<sup>1</sup>, Maksim S. Pudovkin<sup>1</sup>, Aleksey S. Nizamutdinov<sup>1</sup>; <sup>1</sup>Kazan (Volga Region) Federal University, Kazan, Russia; <sup>2</sup>Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia

**15.05 – 15.20**

**Oral**

**Sensing of various biomarkers with gold and gold-silver luminescent nanoclusters**

Nikolay V. Shekhovtsov, Varvara G. Kubenko, Egor I. Alekseenko, Tomash S. Sych, and Alexei I. Kononov; Saint Petersburg State University, Saint Petersburg, Russia

**15.20 – 15.35**

**Oral**

**Fiber optic few-mode needle for refractive index sensing**

Aleksandr Markvart, Zavalishina L., Filonov V., Bobyleva O., Grazhdian A., Petrov A., Liokumovich L., Ushakov N.; Peter the Great St. Petersburg Polytechnic University, Saint Petersburg, Russia

**15.35 – 15.50**

**Oral**

**Comparative photophysical characterization of chitosan-coated isotropic and anisotropic gold nanoparticles conjugated with a phthalocyanine photosensitizer**

Puzanov-Tyurin D.A., Bogatyrev V.A., Khlebtsov N.G.; Institute of Biochemistry and Physiology of Plants and Microorganisms Russian Academy of Sciences (IBPPM RAS)

**16.00–16.30**  
**Coffee break**

**16.30 – 16.45**

**Oral**

**How to surface: facile technique for the Zn-rich QDs ligand exchange**

Daniil D. Drozd, Artyom K. Skvortsov, Danila A. Kornilov, Daria G. Koganova, Olga A. Goryacheva, Irina Yu. Goryacheva; Saratov State University, Saratov, Russia

**16.45 – 17.00**

**Oral**

**Intrafollicular glucocorticoid delivery to treat psoriasis-like skin inflammation**

Yulia Svenskaya<sup>1</sup>, Yury Surkov<sup>1,2</sup>, Isabella Serebryakova<sup>1,2</sup>, Mikhail Lobanov<sup>1</sup>, Polina Demina<sup>1</sup>, Mariia Saveleva<sup>1</sup>, Natalia A. Shushunova<sup>1</sup>, Elina A. Genina<sup>2</sup>, Georgy S. Terentyuk<sup>1</sup>, Valery V. Tuchin<sup>1,2,3</sup>; <sup>1</sup>Science Medical Center, Saratov State University, Saratov, Russia; <sup>2</sup>Institution of Physics, Saratov State University, Saratov, Russia; <sup>3</sup>Institute of Precision Mechanics and Control, FRC "Saratov Scientific Centre of the RAS", Saratov, Russia

**17.00 – 17.15**

**Oral**

**Protein Hydrogels as a Thermoinduced Platform for Controlled Antibiotic Release**

Oksana A. Mayorova, Olga I. Gusliakova, Valentina O. Plastun; Saratov State University, Saratov, Russia

**17.15 – 17.30**

**Oral**

**Aggregation-induced emission enhancement (AIEE) of gold nanoclusters in biopolymer hydrogel nanoparticles**

Daniil S. Chumakov<sup>1</sup>, Stella S. Evstigneeva<sup>2,3</sup>, Andrey M. Burov<sup>1</sup>, Nikolai G. Khlebtsov<sup>1</sup>; <sup>1</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms, Saratov Scientific Centre of the Russian Academy of Sciences (IBPPM RAS), Saratov, Russia; <sup>2</sup>Saratov State University, Saratov, Russia; <sup>3</sup>Saratov State Medical University of V.I. Razumovsky, Ministry of Health of the Russian Federation, Saratov, Russia

**17.30 – 17.45**

**Oral**

**Raman Spectroscopy Meets Machine Learning: From Data Generation to Molecular Interpretation**

Ekaterina S. Prikhodzhenko; Laboratory of medical equipment in the field of in vitro diagnostics, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow region, Russia

**17.45 – 18.00**

**Oral**

**Erythrocytes-like particles with tunable oxygenation state: fabrication and optical properties**

Andrei A. Pilnik<sup>1,2</sup>, Timofei N. Torokhov<sup>1,3</sup>, Sergei A. Perkov<sup>1,4</sup>, Vladislav I. Shcheslavskiy<sup>1,5,6</sup>, Dmitry A. Gorin<sup>1,4</sup>; <sup>1</sup>Skolkovo Institute of Science and

Technology, Moscow, Russia; <sup>2</sup>Institute of Automation and Control Processes, Far Eastern Branch, Russian Academy of Science, Vladivostok, Russia; <sup>3</sup>Prokhorov General Physics Institute, Moscow, Russia; <sup>4</sup>Central University, Moscow, Russia; <sup>5</sup>Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>6</sup>Becker & Hickl GmbH, Berlin, Germany

**18.00 – 18.15**

**Oral**

**Photodissolution of ultrasmall maghemite nanoparticles**

Dmitrii Tsiurko<sup>1</sup>, Ekaterina Moiseeva<sup>1</sup>, Sergei German<sup>1,2</sup>, Daria Terentyeva<sup>1</sup>, Arsen Zotov<sup>3</sup>, Alina Platonova<sup>1,3</sup>, Vsevolod Skribitsky<sup>4</sup>, Alexey Lipengolts<sup>4</sup>, Zhanna Bochkova<sup>1,5</sup>, Semen Domarev<sup>6</sup>, Nadezhda Brazhe<sup>5</sup>, Anna Orlova<sup>6</sup>, Dmitry Gorin<sup>1,2</sup>; <sup>1</sup>Center for Photonic Science and Engineering, Skolkovo Institute of Science and Technology, 143026 Moscow, Russia; <sup>2</sup>Central University, 125047 Moscow, Russia; <sup>3</sup>A.M. Prokhorov Institute of General Physics of the Russian Academy of Sciences (IGF RAS), 119991 Moscow, Russia; <sup>4</sup>N.N. Blokhin National Medical Research Center of Oncology, 115522 Moscow, Russia; <sup>5</sup>Faculty of Physics, M.V. Lomonosov Moscow State University, 119991 Moscow, Russia; <sup>6</sup>International Research and Education Centre for Physics of Nanostructures, ITMO University, 197101 Saint Petersburg, Russia

**18.15 – 18.30**

**Oral**

**Engineering Strategies to Overcome Biological Barriers**

Alexey V. Ermakov, Andrey V. Zvyagin; Research Center for Translational Medicine, Sirius University of Science and Technology, Olympic Av., 1, 354340 Sirius Federal Territory, Russia

**18.30 – 18.45**

**Oral**

**Spectral measurements of fluorescence lifetimes for RPE lipofuscin with MM-fiber coupled SNSPD FLIM system**

Pavel V. Morozov<sup>1,2</sup>, Vladislav Andreev<sup>1,2,3</sup>, Marina Yakovleva<sup>4,5</sup>, Tatiana Feldman<sup>4,5</sup>, Anastasiya Ryabova<sup>5</sup>, I. Romanishkin<sup>5</sup>, G.N. Goltsman<sup>1,2,3</sup>; <sup>1</sup>Moscow Pedagogical State University, Moscow, Russia; <sup>2</sup>Superconducting Nanotechnology, Moscow, Russia; <sup>3</sup>National University Higher School of Economics, Moscow, Russia; <sup>4</sup>N.M. Emanuel Institute of Biochemical Physics RAS, Moscow, Russia; <sup>5</sup>Lomonosov Moscow State University, Moscow, Russia; <sup>6</sup>Prokhorov General Physics Institute, RAS, Moscow, Russia;

**18.45 – 19.00**

**Online Oral**

**Production of hybrid iron-carbon ultradispersed particles and their application in immunoassay**

Nadezhda A. Taranova, Alisa A. Bulanaya, Anatoliy V. Zherdev, Boris B. Dzantiev; A.N. Bach

Institute of Biochemistry, Centre of Biotechnology of the Russian Acad. Sci., Moscow, Russia

**September 24, Thursday**

**JOINT POSTER/INTERNET SESSION  
(Building 3, 3<sup>rd</sup> floor Hall)**

Chair (N): **Vitaly A. Khanadeev**,  
IBPPM RAS; Saratov State University of Genetics,  
Biotechnology, and Engineering named after  
N.I. Vavilov

**18.00-20.00**

**1NB. Study of the electrical characteristics of epithelial cell layers for the development of an organ-on-a-chip system**

Ilya A. Gorbachev<sup>1</sup>, Zhukova O.A.<sup>2</sup>, Baklaushev V.P.<sup>2</sup>, Zikov K.A.<sup>2</sup>, Kuznetsova I.E.<sup>1</sup>, Kolesov V.V.<sup>1</sup>; <sup>1</sup>IRE Kotelnikova RAS; <sup>2</sup>Federal State Budgetary Institution "Research Institute of Pulmonology" of the Federal Medical-Biological Agency of Russia

**2NB. The use of bifunctional gold nanoparticles in enzyme-linked immunosorbent assay**

Yulia A. Raspopova<sup>1</sup>, Gennady L. Burygin<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms, Saratov Scientific Centre RAS, Saratov, Russia

**3NB. A comparative evaluation of the antibacterial activity of gold nanoparticle conjugates with ceftazidime and cefepime**

Daria Galeeva<sup>1</sup>, Gennady Burygin<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Institute of Biochemistry and Physiology of Plants and Microorganisms, Saratov Scientific Centre RAS, Saratov, Russia

**4NB. Chip design for surface-enhanced Raman spectroscopy based on silicon nitride photonic integrated circuits for small extracellular vesicles detection**

Sandal N. Vasilev<sup>1,2</sup>, Aleksei Yu. Kuzin<sup>2,4</sup>, Vadim V. Kovalyuk<sup>2,3</sup>, Alexander D. Golikov<sup>2,3</sup>, Ksenia O. Sedykh<sup>2,4</sup>, Irina N. Florya<sup>2,3</sup>, Alexey N. Semenov<sup>2</sup>, Gregory N. Goltsman<sup>4,5</sup>, Dmitry A. Gorin<sup>1</sup>, Alexey M. Yashchenok<sup>1</sup>; <sup>1</sup>Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>2</sup>National University of Science and Technology MISIS, Moscow, Russia; <sup>3</sup>Moscow State Pedagogical University, Moscow, Russia; <sup>4</sup>National Research University Higher School of Economics, Moscow, Russia; <sup>5</sup>Russian Quantum Center, Moscow, Russia

**5NB. Determination of quantum dots AgInS/ZnS concentration for linezolid determination in the presence of levofloxacin**

Kseniia S. Tumerbulatova, Violetta S. Yaroslavtseva, Vera V. Rodionova, Irina Yu. Goryacheva; Saratov State University, Saratov, Russia

**6NB. Preparation of stable conjugates of gold nanoparticles with disaccharide aglycones**

Anastasia S. Demidova<sup>1</sup>, Alena S. Redjepova<sup>2</sup>,  
Gennady L. Burygin<sup>1,2</sup>; <sup>1</sup>Institute of Biochemistry  
and Physiology of Plants and Microorganisms,  
Saratov Scientific Centre RAS, Saratov, Russia;  
<sup>2</sup>Saratov State University, Saratov, Russia

**7NB. Separation and analysis of polydisperse mixtures of gold nanobipyramids via centrifugation and digital photometry**

V.A. Bogatyrev, D.A. Puzanov-Tyurin, A.M. Burov,  
N.G. Khlebtsov; Institute of Biochemistry and  
Physiology of Plants and Microorganisms, Russian  
Academy of Sciences (IBPPM RAS)

**8NB. Polydopamine-coated, folic acid-functionalized gold nanostars for photothermal therapy**

Andrey V. Simonenko<sup>1,2</sup>, Darya V. Manushina<sup>3</sup>,  
Vitaly A. Khanadeev<sup>1,3</sup>; <sup>1</sup>Institute of Biochemistry  
and Physiology of Plants and Microorganisms,  
Saratov Scientific Centre of the Russian Academy  
of Sciences (IBPPM RAS), Saratov, Russia;  
<sup>2</sup>Saratov State University, Saratov, Russia;  
<sup>3</sup>Saratov State University of Genetics,  
Biotechnology and Engineering named after N.I.  
Vavilov, Saratov, Russia

**9NB. Intrafollicular delivery of glucocorticoids using vaterite particles and optical monitoring of their degradation process**

Yury I. Surkov<sup>1</sup>, Mariia S. Saveleva<sup>1</sup>, Polina A.  
Demina<sup>1</sup> Isabella A. Serebryakova<sup>1</sup>, Mikhail E.  
Lobanov<sup>1</sup>, Valery V. Tuchin<sup>1,2</sup>, Yulia I. Svenskaya<sup>1</sup>;  
<sup>1</sup>Saratov State University, Saratov, Russia;  
<sup>2</sup>Institute of Precision Mechanics and Control RAS,  
Saratov, Russia

**10NB. Silver nanostars: influence of synthesis parameters on optical and morphological properties and potential for biosensing applications**

Vitaly A. Khanadeev<sup>1,2</sup>, Andrey V. Simonenko<sup>1,3</sup>,  
Andrey M. Burov<sup>1</sup>, Maria A. Marinina<sup>1,2</sup>; <sup>1</sup>Institute of  
Biochemistry and Physiology of Plants and  
Microorganisms, Saratov Scientific Centre of the  
Russian Academy of Sciences (IBPPM RAS),  
Saratov, Russia; <sup>2</sup>Saratov State University of  
Genetics, Biotechnology and Engineering named  
after N.I. Vavilov, Saratov, Russia; <sup>3</sup>Saratov State  
University, Saratov, Russia

**11NB. Use of gold nanoparticle conjugates for cancer immunotherapy**

Roman D. Vyrshchikov, S. A. Staroverov, L. A.  
Dykman; Institute of Biochemistry and Physiology  
of Plants and Microorganisms, Saratov Scientific  
Centre of the Russian Academy of Sciences,  
Saratov, Russia

**12NB. Effect of surface modification of non-woven materials on their adsorption and optical properties**

Victoria S. Isaeva, Mariia S. Saveleva, Polina A.  
Demina; Saratov State University, Saratov, Russia

**13NB. Donor-acceptor properties of luminophores in citric acid and ethylenediamine-based carbon dots**

Anisiya A. Korepanova, Kirill A. Laptinskiy, Tatiana  
A. Dolenko; Lomonosov Moscow State University,  
Moscow, Russia

# Conference on Spectroscopy and Molecular Modeling XXVI

**Workshop Chairs:** Kirill V. Berezin, Alexander B. Pravdin, Lev M. Babkov, Saratov State University (Russia), Inna L. Plastun, Saratov State Technical University (Russia).

**Secretary:** Anna A. Doronkina, Saratov State University (Russia)

**International Program Committee:** Lev M. Babkov, Saratov State University (Russia), Dmitry S. Umreiko, Belarus State University (Minsk, Belorussia), Nadezda A. Davydova, Institute of Physics, NAS of Ukraine, Tatiana G. Bourova, Saratov State Pedagogical Institute (Russia), Alexander V. Burenin, Institute of Applied Physics RAS (Moscow, Russia), Victor L. Furer, Kazan Civil Engineer Academy (Russia), Alexander V. Gorohov, Samara State University (Russia).

## September 23, Wednesday

### ON-LINE INVITED LECTURE/ORAL SESSION SPECTROSCOPY I (Building 8, Room 216)

Co-chairs: Kirill V. Berezin<sup>1</sup>, Inna L. Plastun<sup>2</sup>

<sup>1</sup>Saratov State University, Russia

<sup>2</sup>Saratov State Technical University

### Saratov time/Moscow time

15.00 - 15.15 / 14.00 – 14.15

#### Oral Report

**Rapid evaluation of the linoleic-to-oleic acid ratio in sunflower oil using Raman spectroscopy**

**Sergey M. Kuznetsov<sup>1</sup>**, D.D. Vasimov<sup>1,2</sup>, Z.I. Kalugina<sup>3</sup>, V.I. Andreev<sup>1,4</sup>, V.S. Novikov<sup>1</sup>, E.A. Sagitova<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia; <sup>3</sup>Research Institute of Canning Technology – branch of the V. M. Gorbатов Federal Research Center for Food Systems of the RAS, Vidnoe, Moscow region, Russia; <sup>4</sup>D. Mendeleev University of Chemical Technology of Russia, Moscow, Russia.

15.15 - 15.30 / 14.15 – 14.30

#### Oral Report

**Developing of a method for absolute dating of archaeological bone tissue using Raman spectroscopy**

**Dmitrii V. Abramov<sup>1</sup>**, Oleg V. Danilov<sup>2</sup>, Viktoriya A. Bykova<sup>2</sup>, Kristina M. Stankevich<sup>1</sup>, Kirill S. Khorkov<sup>1</sup>, Anton S. Chernikov<sup>1</sup>, Anastasiya N. Tselikova<sup>1</sup>; <sup>1</sup>Vladimir State University, Vladimir, Russia; <sup>2</sup>State Center for the Conservation, Use and Restoration of Cultural Objects and Cultural Heritage, Vladimir, Russia.

15.30 - 15.45 / 14.30 – 14.45

#### Oral Report

**Molecular Dynamics Simulation of the Interaction of Carbon Dot Models with Transition Metal Nitrates in water**

**Kirill Kozhushnyi**, A.M. Vervald, T.A. Dolenko; Lomonosov Moscow State University, Moscow, Russia.

15.45 - 16.00 / 14.45 – 15.00

#### Oral Report

**Solving Multi-Parameter Optical Spectroscopy Inverse Problems Using Transfer Learning**

**Artem A. Guskov<sup>1,2</sup>**, Alexander P. Mardanov<sup>1</sup>, Igor V. Isaev<sup>2</sup>, Kirill A. Laptinskiy<sup>2</sup>, Tatiana A. Dolenko<sup>1,2</sup>, Sergey A. Dolenko<sup>2</sup>; <sup>1</sup>Faculty of Physics, Moscow State University, Moscow, Russia; <sup>2</sup>D.V. Skobeltsyn Institute of Nuclear Physics, M.V. Lomonosov Moscow State University, Moscow, Russia.

16.30 - 16.45 / 15.30 – 15.45

#### Oral Report

**Unsupervised Domain-Adversarial Adaptation of Neural Networks for Analysis of Real Wines Using IR Absorption Spectroscopy**

**Louisa Salavatovna Utegenova<sup>1</sup>**, Sergey A. Burikov<sup>1</sup>, Artem A. Guskov<sup>1,2</sup>, Kirill A. Laptinskiy<sup>1,2</sup>, Tatiana A. Dolenko<sup>1,2</sup>, and Sergey A. Dolenko<sup>2</sup>; <sup>1</sup>Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia, <sup>2</sup>Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Moscow, Russia.

16.45 – 17.00 / 15.45 – 16.00

#### Oral Report

**Nucleic acid base SERS vibrational spectra**

**Galina Nikolaevna Ten**, M.I. Plaksin; Saratov State University, Saratov, Russia.

17.00 - 17.15 / 16.00 - 16.15

#### Oral Report

**Vibrational spectra of uracil tautomers**

**Galina Nikolaevna Ten**, M.I. Plaksin; Saratov State University, Saratov, Russia.

17:15-17:30 / 16:15-16:30

**Online Oral Report**

**Analysis of collagen presence in brain tumors by raman spectroscopy**

**Antipova E<sup>1</sup>**, Romanishkin I.D<sup>2</sup>, Savelieva T.A<sup>1,2</sup>, Ryabova A.V.<sup>1,2</sup>. <sup>1</sup>National Research Nuclear University "MEPhI", Moscow, Russia. <sup>2</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia.

20.00-23.00

**Evening boat trip - the lights of Saratov**

## September 24, Thursday

**ORAL SESSION SPECTROSCOPY II**  
**(Building 8, Room 216)**

Co-chairs: **Kirill V. Berezin<sup>1</sup>**, **Inna L. Plastun<sup>2</sup>**

<sup>1</sup>Saratov State University, Russia

<sup>2</sup>Saratov State Technical University

**Saratov time / Moscow time**

15.00 - 15.15 / 14.00 – 14.15

**Oral Report**

**Raman spectroscopy of metallic ferromagnetic foreign bodies extracted from the human body: identification of materials, biocorrosion products, and assessment of clinical hazard**

**Varvara V Dudenkova<sup>1</sup>**, Maxim G Ryabkov<sup>1</sup>, Evgeny O. Bazhenov<sup>2</sup>; <sup>1</sup>Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>2</sup>Nizhny Novgorod State Technical University, Nizhny Novgorod, Russia.

15.15 - 15.30 / 14.15 – 14.30

**Oral Report**

**Effect of Non-Enzymatic Glycation on the Hydration of Collagen and Membrane Phospholipids: A DFT Study of the Energetics and Structure of the First Hydration Shell**

**Kirill V. Berezin<sup>1,2</sup>**, E. Yu. Stepanovich<sup>2</sup>, A. M. Likhter<sup>2</sup>, E. V. Grabarchuk<sup>2</sup>, K. N. Dvoretzky<sup>3</sup>, Yu. Yanina<sup>1</sup>; <sup>1</sup>N.G. Chernyshevsky Saratov State National Research University, Saratov, Russia; <sup>2</sup>V.N. Tatishchev Astrakhan State University, Astrakhan, Russia; <sup>3</sup>V.I. Razumovsky Saratov State Medical University, Saratov, Russia.

15.30 - 15.45 / 14.30 – 14.45

**Oral Report**

**Effect of Non-Enzymatic Collagen Glycation on Intermolecular Interaction with Optical Clearing Agents: A DFT Study of the Thermodynamics and Structure of Complexes with DMSO, Urea, and Glycerol**

**Kirill V. Berezin<sup>1,2</sup>**, E. Yu. Stepanovich<sup>2</sup>, A. M. Likhter<sup>2</sup>, E. V. Grabarchuk<sup>2</sup>, K. N. Dvoretzky<sup>3</sup>, Yu. Yanina<sup>1</sup>, V. V. Tuchin<sup>1,4,5</sup>; <sup>1</sup>N.G. Chernyshevsky Saratov State National Research University, Saratov, Russia; <sup>2</sup>V.N. Tatishchev Astrakhan State University, Astrakhan, Russia; <sup>3</sup>V.I. Razumovsky Saratov State Medical University, Saratov, Russia; <sup>4</sup>National Research Tomsk State University,

Tomsk, Russia; <sup>5</sup>Institute of Precision Mechanics and Control, Federal Research Center "Saratov Scientific Center of the Russian Academy of Sciences," Saratov, Russia.

15.45 - 16.00 / 14.45 – 15.00

**Oral Report**

**Spectral manifestations of urea effect on glycylglycine self-association**

**Egor V. Nazarev<sup>1</sup>**, Inna L. Plastun<sup>1</sup>, Lev M. Babkov<sup>2</sup>; <sup>1</sup>Saratov State Technical University, Saratov, Russia; <sup>2</sup>Saratov State University, Saratov, Russia.

16:00-16:30/15:00-15:30

**Coffee break**

16.30 - 16.45 / 15.30 – 15.45

**Oral Report**

**Effect of crystal modification on the spectral characteristics of chromium picolinate**

**Pavel D. Filin**, Inna L. Plastun; Yuri Gagarin State Technical University of Saratov, Astrakhan, Russia; <sup>3</sup>V.I. Razumovsky Saratov State Medical University, Saratov, Russia.

16.30 - 16.45 / 15.30 – 15.45

**Oral Report**

**DFT Analysis of Cyanine 7 Binding to TNF Receptor–Ligand Amino Acid Chains**

**Bogdan A. Mishunin<sup>1</sup>**, Egor V. Nazarev<sup>1</sup>, Inna L. Plastun<sup>1</sup>, Kirill A. Laptinsky<sup>2</sup>, Tatyana A. Dolenko<sup>2</sup>, Ruslan Y. Yakovlev<sup>3</sup>; <sup>1</sup>Yuri Gagarin State Technical University of Saratov, Saratov, Russia; <sup>2</sup>Lomonosov Moscow State University, Moscow, Russia; <sup>3</sup>LLC «Protonica», cluster «Lomonosov», Moscow, Russia.

16.45 – 17.00 / 15.45 – 16.00

**Oral Report**

**Response surface modeling for the multifactorial synthesis of imprinted polyaniline**

**Victoria D. Gorlo**, Pavel S. Pidenko, Natalia A. Burmistrova; Saratov State University, Saratov, Russia.

17.00 – 17.15 / 16.00 – 16.15

**Oral Report**

**Imprinted analytical approaches for determination of antibiotics. Do we catch up with antibodies?**

**Pavel P. Pidenko**, Victoria D. Gorlo, Daria G. Koganova, Natalia A. Burmistrova, Daniil D. Drozd; Saratov State University, Saratov, Russia.

17:15 - 17:30 / 16:15 – 16:30

**Online Oral Report**

**DFT-Based Modeling and Interpretation of the Rat Skin Raman Spectrum**

Piri Aliyev<sup>1</sup>, E.Yu. Stepanovich<sup>1</sup>, A.M. Likhter<sup>1</sup>, K.V. Berezin<sup>2</sup>; <sup>1</sup>V.N. Tatishchev Astrakhan State University, Astrakhan, Russia; <sup>2</sup>N.G. Chernyshevsky Saratov State National Research University, Saratov, Russia

**September 24, Thursday**

**JOINT POSTER/INTERNET SESSION  
SPECTROSCOPY (S)  
(Building 3, 3rd floor Hall)**

Co-chairs: Kirill V. Berezin<sup>1</sup>, Inna L. Plastun<sup>2</sup>

<sup>1</sup>Saratov State University, Russia

<sup>2</sup>Saratov State Technical University

**18:00-20:00**

- 1S. **Structural Determination of Spiropyrazolines and Spiropyrrolizidines by Spectral Methods** Andrey S. Kochukov<sup>1</sup>, Anna A. Meshcheryakova<sup>1</sup>, Nikolay I. Davydov<sup>1</sup>, Alisa A. Zhidkova<sup>1</sup>, Dmitry P. Vozyagin<sup>1</sup>, Nikita V. Oprishchenko<sup>1</sup>, Efrosinya M. Erkina<sup>1</sup>, Svetlana V. Borisova<sup>2</sup>, Vitaly V. Sorokin<sup>1</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov Higher Military Engineering School of Radiation, Chemical and Biological Defense, Saratov, Russia.
- 2S. **Raman spectroscopy monitoring of hydrogen-deuterium exchange kinetics in lyophilized lysozyme at controlled humidity** Elizaveta A. Dobrynina, Nikolay V. Surovtsev; Institute of Automation and Electrometry, Russian Academy of Sciences, Novosibirsk, Russia.
- 3S. **Quantum Chemical Modeling of IR Spectra of Aldol and Knoevenagel Condensation Products Catalyzed by Organotellurium Compounds to Improve Component Identification Accuracy** Denis A. Korsikov, Nikolay A. Redkin, Samara State University, Samara, Russia.
- 4S. **Comparative analysis of data balancing methods for the classification of raman spectra of skin growths based on a convolutional neural network** Angelina O. Kapkaeva, I.A. Matveeva; Samara National Research University, Samara, Russia.
- 5S. **Raman spectroscopy of erythrocyte membranes: investigation of the molecular conformational state** Sergey V. Adichtchev, Elizaveta A. Dobrynina, Nikolay V. Surovtsev; Institute of Automation and Electrometry SB RAS, Novosibirsk, Russia.
- 6S. **A method of fluorescence polarization of probes in the study of the interaction of glycated serum albumin with non-glycated one** Andrei G. Melnikov<sup>1</sup>; Alexander B. Pravdin<sup>2</sup>; <sup>1</sup>Saratov State Technical University, Saratov, Russia; <sup>2</sup>Saratov State University, Saratov, Russia.
- 7S. **Machine learning assisted spectral analysis for non-invasive skin lesion classification** Ekaterina A. Beshanova, Irina A. Matveeva; Samara National Research University, Samara, Russia.
- 8S. **Effect of Transition Metals on the Fluorescence Excitation-Emission Matrices of Carbon Dots and Their Fractions in water** Matvey S. Kulikov<sup>1</sup>, Kirill A. Laptinsky<sup>1,2</sup>, Tatyana A. Dolenko<sup>1</sup>; <sup>1</sup>Faculty of Physics, M.V. Lomonosov Moscow State University, Moscow, Russia; <sup>2</sup>D.V. Skobeltsyn Institute of Nuclear Physics, M.V. Lomonosov Moscow State University, Moscow, Russia.
- 9S. **Comparative analysis of the principle of complementarity of N. Bohr in physics and teaching the German language** Galina N. Ten, A.A. Minor, Saratov State University, Saratov, Russia.
- 10S. **Quantum-Chemical Study of the Structure, Vibrational Spectra, and Stabilization Mechanism of the Triplet State in  $\beta$ -Carotene Isomers** E. Yu. Stepanovich<sup>1</sup>, A. M. Likhther<sup>1</sup>, K. V. Berezin<sup>2</sup>, V.V. Nechaev<sup>3</sup>; <sup>1</sup>V.N. Tatishchev Astrakhan State University, Astrakhan, Russia; <sup>2</sup>N.G. Chernyshevsky Saratov State National Research University, Saratov, Russia; <sup>3</sup>Saratov State Technical University named after Yuri Gagarin, Saratov, Russia.
- 11S. **Quantum-Chemical Study of the Structure, Vibrational Spectra, and Isotopic Effects of Chlorin: Force Field Modeling, Scaling, and Correlation with Porphine** E. Yu. Stepanovich<sup>1</sup>, A. M. Likhther<sup>1</sup>, K. V. Berezin<sup>2</sup>, V.V. Nechaev<sup>3</sup>; <sup>1</sup>V.N. Tatishchev Astrakhan State University, Astrakhan, Russia; <sup>2</sup>N.G. Chernyshevsky Saratov State National Research University, Saratov, Russia; <sup>3</sup>Saratov State Technical University named after Yuri Gagarin, Saratov, Russia.
- 12S. **Structure, IR Spectra, and NH-Tautomerism of Chlorin: Nonlocal Force Field Changes upon Rearrangement of the Central Protons** E. Yu. Stepanovich<sup>1</sup>, A. M. Likhther<sup>1</sup>, K. V. Berezin<sup>2</sup>, V.V. Nechaev<sup>3</sup>; <sup>1</sup>V.N. Tatishchev Astrakhan State University, Astrakhan, Russia; <sup>2</sup>N.G. Chernyshevsky Saratov State National Research University, Saratov, Russia; <sup>3</sup>Saratov State Technical University named after Yuri Gagarin, Saratov, Russia.
- 13S. **IR spectra and structure of chromenopiridine and pyrido[1,2-a]pyrimidine systems** Irina V. Peretokina, Lev M. Babkov, Anna A. Mecheryakova, Vitaly V. Sorokin; Saratov State University, Saratov, Russia

# Workshop on Electromagnetics of Microwaves, Submillimeter and Optical Waves XXVI

**Workshop Chair:** Michael V. Davidovich, Saratov State University

Secretaries: **Alexander N. Savin**, Istok, Fryazino. (Russia), **Kirill A. Sayapin**, Saratov State University, Saratov (Russia)

International Program Committee:

**Nikita M. Ryskin**, Kotelnikov Institute of Radio-Engineering of RAS (Russia); **Igor S. Nefedov**, Aalto University, Espoo (Finland); **Georgi N. Georgiev**, "Sts. Cyril and Methodius" University, Veliko Tirnovo, (Bulgaria); **Andrei D. Grigoriev**, St. Petersburg Electrotechnical University LETI (Russia); **Josef Modelsky**, Warsaw University of Technology (Poland); **Alexander M. Lerer**, South Federal University, Rostov-Don (Russia), **Vyacheslav V. Popov**, Kotelnikov Institute of Radio-Engineering of RAS (Russia)

## Thursday, September 24

### Online Oral Report Session

*(Building 8, 3rd floor, Room 318, SSU)*

Chair (EM): **Michael V. Davidovich**, Saratov State University, Russia

#### 14.00–14.15

**Влияние модели эффективной среды на расчетные характеристики поглощающих метаповерхностей с плазмонными наночастицами**

Lerer A.M.<sup>1</sup>, Kleshnikov A.B.<sup>1</sup>, Gorbachev N.V.<sup>1</sup>, Ivanova I.N.<sup>1</sup>; <sup>1</sup>Southern Federal University, Rostov-on-Don, Russia, <sup>2</sup>Penza State University, Penza, Russia

#### 14.15–14.30

**Comparative analysis of cylindrical lenses made of photonic crystals formed from solid and cut metal cylinders**

Donets I.V.<sup>1</sup>, Lerer A.M.<sup>1</sup>, Danelyan M.<sup>1</sup>, Tsvetkovskaya S.M.<sup>2,1</sup>; <sup>1</sup>Southern Federal University, Rostov-on-Don, Russia; <sup>2</sup>Don State Technical University, Rostov-on-Don, Russia

### ORAL SESSION

#### ELECTROMAGNETICS

*(Building 8, 3rd floor, Room 318, SSU)*

Chair: **Michael V. Davidovich**, Saratov State University, Russia

#### 14.30–14.45

**PIC Modeling of the Self-Oscillatory Generation of a Continuous RF Train of Short Electron Bunches in a Vircator with a Magnetic Mirror**

Kolesov H.N.<sup>1</sup>, Dubinov A.E.<sup>1</sup>; <sup>1</sup>Russian Federal Nuclear Center—All-Russia Scientific and Research Institute of Experimental Physics (RFNC-VNIIEF), Sarov, 607188 Russia

#### 14.45–15.00

**The dynamics of a high-current relativistic electron beam passing through a magnetic mirror**

Kolesov H.N.<sup>1</sup>, Dubinov A.E.<sup>1</sup>; <sup>1</sup>Russian Federal Nuclear Center – All-Russia Scientific and Research Institute of Experimental Physics (RFNC-VNIIEF), Sarov, 607188 Russia

#### 15.00–15.15

**NORMAL MODES OF ELECTROMAGNETICALLY INDUCED TRANSPARENCY IN A LAMBDA-TYPE QUANTUM TRANSITION SCHEME**

Parshkov O.M., Yuri Gagarin State Technical University of Saratov, Russia, Saratov, 410054, ul. Politekhnikeskaya, 77

#### 15.15–15.30

**Development of a W-Band Sheet-Beam Phase-Velocity-Tapered Traveling-Wave Tube**

Roman A. Torgashov<sup>1,2</sup>, Alina D. Murlaeva<sup>1,2</sup>, Nikita M. Ryskin<sup>1,2</sup>; <sup>1</sup>Saratov Branch Kotelnikov Institute of Radioengineering and Electronics of RAS, Saratov, Russia; <sup>2</sup>Saratov State University, Saratov, Russia

#### 15.30–15.45

**Theoretical analysis of mode competition in a gyrotron**

Grigorieva N.V.<sup>1</sup>, Ryskin N.M.<sup>1,2</sup>; <sup>1</sup>Kotelnikov Institute of Radio-Engineering of RAS, Saratov Branch; <sup>2</sup>Saratov State University

#### 15.45–16.00

**Casimir pressure on two graphene sheets on the substrate**

Davidovich M.V., Saratov State University, Saratov, Russia

#### 16.00–16.15

**On Casimir force between two real metallic plates**

Davidovich M.V., Saratov State University, Saratov, Russia

#### 16.15–16.30

**Optical Quantum Cascade Laser on MIM-Structure**

Davidovich M.V., Saratov State University, Saratov, Russia

## 16.30–16.45

### Ensuring the required electrical parameters in coaxial switches

Molchanov S.Yu., Dovgan A.A., Bahteev I.Sh., Ogorodnik V.O., Dmitrichkova N.V., Kuzyutkin S.I., RPE «Almaz», Saratov, Russia

## 16.45–17.00

### Waveguide Multiplexers for Terrestrial and Satellite Communication Systems

Kirill A. Sayapin<sup>1,2</sup>, Maxim E. Golubtsov<sup>1</sup>, Boris M. Katz<sup>1</sup>, Nikita M. Gerasimov<sup>1</sup>, Nikita A. Shkunov<sup>1</sup>;

<sup>1</sup>Waveguide-based Systems LLC, Saratov, Russia;

<sup>2</sup>Saratov State University, Saratov, Russia

## 17.00–17.15

### Synthesis of Narrowband Channel Filters Based on High-Q TE<sub>011</sub>-Mode Resonators for Satellite DVB-T/DVB-T2 TV Signal Relay Systems

Boris M. Kats<sup>1</sup>, Nikita M. Gerasimov<sup>1</sup>, Nikita A. Shkunov<sup>1</sup>, Kirill A. Sayapin<sup>1,2</sup>; <sup>1</sup>Waveguide-based Systems LLC, <sup>2</sup>Saratov State University, Saratov, Russia

## JOINT POSTER/INTERNET SESSION

(Building 3, 3rd floor Hall)

Chairs: Ivan V. Fedosov, Daria K. Tuchina, Saratov State Univ., Russia

Moderators: Ivan V. Fedosov, Michael M. Slepchenkov, Alexander I. Dubrovsky, Saratov State Univ., Russia

Chair (EM): Michael V. Davidovich, Saratov State University, Russia

## Thursday September 24

### 18.-00–20.-00

#### 1. Investigation of W-Band Traveling-Wave Tube Amplifiers with Folded Waveguide Slow Wave Structures

I.S. Dmitriev<sup>1</sup>, A.A. Rostuntsova<sup>1,2</sup>, <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov Branch, Kotelnikov Institute of Radioengineering and Electronics RAS, Saratov, Russia

#### 2. Development of Periodic Cusped Magnet Focusing System for a miniaturized W-band Sheet-Beam Traveling-Wave Tube

Alina D. Murlaeva, Roman A. Torgashov Saratov Branch Kotelnikov Institute of Radioengineering and Electronics of RAS, Saratov, Russia; Saratov State University, Saratov, Russia

#### 3. Study of the characteristics of micro-sized millimeter-wave waveguides fabricated using laser microfabrication technology

Veronika D. Churikova<sup>1</sup>, Dmitry A. Nozhkin<sup>1,2</sup>, Roman A. Torgashov<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov Branch Kotelnikov Institute of Radioengineering and Electronics of RAS, Saratov, Russia

#### 4. Development and Fabrication of Electron-Optical System With Elliptic Electron Beam for a W-Band Traveling-Wave Tube

Dmitry A. Nozhkin<sup>1,2</sup>, Roman A. Torgashov<sup>1,2</sup>, Igor A. Navrotsky<sup>1</sup>, Anna A. Akst<sup>2</sup>, Dmitry A. Bessonov<sup>1</sup>, Nikita M. Ryskin<sup>1,2</sup>; <sup>1</sup>Saratov Branch, Kotelnikov Institute of Radioengineering and Electronics RAS; <sup>2</sup>Saratov State University, Saratov, Russia

#### 5. Micromagnetic investigation of spin waves propagation in nanoscale YIG waveguides

Varvara A. Ochkina<sup>1</sup>, Vera V. Balaeva<sup>1</sup>, Maria A. Morozova<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov Branch of V.A. Kotelnikov Institute of Radioengineering and Electronics RAS

#### 6. Study of the characteristics of micro-sized millimeter-wave waveguides fabricated using laser microfabrication technology

Veronika D. Churikova<sup>1</sup>, Dmitry A. Nozhkin<sup>1,2</sup>, Roman A. Torgashov<sup>1,2</sup>; <sup>1</sup>Saratov State University, Saratov, Russia; <sup>2</sup>Saratov Branch Kotelnikov Institute of Radioengineering and Electronics of RAS, Saratov, Russia

#### 7. Design of Highly Selective Microwave Filters and a Multiplexer Based on Them

Kirill A. Sayapin<sup>1,2</sup>; <sup>1</sup>Waveguide-based Systems LLC, <sup>2</sup>Saratov State University, Saratov, Russia

#### 8. Compact Multimode Microwave Filter with Cascaded-Triple Topology

Nikita M. Gerasimov; Waveguide-based Systems LLC, Saratov, Russia

# Workshop on Medical Applications of Laser Molecular Imaging and Machine Learning

**Chairs:** Yury V. Kistenev, Tomsk State University (Russia)

**Secretary:** Tatiana B. Lepekhina, Tomsk State University (Russia)

**International Program Committee:** Vladimir L. Vaks, Institute of Applied Physics of RAS, Nizhny Novgorod (Russia), Olga P. Cherkasova, Institute of Laser Physics of SB of RAS (Russia), Denis A. Vrazhnov, Tomsk State University (Russia), Alexey V. Borisov, Tomsk State University (Russia)

**September 23, Wednesday**

## ON-LINE SESSION APPLICATIONS OF LASER MOLECULAR IMAGING AND MACHINE LEARNING VI (On-line)

**Chairs:** Yury V. Kistenev, Denis A. Vrazhnov,  
Tomsk State University, Russia,

**Moderator:** Denis A. Vrazhnov, Tomsk State  
University, Russia

**Tomsk time/ Indian time**

**16.00-16.15/14.30-14.45**

**Internet Poster**

**Two-Photon Microscopy based Oral lesion classification using AI models**

Edwin Pious<sup>1</sup>, Manikanth Karnati<sup>1</sup>, Jackson Rodrigues<sup>2</sup>, Gagan Raju<sup>1</sup>, Guan-Yu Zhuo<sup>2</sup>, Nirmal Mazumder<sup>1</sup>; <sup>1</sup>Department of Biophysics, Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal, India; <sup>2</sup>Institute of Biophotonics, College of Biomedical Science and Engineering, National Yang Ming Chiao Tung University, Taipei, Taiwan

**16.15-16.30/14.45-15.00**

**Online Oral Report**

**Two-photon microscopy as a method for studying the biocompatibility of medical implants**

Tatiana B. Lepekhina<sup>1</sup>, Viktor V. Nikolaev<sup>2</sup>, Yury V. Kistenev<sup>1</sup>; <sup>1</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia; <sup>2</sup>Laboratory of Ecophotonics, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia

**16.30-16.45/15.00-15.15**

**Online Oral Report**

**Quantitative Analysis of Eutrophication Marker Molecules in Atmospheric Air Based on Model IR Spectra and the SIMCA Method**

Akim K. Tretyakov<sup>1</sup>, Viktor V. Nikolaev<sup>1</sup>, Yury V. Kistenev<sup>2</sup>; <sup>1</sup>Laboratory of Ecophotonics, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia; <sup>2</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia

**16.45-17.00/15.15-15.30**

**Online Oral Report**

**Experimental verification of a method for quasi-continuous monitoring of the resonance frequency of a quartz tuning fork based photoacoustic detector**

Georgii K. Raspopin<sup>1</sup>, Viktor V. Nikolaev<sup>1</sup>, Alexei V. Borisov<sup>1</sup>, Yury V. Kistenev<sup>2</sup>

<sup>1</sup>Laboratory of Ecophotonics, Tomsk State University, 634050, Tomsk, Russia

<sup>2</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, 634050, Tomsk, Russia

**17.00-17.15/15.30-15.45**

**Online Oral Report**

**Infrared photoacoustic spectrometer for CO<sub>2</sub> detection**

Didar R. Makashev<sup>1</sup>, David A. López Guardado<sup>1</sup>, Viktor V. Nikolaev<sup>1</sup>, Yury V. Kistenev<sup>2</sup>;

<sup>1</sup>Laboratory of Ecophotonics, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia

<sup>2</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia

**17.15-17.30/15.45-16:00**

**Online Oral Report**

**Quartz-Enhanced Photoacoustic Detection of Gases in the Sub-Terahertz Range**

Viktor V. Nikolaev<sup>1</sup>, Akim K. Tretyakov<sup>1</sup>, Georgii K. Raspopin<sup>1</sup>, Didar R. Makashev<sup>1</sup>, Yury V. Kistenev<sup>2</sup>

<sup>1</sup>Laboratory of Ecophotonics, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia

<sup>2</sup>Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University 36, Lenin Ave., Tomsk, 634050 Russia

# Workshop on Quantum Science and Technologies VI

*Co-Chairs:* **Aleksey K. Fedorov**, and **Evgeniy O. Kiktenko**, Russian Quantum Center (Russia); National University of Science and Technology “MISIS” (Russia)

*Secretary:* **Alena S. Mastiukova**, Russian Quantum Center (Russia); National University of Science and Technology “MISIS” (Russia)  
([a.mastiukova@rqc.ru](mailto:a.mastiukova@rqc.ru), +7 (906) 747-72-29)

*International Program Committee:*

**Vladimir L. Derbov**, Saratov State University (Russia)

**Igor V. Meglinski**, Aston University, Birmingham (UK), Sechenov University, Moscow (Russia)

**Lingyan Shi**, University of California San Diego (USA)

**Georgy Shlyapnikov**, LPTMS, University of Paris-Sud (France), University of Amsterdam (The Netherlands), Russian Quantum Center (Russia)

**Lihong Wang**, Caltech, Pasadena (USA)

**Aleksei M. Zheltikov**, Lomonosov Moscow State University, Russian Quantum Center (Russia), Texas A&M University (USA)

## September 25, Friday

### ORAL SESSION

*Chair:* **Evgeniy O. Kiktenko**,  
Russian Quantum Center  
(Russia)

#### 11:00 – 11:25

**T. A. Voronova**, G. A. Vishnyakova, Trapping of Ultracold Rydberg Atoms in a 1012-nm Optical Dipole Potential

#### 11:25 – 11:50

**Andrey Yu. Chernyavskiy**, Denis A. Kulikov, Boris I. Bantysh, Empirical Evaluation of the Approximation Ratio in Scalable Fixed-Point QAOA

#### 11:50 – 12:15

**Boris I. Bantysh**, Andrey Yu. Chernyavskiy, Denis A. Kulikov, Entanglement Analysis of QAOA with Increasing Circuit Depth

#### 12:15 – 12:40

**Maksim A. Gavreev**, Evgeniy O. Kiktenko, Aleksey K. Fedorov, Anastasiia S. Nikolaeva, Qudit-native simulation of the Quantum Potts model

#### 12:40 – 13:05

Grigorii A. Grechkin, **Daniil S. Bagaev**, Evgeniy O. Kiktenko, Adaptive neural-network decoding for quantum error correction

#### 13:05 – 13:30

**Elisaveta Krendeleva**, Evgeniy O. Kiktenko, Resource-Efficient Grover-Mixer QAOA for Higher-Order Optimization via Analytical Parameter Pre-optimization

#### 13:30 – 13:55

**Vladislav I. Katkov**, Phase-sensitive signal detection with a Rydberg-atom quantum receiver based on a Raman two-photon process

#### 13:55 – 14:20

**Andrey Konyukhov**, Quantum noise correlations in optical dispersive waves

# Workshop on Brillouin, Ultrafast and Terahertz, Spectroscopy of Micro- and Nanostructures, Including Living Objects

Workshop Co-Chairs: **Alexander V. Sadovnikov**, Saratov State University, Russia; **Valery V. Tuchin**, Saratov State University, Russia

Secretary: **Alexey A. Solyanov**, Saratov State University, Russia, E-mail: solyanov555@gmail.com;  
**Anna A. Manysheva**, Saratov State University, Russia, E-mail: aamsgmaam2006@gmail.com

**September 23, Wednesday**

## INVITED LECTURE/ ORAL REPORT BRILLOUIN SPECTROSCOPY I

*(Building 8, Room 005)*

Chairs: **Alexander V. Sadovnikov**, Saratov State Univ., Russia; **Valery V. Tuchin**, Saratov State Univ., Russia;

Moderator: **Alexander V. Sadovnikov**, Saratov State Univ., Russia

### Saratov time

**14:00-14:30**

#### Online Oral Report

#### How Reticular Chemistry Pushes the Limits in Physics

Valentin A. Milicko;  
New Uzbekistan University, Tashkent, Uzbekistan

**14:30-15:00**

#### Oral Report

#### Brillouin scattering sensitivity to mechanical stiffness changes in hydrated protein systems

Elizaveta A. Dobrynina, Nikolay V. Surovtsev;  
Institute of Automation and Electrometry, Russian Academy of Sciences, Novosibirsk, Russia

**15:00-15:30**

#### Online Oral Report

#### Control of Extreme Radiation Tolerance in Ceramics by Depth Profiling of Structure-Property Relations

Vladimir D. Bessonov;  
Nazarbayev University, Astana, Kazakhstan

**15:30-16:00**

#### Online Oral Report

#### Computer modeling of the properties of magnetic nanoparticles and their influence on the dynamic magnetomechanical characteristics of soft materials

Sofia S. Kontorovich;  
University of Vienna Kolingasse, Vienna, Austria

**16:00-16:15**

**Coffee break**

**16:15-16:45**

#### Oral Report

#### Rigidity properties of biological objects measured using BLS

Maria V. Lomova;  
Saratov State University, Saratov, Russia

**16:45-17:15**

#### Oral Report

#### Single-molecule study of SMC-like protein RecN-DNA binding using optical tweezers

Natalia E. Morozova;  
Peter the Great St.Petersburg Polytechnic University, St. Petersburg, Russia

**17:15-17:30**

#### Online Oral Report

#### Biophysical Differences Between Macrophages of Distinct Origin

Dmitry Kolesov;  
Saratov State University, Saratov, Russia;

**17:30-17:45**

#### Oral Report

#### Resonant Routing of Spin Waves in YIG Structures with Ring Resonators: Effect of Geometry and External Magnetic Field

Anna A. Manysheva, Nikita Y. Yasnev, Alexander V. Sadovnikov;  
Saratov State University, Saratov, Russia

**17:45-18:00**

#### Oral Report

#### Control of Resonance Properties in a "Microwave Waveguide – Ring Resonator" System Based on Yttrium Iron Garnet Films

Nikita Y. Yasnev, Anna A. Manysheva, Alexander V. Sadovnikov;  
Saratov State University, Saratov, Russia

**18:00-18:15**

#### Oral Report

#### Edge modes in strip-loaded bilayer YIG waveguides

Alexander A. Martyshkin;  
Saratov State University, Saratov, Russia

**18:15-18:30**

#### Oral Report

**Phase and Symmetry Control Strategies for Spin Wave Routing in Hybrid Magnonic Networks with a Central Resonator**

Alexey A. Solyanov, Alexander V. Sadovnikov;  
Saratov State University, Saratov, Russia;

**18:30-18:45**

**Oral Report**

**September 24, Thursday**

**JOINT INTERNET/POSTER SESSION  
BRILLOUIN SPECTROSCOPY (BS)**

*(Building 3, 3rd floor Hall)*

*Chairs (B):* **Alexander V. Sadovnikov**,  
Saratov State Univ., Russia

**1BS. Spin Wave Propagation in a System of Laterally Coupled Mach-Zehnder Interferometers**

Ilya R. Klovov;  
Saratov State University, Saratov, Russia

**2BS. Analysis of Edge Modes in Magnetostatic Surface Spin Waves for Different Waveguide Widths Comparable to Thickness**

Pavel A. Zhironkin;  
Saratov State University, Saratov, Russia

**3BS. A study of the effect of the width of a YIG microwave waveguide on the spectra of surface and inverse bulk spin waves**

Karina E. Zhumabekova;  
Saratov State University, Saratov, Russia

**4BS. Edge Mode Coupling and Controlled Propagation in YIG Microstructures for Magnonic Logic**

Vitalii A. Boldyrev;  
Saratov State University, Saratov, Russia

**5BS. Influence of a Square Resonator on Spin-Wave Routing in a YIG Structure of Connected Zigzags**

Arsenii K. Timofeev;  
Saratov State University, Saratov, Russia

**6BS. Controlling the propagation of spin waves in hybrid YIG/FeRh structures through thermally induced modulation of magnetization.**

Andrey S. Ptashenko, Alexandr V. Sadovnikov;  
Saratov State University, Saratov, Russia

# Joint session of Workshop on Terahertz Optics and Biophotonics IX & Advanced Materials for Optics and Biophotonics IX

**Chairs:** **Nikita V. Chernomyrdin**, Prokhorov General Physics Institute RAS (Russia); **Arseniy A. Gavdush**, Prokhorov General Physics Institute RAS (Russia); **Mariya V. Ponarina**, Prokhorov General Physics Institute RAS (Russia); **Stanislav O. Yurchenko**, Bauman Moscow State Technical University (Russia); **Egor V. Yakovlev**, Bauman Moscow State Technical University (Russia); **Irina N. Dolganova**, Osipyan Institute of Solid State Physics RAS (Russia); **Vladimir N. Kurlov**, Osipyan Institute of Solid State Physics RAS (Russia); **Kirill I. Zaytsev**, Prokhorov General Physics Institute RAS (Russia)

**Secretary:** **Vladislav A. Zhelnov**, Prokhorov General Physics Institute RAS (Russia), E-mail: [vleder.zel@mail.ru](mailto:vleder.zel@mail.ru);

**Polina V. Aleksandrova**, Prokhorov General Physics Institute RAS (Russia), E-mail: [aleksandrovapolina98@gmail.com](mailto:aleksandrovapolina98@gmail.com)

**International Program Committee:** **Maria G. Burdanova**, Moscow Institute of Physics and Technology (Russia); **Nikita V. Chernomyrdin**, Prokhorov General Physics Institute RAS (Russia); **Gleb M. Katyba**, Osipyan Institute of Solid State Physics RAS (Russia); **Arseniy A. Gavdush**, Prokhorov General Physics Institute RAS (Russia); **Sergey V. Garnov**, Prokhorov General Physics Institute RAS (Russia); **Gennady A. Komandin**, Prokhorov General Physics Institute RAS (Russia); **Olga P. Cherkasova**, Institute of Automation and Electrometry SB RAS, Institute of Laser Physics SB RAS (Russia); **Vladimir M. Masalov**, Osipyan Institute of Solid State Physics RAS (Russia); **Irina N. Dolganova**, Osipyan Institute of Solid State Physics RAS (Russia); **Vladimir N. Kurlov**, Osipyan Institute of Solid State Physics RAS (Russia); **Dmitry S. Ponomarev**, NRC "Kurchatov Institute" (Russia); **Igor V. Reshetov**, Sechenov University, Academy of Postgraduate Education FSCC FMBA (Russia); **Stanislav O. Yurchenko**, Bauman Moscow State Technical University (Russia); **Egor V. Yakovlev**, Bauman Moscow State Technical University (Russia)

## September 23, Wednesday

### INVITED LECTURE/ORAL/ ON-LINE SESSION

*(Cluster for Engineering for Life Sciences,  
Centre for Soft Matter and Physics of Fluids,  
BMSTU)*

**Chairs:** **Arsenii A. Gavdush**, Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

### Saratov time/Moscow time

**09:30-10:00 / 8:30-09:00**  
**Welcome coffee break**

**10:00-10:30/09:00-09:30**

#### Online Invited Lecture

**Terahertz pyroelectric detectors based on tetraaminodiphenyl thin films**

**Vasily V. Gerasimov**<sup>1,2</sup>, Sergei A. Kuznetsov<sup>2,3</sup>, Vladislav S. Vanda<sup>1,2</sup>, Aleksey G. Lemzyakov<sup>1,4</sup>, D.V. Fromichev<sup>5</sup>, N.M. Shemyagin<sup>5</sup>, V.A. Stepanov<sup>5</sup>, Alexey K. Nikitin<sup>6</sup>; <sup>1</sup>Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia; <sup>2</sup>Department of Physics, Novosibirsk State University, Novosibirsk, Russia; <sup>3</sup>Rzhanov Institute of Semiconductor Physics of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk,

Russia; <sup>4</sup>Synchrotron Radiation Facility SKIF, Kol'tsovo, Russia; <sup>5</sup>Joint Stock Company "Novosibirsk factory of semiconductor device EAST", Novosibirsk, Russia; <sup>6</sup>Scientific and Technological Centre of Unique Instrumentation of the Russian Academy of Sciences, Moscow, Russia

**10:30-10:45 / 9:30-9:45**

#### Oral

**Effect of thickness and morphology on terahertz and optical properties of ultrathin gold films**

**Aleksandr S. Marakulin**<sup>1</sup>, Maksim I. Paukov<sup>1</sup>, Maria G. Burdanova<sup>1</sup>, Gennadii A. Komandin<sup>2</sup>, Alexey V. Arsenin<sup>1</sup>, Dmitry I. Yakubovsky<sup>1</sup>; <sup>1</sup>Moscow Institute of Physics and Technology, Dolgoprudny, Russia; <sup>2</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

**10:45-11:00 / 9:45-10:00**

#### Oral

**Broadband dielectric spectroscopy of astrophysically relevant phases of water ice**

**Maria K. Matveyshina**<sup>1,2</sup>, Arsenii A. Gavdush<sup>1</sup>, Kirill I. Zaytsev<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Bauman Moscow State Technical University, Moscow, Russia

**11:00-11:15 / 10:00-10:15**

**Oral**

**Terahertz scattering in biological tissues: spherical and cylindrical scatterers**

**Anna S. Kucheryavenko**<sup>1,2</sup>, Irina N. Dolganova<sup>2</sup>, Nikita V. Chernomyrdin<sup>1</sup>, Kirill I. Zaytsev<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia

**11:15-11:30 / 10:15-10:30**

**Oral**

**Immersion optical clearing of biological tissues in the THz range**

**Daria S. Ustiantseva**<sup>1</sup>, Daria R. Il'enkova<sup>1</sup>, Valery V. Tuchin<sup>2</sup>, Nikita V. Chernomyrdin<sup>2</sup>, Kirill I. Zaytsev<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Saratov State University, Saratov, Russia

**11:30-12:00 / 10:30-11:00**

**Coffee break**

**12:00-12:15 / 11:00-11:15**

**Oral**

**Polarization-sensitive terahertz solid immersion microscopy for probing heterogeneity and birefringence in soft tissues**

**Daria R. Il'enkova**<sup>1</sup>, Demyan D. Rybnikov<sup>1</sup>, Anna I. Alekseeva<sup>2</sup>, Anna S. Kucheryavenko<sup>1,3</sup>, Kirill I. Zaytsev<sup>1</sup>, Nikita V. Chernomyrdin<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Research Institute of Human Morphology, Moscow, Russia; <sup>3</sup>Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia

**12:15-12:30 / 11:15-11:30**

**Oral**

**Superresolution THz solid immersion microscopy**

**Demyan D. Rybnikov**, Vladislav A. Zhelnov, Kirill I. Zaytsev, Nikita V. Chernomyrdin; Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

**12:30-12:45 / 11:30-11:45**

**Oral**

**A method for local evaluation of optical properties of heterogeneous media of various nature using a pulsed terahertz solid immersion microscope**

**Vladislav A. Zhelnov**, Demyan D. Rybnikov, Kirill I. Zaytsev, Nikita V. Chernomyrdin; Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

**12:45-13:00 / 11:45-12:00**

**Oral**

**Study of diffusion processes in microfluidic chips using super-resolution terahertz solid immersion microscopy**

**Vera V. Koroleva**<sup>1,2</sup>, Daria R. Il'enkova<sup>1</sup>, Demyan D. Rybnikov<sup>1</sup>, Ivan A. Kushnir<sup>2</sup>, Vladislav A. Zhelnov<sup>1</sup>, Stanislav O. Yurchenko<sup>2</sup>, Kirill I. Zaytsev<sup>1</sup>, Nikita V. Chernomyrdin<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Bauman Moscow State Technical University, Moscow, Russia

**13:00-14:00 / 12:00-13:00**

**Coffee break**

### **ORAL/ON-LINE SESSION**

**(Cluster for Engineering for Life Sciences, Centre for Soft Matter and Physics of Fluids, BMSTU)**

*Chair:* **Stanislav O. Yurchenko**,  
Bauman Moscow State Technical University,  
Moscow, Russia

**14:00-14:15 / 13:00-13:15**

**Oral**

**Microfluidic "angiogenesis-on-a-chip" test system for studying fundamental mechanisms of angiogenesis and testing pharmacological drugs**

**Ksenia O. Salina**, Anna A. Kopylova, Ivan A. Kushnir, Maxim A. Dragun, Daniil A. Bystrov, Nikita P. Kryuchkov, Egor V. Yakovlev, Stanislav O. Yurchenko; Bauman Moscow State Technical University, Moscow, Russia

**14:15-14:30 / 13:15-13:30**

**Oral**

**Vortex micromixing by magnetic particles via tunable rotating magnetic fields and its application for early diagnosis of neurodegenerative diseases**

**Aksinya A. Bondareva**<sup>1</sup>, Ivan A. Kushnir<sup>1</sup>, Viktoriya I. Zhdankina<sup>2</sup>, Valeriya S. Voronina<sup>2</sup>, Kseniya V. Barinova<sup>3</sup>, Stanislav O. Yurchenko<sup>1</sup>, Nataliya A. Kolotieva<sup>1,2</sup>, Egor V. Yakovlev<sup>1</sup>; <sup>1</sup>Bauman Moscow State Technical University, Moscow, Russia; <sup>2</sup>Research center of neurology, Moscow, Russia; <sup>3</sup>Lomonosov Moscow State University, Moscow, Russia.

**14:30-14:45 / 13:30-13:45**

**Oral**

**Evaluating dynamic light scattering for  $\alpha$ -synuclein oligomer analysis in cerebrospinal fluid**

**Aleksandr Shefer**, Mariia S. Kuzmina, Stanislav O. Yurchenko, Anastasia A. Belyaeva; Centre for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia

14:45-15:00 / 13:45-14:00

Oral

**Dielectrophoresis: physical principles, applications, and future perspectives**

**Leonid Y. Polynkin**, Aleksandra V. Kokhanovskaia, Oleg I. Pohodyaev, Maksim A. Dragun, Tatiana G. Statsenko, Margarita A. Zhgut, Stanislav O. Yurchenko, Egor V. Yakovlev; Center for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia

15:00-15:15 / 14:00-14:15

Oral

**Cellulose nanocrystal-based hydrogels as tunable platforms for 2D and 3D cell culture system**

Ksenia O. Salina, Ivan A. Kushnir, Anna S. Kopylova, **Anastasia A. Belyaeva**; Centre for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia

15:15-15:30 / 14:15-15:30

Oral

**The biocompatibility of hydrogels from nanocrystalline cellulose with gelatin, PAM, or hyaluronic acid**

**Anna G. Erokhina**<sup>1,2</sup>, Anna A. Kopylova<sup>1</sup>, Ksenia O. Salina<sup>1</sup>, Anastasia A. Belyaeva<sup>1</sup>; <sup>1</sup>Centre for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia; <sup>2</sup>I.M. Sechenov First Moscow State Medical University, Moscow, Russia

## September 24, Thursday

**INVITED LECTURE/ORAL/**

**ON-LINE SESSION**

*(Cluster for Engineering for Life Sciences,  
Centre for Soft Matter and Physics of Fluids,  
BMSTU)*

*Chairs: **Arsen K. Zotov**, Prokhorov General  
Physics Institute of the Russian Academy of  
Sciences, Moscow, Russia*

**Saratov time/Moscow time**

**09:30-10:00 / 8:30-09:00**

**Welcome coffee break**

10:00-10:30 / 09:00-09:30

Invited Lecture

**Developing multimodal fiber-optic probe and calibration materials for combined laser spectroscopy of intracranial tumors**

**Tatiana A. Savelieva**<sup>1</sup>, Vadim Yu. Yunanov<sup>2</sup>, Igor D. Romanishkin<sup>1</sup>, Alexander V. Borodkin<sup>1</sup>, Kirill G. Linkov<sup>1</sup>, Anastasia V. Ryabova<sup>1,2,3</sup>, Svetlana V. Shugay<sup>4</sup>, Alexandra V. Kosyrkova<sup>4</sup>, Galina V. Pavlova<sup>4,5</sup>, Igor N. Pronin<sup>4</sup>, Victor B. Loschenov<sup>1,2</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia;

<sup>2</sup>National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, Russia; <sup>3</sup>RUDN University, Moscow, Russia; <sup>4</sup>N.N. Burdenko National Medical Research Center of Neurosurgery, Moscow, Russia; <sup>5</sup>Institute of Higher Nervous Activity and Neurophysiology of the Russian Academy of Sciences, Moscow, Russia

10:30-10:45 / 09:30-09:45

Oral

**Interaction of microsecond dual-wavelength laser radiation with soft tissues**

**Danil V. Pechenkin**, Arsen K. Zotov, Yuriy A. Suchkov, David G. Kochiev; Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

10:45-11:00 / 09:45-10:00

Oral

**Ablation and coagulation of soft biological tissues induced by microsecond pulsed laser**

**Polina V. Aleksandrova**<sup>1</sup>, Arsen K. Zotov<sup>1</sup>, Danil V. Pechenkin<sup>1</sup>, Yuriy A. Suchkov<sup>1</sup>, David G. Kochiev<sup>1</sup>, Anna I. Alekseeva<sup>2</sup>, Irina N. Dolganova<sup>1,3</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Avtsyn Research Institute of Human Morphology of Federal State Budgetary Scientific Institution "Petrovsky National Research Centre of Surgery", Moscow, Russia; <sup>3</sup>Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia

11:00-11:15 / 10:00-10:15

Oral

**Tissue-mimicking phantoms for investigating laser ablation and thermotherapy**

**Sofia A. Mirzaeva**<sup>1</sup>, Danil V. Pechenkin<sup>1</sup>, Polina V. Aleksandrova<sup>1</sup>, Irina N. Dolganova<sup>1,2</sup>, David G. Kochiev<sup>1</sup>, Arsen K. Zotov<sup>1</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia

11:15-11:30 / 10:15-10:30

Oral

**Optoacoustic and fluorescence lifetime visualization based on chlorophyll-loaded particles in phantoms**

**Timofei Torokhov**<sup>1,2</sup>, Sergei Perkov<sup>1,3</sup>, Julijana Cvjetinovic<sup>1</sup>, Alexey Kurnikov<sup>4</sup>, Maksim Mokrousov<sup>1,5</sup>, Igor Sergeev<sup>1</sup>, Arkady Abdurashitov<sup>6,7</sup>, Pavel Subochev<sup>4</sup>, Vladislav Shcheslavskiy<sup>8,9</sup>, Dmitry Gorin<sup>1,3</sup>; <sup>1</sup>Laboratory of Biophotonics, Center for Photonic Science and Engineering, Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>2</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>3</sup>Laboratory of Digital Biophotonics, Central University, Moscow, Russia; <sup>4</sup>Institute of Applied Physics of the Russian Academy of Sciences, Nizhny Novgorod, Russia; <sup>5</sup>Moscow Institute of Physics and Technology,

Dolgoprudny, Russia; <sup>6</sup>Center for Bio- and Medical Technologies, Skolkovo Institute of Science and Technology, Moscow, Russia; <sup>7</sup>Life Improvement by Future Technologies Center, Moscow, Russia; <sup>8</sup>Institute of Experimental Oncology and Biomedical Technologies, Privolzhsky Research Medical University, Nizhny Novgorod, Russia; <sup>9</sup>Becker&Hickl GmbH, Berlin, Germany

**11:30-11:45 / 10:30-10:45**

**Oral**

**Assessment of optical parameters changes in biological tissues via diffuse reflectance spectroscopy using sapphire-fiber probe**

**Alina A. Platonova<sup>1</sup>**, Arsen K. Zotov<sup>1</sup>, David G. Kochiev<sup>1</sup>, Vladimir N. Kurlov<sup>2</sup>, Irina N. Dolganova<sup>2</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia

**11:45-12:00 / 10:45-11:00**

**Oral**

**Development of terahertz step-index fibers based on crystalline materials**

**Polina A. Tsabolova<sup>1,2</sup>**, Leonid N. Butvina<sup>1</sup>, Vladimir N. Kurlov<sup>2</sup>, Kirill I. Zaytsev<sup>1</sup>, Gleb M. Katyba<sup>1,2</sup>; <sup>1</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Osipyan Institute of Solid State Physics Russian Academy of Sciences, Chernogolovka, Russia

**12:00-12:15 / 11:00-11:15**

**Oral**

**Opal-like matrices based on hollow SiO<sub>2</sub> nanoparticles**

**Aysiena-Ekaterina P. Protopopova<sup>1</sup>**, Vladimir M. Masalov<sup>1</sup>, Nadezhda S. Sukhinina<sup>1</sup>, Vladimir N. Kurlov<sup>1</sup>, Kirill I. Zaytsev<sup>2</sup>, Gleb M. Katyba<sup>1</sup>; <sup>1</sup>Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia; <sup>2</sup>Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

**12:15-12:30 / 11:15-11:30**

**Coffee break**

**INVITED LECTURE/ORAL/**

**ON-LINE SESSION**

**(Cluster for Engineering for Life Sciences,  
Centre for Soft Matter and Physics of Fluids,  
BMSTU)**

**Chair:** Nikita P. Kryuchkov,  
Bauman Moscow State Technical University,  
Moscow, Russia

**12:30-12:45 / 11:30-11:45**

**Online Oral Report**

**Machine-learned interaction potentials for colloidal systems**

**Anton I. Shvetsov**, Raniya R. Nafikova, Nikita P. Kryuchkov, Stanislav O. Yurchenko, Ivan V. Simkin; Bauman Moscow State Technical University, Moscow, Russia

**12:45-13:00 / 11:45-12:00**

**Online Oral Report**

**Orientation-controlled three-body polarization in rotating-field colloidal materials**

**Ivan V. Simkin**, Anton I. Shvetsov, Rania R. Nafikova, Nikita P. Kryuchkov, Stanislav O. Yurchenko; Soft Matter and Physics of Fluids Centre, Bauman Moscow State Technical University, Moscow, Russia

**13:00-13:15 / 12:00-12:15**

**Online Oral Report**

**An in silico model of vascular organoid growth and fusion dynamics for early detection of neurodegenerative diseases**

**Alina R. Krasina**, Nikita P. Kryuchkov; Bauman Moscow State Technical University, Moscow, Russia

**13:15-13:30 / 12:15-12:30**

**Oral**

**Self-assembly of various structures in colloidal systems with controlled interactions under confinement conditions**

**Konstantin P. Zhukov**, Alexandra V. Kokhanovskaia, Raniya R. Nafikova, Anastasia A. Simkina, Aksinya A. Bondareva, Oleg I. Pokhodyaev, Artur D. Nasyrov, Roman V. Shumilin, Nikita P. Kryuchkov, Egor V. Yakovlev, and Stanislav O. Yurchenko; Bauman Moscow State Technical University, Moscow, Russia

**13:30-13:45 / 12:30-12:45**

**Oral**

**Surface diffusion in two-dimensional clusters**

**Raniya R. Nafikova**, Nikita P. Kryuchkov, Stanislav O. Yurchenko; Soft Matter and Physics of Fluid Centre, Bauman Moscow State Technical University, Moscow, Russia

**13:45-14:15 / 12:45-13:15**

**Invited Lecture**

**Diagnostic and multimodal sapphire applicators and probes**

**Irina N. Dolganova**; Osipyan Institute of Solid State Physics of the Russian Academy of Sciences, Chernogolovka, Russia

**14:15-15:00/13:15-14:00**

**Coffee break**

**JOINT POSTER SESSION**  
**(Cluster for Engineering for Life Sciences,**  
**Centre for Soft Matter and Physics of Fluids,**  
**BMSTU)**

Chair: **Egor V. Yakovlev**,  
Bauman Moscow State Technical University,  
Moscow, Russia

**15:00-17:00 / 14:00-16:00**

- 1B. Membrane-based biosensors for detecting hypocalcemia in blood** Polina S. Kazaryan<sup>1</sup>, Vadim V. Zefirov<sup>1</sup>, Evgeny A. Shirshin<sup>1,2</sup>; <sup>1</sup>Center for Photonics, Institute of Robotics Systems, HSE University, Moscow, Russia; <sup>2</sup>Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia
- 2B. Development of silver SERS-active substrates for spectroscopic analysis of blood plasma** M.A. Borozdova<sup>1</sup>, P.S. Kazaryan<sup>1</sup>, E.A. Shirshin<sup>1,2</sup>; <sup>1</sup>Center for Photonics, National Research University Higher School of Economics; <sup>2</sup>Lomonosov Moscow State University, Faculty of Physics
- 3B. Oxidized polypropylene-derived water-soluble fluorescent oligomers as model nonconventional luminophores for optical bioanalysis** V.V. Zefirov<sup>1</sup>, P.S. Kazaryan<sup>1</sup>, M.A. Borozdova<sup>1</sup>, E.A. Shirshin<sup>1,2</sup>; <sup>1</sup>Center for Photonics, Institute for Robotics Systems, HSE University, Moscow, Russia; <sup>2</sup>Faculty of Physics, M.V. Lomonosov Moscow State University, Moscow, Russia
- 4B. Development of a low-cost extrusion-based 3D printer for hydrogel printing** Mariia S. Kuzmina, Ksenia O. Salina, Dmitriy S. Titeev, Tatiana G. Statsenko, Anastasia A. Belyaeva; Centre for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia
- 5B. Dielectrophoresis: physical principles, applications, and future perspectives** Margarita A. Zhgut, Leonid Y. Polynkin, Oleg I. Pohodyaev, Aleksandra V. Kokhanovskaia, Maksim A. Dragun, Tatiana G. Statsenko, Stanislav O. Yurchenko, Egor V. Yakovlev; Center for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia
- 6B. Numerical simulation of electric fields for TEER "brain on a chip"** Maksim E. Kovalev, Leonid Y. Polynkin, Maksim A. Dragun, Ivan A. Kushnir, Stanislav O. Yurchenko; Center for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia
- 7B. Automated morphometric analysis and machine learning classification of iPSC-derived vascular organoids in Alzheimer's and Parkinson's disease models** Roman V. Shumilin<sup>1</sup>, Anna A. Kopylova<sup>1</sup>, Daria D. Volegova<sup>1</sup>, Elizaveta S. Pereplitsa<sup>2</sup>, Anna V. Blagova<sup>2</sup>, Ksenia O. Salina<sup>1</sup>, Ilya K. Lanikin<sup>1</sup>, Petr I. Kupriyanov<sup>1</sup>, Anna V. Zubova<sup>2</sup>, Marina R. Kapkaeva<sup>2</sup>, Ivan V. Simkin<sup>1</sup>, Alla B. Salmina<sup>1,2</sup>, Stanislav O. Yurchenko<sup>1</sup> and Sergei N. Illarioshkin<sup>2</sup>; <sup>1</sup>Laboratory of Cellular Technologies and Tissue Engineering, Center "Soft Matter and Physics of Fluids," Bauman Moscow State Technical University, Moscow, Russia; <sup>2</sup>Laboratory of Neurobiology and Tissue Engineering, Brain Science Institute, Russian Center of Neurology and Neurosciences, Moscow, Russia
- 8B. Structural MRI preprocessing for biological brain-Age estimation** Mikhail S. Sokolov<sup>1</sup>, Anton I. Shvetsov<sup>1</sup>, Ivan V. Simkin<sup>1</sup>, Elena I. Kremneva<sup>2</sup>, Polina S. Shlapakova<sup>2</sup>, Larisa A. Dobrynina<sup>2</sup>, Stanislav O. Yurchenko<sup>1</sup>, Elena V. Gnedovskaya<sup>2</sup>, Mikhail A. Piradov<sup>2</sup>; <sup>1</sup>Bauman Moscow State Technical University, Moscow, Russia; <sup>2</sup>Russian Center of Neurology and Neurosciences, Moscow, Russia
- 9B. Development of a method for modeling cell dynamics considering the microenvironment based on cellular potts model** Olesya S. Kuznetsova, Artur D. Nasyrov, Leonid Y. Polynkin, Stanislav O. Yurchenko, Nikita P. Kryuchkov; Center for Soft Matter and Physics of Fluids, Bauman Moscow State Technical University, Moscow, Russia
- 10B. Ab-initio simulations of ZnSe point defects revealed** Egor A. Nikulchin and Gennady A. Komandin; Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

# Workshop on Optical and Biomedical Engineering

**Chairs:** **Igor L. Fufurin**, Bauman Moscow State Technical University (Russia), **Igor S. Golyak**, Bauman Moscow State Technical University (Russia), **Alexander V. Kolpakov**, Bauman Moscow State Technical University (Russia), **Elena N. Rinskaya**, Lebedev Physical Institute of the Russian Academy of Sciences (Russia)

**Secretary:** **Olga A. Nebritova**, Bauman Moscow State Technical University (Russia)

**International Program Committee:** **Andrey N. Morozov**, Bauman Moscow State Technical University (Russia), **Stanislav O. Yurchenko**, Bauman Moscow State Technical University (Russia), **Nikolay N. Evtihiyev**, Laser Association (Russia), **Dmitry A. Rogatkin**, «MONIKI» M. F. Vladimirovskii Moscow Regional Scientific Research Institute (Russia), **Andrey V. Samorodov**, Bauman Moscow State Technical University (Russia), **Igor L. Fufurin**, Bauman Moscow State Technical University (Russia), **Igor S. Golyak**, Bauman Moscow State Technical University (Russia), **Alexander V. Kolpakov**, Bauman Moscow State Technical University (Russia), **Elena N. Rinskaya**, Lebedev Physical Institute of the Russian Academy of Sciences (Russia), **Alexander A. Apolonsky**, Institute of Automation and Electrometry of the Siberian Branch of the Russian Academy of Sciences (Russia), **Vladimir A. Lazarev**, Bauman Moscow State Technical University (Russia), **Stanislav G. Sazonkin**, Bauman Moscow State Technical University (Russia), **Pavel V. Berezhaniky**, Sechenov University (Russia), **Mohammad Ali Ansari**, Shahid Beheshti University, Tehran (Iran), **Santhosh Chidangil**, Manipal Academy of Higher Education (India), **Yury Zakharov**, Harvard University, Cambridge (United States), **Li Dongyu**, Huazhong University of Science and Technology, Wuhan, Hubei (China), **Pengcheng Li**, School of Biomedical Engineering, Hainan University (China), **Polina A. Timoshina**, Saratov State University (Russia), **Qingyu Lin**, Sichuan University, Chengdu (China)

## September 23, Wednesday

### INVITED LECTURE/ORAL/ ON-LINE SESSION OPTICAL AND BIOMEDICAL ENGINEERING (Building 8, Room 201)

**Chairs:** **Igor L. Fufurin**, **Igor S. Golyak**, Bauman Moscow State Technical University, Russia  
**Moderator:** **Olga A. Nebritova**, Bauman Moscow State Technical University, Russia

### Saratov time/Moscow time

11:30-11:50/10:30-10:50

Invited

**A comprehensive approach to evaluating therapy and controlling asthma symptoms in children using the method of Fourier-transform infrared spectroscopy**

**Igor S. Golyak**; Bauman Moscow State Technical University, Moscow, Russia

11:50-12:10/10:50-11:10

Oral

**High-resolution sonography of fish organs and tissues at early stages of development**

**Sergey A. Titov**; Scientific and Technological Centre of Unique Instrumentation of the Russian Academy of Sciences, Moscow, Russia

12:10-12:30/11:10-11:30

Oral

**Molecular Stratification of Sperm by Raman Spectroscopy**

**Elena Rinskaya**; Lebedev Physical Institute, Moscow, Russia; V.I. Kulakov National Medical Research Center for Obstetrics Gynecology and Perinatology, Ministry of Healthcare of Russian Federation, Moscow, Russia

12:30-12:50/11:30-11:50

Oral

**The effect of subpicosecond laser irradiation on wound healing in a rat skin flap excision model**

**Vasily M. Bogomolov**; Scientific and Educational Center "Photonics and IR Technology", Bauman Moscow State Technical University, Moscow, Russia

**13.00–14.30/12.00-13.30  
LUNCH**

14:30-14:50/13:50-14:10

Oral

**Development and validation of a Russian-made NDIR gas analyzer NGAP-1 for CO<sub>2</sub> and H<sub>2</sub>O flux measurements by the Eddy Covariance technique**

**Pavel P. Demkin**; Bauman Moscow State Technical University, Russia

**14:50-15:10/14:10-14:30**

**Oral**

**Development of a method for analyzing two-component mixtures using raman spectra**

**Roman A. Gylka**; Bauman Moscow State

Technical University, Russia

**15:10-15:30/17:30-17:50**

**Oral**

**Human exhaled breath for non-invasive disease detection**

**Olga A. Nebritova**; Bauman Moscow State

Technical University, Russia

**15:30-15:50/14:30-14:50**

**Oral**

**Tunable diode laser spectroscopy for analysis of gas impurities**

**Igor L. Fufurin**; Bauman Moscow State Technical University, Russia

**15:50-16:10/14:50-15:10**

**Oral**

**Breathomics using IR spectroscopy. A way to monitor noncompliance**

**Igor L. Fufurin**; Bauman Moscow State Technical University, Russia

**16:10-16:30/15:10-15:30**  
**Coffee break**

**16:30-16:50/15:30-15:50**

**Online Oral**

**Development of a dynamic Fourier-transform Raman spectrometer**

**Dmitriy R. Anfimov**; Bauman Moscow State Technical University, Moscow, Russia

**16:50-17:10/15:50-16:10**

**Online Oral**

**Optimization of endoscopic illumination system parameters for contrast-enhanced mucosal vascular structures visualization**

**Evgeniia D. Kulikova**; Federal State Budgetary Institution of Science "Scientific and Technological Centre of Unique Instrumentation" of the Russian Academy of Sciences, Moscow, Russia

**17:10-17:30/16:10-16:30**

**Online Oral**

**Comparison of digital filtering methods for diffuse reflectance spectra of the oral mucosa**

**Maxim A. Mamaev**; Bauman Moscow State Technical University, Moscow, Russia

**17:30-17:50/16:30-16:50**

**Online Oral**

**Numerical model of refractive-index writing inside an intraocular lens at a laser wavelength of 1550 nm**

**Uliana S. Averkieva**; Bauman Moscow State Technical University, Moscow, Russia

**17:50-18:10/16:50-17:10**

**Online Oral**

**Numerical Modeling of Laser-Assisted Blood Vessel Welding**

**Dmitrii I. Ryabkin**; National Research University of Electronic Technology, Moscow, Russia; Sechenov University или I.M. Sechenov First MSU, Moscow, Russia

**18:10-18:30/17:10-17:30**

**Online Oral**

**Objective monitoring of muscle spasticity treatment in children using frequency-domain near infrared spectroscopy**

**Mikhail A. Naumov**; Bauman Moscow State Technical University, Moscow, Russia

## **September 24, Thursday**

### **JOINT INTERNET/POSTER SESSION BIOPHYSICS (B)**

**(Building 3, 3rd floor Hall)**

**Chairs (B): Ivan V. Fedosov,**  
Saratov State Univ., Russia

**18:00-20:00**

- 1B. Raman spectroscopy of DNA packaging in human sperm cells** Alina Neginina<sup>1</sup>, Elena Rimskaya<sup>1</sup>, Alexey Gorevoy<sup>1</sup>; <sup>1</sup>Lebedev Physical Institute, Moscow, Russia
- 2B. Raman Spectroscopy of Cell-Free Cervicovaginal Lavage for Differentiation of HPV-Associated Cervical Lesions** Anastasia Devyatkina<sup>1</sup>, Elena Rimskaya<sup>1,2</sup>, Alexey Gorevoy<sup>1,2</sup>, Niso Nazarova<sup>1</sup>, Natalia Starodubtseva<sup>1,3</sup>, Patimat Abakarova<sup>1</sup>, Anna Mgeryan<sup>1</sup>, Sergey Kudryashov<sup>1</sup>, Vera Prilepskaya<sup>1</sup> and Gennady Sukhikh<sup>1,4</sup>; <sup>1</sup>V.I. Kulakov National Medical Research Center for Obstetrics Gynecology and Perinatology, Russia; <sup>2</sup>Lebedev Physical Institute, Russia; <sup>3</sup>Moscow Center for Advanced Studies, Russia; <sup>4</sup>Department of Obstetrics, Gynecology, Perinatology and Reproductology, Institute of Professional Education, Federal State Autonomous Educational Institution of Higher Education I.M. Sechenov First Moscow State Medical University of the Ministry of Health of the Russian Federation, Russia.
- 3B. Comparative analysis of data balancing methods for the classification of raman spectra of skin growths based on a convolutional neural network** Angelina O.Kapkaeva<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University
- 4B. In Vivo Evaluation of Biointegration and Resorption of Polypropylene and Vicryl-**

**Based Tissue-Engineered Meshes via MRI and ICG Fluorescence Imaging**

Astemir R. Likhov<sup>1</sup>, Natalia V. Rassomakhina<sup>1</sup>, Veronika N. Volodina<sup>1</sup>, Mikhail S. Krasnov<sup>1</sup>, Ulyana A. Apukhtina<sup>1</sup>, Tatiana I. Yaremenko<sup>1</sup>, Ilya V. Turchin<sup>2</sup>, Victoria V. Zherdeva<sup>1</sup>; <sup>1</sup>Federal Research Centre of Biotechnology of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Institute of Applied Physics of the Russian Academy of Sciences, Nizhny Novgorod, Russia

**5B. Evaluation of DNA Damage in Brain Tissue Using the Comet Assay in a Cuprizone-Induced Mouse Model of Demyelination**

Ulyana A. Apukhtina<sup>1</sup>, Veronika N. Volodina<sup>1</sup>, Olga I. Klein<sup>1</sup>, Tatiana I. Yaremenko<sup>1</sup>, Astemir R. Likhov<sup>1</sup>, Victoria V. Zherdeva<sup>1</sup>; <sup>1</sup>Federal Research Centre of Biotechnology of the Russian Academy of Sciences, Moscow, Russia

**6B. Assessment of Peripheral Hemodynamics by Diffuse Reflectance Spectroscopy in the Visible and Near-Infrared Range in the Cuprizone-Induced Demyelination Model**

Veronika N. Volodina<sup>1</sup>, Anastasia A. Chervakova<sup>1</sup>, Alexander V. Kolpakov<sup>2</sup>, Diana Y. Sokolova<sup>2</sup>, Petr E. Zaitsev<sup>1</sup>, Ulyana A. Apukhtina<sup>1</sup>, Tatiana I. Yaremenko<sup>1</sup>, Mikhail S. Krasnov<sup>1</sup>, Nikolai N. Kuznetsov<sup>1,2</sup>, Viktoria V. Zherdeva<sup>1</sup>; <sup>1</sup>A.N. Bach Institute of Biochemistry, Research Center of Biotechnology of the Russian Academy of Sciences, Moscow, Russia; <sup>2</sup>Bauman Moscow State Technical University, Moscow, Russia.

**7B. Machine-learning pipeline for cardiovascular risk prediction from clinical datasets**

Karina A. Zhubanazarova<sup>1</sup>, Irina A. Matveeva<sup>1</sup>; <sup>1</sup>Samara National Research University, Samara, Russia

# **30<sup>th</sup> International School for Junior Scientists and Students on Optics, Laser Physics & Biophotonics**

## **Workshop on Modern Optics XXV**

### **Lectures on Optics for University Students, Postgraduate Students and High School Students**

*Chairs:* **Georgy V. Simonenko, Ekaterina N. Lazareva**, Saratov State University

*Secretary:* **Arseny P. Fashevski, Nadezhda A. Krapivina**, Saratov State University

*Moderator:* **Isabella Serebryakova**, Saratov State University

*International Program Committee:* **Ivan V. Fedosov, Alexander B. Pravdin, Valery V. Tuchin**, Saratov State University,  
**Alexander V. Priezzhev**, Moscow State University

#### **September 21, Monday**

##### **PUBLIC LECTURE SESSION MODERN OPTICS**

*(Building 8, room 420)*

Chairs: **Georgy V. Simonenko, Ekaterina N. Lazareva**, Saratov State University

**14.00-14.45**

##### **CREATING BIOMATERIALS WITH CONTROLLED PROPERTIES: HOW CAN NATURE HELP US?**

**Gleb B. Sukhorukov**, Skolkovo Institute of Science and Technology, Skoltech; Life Improvement by Future Technologies, LIFT Center, Moscow, Russia

#### **September 24, Thursday**

##### **PUBLIC LECTURE SESSION MODERN OPTICS**

*(Building 3, Big Physical Hall)*

Chairs: **Georgy V. Simonenko, Ekaterina N. Lazareva**, Saratov State University

**14.00-14.40**

##### **Photon adventures in the sky and on the ground: which is stronger, light scattering or absorption?**

**Dmitry A. Gorin**, Skolkovo Institute of Science and Technology, Skoltech, Moscow, Russia

# Workshop on History, Methodology and Philosophy of the Optical Education XIX

Workshop Chairs: **Boris A. Medvedev, Irina Yu. Yanina**, Saratov State University, Russia

Secretary: **Anton A. Kharchenko**, Saratov State University, Russia

International Program Committee **Vladimir L. Derbov**, Saratov State University, Russia; **Alexander V. Priezzhev**, M.V. Lomonosov Moscow State University, Russia; **Alexander V. Gorokhov**, Samara State University, Russia; **Valery V. Tuchin**, Saratov State University, Russia;

**September 23, Wednesday**

## PLENARY LECTURE/ORAL SESSION/

(Scientific Library, Conf. Hall)  
Co-chairs: **Boris A. Medvedev,**  
**Irina Yu. Yanina,**  
Saratov State University, Russia

### Saratov time

**14:00-14:30**

#### PLENARY LECTURE

**History, Semantics, and Explication of the Term  
"Artificial Intelligence"**

Valery M. Anikin;

Saratov State University, Saratov, Russia

### ROUND TABLE:

**Man and light in natural and art treatment  
of the Universe**

**14:30-14:50**

#### Oral Report

**Patterns of natural and artificial intelligence:  
basic differences**

Yuliya M. Duplinskaya;

Saratov State University, Saratov, Russia

**14:50-15:10**

#### Oral Report

**About the limitations of artificial intelligence**

Natal'ya V. Dovgalenko

Gagarin's State Technical University of Saratov,  
Saratov, Russia

**15:10-15:30**

#### Oral Report

**The Power of Color. Food Colorants. Between  
Substance and Meaning.**

Vitaly V. Sorokin;

Saratov State University, Saratov, Russia

**15:30-15:50**

#### Oral Report

**Three Ways to Make Science: Resources and  
Outcomes**

Ivan V. Fedosov;

Saratov State University, Saratov, Russia

**15:50-16:10**  
**Coffee break**

## ORAL SESSION

**16:10-16:25**

#### Oral Report

**Relevance of Quantum Informatics in School  
Motivated by International Experience**

Svetlana V. Churochkina<sup>1</sup>, Dmitry V. Churochkin<sup>1</sup>,  
Ekaterina Lozhkina<sup>2</sup>;

<sup>1</sup>Saratov State University, Saratov, Russia;

<sup>2</sup>Novosibirsk State University, Novosibirsk, Russia

**16:25-16:40**

#### Oral Report

**Ontology of an Interactive Learning Laboratory  
Complex for the General Physics Course for  
Natural Science Majors at Saratov State  
University**

Petr E. Shlygin, Ol'ga G. Danke, Anton A.  
Kharchenko ;

Saratov State University, Saratov, Russia

**16:40-16:55**

#### Oral Report

**Statistical Analysis of Polarized Speckle Fields  
Scatted by Skin Dermis During Optical  
Immersion Clearing**

Anton A. Kharchenko<sup>1</sup>, Valery V. Tuchin<sup>1,2,3</sup>;

<sup>1</sup>Saratov State University, Saratov, Russia

<sup>2</sup>Tomsk State University, Tomsk, Russia

<sup>3</sup>Institute of Precision Mechanics and Control, FRC  
"Saratov Scientific Center of the Russian Academy  
of Sciences", Saratov, Russia

**16:55-17:10**

#### Oral Report

**On the implementation of pattern recognition  
methods in the diagnosis of non-communicable  
blood diseases**

Ivan N. Beglakov, Julia A. Brodskaya;

Gagarin's State Technical University of Saratov,  
Saratov, Russia

**17:10-17:25**

**Oral Report**

**Building a system of differential diagnosis of oncological diseases of the thoracic region**

Sergey V. Mikhailov, Julia A. Brodskaya; Gagarin's State Technical University of Saratov, Saratov, Russia

Alexander V. Gorokhov;

Samara State University, Samara, Russia

**15:00-15:15**

**Oral Report**

**Proof of Gödel's theorem**

Boris L. Faifel;

Gagarin's State Technical University of Saratov, Saratov, Russia

**September 24, Thursday**

(Scientific Library, Conf. Hall)

Co-chairs: **Boris A. Medvedev,**

**Irina Yu. Yanina,**

Saratov State University, Russia

Panel members:

Valery V. Tuchin<sup>a</sup>, Vladimir L. Derbov, Victor V. Rozen<sup>a</sup>, Oleg V. Shimelfenig<sup>a</sup>, Lev M. Babkov<sup>a</sup>, A. V. Gorokhov<sup>b</sup>, Dmitry A.

Zimnyakov<sup>c</sup>, Leonid A. Melnikov<sup>c</sup>, Julia M. Duplinskay<sup>c</sup>, Oleg M. Parshkov<sup>c</sup>, A. V. Priezzhev<sup>d</sup>,

<sup>a</sup>Saratov State University, Saratov, Russia;

<sup>b</sup>Samara University, Samara, Russia, <sup>c</sup>Yuri

Gagarin State Technical University of Saratov, Russia, <sup>d</sup>M.V. Lomonosov Moscow State University, Moscow, Russia

**ROUND TABLE**

**Man and light in natural and art treatment of the Universe**

**Saratov time**

**14:00-14:15**

**Oral Report**

**Modern technologies and competencies in the zoological research profession**

Vasily V. Anikin;

Saratov State University, Saratov, Russia

**14:15-14:30**

**Oral Report**

**Descartes vs. Aristotle: a Comparative picture of the World.**

Victor V. Rozen,

Saratov State University, Saratov, Russia

**14:30-14:45**

**Oral Report**

**On the 430th Anniversary of René Descartes: The**

**Triumph and Defeat of Rationalism**

Boris A. Medvedev<sup>1</sup>, Maria I. Kharkovenko<sup>2</sup>;

<sup>1</sup>Saratov State University, Saratov, Russia

<sup>2</sup>State Autonomous Culture Institution "Markin Classic Music Center, Vladimir, Russia

**14:45-15:00**

**Oral Report**

**Modern Quantum Technologies and Its Realisation in Leader Russian Scientific Institutes. Part 1**

**15:15-15:35**

**Coffee break**

**15:35-15:50**

**Oral Report**

**On approaches to solving the problem of attribution of works by representatives of the Russian avant-garde through the implementation of image recognition methods**

Julia A. Brodskaya;

Gagarin's State Technical University of Saratov, Saratov, Russia

**15:50-16:05**

**Oral Report**

**On the Origins and Evolution of Niels Bohr's Concept of Complementarity**

Boris A. Medvedev

Saratov State University, Saratov, Russia

**16:05-16:20**

**Oral Report**

**The Torus as a Universal Form of Nature**

Oleg V. Shimelfenig;

Saratov State University, Saratov, Russia

**16:20-16:35**

**Oral Report**

**«Just» questions of interpretation (On the 100th anniversary of the creation of quantum mechanics)**

Michael M. Stolnitz,

Saratov State University, Saratov, Russia

**16:35-16:50**

**Oral Report**

**The International Festival "Days of Contemporary Music in Saratov".**

Vladimir V. Orlov;

Saratov State Conservatory, Saratov, Russia

**16:50-17:10**

**Oral Report**

**"Artistic ways of reflecting mystical ideas in the late piano works of A. Scriabin"**

Vasily S. Igonin;

Saratov State Conservatory, Saratov, Russia

**JOINT POSTER/INTERNET SESSION AND  
INTERNET DISCUSSION  
(Online)**

**1H. Modern Quantum Technologies and Its  
Realisation in Leader Russian Scientific  
Institutes. Part 2**

Alexander V. Gorokhov;  
Samara State University, Samara, Russia

**2H. Stabilizer as an Order Parameter: Bridging  
Chemistry and Photonics in Gold Nanoclusters**

Anna Abramova;  
Moscow Institute of Physics and Technology,  
Moscow, Russia

**3H. Physics of the mental activity of the brain**

Yuriy N. Zayko;  
Russian Presidential Academy of National  
Economy and Public Administration, Saratov,  
Russia

**4H. Exploring the Universe around the Big Bang**

Yuriy N. Zayko;  
Russian Presidential Academy of National  
Economy and Public Administration, Saratov,  
Russia

**5H. Using Optical Methods to Study the Effect of  
Detergents on *Elodéa canadensis***

Olesya A. Trutko<sup>1</sup>, Ekaterina S. Vasilenko<sup>2</sup>, Lidia P.  
Timchenko<sup>2</sup>, Elena V. Timchenko<sup>1</sup>;

<sup>1</sup> Samara National Research University, Samara,  
Russia;

<sup>2</sup> MBGF Institution Lyceum "Technical" named after  
S.P. Korolev of the Samara City District. Samara,  
Russia

# Round Table of High Technologies Commercialization and Regional Innovation Systems XIX

**Workshop Chairs:** **Julia S. Skibina** LLC SPE “Nanostructured Glass Technology”, Russia, **Andrey Shuvalov** LLC SPE “Nanostructured Glass Technology”, Russia, **Sergey N. Sokolov**, RME “Inject” LLC, Saratov, Russia, **Daniil N. Bratashov** MIPT and Saratov State University, Russia, **Andrey P. Rytik**, Saratov State University, Russia

**September 23, Wednesday**

**ORAL SESSION / ROUND TABLE  
HIGH TECHNOLOGY  
COMMERCIALIZATION  
(Building 6, Room 204)**

*Chairs:* **Daniil N. Bratashov**, MIPT and Saratov State University, Russia; **Andrey P. Rytik** Saratov State University, Russia

**Saratov time/Moscow time**

**12:00-12:20/11:00-11:20**

**Development of a Wearable Optical Sensor for Non-Medical Glucose Dynamics Monitoring: Crowdfunding as a Tool for Early User Engagement and Device Validation**  
**Vladimir Kozlov**; PROBA lab, MIPT, Russia

**12:20-12:40/11:20-11:40**

**On approaches to solving the problem of attribution of works by representatives of the Russian avant-garde through the implementation of image recognition methods**  
**Julia A. Brodskaya**; Gagarin's State Technical University of Saratov, Saratov, Russia

**12:40-13:00/11:40-12:00**

**Custom DNA designs: how to vibe-code full-scale app in the two years**  
**Daniil N. Bratashov**; Future biophysics institute, MIPT, Russia and Chair of innovations, Saratov State University, Saratov, Russia

