



**Program of the 2nd BRICS Workshop on Biophotonics
May 16 –18, 2023, SARATOV, RUSSIA**

Chairs:

Valery V.Tuchin, Saratov State University, Russia

Qingming Luo, Hainan University, China

Vanderlei Salvador Bagnato, University of São Paulo, Brazil

Santhosh Chidangil, Manipal Academy of Higher Education, India

Heidi Abrahamse, University of Johannesburg, RSA

Secretaries:

Polina A. Dyachenko, Optics and Biophotonics Department, Saratov State University, Saratov, Russia

Dongyu Li, HUST, China

Natalia M. Inada, University of São Paulo, Brazil

Renu John, Indian Institute of Technology, Hyderabad, India

Sathish Kumar, University of Johannesburg, RSA

May 16, Tuesday

ON-LINE INVITED LECTURES

Room 8, Building 3

Chairs: **Valery V. Tuchin**, Saratov State University, Russia;

Dan Zhu, HUST, China

ZOOM platform

<https://osachapter.zoom.us/j/94748834968>

**Saratov time (UTC+4)/Brazil
time/India time/RSA time/China
time**

10.00-10.10/3.00-3.10/11.30-11.40/

8.00-8.10/14.00-14.10

Welcome words from Chairs of the

BRICS Workshop on Biophotonics -2023

Valery V Tuchin, Saratov State University,
Russia

Qingming Luo, Hainan University, China

Vanderlei Salvador Bagnato, University of
São Paulo, Brazil

Santhosh Chidangil, Manipal Academy of
Higher Education, India

Heidi Abrahamse, University of Johannesburg, RSA

10.10-10.50/3.00-3.50/11.40-12.20/
8.10-8.50/14.10-14.50

Plenary

Multimodal Imaging and Liquid/Gas Biopsy: Recent Achievements and Challenges

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

10.50-11.30/3.50-4.30/12.20-13.00/
8.50-9.30/14.50-15.30

Plenary

Multicomponent Drugs for Localized Photodynamic Therapy for Cancer Treatment

Heidi Abrahamse, Laser Research Centre, NRF/DSI SARChI, Laser Applications in Health, University of Johannesburg, RSA

11.30-12.10/4.30-5.10/13.00-13.40/
9.30-10.10/15.30-16.10

Plenary

Enhancing Stimulated Emission Depletion Imaging through Optical Methods, Probes and Deep-Learning

Junle Qu, College of Physics and Optoelectronic Engineering, Shenzhen University, China

12.10-12.30/5.10-5.30/13.40-14.00/
10.10-10.30/16.10-16.30

Invited

Modulation of Cellular Responses to Ionising Radiation by Radiofrequency Fields: Potential Mechanisms

John Akudugu, Department of Radiation Biology, University of Stellenbosch, RSA

12.30-12.50//5.30-5.50/14.00-14.20/
10.30-10.50/16.30-16.50

Invited

Alterations of Blood Microrheology and Microcirculation at Cardiovascular Diseases

Alexander V. Priezzhev

Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

12.50-13.10/5.50-6.10/14.20-14.40/
10.50-11.10/16.50-17.10

Invited

Bessel Beam from Optical Fiber Tip and Bioimaging

Samir K. Mondal, Micro and Nano Optics Centre (μ -NOC), CSIR-CSIO, India

13.10-13.30/6.10-6.30/14.40-15.00/
11.10-11.30/17.10-17.30

Invited

Biophotonics and Artificial Intelligence for Improved Diagnostics: Application in Health, Pharmaceuticals and Agriculture
Patience Nthunzi-Kufa, CSIR, RSA

13.30-13.40/6.30-6.40/15.00-15.10/
11.30-11.40/17.30-17.40

Oral

Non-Invasive Determination of Hemoglobin Content in Blood with Spatial Frequency Domain Imaging

Boris Yakimov, Moscow State University, Sechenov University, Moscow, Russia

13.40-14.10/6.40-7.10/15.10-15.40/
11.40-12.10/17.40-18.10

Coffee break

14.10-14.50/7.10-7.50/15.40-16.20/
12.10-12.50/18.10-18.50

Plenary

How is Photonics Potentiating the Combinations of Photodynamic Therapy

with other Non-invasive Therapeutic Technologies for Enhanced Efficacy and Selectivity

Sandile Phinda Songca, University of KwaZulu-Natal, RSA

14.50-15.30/7.50-8.30/16.20-17.00/

12.50-13.30/18.50-19.30

Plenary

Microscopy for Futuristic Diagnostics: from Microbubble Lithography to Bio-inspired Waveguide Sensors

Ayan Banerjee, Department of Physical Sciences, Indian Institute of Science Education and Research, IISER, Kolkata, India

15.30-16.10/8.30-9.10/17.00-17.40/

13.30-14.10/19.30-20.10

Plenary

Optical Coherence Tomography and Photoacoustics: Applications in Dentistry

Anderson Gomes, Departamento de Física, Universidade Federal de Pernambuco, Recife, Brazil

16.10-16.30/9.10-9.30/17.40-18.00/

14.10-14.30/20.10-20.30

Invited

Research on Synergistic Immunotherapy Triggered by Phototherapy

Wen Song, School of Biomedical Engineering, Hainan University, China

16.30-16.50/9.30-9.50/18.00-18.20/

14.30-14.50/20.30-20.50

Invited

Recent Achievements and Challenges in High-Resolution THz Imaging of Biological Tissues

Nikita Chernomyrdin, Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia

16.50-17.10/9.50-10.10/18.20-18.40/

14.50-15.10/20.50-21.10

Invited

Photobiomodulation Improves Wound Healing Through Activation of the Ras/MAPK and PI3K/AKT Pathway

Nicolette Houreld, Laser Research Centre, University of Johannesburg, RSA

17.10-17.30/10.10-10.30/18.40-19.00/

15.10-15.30/21.10-21.30

Invited

Science and Innovations in Non-invasive Diagnostics through Human Exhaled Breath Analysis

Manik Pradhan, S.N.Bose National Centre for Basic Sciences, Salt Lake, Kolkata, India

17.30-17.50/10.30-10.50/19.00-19.20/

15.30-15.50/21.30-21.50

Invited

Image-guided Near Infrared Spectral Tomography for Breast Cancer Diagnosis

Jinchao Feng, Faculty of Information Technology, Beijing University of Technology, China

17.50-18.10/10.50-11.10/19.20-19.40/

15.50-16.10/21.50-22.10

Invited

Instrument Development and Applications of Laser Spectroscopy/Mass Spectrometry

Yixiang Duan, School of Mechanical Engineering, Sichuan University, China

18.10-18.30/11.10-11.30/19.40-20.00/

16.10-16.30/22.10-22.30

Invited

Strategies to Improve Topical Photodynamic Therapy Efficacy Using Animal Models

Mirian Denise Stringasci, University of São Paulo, IFSC, Brazil

18.30-18.50/11.30-11.50/20.00-20.20/
16.10-16.30/22.10-22.30

Invited

Using Opto-thermal Gradients for Optical Trapping

Pavan Kumar, Department of Physics, Indian Institute of Science Education and Research, Pune, India

18.50-19.10/11.50-12.10/20.20-20.40/
16.50-17.10/22.50-23.10

Invited

Group 13-15 Coordinated Porphyrinoids as Photosensitizers for Photodynamic Anticancer and Antimicrobial Chemotherapy

John Mack, Medicinal Chemistry and Nanotechnology Rhodes University, RSA

19.10-19.30/12.10-12.30/20.40-21.00/
17.10-17.30/23.10-23.30

Invited

Strategies for an Individualized Light Dosimetry

Lilian Tan Moriyama, University of São Paulo, IFSC, Brazil

19.30-19.40/12.30-12.40/21.00-21.10/
17.30-17.40/23.30-23.40

Oral

Carrier/Spheroid Match: Investigating Tissue-Specific Targeting of Nano- and Micro-Carriers Using 3D Cell Cultures

Anatolii Abalymov, Science Medical Center, Saratov State University, Russia

19.40-19.50/12.40-12.50/21.10-21.20/
17.40-17.50/23.40-23.50

Oral

Identifying Plant-based Natural Compounds in Photodynamic Therapy

Rahul Chandran, Laser Research Centre, South African Research Chair in Laser

Applications in Health, University of Johannesburg, RSA

19.50-20.00/12.50-13.00/21.20-21.30/
17.50-18.00/23.50-00.00

Oral

Study of Changes in the Attenuation Coefficient of Tissue with Deformation According to OCT Data

Evgeny Sherstnev, A.V. Gaponov-Grekhov Institute of Applied Physics of the Russian Academy of Sciences, Russia

May 17, Wednesday

ON-LINE INVITED LECTURES

Room 8, Building 3

Chairs: Vanderlei Salvador Bagnato, University of São Paulo, Brazil;
Santhosh Chidangil, Manipal Academy of Higher Education, India

ZOOM platform

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10.30-11.10/3.30-4.10/12.00-12.40/

8.30-9.10/14.30-15.10

Plenary

Discovering Novel Fluorophores in the Human Organism: Deep Learning Prediction of Optical Properties

Evgeny Shirshin, M.V.Lomonosov Moscow State University, Russia

11.10-11.30/4.10-4.30/12.40-13.00/

9.10-9.30/15.10-15.30

Organ-PAM: Photoacoustic Microscopy of Whole-Organ Multiset Vessel Systems

Lei Xi, Department of Biomedical Engineering, Southern University of Science and Technology, China

11.30-11.50/4.30-4.50/13.00-13.20/

9.30-9.50/15.30-15.50

Invited

Near Infrared Optical Window for Theranostics

Sharad Gupta, Biosciences and Biomedical Engineering Indian Institute of Technology Indore, Indore, MP, India

11.50-12.10/4.50-5.10/13.20-13.40/

9.50-10.10/15.50-16.10

Invited

Photodynamic Inactivation of Vegetative and Dormant Forms of the Causative Agent of Tuberculosis *In Vitro* and Inside Macrophages in the Presence of 5-

Aminolevulinic Acid

Margarita. Shleeva, A.N. Bach Institute of Biochemistry, Federal Research Center "Fundamentals of Biotechnology" of the Russian Academy of Sciences, Moscow, Russia

12.10-12.30/5.10-5.30/13.40-14.00/

10.10-10.30/16.10-16.30

Invited

A Through-Intact-Skull (TIS) Chronic Window Technique for Cortical Structure and Function Observation in Mice

Dongyu Li, School of Optical and Electronic Information-Wuhan National Laboratory for Optoelectronics-Advanced Biomedical Imaging Facility, Huazhong University of Science and Technology, China

12.30-12.50//5.30-5.50/14.00-14.20/

10.30-10.50/16.30-16.50

Invited

Raman Stable Isotope Probing for Metabolomics Applications

Surya Prathap Singh, Indian Institute of Technology Dharwad, Dharwad, Karnataka, India

12.50-13.10/5.50-6.10/14.20-14.40/

10.50-11.10/16.50-17.10

Invited

High Throughput 3D Imaging and its Application in Neuroscience,
Wei Gong, Zhejiang University School of Medicine, China

13.10-13.30/6.10-6.30/14.40-15.00/
11.10-11.30/17.10-17.30

Invited

Single-Molecule Localization Super-Resolution Microscopy and Its Applications

Leiting Pan, the Key Laboratory of Weak-Light Nonlinear Photonics of Education Ministry, School of Physics and TEDA Institute of Applied Physics, Nankai University, China

13.30-13.50/6.30-6.50/15.00-15.20/
11.30-11.50/17.30-17.50

Invited

Probing Fractal Properties of Refractive Index Fluctuations in Biological Tissues Using Backscattering Spectral Interferometry

Nandan Kumar Das, Indian Institute of Science Education and Research, Kolkata, West Bengal, India

13.50-14.10/6.50-7.10/15.20-15.40/
11.50-12.10/17.50-18.10

Coffee break

14.10-14.50/7.10-7.50/15.40-16.20/
12.10-12.50/18.10-18.50

Plenary

Enhanced Photodynamic Therapy
Buhong Li, School of Science, Hainan University, China

14.50-15.30/7.50-8.30/16.20-17.00/
12.50-13.30/18.50-19.30

Plenary

New Achievements in Tissue Optics and Optical Clearing in a Wide Spectral Range from Deep UV to Terahertz

Valery V. Tuchin, Institution of Physics and Science Medical Center, Saratov State University, Laboratory of Laser Molecular Imaging and Machine Learning, Tomsk State University, Institute of Precision Mechanics and Control, FRC "Saratov Scientific Centre of the Russian Academy of Sciences, Russia

15.30-15.50/8.30-8.50/17.00-17.20/
13.30-13.50/19.30-19.50

Invited

3D Printable Artificial Optical Skin for Healthcare Application

Abhijit Chandra Roy, DST Inspire Faculty, Department of Physics II Sc Bangalore, Karnataka, India

15.50-16.10/8.50-9.10/17.20-17.40/
13.50-14.10/19.50-20.10

Invited

Photoacoustic Molecular Imaging Technology and Applications

Chengbo Liu, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

16.10-16.30/9.10-9.30/17.40-18.00/
14.10-14.30/20.10-20.30

Invited

The Sensitive Cytosensor Based on Fiber Optic Local Surface Plasmonic Resonance

Zewei Luo, Research Center of Analytical Instrumentation, School of Mechanical Engineering, Sichuan University, China

16.30-16.50/9.30-9.50/18.00-18.20/
14.30-14.50/20.30-20.50

Invited

PDT and PTT Efficacy in Cutaneous Melanoma Model

Cristina Kurachi, University of São Paulo, IFSC, Brazil

16.50-17.10/9.50-10.10/18.20-18.40/
14.50-15.10/20.50-21.10

Invited

Synergic Vascular Photodynamic Activities by Methylene Blue-Curcumin Supramolecular Assemblies

Rodrigo Costa, São Carlos Federal University, Chemistry Department, Brazil

17.10-17.50/10.10-10.50/18.40-19.20/
15.10-15.50/21.10-21.50

UK time 14.10-14.50

Plenary

Clinical Applications of Transcranial Photobiomodulation Therapy for Brain Disorders

Mike Hamblin, Laser Research Centre, Faculty of Health Sciences, University of Johannesburg, RSA

17.50-18.00/10.50-11.00/19.20-19.30/
15.50-16.00/21.50-22.00

Oral

The Combined Effect of Photobiomodulation and Nanoparticle-Based Biomaterials for The Treatment of Pathogen-Infected Wounds

Sathish Kumar, Laser Research Centre, South African Research Chair in Laser Applications in Health, University of Johannesburg, RSA

18.00-18.10/11.00-11.10/19.30-19.40/
16.00-16.10/22.00-22.10

Oral

Investigation of Hair Optical Properties for its Laser Coloring

Vladislav Ermolaev, ITMO University,

Saint Petersburg, Russia

18.10-18.20/11.10-11.20/19.40-19.50/
16.10-16.20/22.10-22.20

Oral

A Study on the Flow of Cells Through Microfluidic Channel Using Digital Holographic Microscopy

Aswathy Vijay, Biomedical Optics Lab, Indian Institute of Technology Hyderabad, Hyderabad, India

18.20-18.30/11.20-11.30/19.50-20.00/
16.20-16.30/22.20-22.30

Oral

The Forces of Interaction of Red Blood Cells and Endothelium: a Revised Study by Laser Tweezers

Petr Ermolinskiy, Faculty of Physics, Lomonosov Moscow State University, Moscow, Russia

18.30-18.40/11.30-11.40/20.00-20.10/
16.30-16.40/22.30-22.40

Oral

Photodynamic Therapy Enhances the Berberine Induced Cytotoxicity in Lung Cancer Cells

Paromita Sardibakary, Laser Research Centre, South African Research Chair in Laser Applications in Health, University of Johannesburg, RSA

18.40-18.50/11.40-11.50/20.10-20.20/
16.40-16.50/22.40-22.50

Oral

Probing of Cellular Metabolism for Cancer Detection with Laser-Induced Fluorescence

Sanoop Pavithran, Department of Atomic and Molecular Physics, Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India.

18.50-19.00/11.50-12.00/20.20-20.30/
16.50-17.00/22.50-23.00

Oral

InSitu Monitoring of Layer-By-Layer
Assembly Surface Modification of
Nanophotonic-Microfluidic

Sensor

Aleksei Kuzin, Skolkovo Institute of
Science and Technology, Moscow, Russia

19.00-19.10/12.00-12.10/20.30-20.40/
17.00-17.10/23.00-23.10

Oral

Diatom Optics: Unlocking the Potential of
Biogenic Photonic Crystals

Julijana Cvjetinovic, Skolkovo Institute of
Science and Technology, Moscow, Russia

19.10-19.20/12.10-12.20/20.40-20.50/
17.10-17.20/23.10-23.20

Oral

Investigation of the Influence of
Thermally-Induced Methemoglobin in the
Skin Layers on the Efficiency of Laser
Sclerosing of Telangiectasias

Victor Chuchin, ITMO University, Saint
Petersburg, Russia

19.20-19.40/12.20-12.40/20.50-21.10/
17.20-17.40/23.20-23.40

Invited

Phase II Clinical Trials in Photodynamic
Therapy of Pharyngotonsillitis

Kate Blanco, São Carlos Institute of
Physics, University of São Paulo, São Carlos,
Brazil.

May 18, Thursday

ON-LINE INVITED LECTURES

Room 8, Building 3

Chairs: Heidi Abrahamse, University of Johannesburg, RSA;

Valery V. Tuchin, Saratov State University

ZOOM platform

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14.10-14.50/7.10-7.50/15.40-16.20/
12.10-12.50/18.10-18.50

Plenary

In vivo Surface-enhanced Transmission
Raman Spectroscopy

Jian Ye, School of Biomedical Engineering,
Shanghai Jiao Tong University, China

14.50-15.30/7.50-8.30/16.20-17.00/
12.50-13.30/18.50-19.30

Plenary

Design and Development of Non-invasive Optoelectronic Biosensors for Primary Healthcare and Diagnostics

Sangeeta Kale, Defence Institute of Advanced Technology (DIAT), Pune, India

15.30-16.10/8.30-9.10/17.00-17.40/

13.30-14.10/19.30-20.10

Plenary

Photodynamic for Microbiological Control and Breakdown of Resistance To Antibiotic

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

16.10-16.30/9.10-9.30/17.40-18.00/

14.10-14.30/20.10-20.30

Invited

Stokes Mueller Based Polarization Microscopy for Biomedical Applications

Nirmal Mazunder, Department of Biophysics, School of Life Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India

16.30-16.50/9.30-9.50/18.00-18.20/

14.30-14.50/20.30-20.50

Invited

Probing the Interactions between Nanoparticles and Cells Through Darkfield Imaging and Raman Spectroscopy

Rui Hu, Center for Biomedical Photonics & College of Physics and Optoelectronic Engineering, Key Laboratory of Optoelectronic Devices and Systems, Shenzhen University, China

16.50-17.10/9.50-10.10/18.20-18.40/

14.50-15.10/20.50-21.10

Invited

Science and Innovations in Non-invasive Diagnostics through Human Exhaled

Breath Analysis

Manik Pradhan, S.N.Bose National Centre for Basic Sciences Salt Lake Kolkata, INDIA

17.10-17.30/10.10-10.30/18.40-19.00/

15.10-15.30/21.10-21.30

Invited

High-grade Cervical Intraepithelial Neoplasia Treatment Comparing Photodynamic Therapy Protocols

Natalia Mayumi Inada, University of São Paulo, IFSC, Brazil

17.30-17.50/10.30-10.50/19.00-19.20/

15.30-15.50/21.30-21.50

Invited

Antimicrobial Photodynamic Therapy in the Treatment of Oral Candidiasis

Ewerton Garcia de Oliveira Mima, São Paulo State University, FOAr, Brazil

17.50-18.10/10.50-11.10/19.20-19.40/

15.50-16.10/21.50-22.10

Invited

Bio-imaging Using Noise: Application of Laser Speckles for Deep Tissue Blood Flow Imaging

Hari Varma, Biosciences and Bioengineering Indian Institute of Technology Bombay Mumbai, India

18.10-18.30/11.10-11.30/19.40-20.00/

16.10-16.30/22.10-22.30

Invited

Optical Technologies for Organ Transplantation Procedures

José Dirceu Vollet-Filho, University of São Paulo, IFSC, Brazil

18.30-18.50/11.30-11.50/20.00-20.20/

16.30-16.50/22.30-22.50

Invited

Photodynamic Therapy and Combined

Treatments

Amanda Surur, School of Pharmaceutical Sciences, São Paulo State University, Brazil

18.50-19.00/11.50-12.00/20.20-20.30/
16.50-17.00/22.50-23.00

Oral

Neuromorphic Localisation Microscopy for Cell Biology

Rohit Mangalwedhekar, Centre for Neuroscience, Indian Institute of Science, Bengaluru, Department of Atomic and Molecular Physics, Manipal Academy of Higher Education, Manipal, India

19.00-19.10/12.00-12.10/20.30-20.40/
17.00-17.10/23.00-23.10

Oral

The Influence of Photobiomodulation in the Visible Red Light (660 Nm) on Cell Migration, Viability and Proliferation in Diabetic Wounded Fibroblast Cells

Sandy Jere, Laser Research Centre, South African Research Chair in Laser Applications in Health, University of Johannesburg, RSA

19.10-19.20/12.10-12.20/20.40-20.50/
17.10-17.20/23.10-23.20

Oral

Machine Learning-Based Reconstruction of Blood Oxygen Saturation: Pilot Study

Alexander Khilov, Federal Research Center A.V. Gaponov-Grekhov Institute of Applied Physics of the Russian Academy of Sciences

19.20-19.30/12.20-12.30/20.50-21.00/
17.20-17.30/23.20-23.30

Oral

Aluminium-Phthalocyanine-Gold Nanoparticle Conjugates Enhance the Therapeutic Effect of PDT in Oesophageal Cancer

Christy Didamson, Laser Research Centre, South African Research Chair in Laser Applications in Health, University of Johannesburg, RSA

19.30-19.40/12.30-12.40/21.00-21.10/
17.30-17.40/23.30-23.40

Oral

Quantitative Assessment of Infantile Hemangioma Using Hyperspectral Imaging

Sergei Perkov, Skolkovo Institute of Science and Technology, Moscow, Russia