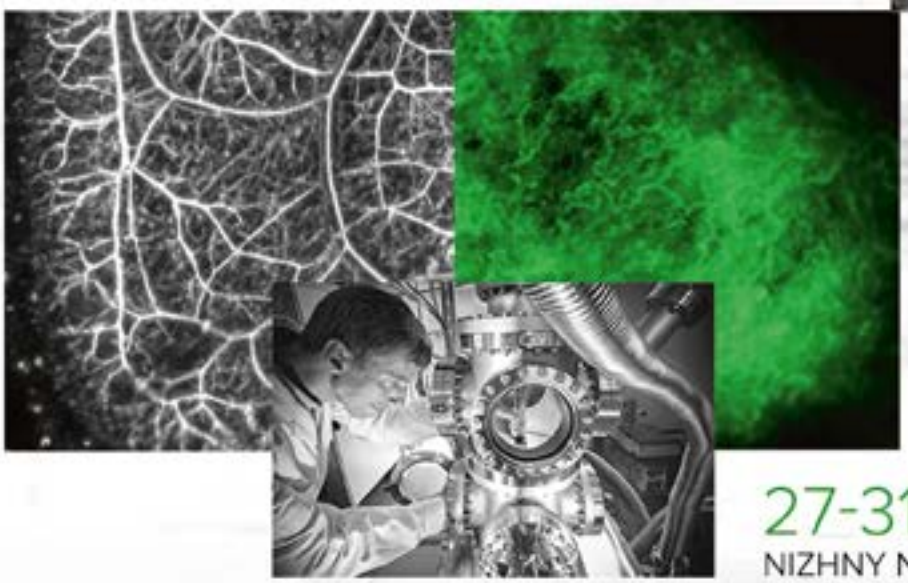
TOPICAL PROBLEMS OF BIOPHOTONICS



27-31 JULY 2019
NIZHNY NOVGOROD – UGLICH

PROGRAM

VII INTERNATIONAL SYMPOSIUM

TOPICAL PROBLEMS OF BIOPHOTONICS

Nizhny Novgorod, 2019

ORGANIZED BY

Institute of Applied Physics
of the Russian Academy of Sciences

Privolzhsky Research Medical University
of the Ministry of Health of the Russian Federation

SYMPOSIUM CHAIRS

- **Ammasi Periasami**, *University of Virginia*, USA
- **Ilya Turchin**, *Institute of Applied Physics RAS*, Russia
- **Alfred Vogel**, *University of Luebeck*, Germany
- **Elena Zagaynova**, *Privolzhskiy Research Medical University,* Russia

PROGRAM COMMITTEE

- **Igor Adameyko**, *Karolinska Institutet,* Sweden*; Medical University of Vienna*, Austria
- **Boris Chichkov**, *Laser Zentrum Hannover e.V.*, Germany
- **Sergey Gamayunov**, *National Medical Research Radiological Center of the Ministry of Health of the Russian Federation*, Russia
- **Tayyaba Hasan**, *Wellman Center, Harvard Medical School, Massachusetts General Hospital, Boston*, USA
- **Irina Larina**, *Baylor College of Medicine*, USA
- **Marcel Leutenegger**, *Max Planck Institute for Biophysical Chemistry*, Germany
- **Konstantin Lukyanov**, *Skolkovo Institute of Science and Technology*, Russia
- **Angelika Rueck**, *Universitat Ulm*, Germany
- **Natalya Shakhova**, *Institute of Applied Physics RAS*, Russia
- **Vladislav Shcheslavskiy**, *Becker&Hickl GmbH,* Germany
- **Marina Shirmanova**, *Privolzhskiy Research Medical University*, Russia
- **Pavel Subochev**, *Institute of Applied Physics RAS*, Russia
- **Peter So**, *Massachusetts Institute of Technology, Cambridge*, USA
- **Ronald Sroka**, *Laser Research Laboratory, LIFE Center, University Clinic, Munich*, Germany
- **Peter Timashev**, *Sechenov First Moscow State Medical University*, Russia
- **Bruce Tromberg**, *Beckman Laser Institute and Medical Clinic, UC Irvine*, USA
- **Valery Tuchin**, *Research-Educational Institute of Optics and Biophotonics, Saratov State University*, Russia

CONFERENCES CHAIRS

Optical Bioimaging

Chairs:

- **Stefan Andersson-Engels**, *Irish Photonic Integration Centre, Tyndall National Institute, Cork,* Ireland;
- **Alex Vitkin**, *University of Toronto*, Canada;
- **Ilya Turchin**, *Institute of Applied Physics RAS*, Russia.

Biophotonics in Cancer and Stem Cells Research

Chairs:

- **Ammasi Periasamy,** *Keck Center for Cellular Imaging, University of Virginia*, USA;
- **Elena Zagaynova**, *Privolzhskiy Research Medical University,* Russia.

Clinical Biophotonics Workshop

Chairs:

- **Mikhail Kirillin**, *Institute of Applied Physics RAS*, Russia;
- **Herbert Stepp**, *LIFE Center,Munich University Clinic*, Germany.

Russian-Chinese Workshop On Biophotonics (Collocated)

Chairs:

- **Dan Zhu**, *Huazhong University of Science and Technology,* China;
- **Valery Tuchin**, *Saratov State University,* Russia.

TOPICAL PROBLEMS OF BIOPHOTONICS 2019

VII INTERNATIONAL SYMPOSIUM

CONFERENCES AND TOPICS

Optical Bioimaging

Clinical Biophotonics

Biophotonics in Cancer and Stem Cells Research

Russian-Chinese Workshop On Biophotonics (Collocated)

Saturday, 27 July

8:00	*Bus transfer from Nizhny Novgorod to Gorodets*
10:00-12:00	*Registration*
10:00-11:00	*Coffee break (Restaurant "Volga")*
11:00	*Departure from Gorodets*

HALL A

12:00-12:30	**OPENING CEREMONY** **Alexander Sergeev,** *president of the Russian Academy of Sciences* (Russia) **Nikolay Karyakin**, *rector of Privolzhsky Research Medical University* (Russia)
12:30-13:00	**Arjun G. Yodh** (USA) *Cancer imaging and brain monitoring with diffuse light* **(plenary)**
13:00-13:30	**Sergei Vinogradov** (USA) *Tissue oxygen imaging by phosphorescence quenching* **(plenary)**
13:30-14:30	*Lunch (Restaurant "Volga")*

HALL A
Optical Bioimaging and Clinical Biophotonics

14:30-16:35 — **Diffuse optical spectroscopy and fluorescence imaging techniques**
Chairs: **Arjun G. Yodh, Ilya Turchin**

14:30-14:50
Xavier Intes (USA)
Macroscopic lifetime imaging (invited)

14:50-15:10
Hamid Dehghani (United Kingdom)
Applications of diffuse optics for detection and characterisation of disease: Thyroid cancer and Rheumatoid Arthritis (invited)

15:10-15:30
Stefan Andersson-Engels (Ireland)
Monitoring infant lung function using NIR spectroscopy of oxygen and water vapour (invited)

15:30-15:45
Zhiyu Qian (China)
Real time assessment of microwave ablation on tumors by NIR spectra techniques (invited)

HALL B
Biophotonics in Cancer and Stem Cells Research

14:30-15:40 — **Tumor biology: molecular and immune mechanisms**
Chair: **Vsevolod Belousov**

14:30-14:50
Alexey Terskikh (USA)
Microscopic imaging of epigenetic landscapes (invited)

14:50-15:10
Konstantin Lukyanov (Russia)
Visualization of landscapes of histone epigenetic modifications in live cells (invited)

15:10-15:25
George Sharonov (Russia)
From understanding the immune responses to checkpoint blockade to better cancer immunotherapies

15:25-15:40
Diana Yuzhakova (Russia)
Methods for identification of tumor-specific T-lymphocytes

15:45-16:00
Jinling Lu (China)
Resting-state brain functional connectivity accessed by neural and hemodynamic optical imaging

16:00-16:15
Alexander Konovalov (Russia)
Fluorescence molecular tomography using early arriving photons: fundamental equations, numerical experiment, and resolution analysis

16:15-16:35
Ekaterina Borisova (Bulgaria)
Exogenous fluorescence diagnostics of stress-induced gastric cancer – current state and future perspectives (invited)

15:40-16:35 **New optical tools, probes, sensors**
Chair: **Vladislav Shcheslavskiy**

15:40-16:00
Aleksei Zheltikov (Russia)
Multiphoton cell-specific brain imaging: neurons, astrocytes, and gliovascular interfaces (invited)

16:00-16:20
Victor Nadtochenko (Russia)
Live cell in situ staining for fluorescent bioimaging by focused femtosecond laser near-IR laser light (invited)

16:20-16:35
Valentin Milichko (Russia)
Metal-dielectric nanocavity for all-optical protein diagnostic

16:35-17:00 *Coffee break (Restaurant "Volga")*

HALL A **Optical Bioimaging**		**HALL B** **Biophotonics in Cancer and Stem Cells Research**	
17:00-19:00	**Optical microscopy techniques** *Chair:* **Herbert Schneckenburger**	**17:00-19:00**	**New optical tools** *Chair:* **Vladislav Shcheslavskiy**

17:00-17:20
Angelika Unterhuber (Austria)
Label-free multimodal morpho-molecular bioimaging (invited)

17:20-17:40
Peter So (USA)
Fast and deep multiphoton imaging based on computational optics (invited)

17:40-18:00
Sebastian Karpf (Germany)
Ultrafast multiphoton microscopy and FLIM (invited)

18:00-18:20
Liwei Liu (China)
Application fluorescence lifetime imaging microscopy in tumor microenvironment (invited)

18:20-18:40
Peng Fei (China)
Large-view Bessel light-sheet fluorescence microscopy for high-resolution, isotropic whole-brain imaging (invited)

17:00-17:20
Rawil Fakhrullin (Russia)
Dark-field/hyperspectral microscopy for imaging and identification of nanoscale particles in cells and organisms (invited)

17:20-17:40
Robert Zawadzki (USA)
Mouse ocular xenograft model as window for cancer nanotheranostics: progress on developing novel in vivo imaging tools (invited)

17:40-18:00
Dmitry Gorin (Russia)
Bimodal photoacoustic/fluorescent probes: preparation, properties and applications (invited)

18:00-18:20
Sergey Tunik (Russia)
Phosphorescent probes and sensors; rational design for fine tuning the photophysical characteristics and chemical properties (invited)

18:20-18:40
Vsevolod Belousov (Russia)
Thermogenetics: neurostimulation and beyond (invited)

18:40-19:00
Aleš Benda (Czech Republic)
Imaging role of mitochondria in life and death of a cancer cell (invited)

18:40-18:55
Julia Shakirova (Russia)
Nanoscale polymeric temperature sensors based on europium (III) complex

19:00-20:00	*Dinner (Restaurant "Volga")*
20:30	*Welcome party (Bar-restaurant "Neva")*

Sunday, 28 July

8:00-9:00	*Breakfast (Restaurant "Volga")*
9:00-13:30	***Yaroslavl**. City tour*
14:00	*Departure from Yaroslavl*
13:30-14:30	*Lunch (Restaurant "Volga")*

HALL A **Optical Bioimaging and Clinical Biophotonics**		**HALL B** **Biophotonics in Cancer and Stem Cells Research**	
14:30-15:45	**Advanced laser techniques** *Chair:* **Stefan Andersson-Engels**	**14:30-16:50**	**Nanoparticles and drug discovery** *Chairs:* **Chia-Liang Cheng, Victor Nadtochenko**

14:30-14:50
Alfred Vogel (Germany)
Free-electron-mediated effects of single femtosecond pulses and pulse series in the (intensity/irradiation dose) parameter space (invited)

14:50-15:10
Ronald Sroka (Germany)
Laser-induced lithotripsy – developments for future clinical use (invited)

15:10-15:30
Alexander Priezzhev (Russia)
Benefits of laser tweezers in living cells studies (invited)

15:30-15:45
Yulia Alexandrovskaya (Russia)
First clinical application of laser modification of cartilage for transplantation

15:45-17:00	**Novel agents for drug delivery and theranostics** *Chairs:* **Valery Tuchin, Dan Zhu**

15:45-16:00
Yao He (China)
Functionalized silicon nanomaterials for biosensing and bioimaging (invited)

14:30-14:50
Nikolai Khlebtsov (Russia)
Polydopamine-coated Au nanorods for targeted fluorescent imaging and photothermal therapy (invited)

14:50-15:10
Chia-Liang Cheng (Taiwan)
Nanodiamond facilitated Drug delivery in 3D co-culture model (invited)

15:10-15:30
Elena Perevedentseva (Taiwan)
Influence of surfaces and interfaces on properties of nanodiamond considering for their bioapplications (invited)

15:30-15:45
Mikhail Zyuzin (Russia)
Hybrid micro- and nanocarriers as a universal platform for controlled photo-induced drug release for an effective melanoma treatment

15:45-16:00
Maxim Gongalsky (Russia)
Fluorescent amphiphilic porous silicon nanocontainers for drug delivery and ultrasonic cancer therapy

16:00-16:15
Evgenii Guryev (Russia)
Radioactive (90Y) upconversion nanoparticles conjugated with recombinant targeted toxin for synergistic nanotheranostics of cancer

16:00-16:15
Elina Genina (Russia)
Advanced strategy for plasmonic photothermal therapy of tumors (invited)

16:15-16:30
Siwen Li (China)
Reversing temozolomide resistance in glioblastoma by photosensitive liposome drug delivery (invited)

16:30-16:45
Gang Liu (China)
Bioinspired nanovesicles as a versatile drug delivery system for imaging-guided cancer therapy (invited)

16:45-17:00
Xiaolong Liu (China)
Smart strategies for synergistic antitumor therapy: towards hypoxia microenvironment aggravated by phototherapy (invited)

16:15-16:35
Gleb Sukhorukov (United Kingdom)
Optically addressable fluorescent microcapsules and carbon dots for controlled delivery, release and individual cell tracking (invited)

16:35-16:50
Ilya Kritchenkov (Russia)
Water-soluble near infrared luminescent iridium complexes and study of their interaction with human serum albumin

17:00-17:30	*Coffee break (Restaurant "Volga")*
17:30-19:00	**POSTER SESSION (Bar-restaurant "Neva")**

[OB+CB]-1 **Olga Streltsova** (Russia)
Cross-polarization oct study of the urethra in patients with urethral pain syndrome

[OB+CB]-2 **Fedor Gubarev** (Russia)
Whole blood clotting time assessment using the method of laser-speckle correlation

[OB+CB]-3 **Elena Sedova** (Russia)
Low-level laser therapy for correctionof radiation induced mucositis: a comparison of two treatment regimes

[OB+CB]-4 **Ekaterina Lazareva** (Russia)
Estimation of rat skin osmotically-induced dehydration during development of tumor using optical measurements in a wide spectral range

[OB+CB]-5 **Angelina Zherebtsova** (Russia)
Study of changes in blood microcirculation in normal and pathological conditions using wearable photonics devices

[OB+CB]-6 **Alexander Sovetsky** (Russia)
Probability density function formalism in OCT: numerical simulation study and its application to tumor fluidics mapping

[OB+CB]-7 **Ekaterina Smolina** (Russia)
Whole-brain in vivo optoacoustic angiography of rodents

[OB+CB]-8 **Ekaterina Gubarkova** (Russia)
Quantitative compressional optical coherence elastography for monitoring of tumor response to photodynamic therapy

[OB+CB]-9 **Alina Meller** (Russia)
Dual-wavelength photodynamic therapy for treatment of inflammatory diseases of ENT

[OB+CB]-10 **Vladimir Zaitsev** (Russia)
Assessment of microstructural changes in laser-irradiated collagenous tissue samples using OCT-based strain mapping in combination with compressional elastography

[OB+CB]-11 **Alexander Moiseev** (Russia)
Finite impulse response filter for digital refocusing in optical coherence tomography

[OB+CB]-12 **Pavel Subochev** (Russia)
Wideband PVDF detectors for optoacoustic imaging

[OB+CB]-13 **Daria Kurakina** (Russia)
Optical monitoring for photodynamic therapy of tumors with chlorin based photosensitizers: animal and clinical studies

[OB+CB]-14 **Nina Mitrakova** (Russia)
New opportunities of endoscopic diagnosis of early cancer of stomach

[CR]-1 **Alena Gavrina** (Russia)
Study of tumor cells apoptosis using fluorescence bioimaging and new genetically encoded FLIM/FRET sensor.

[CR]-2 **Alexandra Gavshina** (Russia)
The role of surface cysteine residues of SAASoti -FP

[CR]-3 **Natalia Gladkova** (Russia)
Predictive capacity of optical coherence angiography monitoring for PDT

[CR]-4 **Maria Karabut** (Russia)
Identification of tumor-specific T-lymphocytes in a mouse melanoma model

[CR]-5 **Elena Kiseleva** (Russia)
Determining of the optical and elastic properties of the tissue type in glial brain tumors by multimodal OCT

[CR]-6 **Natalia Klementieva** (Russia)
An isogenic model to study molecular mechanisms of tumorigenesis associated with MEN1 mutation

[CR]-7 **Anton Plekhanov** (Russia)
In vivo detection of tumor response to chemotherapy by optical coherence elastography

[CR]-8 **Ilya Solovyev** (Russia)
Some aspects of SAASoti FP photoswitching

[CR]-9 **Svetlana Rodimova** (Russia)
Metabolic imaging of hepatocytes during liver regeneration by multiphoton microscopy

[CR]-10 **Irina Druzhkova** (Russia)
Correlation of chemosensitivity and invasiveness in colorectal cancer cells

19:00-20:00	*Dinner (Restaurant "Volga")*
HALL A	
20:30-22:00	**Sponsor Session** *Chairs:* **Pavel Subochev, Elena Zagaynova**

20:30-20:45
Wolfgang Becker (Germany). *Multi-Parameter FLIM Provides New Insight into Biological Systems (Becker & Hickl GmbH)*

20:45-21:00
Vladimir Shershulin (Russia). *STEDYCON is a new class of microscopes* (Azimuth Photonics)

21:00-21:15
Andrey Evteev (Russia). *Solutions for 3D cell model imaging: acquisition, data management and analysis* (BioLine LLC)

21:15-21:30
Fedor Orlov (Russia). *Weak optical signal detectors from Hamamatsu Photonics* (Hamamatsu Photonics Norden AB)

21:30-21:45
Vladimir Pleshanov (Russia). *Super resolution at high speed* (LLC "Optical Systems Alliance")

21:45-22:00
Valentin Makarov (Russia). *Modern method of selecting, sorting, and collecting both individual and groups of cells with 100% purity for powerful genomic analysis* (BioGen-Analytica Ltd)

22:30	*Dancing (Bar-restaurant "Neva")*

Monday, 29 July

8:00-9:00	*Breakfast (Restaurant "Volga")*
9:00-12:00	***Uglich**. City tour*
12:00-12:30	*Coffee break (Restaurant "Volga")*
13:00	*Departure from Uglich*

HALL A

12:30-13:00	**Paul Beard** (United Kingdom) *Photoacoustic imaging in biology and medicine: from light to sound...and back* **(plenary)**
13:00-13:30	**Irina Larina** (USA) *Shining light of early development* **(plenary)**
13:30-14:30	*Lunch (Restaurant "Volga")*

HALL A **Optical Bioimaging**		HALL B **Biophotonics in Cancer and Stem Cells Research**	
14:30-15:40	**Optoacoustic techniques** *Chair:* **Paul Beard**	**14:30-16:25**	**Tumor biology: metabolism** *Chair:* **Ammasi Periasamy**

14:30-14:50
Yoshifumi Saijo (Japan)
Skin vasculature and its relation with aging assessed by ultrasound-optoacoustic microscopy (invited)

14:50-15:10
Martin Frenz (Switzerland)
Steps toward an epi-style multimodal quantitative optoacoustic imaging device (invited)

15:10-15:25
Pavel Subochev (Russia)
Scanning optoacoustic mesoscopy of biological tissues

15:25-15:40
Anna Orlova (Russia)
Optoacoustic angiography of experimental tumors

14:30-14:50
Wolfgang Becker (Germany)
Metabolic imaging by simultaneous FLIM of NAD(P)H and FAD (invited)

14:50-15:10
Chiara Stringari (France)
Label-free metabolic imaging by fluorescence lifetime of intrinsic biomarkers (invited)

15:10-15:30
Angelika Rueck (Germany)
Metabolic FLIM and Oxygen PLIM in biomedical research (invited)

15:30-15:50
Marina Shirmanova (Russia)
Understanding cancer's complexity with multimodal FLIM (invited)

15:40-16:35	**Optical clearing** *Chair:* **Alexander Priezzhev**

15:40-16:00
Dan Zhu (China)
Optical clearing skull window for cortical neural and vascular imaging (invited)

16:00-16:20
Valery Tuchin (Russia)
Advances in tissue optical clearing: towards broadband multimodal imaging techniques and in vivo applications (invited)

16:20-16:35
Tingting Yu (China)
FDISCO: advanced solvent-based clearing method for imaging whole organs

15:50-16:10
Mihaela Balu (USA)
In-vivo multiphoton microscopy for monitoring and guiding treatment of pigmentary skin disorders (invited)

16:10-16:25
Vadim Elagin (Russia)
Multiphoton imaging and OCA for in vivo discrimination between benign and malignant melanocytic lesions

16:35-17:00	*Coffee break (Restaurant "Volga")*
17:00-20:00	*Riverside outings, Sport activities in* ***Koprino***
20:00-21:00	*Dinner (Restaurant "Volga")*
21:30	*Musical program (Bar-restaurant "Neva")*
22:00	*Departure from Koprino*

Tuesday, 30 July

8:00-9:00	*Breakfast (Restaurant "Volga")*

HALL A

9:00-9:30 **Takeharu Nagai** (Japan)
Development of fluorescent/ bioluminescent probes toward singularity biology **(plenary)**

9:30-10:00 **Joerg Enderlein** (Germany)
Metal induced energy transfer (MIET) imaging **(plenary)**

HALL A Optical Bioimaging and Clinical Biophotonics		HALL B Biophotonics in Cancer and Stem Cells Research	
10:15-12:00	**Translational biophotonics** *Chair:* **Ronald Sroka**	**10:15-11:45**	**Stem cell biology** *Chair:* **Vladimir Baklaushev**

10:15-10:35
Alex Vitkin (Canada)
Breast cancer margin assessment using a hybrid technology approach with polarized light + mass spectrometry (invited)

10:15-10:35
Andrei Chagin (Sweden)
Peripheral glia makes chondro- and osteo-progenitors (invited)

10:35-10:55
Tatiana Novikova (France)
Tissue diagnostics with Mueller polarimetry at macro- and microscale (invited)

10:55-11:15
Martin Villiger (USA)
Advances in intravascular polarimetry (invited)

11:15-11:30
Andrei Lugovtsov (Russia)
Microrheologic and viscoelastic studies of red blood cells aggregation and interaction by optical techniques

11:30-11:45
Andrian Mamoshin (Russia)
Optical fine-needle aspiration biopsy for mini-invasive surgery

11:45-12:00
Mikhail Pavlov (Russia)
Multimodal ultrasound and optical methods in assessment of the response of breast cancer to neoadjuvant chemotherapy

10:35-10:55
Peter Kharchenko (USA)
Joint analysis of heterogeneous single-cell dataset panels (invited)

10:55-11:15
Anastasia Koroleva (Germany)
Development of human iPSCs derived functional neuronal networks on laser fabricated 3D scaffolds (invited)

11:15-11:30
Nastasia Kosheleva (Russia)
Paradoxes of cell spheroid fusion

11:30-11:45
Aleksandra Meleshina (Russia)
Optical imaging techniques in the study of the risks and the safety of the biomedical cell products based on stem cells

12:00	*Coffee break (Restaurant "Volga")*	11:50	*Coffee break (Restaurant "Volga")*
HALL A **Clinical Biophotonics**		**HALL B** **Biophotonics in Cancer and Stem Cells Research**	
12:30-14:00	**Photodynamic therapy I** *Chair:* **Mikhail Kirillin**	**12:30-14:10**	**Regenerative technologies, tissue engineering Memorial session for Victor Bagratashvili** *Chair:* **Elena Zagaynova**

12:30-12:50
Herbert Stepp (Germany)
Update on interstitial PDT for malignant glioma (invited)

12:50-13:10
Stephen Bown (United Kingdom)
Photodynamic therapy for early mouth cancer - battery operated LED light activation with mobile phone fluorescence monitoring (invited)

13:10-13:25
Ekaterina Sergeeva (Russia)
Combined fluorescence and optoacoustic imaging for monitoring the efficiency of photodynamic therapy with BPD based nanoconstructs

13:25-13:45
Buhong Li (China)
Enhanced singlet oxygen genernation during photodynamic therapy (invited)

12:30-12:55
Peter Timashev (Russia)
Russia's landscape in regenerative medicine (invited)

12:55-13:15
Boris Chichkov (Germany)
Laser printing of cells and microorganisms for cancer research and therapy (invited)

13:15-13:35
Yury Rochev (Ireland)
Bioresponsive drug delivery systems in intestinal inflammation (invited)

13:35-13:55
Vladimir Baklaushev (Russia)
Nervous tissue engineering as a tool for spinal cord recovery (invited)

13:45-14:00
Sergey Gamayunov (Russia)
Noninvasive optical imaging for monitoring PDT in clinic (invited)

13:55-14:10
Daria Kuznetsova (Russia)
Label free FLIM and SHG imaging to study liver function and structure

14:00-15:00	*Lunch (Restaurant "Volga")*

HALL A **Clinical Biophotonics**		**HALL B** **Biophotonics in Cancer and Stem Cells Research**	
15:00-16:45	**Photodynamic therapy II** *Chair:* **Herbert Stepp**	**15:00-17:00**	**Developmental biology** *Chair:* **Irina Larina**

15:00-15:15
Felix Feldchtein (Russia)
Optical coherence angiography for basal cell carcinoma photodynamic therapy monitoring

15:00-15:20
Igor Adameyko (Sweden)
The enigma of muscle orientation in the body: how do muscles know where to go (invited)

15:15-15:30
Mikhail Kirillin (Russia)
Optical monitoring of photodynamic therapy with chlorin based photosensitizers at red and blue wavelengths

15:20-15:40
Vyacheslav Dyachuk (Sweden)
New transgenic strains of zebrafish for developmental biology and clinical investigations (invited)

15:30-15:45
Christian Heckl (Germany)
Intra-operative measurement of optical tissue parameters to individualize treatment planning in stereotactic interstitial PDT of malignant glioma

15:40-16:00
Artashes Karmenyan (Taiwan)
Development of preimplantation mammalian embryos after experimental exposure (invited)

15:45-16:00
Aleksandr Khilov (Russia)
Dual-wavelength fluorescence imaging for chlorin-based photosensitizer localization and photodynamic therapy monitoring

16:00-16:20
Ross Poche (USA)
Imaging of mitochondrial dynamics and cell cycle kinetics during development (invited)

16:00-16:15
Yueqing Gu (China)
Biological detection of reactive oxygen species based on upconversion nanomaterials (invited)

16:20-16:40
Maciej Szkulmowski (Poland)
Optical coherence microscopy as a tool for imaging structure and function of mammalian embryos (invited)

16:15-16:30
Maria Shakhova (Russia)
Morphofunctional effects of different photodynamic therapy regimens

16:40-17:00
Chao Zhou (USA)
Optical coherence tomography for high-throughput imaging of 3D engineered tissue and developmental biology (invited)

16:30-16:45
Stephan Stroebl (Austria)
Light distribution of optical fiber diffusers in turbid medium derived from air-based measurement methods

17:00	*Coffee break (Restaurant "Volga")*
17:30	***Ples**, Walking tour*
20:00	*Departure from Ples*
20:00	*Conference Reception*

Wednesday, 31 July

8:00	*Breakfast (Restaurant "Volga")*		
HALL A **Optical Bioimaging and Clinical Biophotonics**		**HALL B** **Biophotonics in Cancer and Stem Cells Research**	
9:00-11:05	**Clinical applications of OCT** *Chair:* **Felix Feldchtein**	**9:00-10:50**	**Tumor biology: FLIM/FRET** *Chair:* **Marina Shirmanova**
9:00-9:20 **Kirill Larin** (USA) *Quantification of tissue mechanical properties with dynamic optical coherence elastography: from bench to bedside* (invited)		9:00-9:20 **Alexander Savitsky** (Russia) *A new solution for the old problem of fluorescence molecular tomography: measurement in lifetime domain and tissue optical clearing combined with MRI* (invited)	
9:20-9:40 **Ralf Brinkmann** (Germany) *OCT guided tumor detection and resection in neurosurgery* (invited)		9:20-9:40 **Alena Rudkouskaya** (USA) *FLIM-FRET as an analytical tool to non-invasively monitor drug internalization in mouse breast cancer model* (invited)	
9:40-10:00 **Anna Maslennikova** (Russia) *Comprehensive monitoring of the damaging and therapeutic effects on the oral mucosa by multi-functional optical coherence tomography* (invited)		9:40-10:00 **Ammasi Periasamy** (USA) *Multiphoton metabolic imaging of cancer cells and tissues* (invited)	
10:00-10:20 **Hinnerk Schulz-Hildebrandt** (Germany) *Towards optical biopsy by microscopic optical coherence tomography* (invited)		10:00-10:15 **Maria Lukina** (Russia) *Metabolic imaging of tumor samples from patients*	
10:20-10:35 **Tatyana Motovilova** (Russia) *Evaluation of endometrial status in patients with fertility problems using optical coherence tomography*		10:15-10:35 **Vladislav Shcheslavskiy** (Germany) *Macroscopic time-resolved fluorescence imaging* (invited)	
10:35-10:50 **Alexei Novozhilov** (Russia) *Optical coherence tomography in diagnostic of otitis media with effusion*		10:35-10:50 **Lubov Shimolina** (Russia) *Microviscosity of plasma membrane during chemotherapy of colorectal cancer cells*	
10:50-11:05 **Vladimir Zaitsev** (Russia) *Application of OCT-based elastography for breast cancer delineation and express assessment of morphological/ molecular subtypes*			
11:05-11:25	*Coffee break (Restaurant "Volga")*	11:10-11:40	*Coffee break (Restaurant "Volga")*

HALL A Optical Bioimaging		HALL B Biophotonics in Cancer and Stem Cells Research	
11:25-12:45	**Advances in OCT technology** *Chair:* **Alex Vitkin**	**11:40-12:50**	**Fluid analysis in cancer research** *Chair:* **Alexander Savitsky**
11:25-11:40 **Zhihua Ding** (China) *Structural and functional optical coherence tomography, technology and applications* (invited)		11:40-12:00 **Santhosh Chidangil** (India) *Early detection of cancers by body fluid analysis using ultra-sensitive hyphenated technique: High-performance liquid chromatography-laser-induced fluorescence* (invited)	
11:40-12:00 **Rainer Leitgeb (**Austria) *Digital wavefront manipulation in OCT* (invited)		12:00-12:20 **Ekaterina Galanzha (**USA) *Biophotonics for lymphatic theranostics in cancer* (invited)	
12:00-12:15 **Lev Matveev** (Russia) *Extension of the compressional optical coherence elastography: various elastic responses and nonlinear paradigm*		12:20-12:35 **Olga Cherkasova** (Russia) *Cancer blood tests using Raman spectroscopy and machine learning*	
12:15-12:30 **Ping Xue** (China) *Optical computing for ultrahigh-speed 3D OCT* (invited)		12:35-12:50 **Galina Afanaseva** (Russia) *Advanced diagnosis of melanoma circulating tumor cells in vitro and in vivo*	
12:30-12:45 **Pavel Shilyagin** (Russia) *Numerical method of correction of axial motion influence on retinal images obtained by spectral domain optical coherence tomography*			
13:00	*Lunch (Restaurant "Volga")*		
HALL A **Optical Bioimaging**		**HALL B** **Biophotonics in Cancer and Stem Cells Research**	
14:00-15:10	**Super-resolution microscopy** *Chair:* **Peter So**	**14:00-14:35**	**PDT** *Chair:* **Angelika Rueck**
14:00-14:20 **Marcel Leutenegger** (Germany) *Photolysis and photoconversion of synthetic fluorophores* (invited)		14:00-14:20 **Victor Loschenov** (Russia) *We change the strategy of the attack on cancer. New targets of PD and PDT* (invited)	
14:20-14:40 **Herbert Schneckenburger** (Germany) *Introducing super-resolution in 3D live cell microscopy* (invited)		14:20-14:35 **Layla Pires** (Canada) *New insights on PDT response for nodular and/or pigmented tumors*	
14:40-14:55 **Junle Qu** (China) *Nanobiophotonics for theranostic applications: nonlinear optical imaging and photodynamic effects* (invited)		**14:35-16:00**	**OCT in cancer research** *Chair:* **Vladimir Zaitsev**
14:55-15:10 **Willi Stepp** (Germany) *Nanometer imaging of motile specimens*		14:35-14:55 **Brendan Kennedy** (Australia) *Optical elastography in cancer imaging* (invited)	

HALL A **Optical Bioimaging and Clinical Biophotonics**	
15:10-16:15	**Novel techniques for biophotonics** *Chair:* **Ekaterina Borisova**

15:10-15:30
Igor Meglinski (Finland)
When does the dynamic light scattering approach fail at broken ergodicity conditions? (invited)

15:30-15:45
Pengcheng Li (China)
Laser speckle techniques for functional optical imaging (invited)

15:45-16:00
Yury Kistenev (Russia)
Cancer tissue analysis using optical imaging and machine learning

16:00-16:15
Andrey Dunaev (Russia)
Laparoscopic laser speckle contrast imaging for real-time mini-invasive surgery: animal studies

14:55-15:15
Brian Applegate (USA)
PLGA Encapsulated Methylene Blue as a Contrast Agent for Optical Coherence Tomography (invited)

15:15-15:30
Elena Kiseleva (Russia)
Detection of the myelin fibers direction in different areas of the human brain using cross-polarization OCT

15:30-15:45
Konstantin Yashin (Russia)
Optical coherence tomography grading correlates with diffusion tensor MRI in gliomas

15:45-16:00
Natalia Gladkova (Russia)
Multimodal OCT for malignancy imaging and for predicting of tumor responce to treatment

16:15-16:40	*Coffee break (Restaurant "Volga")*
16:40-17:30	**Closing ceremony**
18:00	*Arrival in Nizhny Novgorod*

NIZHNY NOVGOROD

Nizhny Novgorod is called as the third capital and the "pocket of Russia". The city was founded in 1221 by Vladimir-Suzdal Prince Yury Vsevolodovich as a frontier fortress, but after the biggest fair in the country moved here, it became one of the main shopping centers in Russia. There were legends about the wealth and prosperity of Nizhny Novgorod, and its stone Kremlin of the 16th century was never yielded to the onslaught of the besiegers.

There are many unique monuments of history, architecture and culture in the city, which gave UNESCO grounds for including Nizhny Novgorod in the list of 100 cities of world historical and cultural value.

Nizhny Novgorod can boast of over 600 exclusive historical and architectural monuments. What's more, there are many museums here, including particularly outstanding museum complex dedicated to Maxim Gorky, who spent his childhood here. The city even was named in honor of the writer in the period from 1932 to 1990.

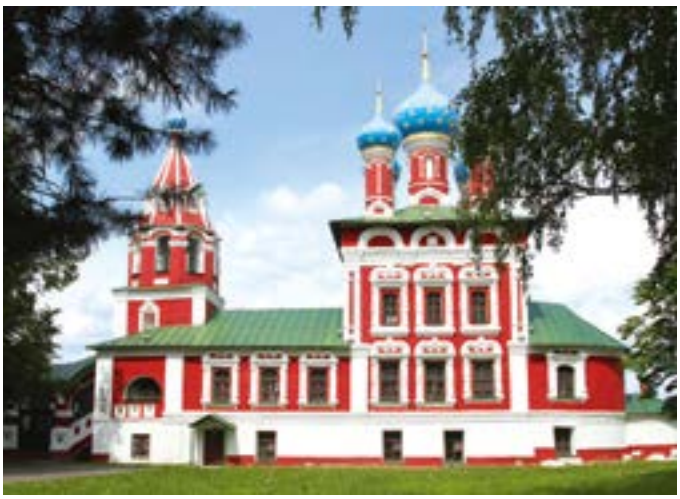
As for the historical center of Nizhny Novgorod, it is, first of all, a magnificent red-brick Kremlin with its 13 towers and the ancient Archangel Michael Cathedral, a beautiful Verhnevolzhskaya embankment, Bolshaya Pokrovskaya street with an abundance of interesting sculptures and Rozhdestvenskaya street, the Fedorovsky embankment and the Chkalovskaya staircase.

SIGHTSEEING TOUR IN YAROSLAVL

(3 hours)

The pearl of the Golden Ring, an member of the UNESCO List with more than 800 monuments of architecture, the center of Russian merchants and just a very beautiful city that recently celebrated its millennium - all this is Yaroslavl. In its historical center, located in a place where the river Volga and the river Kotorosli meet, you can see pieces of art of the architects of the last five centuries including shopping streets, exchange houses, merchants' mansions and, of course, churches with «branded» emerald doms, topped with openwork gold crosses. It's difficult to count all the interesting things of Yaroslavl: "The Tale of Igor's Campaign" was found in the the Monastery of the Transfiguration of the Savior of Yaroslavl, the Russian theater was born in this city, the poet N.Nekrasov worked here, the first printing house in the Russian province was opened in Yaroslavl, and the brilliant voice of the opera singer Sobinov sounded here.

Today Yaroslavl is one of the centers of Volga tourism with convenient infrastructure, an abundance of attractions and museums, a good choice of hotels for different preferences and budgets and excellent opportunities for outdoor activities like trekking and fishing.



UGLICH INCLUDING VISITING THE CHURCH TSAREVICH DMITRY "ON BLOOD"

(2,5 hours)

The old Russian town of Uglich is located on the Volga River, in that picturesque place where the Volga River makes a steep turn. The town was named so after this river turn or after the coal mines located here long time ago or after one of the Slavic tribes.

Anyway, the history of Uglich is rich. The most famous history of the city chronicles is the murder of Tsarevich Dmitry, the walls of the local Kremlin still keep the secrets of this tragedy. Uglich seems to have frozen somewhere in the past: there are many ancient churches, monasteries, merchant houses, museums and other sights, and a special atmosphere, cozy, calm, perfect for having meditative rest. Today Uglich is one of the main tourist centers of the Yaroslavl region: it is impossible to pass this town traveling around the Golden Ring.

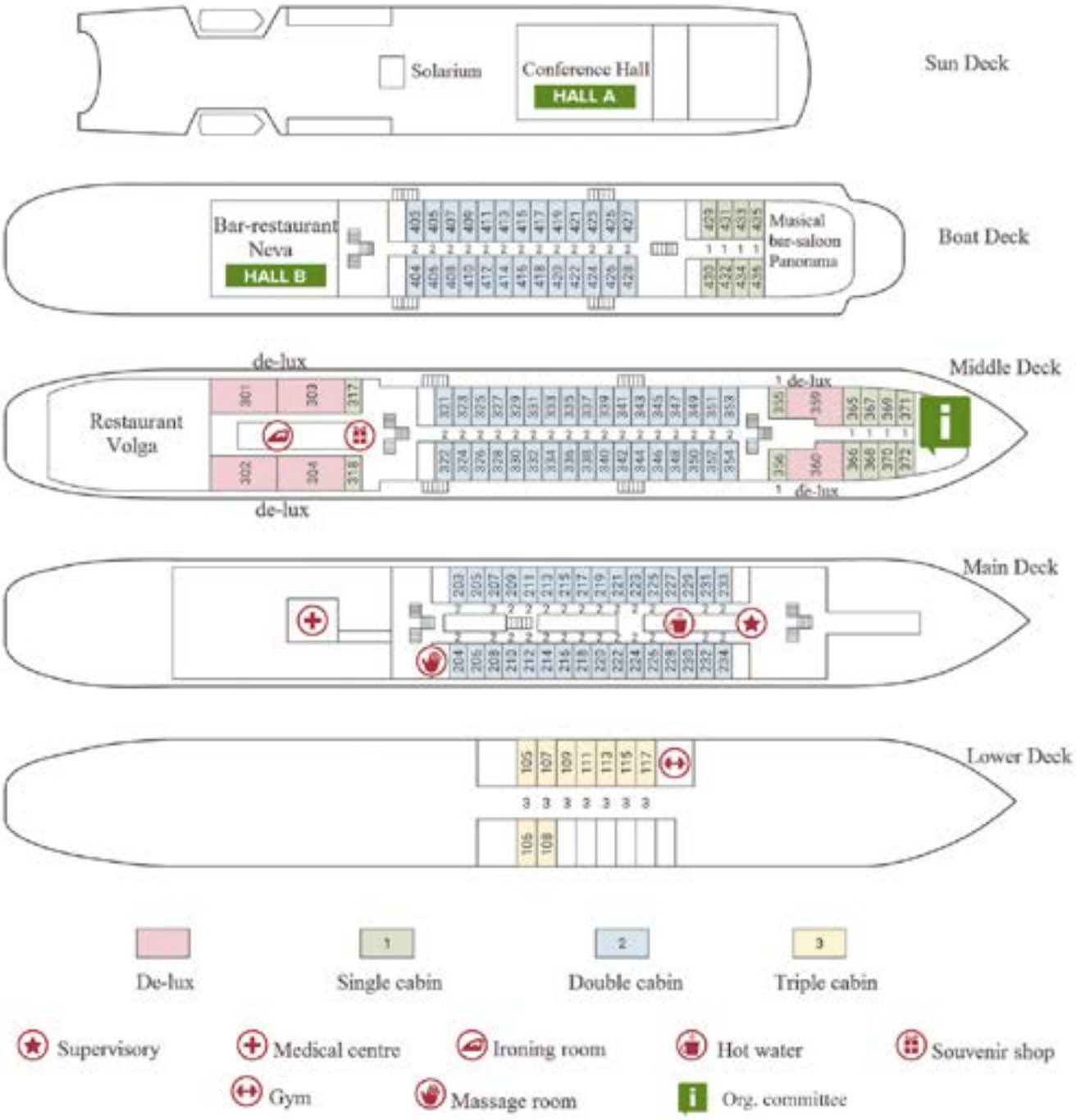
SIGHTSEEING TOUR OF THE HISTORICAL PART OF PLES

1.5 hours

IMPORTANT! *This excursion is a uphill and downhill walking one. If it's raining it's necessary to wear safe shoes as cobbled paths with wet foliage are not safe.*

Ples was not such a popular place but one day the talented artist Isaac Levitan chose this town. He was not born here but he was so impressed with it that he lived here for several years. Thanks to his more than 200 pictures that he painted here, other artists, writers and then tourists started coming here. This is the reason why Ples is almost the same place as it was at the time its foundation 600 years ago. People come here for the historical atmosphere: colorful wooden houses over the Volga, the outlines of ancient bell towers and the forest on the hills attract hundreds of thousands of tourists a year here. Nevertheless, it is quiet and clean here. Golden beaches in summer and ski slopes in winter are interesting additions to the typical museums, which there are many in the Volga settlements.

Deck Scheme of "Konstantin Korotkov" Boat



TOPICAL PROBLEMS OF BIOPHOTONICS 2019

VII INTERNATIONAL SYMPOSIUM

SPONSORS

The event is supported financially
by the Russian Foundation for Basic
Research, project 02-19-20081

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION

ООО «АЛЬЯНС ОПТИЧЕСКИХ СИСТЕМ»

Авторизованный дилер Olympus в России и странах СНГ

Комплексные поставки, методическая и сервисная поддержка микроскопов и другого оборудования для научных и лабораторных исследований.

Мультифотонный лазерный сканирующий микроскоп Olympus FLUOVIEW FVMPE-RS

Мультифотонный лазерный сканирующий микроскоп Olympus FLUOVIEW FVMPE-RS – разработан для исследований глубоких слоев тканей. Он обеспечивает высокоскоростное получение изображений в течение миллисекунд быстропротекающих процессов in vivo и идеальное точеное возбуждение высоким уровнем энергии – даже в глубинных слоях тканей.

Конфокальный сверхразрешающий микроскоп на базе диска Нипкова Olympus IXplore SpinSR10

Конфокальный сверхразрешающий микроскоп на базе диска Нипкова Olympus IXplore SpinSR10 - создан для визуализации живых клеток с разрешением 120 нм, сочетает в себе скорость, разрешение и эффективность на единой гибкой платформе. Исследователи могут наблюдать мельчайшие детали и работу внутренних клеточных структур при разрешении, превышающем дифракционный предел, с возможностью простого переключения между сверхразрешением, конфокальными и широкопольными изображениями.

Конфокальный лазерный сканирующий микроскоп Olympus FLUOVIEW FV3000

Конфокальный лазерный сканирующий микроскоп Olympus FLUOVIEW FV3000 разработан для решения самых сложных задач современной науки. Обладая высокой чувствительностью и скоростью, необходимыми для визуализации живых клеток и тканей, FV3000 также обеспечивает интуитивно понятный и адаптируемый интерфейс, а также способен реализовать сложные протоколы скрининга, в том числе и многолуночных планшетов. Серия поддерживает полную функциональность, необходимую для визуализации живых клеток в формате 2D-6D (x, y, λ, z, t, p) а также обработку изображений, таких как деконволюция и анализ.

105523, г. Москва, Щелковское шоссе, д.100, корпус 5 | www.opticalalliance.ru
+7 905-573-08-66 Плешанов Владимир | pleshanov@opticalalliance.ru

АЗИМУТ ФОТОНИКС

ОПТОЭЛЕКТРОННЫЕ КОМПОНЕНТЫ

Микроскопы для различных исследований:

- биологические;
- эпи-флуоресцентные;
- стереомикроскопы;
- поляризационные;
- цифровые;
- металлографические.

Модульные лазерные сканирующие микроскопические системы от компании Thorlabs

- До 4 каналов возбуждения и детектирования;
- лазер, сопряженный с оптоволокном;
- детекторный модуль на базе ФЭУ (до 4 шт.);
- гальванические / гальвано-резонансные сканеры;
- моторизированное колесо с пинхолами;
- полный кадр - 4096 x 4096 пикселей;
- набор фильтров в комплекте;
- компьютер с монитором и ПО.

Модульные системы для модификации микроскопов

1. **Модуль STEDYCON**

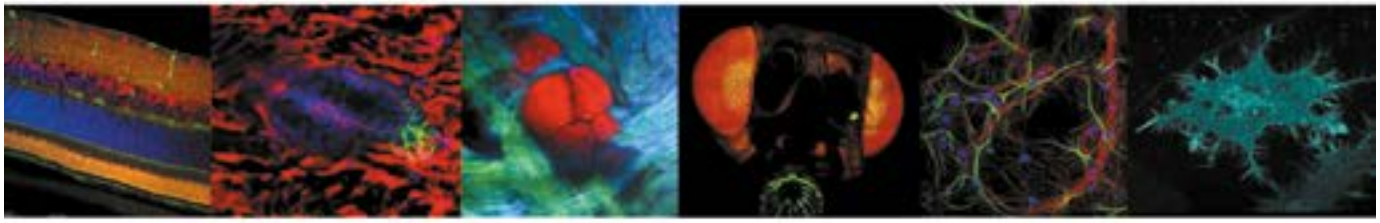
- Преобразует эпи-флуоресцентный микроскоп в конфокальный и STED микроскоп;
- высококачественное 2D STED исполнение
- не требуется настройка и обслуживание;
- простое в использовании ПО.

2. **Модуль RCM (Re-scan Confocal Microscope)**

- Улучшенное латеральное разрешение: 170 нм;
- лучшее отношение сигнал/шум
- квантовая эффективность до 95%;
- открытая архитектура системы;
- более глубокое секционирование по Z-оси;
- высокая чувствительность и низкий шум;

3. **Оптический модуль Clarity**

- Конфокальная визуализация без когерентного источника света;
- минимальное время экспозиции: 10 мс;
- максимальная скорость кадров: 100 к/с;
- диапазон возбуждения: 370 - 700 нм;
- диапазон испускания: 410 - 750 нм.



From Eye to Insight

Leica
MICROSYSTEMS

THUNDER
Imaging Systems

Decode 3D Biology in Real Time

The THUNDER Technology

THUNDER is an opto-digital technology that uses the new Computational Clearing method to generate high resolution and high contrast images. THUNDER, a Leica technology, automatically takes all relevant optical parameters into account in order to achieve haze-free results in real time.

Computational Clearing

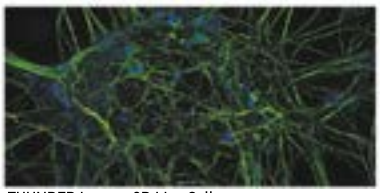
Computational Clearing efficiently differentiates between signal and background by taking the size of the targeted specimen features into account. This approach makes image details immediately visible which formerly were not revealed.

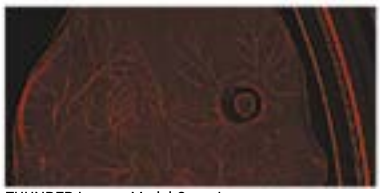
See through the haze

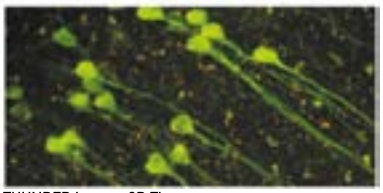
THUNDER Imagers remove the out-of-focus blur through the new Leica method called Computational Clearing. Now with THUNDER Imagers you can have both high-quality 3D images of thick samples and, at the same time, benefit from the speed and sensitivity like with a widefield system.

Decode 3D biology in real time

Whether single cells, tissues, whole organisms, or tumor spheroids, THUNDER Imagers enable the decoding of 3D biology in real time.


THUNDER Imager 3D Live Cell


THUNDER Imager Model Organism


THUNDER Imager 3D Tissue

BioLine LLC is the official distributor for Leica Microsystems in Russia

BioLine
группа компаний

Bioline LLC
Russia, 197101,
St. Petersburg,
Pinsky alley, 3, lit. A

tel .: +7 (812) 320 49 49
fax: +7 (812) 320 49 40
e-mail: main@bioline.ru
www.bioline.ru

Technical assistance number for all regions of Russia:
8 800 333 00 49

БГА
БиоГен-Аналитика

БИОГЕН-АНАЛИТИКА, ООО

Поставщик биотехнологического, аналитического и лабораторного оборудования ведущих мировых производителей поставляет высокотехнологичные приборы в научные и исследовательские институты, в медицинские и диагностические лаборатории, а так же в лаборатории контроля качества в России и странах СНГ.

Мы предлагаем широкий перечень оборудования: центрифуги, микроскопы, оборудование для гель-электрофореза, гель-документации и визуализации, анализаторы клеток и частиц, термоциклеры, оборудование для выделения ДНК и секвенаторы, ультра низкотемпературные морозильники и холодильники, многофункциональные климатические камеры, ламинарные шкафы, микробиологические и CO2-инкубаторы, системы хранения в жидком азоте, сухожаровые шкафы, оборудование для генетических и клеточных исследований, клетки для виварием и оборудование для работы с животными, ингаляционные системы, системы автоматизации лабораторных процессов и доклинических исследований in vivo, включая молекулярную визуализацию, и многое другое.

У нас можно приобрести не только приборы, но и любые запасные части, расходные материалы, реагенты, и получить консультацию высококвалифицированных специалистов, прошедших обучение в компаниях-производителях.

Основными приоритетами нашей компании являются индивидуальный подход к подбору решений тех задач, которые необходимо осуществить нашим коллегам, друзьям или партнерам посредством оборудования, которое мы представляем.

127422, г. Москва, ул. Тимирязевская, д.1, стр.2
Тел.: (495) 220-94-85 | E-mail: 8499046244@bga.su | www.bga.su

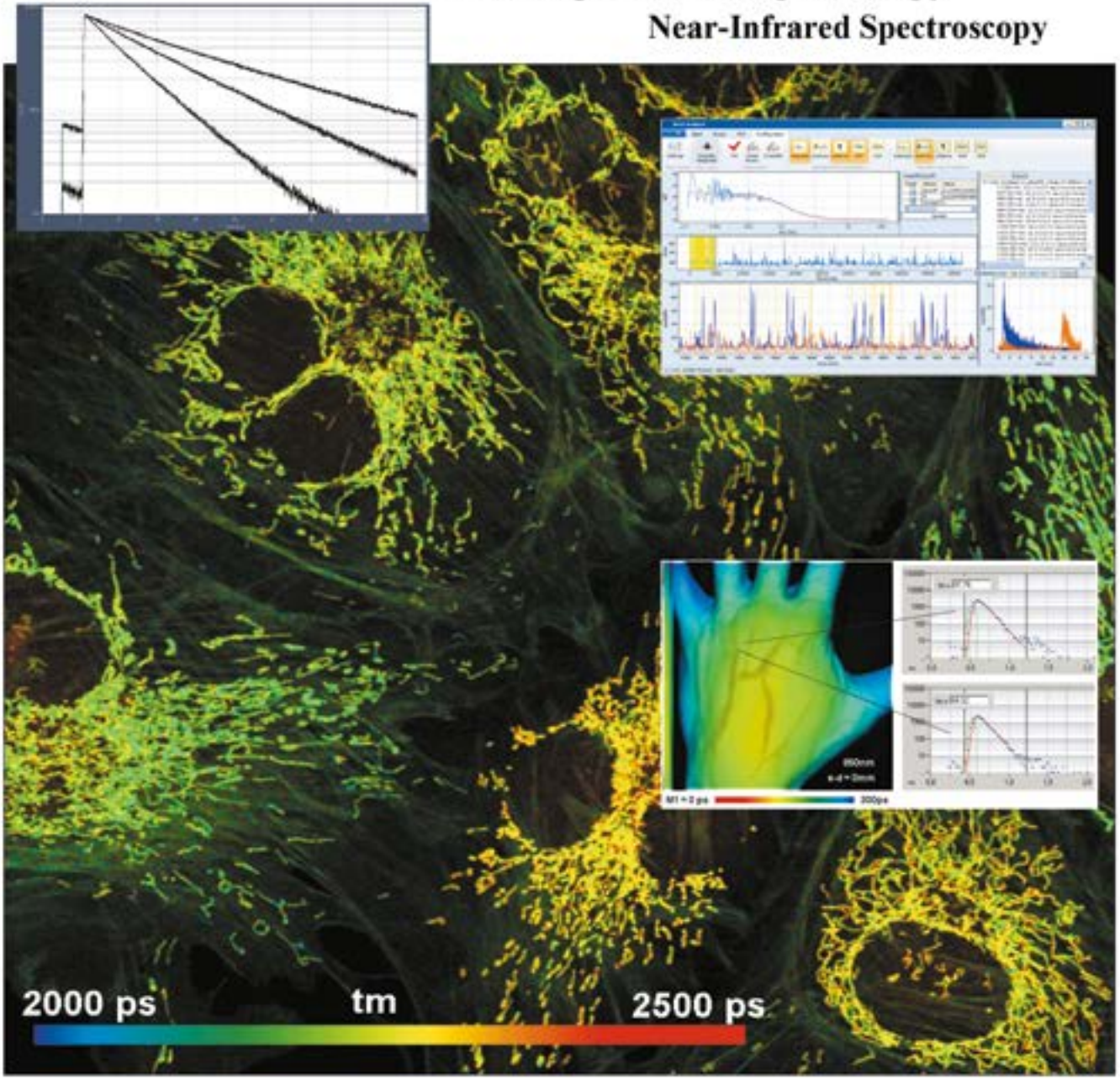
Becker & Hickl GmbH

Time-Correlated Single Photon Counting

Fluorescence Lifetime Imaging

FCS, Single Molecule Spectroscopy

Near-Infrared Spectroscopy



TCSPC Systems **Detectors** **FLIM Systems** **Laser Scanning Systems** **ps Diode Lasers**

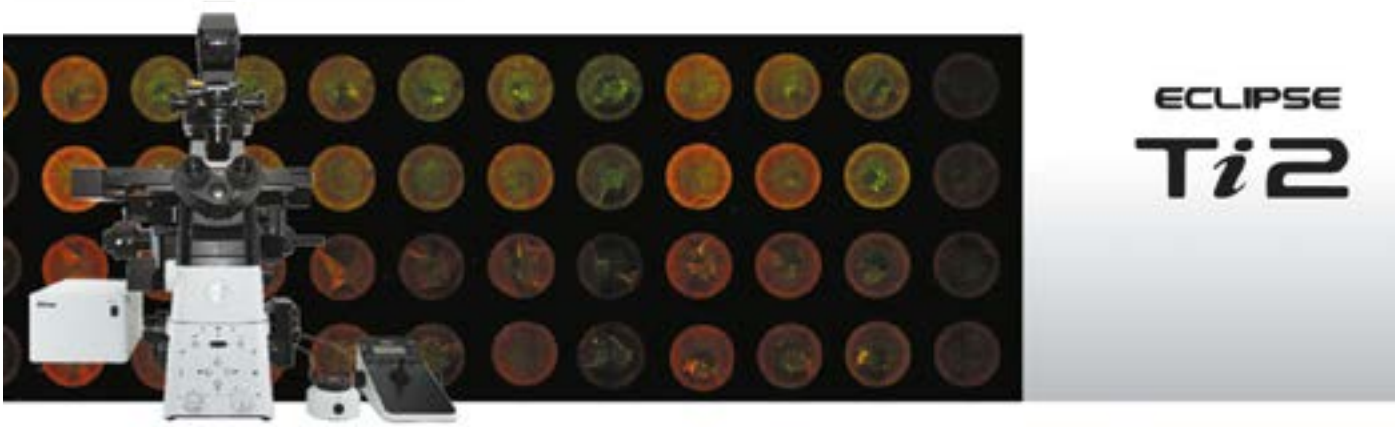
26 Years Technology Leaders in TCSPC

BioVitrum
www.biovitrum.ru

НАУКА, МЕНЯЮЩАЯ МИР

Новый микроскоп исследовательского класса Nikon Eclipse Ti2

Inverted Microscope System



Новый микроскоп исследовательского класса Nikon Eclipse Ti2 сочетает новейшие технологии построения и дизайна оптической системы, позволяя на единой платформе реализовывать широкий круг исследовательских задач. Микроскоп Eclipse Ti2 обеспечивает беспрецедентное поле обзора препарата 25 мм (FOV). Благодаря этому невероятному показателю, Ti2 позволяет максимально эффективно использовать возможности широкоформатных CMOS-камер и значительно улучшает производительность при получении цифровых изображений.

Компания БиоВитрум является официальным дистрибьютором компании Nikon Instruments, а также ряда других компаний – ведущих производителей компонентов для оптической микроскопии.

- **Собственная сервисная служба**
- **Более 10 лет опыта работы на рынке оптической микроскопии**
- **Одна из самых компетентных команд специалистов**
- **Помощь в подборе любого решения в области оптической микроскопии**

Россия, 199106, Санкт-Петербург
Большой пр. В.О., д.68, лит. А
Тел./факс: (812) 3050606
LS@biovitrum.ru

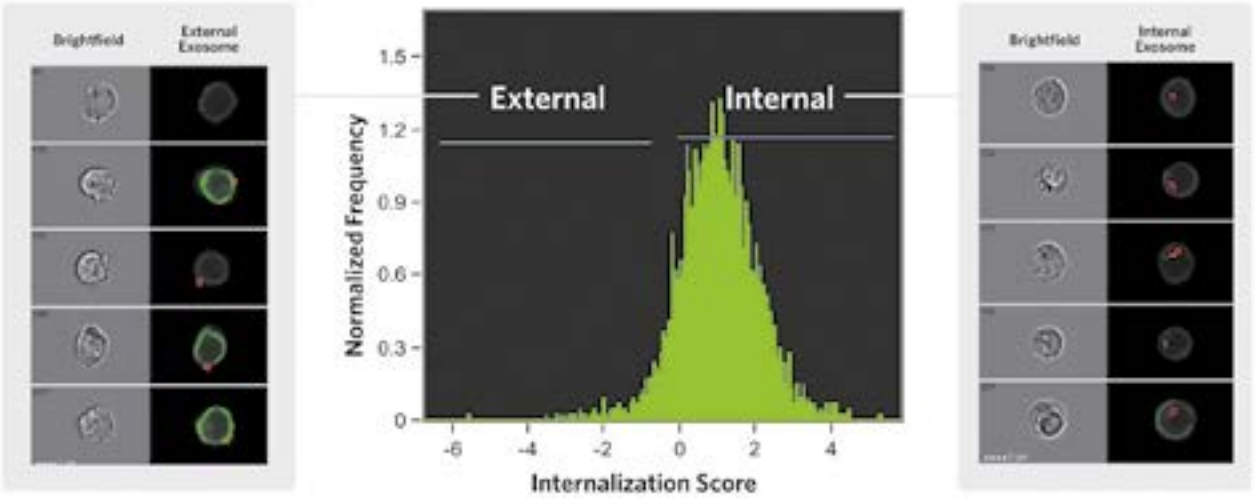
Россия, 127287, г. Москва,
ул. 2я Хуторская, д. 38А, стр. 8, этаж 7
Тел./факс: (495) 7874046
LS@biovitrum.ru

Россия, 630001, г.Новосибирск,
ул. Советская 52, офис 415а
Тел./факс: (383) 2304900
sibir@biovitrum.ru

Amnis® ImageStream®X Mk II

Exosome Internalization and Quantification
Using Imaging Flow Cytometry.

PE-CD63 Exosome Internalization Analysis



Luminex
complexity simplified.

art photonics
broad spectra fiber solutions

UNIQUE FIBER PROBES FOR MEDICAL DIAGNOSTICS

IN 0.3-16 μm SPECTRAL RANGE

FlexiSpec® fiber probes help to analyze biotissues & bioliquids *in-vivo* – using key spectroscopy methods: ATR-absorption, diffuse NIR-reflection, fluorescence and Raman. The best method or their combination enables to run label free medical diagnostics with high specificity, sensitivity & accuracy for tumor margin detection, etc.

art photonics GmbH, Rudower Chaussee 46, 12489 Berlin, Germany

www.artphotonics.com

SUPERCONDUCTING NANOTECHNOLOGY

WWW.SCONTEL.RU
SCONTEL
SUPERCONDUCTING NANOTECHNOLOGY
Detect everything you want

Superconducting Single Photon Detectors (SSPD) for Visible & Infrared

Key Features & Characteristics

- ✓ High system detection efficiency (≥ 85%)
- ✓ Continuous - mode operation & no afterpulsing
- ✓ Operate in the visible and near infrared range (0.5 – 2.5 μm)
- ✓ Picosecond time resolution (25 ps) & Low level of dark counts (down to 0.1 cps)
- ✓ Plug–and–play functionality & Remote control via LabView or another IDE

Essential & Primary Applications

- ✓ Time-resolved single quantum dot/molecule fluorescence spectroscopy
- ✓ Photon-correlation measurements & Quantum cryptography
- ✓ Picosecond Integrated Circuits Analysis - PICA
- ✓ LIDAR & Free space communication
- ✓ Optical tomography

User-Friendly & Flexible Delivery Options

Cryogenic Insert for a standard LHe Dewar

- ✓ One, two, or multi-channel systems
- ✓ Standard single-mode fiber input
- ✓ SMA-coax readout for each channel

Brass–Shell Packaged SSPD

- ✓ Ready to install into any cryogenic system
- ✓ Coupled to a single-mode optical fiber

Closed-Cycle Refrigerator

Optimization of the system characteristics according to customer's specifications

phone: +7 (499) 245 2968
fax: +7 (499) 245 3506
e-mail: scontel@scontel.ru
web-page: www.scontel.ru

HAMAMATSU

PHOTON IS OUR BUSINESS

Hamamatsu is a world leader in optoelectronics. We offer the widest product range of components, modules and systems on the market for science and research and for a broad range of applications within medicine, biotechnology, industry, automation and consumer electronics.

Our worldwide organisation with headquarter in Japan has sales and technical support offices around the world. Hamamatsu Photonics Norden AB is supporting our customers in the Nordic and Baltic countries, Russia and CIS.

Driven by discovery

Peering through a microscope is a wondrous experience. It reveals the beauty and mystery of the cellular world and inspires scientific inquiry. At Hamamatsu Photonics, our mission is to continuously push the boundaries of scientific camera performance, so that every microscope image captures beautiful and quantitative data.

ORCA-Fusion digital CMOS camera

The latest addition to our ORCA range of cameras is the ORCA-Fusion. Built from the sensor up, the ORCA-Fusion balances the complex nuances of camera features to provide beautiful images and robust data at all light levels, but especially in tough low-light conditions.

It has significantly improved low-noise performance compared to conventional scientific CMOS (sCMOS) cameras and has a higher signal-to-noise, even when observing low-light conditions. In addition, since pixel uniformity is excellent, dynamic pixel correction is unnecessary and observation and measurement can be performed with high quantitative efficiency.

www.hamamatsu.com

Phone: +7 (495) 258-85-18, E-mail: info@hamamatsu.ru