Program of the International Symposium "Topical Problems of Biophotonics – 2009"

Sunday, July 19

	Optical Bioimaging	**Nanobiophotonics**	**Neuroimaging and Neurodynamics**
Chairs	**Bruce Tromberg (USA), Karsten König (Germany), Natalia Shakhova (Russia)**	**Tom Brown (UK), Juergen Popp (Germany), Alexey Zheltikov (Russia)**	**Konstantin Anokhin (Russia), Andreas Ioannides (Japan), Victor Kazantsev (Russia), Alexey Semyanov (Japan)**
	Terahertz Diagnostics and Treatment	**Advanced Laser Applications in Biomedicine**	
Chairs	**Alexander Shkurinov (Russia), Xi-Cheng Zhang (USA)**	**Alexander Geinic (Russia), Dietrich Habs (Germany), Vladislav Panchenko (Russia)**	
7:00-9:00	**Registration**		
8:00-9:30	**Breakfast**		
9:30	**Departure from Nizhny Novgorod**		
10:00-10:20	**Opening remarks**		
10:20-11:10	**Paras Prasad** (*USA*) Overcoming challenges to reveal opportunities at the frontiers of biophotonics **[Plenary-1]**		
11:10-12:00	**Vladislav Panchenko** (*Russia*) Laser information technologies for biomedicine **[Plenary-2]**		
12:00-12:20	**Coffee break**		
	HALL A	**HALL B**	**HALL C**
	Optical Bioimaging	**Nanobiophotonics**	**Terahertz Diagnostics and Treatment**
	Session: MFM, confocal and ultramicroscopy technologies **Chair: Xindge Li**	**Session: Raman techniques** **Chair: Tom Brown**	**Session: Terahertz sources and detectors** **Chair: Xi-Cheng Zhang**
12:20-13:30	**12:20 K. König** (*Germany*) Clinical multiphoton tomography and clinical two-photon microendoscopy of human skin for early detection of melanoma, tracing of sunscreen nanoparticles and the evaluation of anti-aging products **(Invited)**	**12:20 M. Ritsch-Marte** (*Austria*) Biological applications of wide-field CARS-microscopy **(Invited)**	**12:20 S.V. Garnov** (*Russia*) High-intensity terahertz pulses: Methods of generation and prospective applications **(Invited)**
	12:50 E. Sergeeva (*Russia*)**, A. Katichev, and I. Balalaeva** Potentialities of deep two-photon fluorescence microscopy imaging using quantum dots	**12:50 M. Schmitt** (*Germany*)**, B. Dietzek, P. Rösch, Ch. Krafft, R. Möller, and J. Popp** New breakthroughs in Raman spectroscopy for biomedical research **(Invited)**	**13:00 G. Leo** (*France*)**, A. Taormina, F. Ghiglieno, S. Ducci, I. Favero, A. Andronico, J. Claudon, and J.-M. Gérard** THz room-temperature integrated parametric source **(Invited)**
	13:10 A. Uchugonova (*Germany*) **and K. König** Multiphoton imaging and nanoprocessing of stem cells		
13:30-15:00	**Lunch**		

Sunday, July 19/ afternoon

13:30-15:00	**Lunch**		
15:00-15:50	**Bruce Tromberg** (*USA*) Diffuse optical imaging using spatially and temporally modulated light **[Plenary-3]**		
	HALL A	**HALL B**	**HALL C**
	Optical Bioimaging	**Nanobiophotonics**	**Terahertz Diagnostics and Treatment**
	Session: Fluorescence imaging **Chair: Ilya Turchin**	**Session: Raman techniques** **Chair: Hiro-o Hamaguchi**	**Session: Terahertz sources and detectors** **Chair: Giuseppe Leo**
16:00-17:00	**16:00 R. Hoffmann** (*USA*) Current technology for *in vivo* imaging using fluorescent proteins **(Invited)**	**16:00 V. Deckert** (*Germany*)**, M. Richter, R. Treffer, and T. Deckert-Gaudig** Tip-enhanced Raman spectroscopy – bio identification at the limit **(Invited)**	**16:00 M. Tani** (*Japan*)**, Ch.T. Que, K. Yamamoto, T. Furuya, and M. Hangyo** Development of photoconductive antennas for terahertz sensing and spectroscopy **(Invited)**
	16:30 A. Savitsky (*Russia*) Molecular and cellular sensors based on fluorescent proteins for fluorescent tomography **(Invited)**	**16:30 S. Schlücker** (*Germany*)**, B. Küstner, M. Gellner, and M. Schütz** SERS microscopy: Nanoparticle probes and biomedical applications **(Invited)**	**16:30 V.I. Gavrilenko** (*Russia*) Terahertz spectroscopy with semiconductor sources and detectors **(Invited)**
17:00-17:20	**Coffee break**		

Sunday, July 19/ evening

	HALL A	**HALL B**	**HALL C**
	Optical Bioimaging	**Nanobiophotonics**	**Terahertz Diagnostics and Treatment**
	Session: MFM, confocal and ultramicroscopy technologies **Chair: Karsten König**	**Session: Advanced imaging concepts and techniques** **Chair: Monika Ritsch-Marte**	**Session: Terahertz sources and detectors** **Chair: Boris Knyazev**
17:20-19:00	**17:20 X. Li** (*USA*)**, J. Xi, Y. Wu, L. Huo, M.J. Cobb, and J.H. Hwang** Enabling endomicroscopy technologies for clinical translation of OCT and two-photon fluorescence imaging **(Invited)**	**17:20 H.U. Dodt, N. Jährling, S. Saghafi, S. Kalchmair, and K. Becker** (*Austria*) Visualization of neuronal networks in the whole mouse brain and mouse embryos by ultramicroscopy **(Invited)**	**17:20 N.A. Vinokurov** (*Russia*) Development and applications of free electron lasers: Status and perspectives **(Invited)**
	17:50 J. Mertz (*USA*)**, D. Lim, K. Chu, N. Bozinovic, T. Ford, and S. Santos** Out of focus background rejection with HiLo microscopy **(Invited)**	**17:50 L. Cognet** (*France*) Single molecule tracking in live neurons **(Invited)**	**18:00 V.L. Bratman** (*Russia*) Terahertz electron devices **(Invited)**
	18:20 A.N. Morozov (*Russia*)**, I.V. Turchin, V.A. Kamensky, A.A. Lazutkin, D. Toptunov, O.I. Efimova, and K.V. Anokhin** Fiber-optic based fluorescent ultramicroscopy	**18:20 T. Mappes** (*Germany*)**, S. Klinkhammer, Ch. Vannahme, M. Schelb, and U. Bog** Biophotonic Lab-on-Chip devices with integrated organic semiconductor lasers **(Invited)**	**18:30 G. Goltsman** (*Russia*) Superconducting THz heterodyne and single-photon detectors and their possible biological applications **(Invited)**
	18:40 I.V. Larina (*USA*) **and M.E. Dickinson** Live confocal imaging of mammalian embryonic cardiovascular development		
19:00-20:00	**Dinner**		
21:00-23:00	**Welcome party**		

8:00-9:00	**Breakfast**		
9:00	**Arrival in Kazan**		
9:00-13:30	**Excursion**		
13:30-15:00	**Lunch**		
14:00	**Departure from Kazan**		
15:00-15:50	**Antoine Triller** (*France*) Real time molecular dynamics of synaptic adaptation and plasticity **[Plenary-4]**		
15:50-16:40	**Xi-Cheng Zhang** (*USA*) Recent development of science, technology, and application of THz air photonics **[Plenary-5]**		
16:40-17:00	**Coffee break**		
	HALL A	**HALL B**	**HALL C**
	Optical Bioimaging	**Neuroimaging and Neurodynamics**	**Terahertz Diagnostics and Treatment**
	Session: Optical coherence tomography **Chair: Felix Feldchtein**	**Session: Neuroimaging 1** **Chair: Pavel Balaban**	**Session: Applications in biology and medicine** **Chair: Derek Abbott**
17:00-19:00	**17:00 J. de Boer** (*Netherlands*) OCT in clinical medicine **(Invited)**	**17:00 K.E. Volynski** (*UK*)**, J. Gorelik, C. Henneberger, Y. Ermolyuk, A.I. Shevchuk, D. Klenerman, D.M. Kullmann, Y. Korchev, G. Moss, and D.A. Rusakov** Imaging of individual synaptic boutons provides direct evidence that efficacy varies among synapses with the magnitude of Ca^{2+} influx at the active zone **(Invited)**	**17:00 J.-H. Son** (*Korea*) Terahertz diagnosis and therapy of cancers using nanoparticles **(Invited)**
	17:30 V.M. Gelikonov (*Russia*) **and G.V. Gelikonov** PS and CP OCT *in vivo* imaging modalities in practical endoscopic optical coherence tomography	**17:30 Y.-W. Wu, S. Grebenyuk, D.A. Rusakov, and A. Semyanov** (*Japan*) Synaptic and extrasynaptic NMDA receptor mediated signaling **(Invited)**	**17:40 A. Ramundo-Orlando** (*Italy*) **and G.P. Gallerano** Terahertz radiation effects and biological applications **(Invited)**
	17:50 M. Kirillin (*Russia*)**, P. Agrba, E. Zagaynova, M. Shirmanova, M. Sirotkina, and V. Kamensky** Contrast enhancement by nanoagents in OCT imaging of skin: Monte Carlo versus *in vivo* study	**18:00 H.D. Mansvelder** (*The Netherlands*)**, C. Holmgren, G.T. Silva, R.B. Poorthuis, and R.M. Meredith** Cortical neuronal network dynamics and connectivity in mental retardation **(Invited)**	**18:10 V.Pikov** (*USA*) **and P. Siegel** The effect of millimeter waves on cellular plasma membrane permeability **(Invited)**
	18:10 D. Shabanov, G. Gelikonov (*Russia*)**, and V. Gelikonov** (*Russia*) Broadband digital holography for 3D OCT imaging of scattered objects	**18:30 D. Ossipov** (*Germany*) **and D. Slavashevich** Diving deep: Achievements of modern multi-photon microscopy **(Invited)**	**18:40 J. Gong, Ch. Wang, F. Liu, Y. Li, A. Zheltikov, X. Zhao, Q. Xing, L. Chai, and Q. Wang** (*China*) Detection of intracellular metabolite by THz time-domain spectroscopy
	18:30 V.M. Gelikonov, G.V. Gelikonov, and P.A. Shilyagin (*Russia*) Real-time SD-OCT system for living biological tissue investigation		
19:00-20:00	**Dinner**		
20:30-22:00	**Sponsor session** **Sergey Pentegov, Laser Track Ltd, Coherent** "Generation and stabilization of femtosecond pulses in commercial lasers" **Arnd Krueger, Newport – Spectra-Physics** "Advanced laser sources for bioinstrumentation and microscopy" **Dmitry Slavashevich, Olympus RUS, Division of Olympus Life Science Europa GMBH** "Olympus FV10i - revolutionary concept of confocal system"		
22:00-23:00	**Evening program**		

8:00-9:00	**Breakfast**		
9:00-9:50	**Hiro-o Hamaguchi** (*Japan*) Single cell viability diagnostics by Raman microspectroscopy **[Plenary-6]**		
9:50-10:40	**Svyatoslav Medvedev** (*Russia*) Inaccurate interpretation of neuroimaging results creates illusions **[Plenary-7]**		
10:40-11:00	**Coffee break**		
	HALL A	**HALL B**	**HALL C**
	Nanobiophotonics	**Neuroimaging and Neurodynamics**	**Optical Bioimaging**
	Session: Nonlinear-optical methods and ultrafast science approaches **Chair: Volker Deckert**	**Session: Systemic neuroscience and human brain 1** **Chairs: Svyatoslav Medvedev, Konstantin Anokhin**	**Session: Clinical and biomedical applications** **Chair: Johannes de Boer**
11:00-13:30	**11:00 C.T.A. Brown** (*UK*)**, C. McDougall, D. Stevenson, F.J. Gunn-Moore, and K. Dholakia** Laser assisted delivery of membrane impermeable materials to targeted single cells **(Invited)**	**11:00 R. Naatanen** (*Finland*) The mismatch negativity (MMN) in clinical research **(Invited)**	**11:00 G. Gelikonov** (*Russia*) Endoscopic OCT devices for medical applications **(Invited)**
	11:30 C.-K. Sun (*Taiwan*) *In vivo* optical virtual biopsy by using least invasive harmonic generation microscopy **(Invited)**	**11:30 A.A. Ioannides** (*Japan, Cyprus*) New insights for attentional mechanisms from tomographic analysis of MEG data **(Invited)**	**11:30 K.V. Larin** (*USA*)**, I.V. Larina, S. Syed, S. Ivers, and M.E. Dickinson** Structural and functional imaging of live mammalian embryos with optical coherence tomography
	12:00 Ch.-Y. Wang (*China*)**, M.-L. Hu, Q.-R. Xing, J.-X. Gong, B.-W. Liu, Y.-F. Li, and L. Chai** Novel femtosecond photonic crystal fiber laser system and its applications in micro/nano scale and biology **(Invited)**	**12:00 M.G. Knyazeva** (*Switzerland*)**, E. Fornari, M. Jalili, R. Meuli, P. Maeder, and J. Ghika** Cortical circuits in aging brain: Magnetization transfer imaging and EEG synchronization studies	**11:50 N.D. Gladkova, E.B. Kiseleva** (*Russia*)**, M.M. Karabut, E.V. Orinicheva, O.S. Streltsova, I.A. Kuznetsova, L.B. Snopova, E.E. Yunusova, A.A. Muraev, Y.V. Fomina, V.V. Koslovsky, E.V. Zagaynova, N.M. Shakhova, and V.M. Gelikonov** Will the polarization techniques expand the clinical scope of endoscopic OCT?
	12:30 D. Chorvat (*Slovakia*)**, A. Mateasik, and A. Chorvatova** Component analysis and linear unmixing in time-resolved spectroscopy – a new approach to the study of cell autofluorescence **(Invited)**	**12:20 H. Koizumi** (*Japan*) Applied Brain Science —A new field emerging through noninvasive brain function imaging— **(Invited)**	**12:10 N.Y. Ignatieva** (*Russia*)**, E.A. Sergeeva, I.V. Balalaeva, V.A. Kamensky, and O.L. Zakharkina** The feature of the interweaving strands of the collagen framework with different stability in meniscus visualized by optics techniques
	13:00 L.V. Doronina, I.V. Fedotov, O.I. Ivashkina, M.A. Zots, A.A. Lanin, A.B. Fedotov, K.V. Anokhin, and A.M. Zheltikov (*Russia*) Enhancement of two-photon-excited luminescence response from brain-tissue-labeling dyes using a wavelength-tunable soliton output of a photonic-crystal fiber **(Invited)**		**12:30 A. Johansson** (*Germany*) **and H. Stepp** Assessing the light distribution and the effective attenuation coefficient during interstitial photodynamic therapy
			12:50 I.A. Kuznetsova, N.M. Shakhova (*Russia*)**, I.A. Yanvareva, and E.E. Yunusova** OCT-colposcopy for cervical neoplasia diagnosis
13:30-15:00	**Lunch**		

Tuesday, July 21/ afternoon

<table>
<tr><td></td><td>HALL A</td><td>HALL B</td><td>HALL C</td></tr>
<tr><td></td><td>Nanobiophotonics</td><td>Terahertz Diagnostics and Treatment</td><td>Advanced Laser Applications in Biomedicine</td></tr>
<tr><td></td><td><u>Session</u>: Nanoparticle-based techniques
<u>Chair</u>: Chi-Kuang Sun</td><td><u>Session:</u> Young Scientists Session
<u>Chair</u>: Bob Miles</td><td><u>Session</u>: Tissue and nanoengineering
<u>Chair</u>: Alexander Sergeev</td></tr>
<tr><td rowspan="4">15:00-17:00</td><td>15:00 <u>W. Fritzsche</u> (Germany), A. Csaki, and R. Möller DNA-conjugated metal nanoparticle for bioanalytics, nanophotonics and nanoelectronics (Invited)</td><td>15:00-15:30 X.C. Zhang (USA) Introduction and Tutorial</td><td>15:00 V. Bagratashvili (Russia) Surface selective laser sintered bioresorbable scaffolds for tissue engineering (Invited)</td></tr>
<tr><td>15:30 S.M. Deyev (Russia) Barnase-Barstar module as a nanoconstructor for cancer imaging and therapy (Invited)</td><td rowspan="3">15:30-17:00
<u>M.N. Esaulkov</u>, A.P. Shkurinov, A.N. Khodan, M.M. Nazarov, O.M. Sarkisov "Dielectric properties of surface and bound water on porous nanostructured alumina measured by THz-TDS"
<u>A.A. Gorodetsky</u>, V.G. Bespalov "Terahertz holographic system – simulation and experimental approach"
<u>V.A. Kostin</u> and N.V. Vvedenskii "Broadband terahertz emission from long laser-produced plasma channels"
<u>S.P. Kovalev</u>, K.A. Kuznetsov, G.Kh. Kitaeva, A.N. Penin "Influence of Mg dopants on the optical properties of $LiNbO_3$ crystals in the terahertz range"
<u>S.M. Sergeev</u>, S.V. Morozov, K.V. Marem'yanin, D.I. Kuritsyn, A.V. Antonov, A.N. Yablonskiy, I.V. Erofeeva, V.I. Gavrilenko "Relaxation kinetics of impurity photoconductivity in terahertz range in semiconductor quantum well heterostructures"
<u>A.A. Silaev</u> and N.V. Vvedenskii "Extremely short laser pulses as an efficient terahertz source"
M.I. Bakunov, <u>M.V. Tsarev</u> "Optical excitation of terahertz surface plasmons on structured metal surfaces"</td><td>15:30 B. Chichkov (Germany) Laser-based nanoengineering for biomedical applications (Invited)</td></tr>
<tr><td>16:00 <u>E.V. Zagaynova</u> (Russia), M.A. Sirotkina, M.V. Shirmanova, V.V. Elagin, M.L. Bugrova, L.B. Snopova, P.D. Agrba, V.N. Nadtochenko, S.M. Deev, A.D. Mansfeld, and V.A. Kamensky Improving optical diagnostics and photothermal therapy of tumor by using gold nanoparticles (Invited)</td><td>16:00 <u>A.V. Kabashin</u> (France), M. Sentis, Ph. Delaporte, D. Grojo, A. Pereira, N. Sanner, O. Uteza Laser-assisted nanofabrication for biological sensing, imaging and therapeutics applications (Invited)</td></tr>
<tr><td>16:30 <u>N. Sapogova</u> (Russia), E. Chelnokov, L. Soustov, and N. Bityurin Theoretical model of UV laser-induced aggregation of β-crystallin in water solution</td><td></td></tr>
<tr><td>17:00-19:30</td><td colspan="3">Riverside Outings and Excursion in Shiryaevo</td></tr>
<tr><td>19:30-20:30</td><td colspan="3">Dinner</td></tr>
<tr><td>20:30-22:00</td><td colspan="3">Poster Session I</td></tr>
<tr><td>22:00-23:00</td><td colspan="3">Evening program</td></tr>
</table>

20:30-22:00	Poster Session I		Terahertz Imaging and Diagnostics
	Neuroimaging and Neurodynamics	**Nanobiophotonics**	**Session: Applications in biology and medicine** **Chair: Joo-Hiuk Son**
20:30-22:00	M.S. Burtsev, K.V. Anokhin, and P.P.G. Bateson, "The role of learning in evolution" L.E. Frumkina and L.G. Khaspekov, "Involvement of synaptic microvesicles in synaptogenesis in the developing rat neocortex" D.I. Iudin and V.V. Kazantsev, "Percolation effects in neuronal network development" A.S. Karavaev, I.V. Sysoev, B.P. Bezruchko, and P. Tass, "Investigation of coupling directionality using nonlinear granger causality approach with application to EEG data" L.G. Khaspekov, I.V. Mukhina, M.Yu. Bobrov, V.B. Kazantsev, L.E. Frumkina, Yu.N. Zakharov, E.V. Mitroshina, and M.V. Vedunova, "Cannabinoid receptor agonist n-arachidonoyldopamine modulates neuron-to-astrocyte calcium signaling in hippocampal cell culture" A.A. Lazutkin, S.A. Chekhov, A.V. Ivanova, D.V. Toptunov, S.V. Uljanov, M.A. Zots and K.V. Anokhin, "Neuroimaging of immediate early gene activity in the mouse brain with whole-mount immunohistochemisry" J. Liepe, "Interplay of growth and diversity in resonant behaviour of coupled neural oscillators" I. Osorio, G. Kochemasov, and T. Lyubynskaya, "Epileptic seizure blockage using implantable cooling system" O.I. Moskalenko, E.Yu. Sitnikova, A.E. Hramov, A.A. Koronovskii, and G. van Luijtelaar, "Application of continuous wavelet transform for analysis and automatic identification of spike-wave discharges and sleep spindles in epileptic EEG" A.S. Pimashkin, A.A. Lebedinsky, and A.V. Semyanov, "Astrocyte transporters role in neuroglia communication" Yu. N. Zakharov, I.V. Mukhina, and V.B. Kazantsev "Development of approaches for calcium concentration analysis by single-wavelength fluorescence imaging" A.V. Zhuravlev, A.V. Medvedeva, and E.V. Savvateeva-Popova "DAPI-cell bodies fluorescent staining for the confocal microscopy imaging of drosophila brain structures" P.A. Zykin, E.I. Krasnoshchekova, A.N. Yalfimov, and T.V. Melashenko "Features of human neocortex development during second gestational trimester. A possibility of cortex malformation diagnostic criteria"	D. Andreyev and K. Sokolov" Colloidal assemblies for biological and optical applications" T.Yu. Bazylenko, L.A. Osminkina, M.B. Gongalsky, R.A. Abidulina, V.A. Veligura, A.V. Motuzyuk, A.A. Kudryavtsev, A.H. Gaydarova, G.T. Sukhih, A.D. Durnev, and V.Yu. Timoshenko "Formation and investigation of biocompatible and bioactive silicon nanocrystals" V.V. Elagin, M.L. Bugrova, L.B. Snopova, M.A. Sirotkina, M.V. Shirmanova, N.N. Denisov, V.A. Nadtochenko, and E.V. Zagaynova "The influence of biocompatible gold nanoparticles on healthy mice" M.B. Gongalsky, V.Yu. Timoshenko, E.A. Konstantinova, and L.A. Osminkina "Direct optical detection of singlet oxygen in silicon nanocrystal systems" Y.F. Salykina, V.V. Jerdeva, M.S. Wakstein, S.V. Dezhurov, and A.P. Savitsky "In vivo detection of quantum dots in nude mice" M.A. Sirotkina, M.V. Shirmanova, V.V. Elagin, P.D. Agrba, V.A. Kamensky, V.A. Nadtochenko, and E.V. Zagaynova "OCT study of passive delivery of gold nanoparticles into tumor in vivo for local laser hyperthermia" R. Belyaev, G. Volkov, E. Krotov, A. Mansfel'd, P. Subochev, M. Sirotkina, V. Elagin, and E. Zagaynova "Passive acoustic method for noninvasive control of inner tumor temperature during laser hyperthermia" I.A. Zhurbina, V.Yu. Timoshenko, M.N. Rumyantseva, and A.M. Gaskov "Optical properties of tin oxide nanocrystals for sensor applications"	**20:30 M.M. Nazarov** (*Russia*)**, O.P. Cherkasova, A.P. Shkurinov, and V.V. Tuchin** Water in biological samples influence on THz spectra **(Invited)** **21:00 S.E. Peltek** (*Russia*)**, T.N. Goryachkovskaya, A.S. Kozlov, A.K. Petrov, M.A. Scheglov, V.A. Mordvinov, and V.M. Popik** FEL radiation use for large biomolecules ablation **(Invited)** **21:30 V.I. Fedorov** (*Russia*) Classification of living system reactions on terahertz radiation **(Invited)**

Wednesday, July 22

8:00-9:00	**Breakfast**		
9:00	**Arrival in Samara**		
9:00-13:30	**Excursion**		
13:30-15:00	**Lunch**		
14:00	**Departure from Samara**		
15:00-15:50	**Claude Boccara** (*France*) Full-field OCT: from bench to the operating room **[Plenary-8]**		
	HALL A	**HALL B**	**HALL C**
	Optical Bioimaging	**Terahertz Diagnostics and Treatment**	**Neuroimaging and Neurodynamics**
	Session: Fluorescence imaging **Chair: Herbert Stepp**	**Session: Terahertz metamaterials** **Chair: Galiya Kitaeva**	**Session: Neurodynamics 1. Oscillations and Synchrony** **Chair: Chi-Keung Chan**
16:00-17:20	**16:00 J. Axelsson, J. Swartling, K. Svanberg, and S. Andersson-Engels** (*Sweden*) Laser spectroscopy for medical treatment control **(Invited)**	**16:00 H.-T. Chen** (*USA*)**, J.F. O'Hara, A.K. Azad, W.J. Padilla, R.D. Averitt, W.L. Chan, D.M. Mittleman, X.G. Peralta, I.Brener, and A.J. Taylor** Terahertz metamaterials and devices **(Invited)**	**16:00 Y.-X. Li** (*Canada*) Synchrony and rhythmogenesis in diffusely distributed hormone secreting neurons **(Invited)**
	16:30 I. Turchin (*Russia*)**, M. Kleshnin, A. Orlova, I. Fiks, I. Meerovich, and A. Savitsky** Fluorescence imaging for detection of RFP-expressed tumors in small animals	**16:30 J. Han** *(Singapore)* THz applications in materials, surface plasmons and metamaterials **(Invited)**	**16:30 Y. Timofeeva** (*UK*) On the dynamics of resonant dendrites with active spines **(Invited)**
	16:50 I. Fiks (*Russia*)**, M. Kirillin, E. Sergeeva, and I. Turchin** Reconstruction of fluorophore distribution for fluorescence diffuse tomography	**17:00 A.N. Khodan** (*Russia*) **and A.P. Shkurinov** Materials design for terahertz optics: Problems and possible solutions **(Invited)**	**17:00 G.V. Osipov and M.A. Komarov** (*Russia*) Sequential activity by synaptic inhibition in a neuronal network
	17:05 L.R. Arslanbaeva (*Russia*)**, T.V. Ivashina, V.V. Jerdeva, and A.P. Savitsky** Novel FRET-based molecular biosensor for detecting of caspase-3 activity		
17:20-17:40	**Coffee break**		

	HALL A	HALL B	HALL C
	Optical Bioimaging	**Terahertz Diagnostics and Treatment**	**Neuroimaging and Neurodynamics**
	Session: Fluorescence imaging **Chair: Stefan Andersson-Engels**	**Session: Terahertz sources and detectors** **Chair: Nikolay Vinokurov**	**Session: Neurodynamics 2. Signal processing and control** **Chair: Victor Kazantsev**
17:40-19:00	**17:40 N.N. Bulgakova** (*Russia*)**, V.V. Sokolov, R.V. Ulijanov, K.A. Vereschagin, A.A. Teplov, I.G. Rusakov, and V.I. Chissov** *In vivo* local fluorescence spectroscopy and imaging of superficial bladder cancer	**17:40 G.Kh. Kitaeva** (*Russia*)**, S.P. Kovalev, A.N. Tuchak, and P.V. Yakunin** Non-linear optical methods of quasi-phase-matched terahertz generation and detection **(Invited)**	**17:40 I.Yu. Tyukin** (*UK, Russia, Japan*) Observer-based methods for fitting parameters of canonical model neurons from input-output observations **(Invited)**
	18:00 M.V. Shirmanova (*Russia*)**, I.V. Balalaeva, M.A. Sirotkina, A.G. Orlova, I.V. Turchin, and E.V. Zagaynova** Investigation of photosensitizers pharmacokinetics *in vivo* by fluorescence transillumination imaging	**18:10 S.A. Kozlov** (*Russia*) The propagation of a few cycle THz pulse: Methods of analysis **(Invited)**	**18:10 A. Zaikin** (*UK*) **and E. Ullner** Influence of noise and coupling on signal processing in neural oscillators population
	18:20 I.G. Meerovich (*Russia*)**, L.R. Arslanbaeva, M.M. Shchigreva, D. Sokolova, O.S. Burova, N.V. Andronova, E.M. Treshalina, A.Ju. Baryshnikov, and A.P. Savitsky** Studying of immunophenoptype of mel Kor-Turbo-RFP cells *in vitro* and *in vivo*	**18:40 M.I. Bakunov** (*Russia*)**, M.V. Tsarev, and S.B. Bodrov** Strongly subluminal regime of optical rectification for improving near-field terahertz microscopy	**18:30 D.A. Smirnov** (*Russia*)**, E.V. Filina, E.Yu. Sitnikova, and B.P. Bezruchko** Changes in brain local field potentials before epileptic discharge: Empirical modelling of data from WAG/Rij rats
19:00-20:00	**Dinner**		
20:00-21:30	**Poster Session II**		
22:00-23:00	**Evening program**		

20:00-21:30	Poster Session II	
	Optical Bioimaging	**Advanced Laser Applications in Biomedicine**
20:00-21:30	P.D. Agrba, M.Yu. Kirillin, A.N. Denisenko, V.A. Kamensky, and V.V. Zagaynov "Differentiating inflammation from carcinoma in OCT images of biotissues using mechanical compression" R. Cernat, G. Dobre, A. Bradu, and A.Gh. Podoleanu "Spectral shaping of a broadband optical source with a double-pass prism sequence for FD-OCT imaging at 840 nm wavelength operation" A. Galimov "Approaches to whole-body molecular imaging of tumor necrosis factor in autoimmune and infectious disease models" E.B. Kiseleva, M.M. Karabut, N.D. Gladkova, Yu.V. Fomina, I.A. Kuznetsova, L.B. Snopova, and O.S. Evdokimova "Assessing polarization properties of mucous keratin and collagen by the method of cross-polarization OCT" N.G. Golubiatnikova, A.G. Orlova, A.V. Maslennikova, G.Yu. Golubiatnikov, V.A. Kamensky, V.I. Plekhanov, I.P. Ivanova, T.I. Prianikova, and N.M. Shakhova "The study of oxygen blood saturation dynamics in two tumor models under chemotherapy action using diffuse optical tomography" R.R. Kalugina, I.A. Yanvareva, S.V. Gamayunov, V.V. Slugarev, E.E. Yunusova, and N.M. Shakhova "Noninvasive monitoring of pathophysiological processes in PDT" P.D. Agrba, A.N. Morozov, E.V.Zagaynova, A.V.Zheglov, and V.A. Kamensky "Polarized reflectance spectroscopy based on polarization maintaining fiber" M.M. Karabut, E.B. Kiseleva, E.V. Orinicheva, I.V. Balalaeva, E.A. Tararova, O.S. Streltsova, A.V. Maslennikova, and N.D. Gladkova "Capabilities of numerical analysis of OCT images for assessing radioleision of tunica mucosa of mouth and urinary bladder" A.R. Katichev and E.A. Sergeeva "Optical limitations of dense biotissues imaging with two-photon fluorecsence microscopy" M.S. Kleshnin, V.A. Kamensky, and I.V. Turchin "Fluorescence tomography for small animal imaging with RFP-expressing tumors based on dispersion of biotissue absorption" G.D. Lapshin and A.P. Savitsky "FRET sensor for investigation of MMP2 and MMP9 (72- and 92- kDa gelatinases) activity" O.V. Onoprienko, N.D. Gladkova, E.E. Yunusova, and N.M. Shakhova "Cross-polarization OCT in visualization of endometrium" A.L. Rusanov, T.V. Ivashina, and A.P. Savitsky "Substrates for lifetime imaging of the caspase-3 activity" E.A. Shirshin and V.V. Fadeev "Nonlinear laser spectroscopy determination of energy transfer rate in the molecule of fluorescent protein (by the example of MRFP1)" V.V. Slugarev, S.R. Pahomov, S.V. Gamayunov, A.N. Denisenko, and N.M. Shakhova "Optical coherence tomography for determining proximal border of resection at cancer of cardia" L.B. Snopova, S.G. Radenska-Lopovok, N.D. Gladkova, and M.M. Karabut "Quantitative assessment of OCT image contrast for morphological justification of visualization of pathological processes in human mucous membranes" O.S. Streltsova, E.V. Zagaynova, N.D. Gladkova, M.M. Karabut, E.B. Kiseleva, and E.A. Tararova "Polarization optical coherence tomography expands the diagnostic potential in urology" O. Zakharkina, M. Shakhova, I. Balalaeva, E. Sergeeva, V. Kamensky, and N. Ignatieva "Perichondrium: Optical visualization of the layer structure and interconnection with hyaline cartilage"	A.A. Brilkina, L.V. Dubasova, I.V. Balalaeva, A.G. Orlova, E.A. Sergeeva, A.R. Katichev, and N.M. Shakhova "Subcellular distribution of photosensitizers in human cancer cells" S.V. Gamayunov, V.V. Slugarev, R.R. Kalugina, A.N. Denisenko, and N.M. Shakhova "Analysis of the efficiency of photodynamic therapy of skin cancer with photosensitizer photoditazin" M.A. Shakhova, G.Yu. Golubiatnikov, V.A. Kamensky, and L.B. Snopova "Comparative analysis of laser and radio frequency impact on biotissues"
22:00-23:00	**Evening program**	

8:00-9:00	**Breakfast**		
9:00-9:50	**Derek Abbott** (*Australia*) Biosensing in the terahertz regime **[Plenary-9]**		
9:50-10:40	**Matthew Larkum** (*Switzerland*) Dendritic recordings in freely moving animals **[Plenary-10]**		
10:40-11:00	**Coffee break**		
	HALL A	**HALL B**	**HALL C**
	Nanobiophotonics	**Neuroimaging and Neurodynamics**	**Advanced Laser Applications in Biomedicine**
	Session: Nanoparticle-based techniques **Chair: Elena Zagainova**	**Session: Neuroimaging 2** **Chair: Alexey Semyanov**	**Session: Laser clinical application** **Chair: Natalia Shakhova**
11:00-13:30	**11:00 J.A. Hollingsworth** (*USA*)**, H. Htoon, J. Vela, Y. Chen, A.R. Casson, V.I. Klimov, F. Garcia Santamaria, D.J. Werder, and J.L. Casson** Suppressed blinking and suppressed auger recombination in "giant" nanocrystal quantum dots: Novel fluorescent probes for advanced bioimaging applications **(Invited)**	**11:00 D. Choquet** (*France*) Integrating surface and intracellular trafficking of glutamate receptors in neuronal spines **(Invited)**	**11:00 I.I. Berishvili** (*Russia*)**, L.E. Chvichia, M.T. Kozaeva, P.V. Gusev, Y.V. Ignatieva, and Z.T. Kasaeva** New laser applications for cardiosurgery (**Invited**)
	11:30 J.U. Sutter (*UK*)**, D.J.S. Birch, and O.J. Rolinski** Core-shell type semiconductor nanocrystals as transition metal ion sensors	**11:30 A. Fukuda** (*Japan*)**, T. Furukawa, T. Morishima, and T. Kumada** Physiological roles of taurine-mediated tonic $GABA_A$-receptor activation in corticogenesis **(Invited)**	**11:30 R. Sroka** (*Germany*)**, M. Seitz, CG. Schmedt, and M. Bader** Advances in clinical laser applications – urology and phlebology **(Invited)**
	11:50 V.Yu. Timoshenko (*Russia*) Light-emitting semiconductor nanocrystals for biomedical applications **(Invited)**	**12:00 M. Nuriya** (*Japan*) **and M. Yasui** Imaging membrane potential dynamics in dendrites using second harmonic generation imaging **(Invited)**	**12:00 H. Stepp** (*Germany*)**, M. Bader, D. Zaak, M. Kriegmair, M. Ehlers, A. Karl, T. Pongratz, W. Beyer, and Ch. Stief** Whole bladder wall white light PDT for the treatment of bladder **(Invited)**
	12:20 I.V. Balalaeva (*Russia*)**, T.A. Zdobnova, A.A. Brilkina, M.V. Shirmanova, I.M. Krutova, O.A. Stremovsky, E.N. Lebedenko, V.A. Vodeneev, I.V. Turchin, and S.M. Deyev** Whole-body imaging of small animal tumors with bioconjugated quantum dots	**12:30 P.M. Balaban** (*Russia*) **and A.Yu. Malyshev** Imaging of caspase activity in individual neurons **(Invited)**	**12:30 V.M. Moiseenko, M.L. Gelfond** (*Russia*)**, I.A. Baldueva, T.L. Nehayeva, A.V. Novik, O.L. Fahrutdinova, A.O. Danilov, and A.B. Danilova** Combination of dendritic cells vaccine and photodynamic therapy shows promising results in patients with disseminated melanoma **(Invited)**
	12:40 L.G. Klapshina (*Russia*)**, W.E. Douglas, I.S. Grigoryev, M.V. Shirmanova, and A.I. Korytin** Novel cyanoporphyrazine ytterbium and vanadium complexes for potential photonic and biophotonic applications	**13:00 G. Kochlamazashvili, O. Bukalo, C. Henneberger, E. Dvoretskova, G. Dityateva, D. Rusakov, M. Schachner, and A. Dityatev** (*Germany, Italy*) Formation and functions of the extracellular matrix in the brain **(Invited)**	**13:00 N.N. Mitrakova** (*Russia*) **and V.Yu. Muravyev** The use of laser technology in endoscopy
	13:00 A.M. Priezhev (*Russia*) The effect of nanoparticles on the microrheologic properties of blood **(Invited)**		**13:15 G. Altshuler** (*Presented by F.Feldchtein on behalf of G. Altshuler, USA*) Fractional thermolysis – new paradigm of skin rejuvenation
14:00-15:00	**Lunch**		

Thursday, July 23 / afternoon

	HALL A	HALL B	HALL C
	Terahertz Diagnostics and Treatment	**Neuroimaging and Neurodynamics**	**Advanced Laser Applications in Biomedicine**
	Session: Terahertz imaging **Chair: Alexander Shkurinov**	**Session: Systemic neuroscience and human brain 2** **Chairs: Hideaki Koizumi, Andreas Ioannides**	**Session: Laser clinical and biomedical applications** **Chair: Mark Gelfond**
15:00-17:00	**15:00 K. Kawase** (*Japan*)**, S. Hayashi , T. Shibuya, and K. Suizu** THz wave generations and imaging applications **(Invited)**	**15:00 A.Ya. Kaplan** (*Russia*)**, S.L. Shishkin, A.Yu. Zhigalov, I.P. Ganin, and I.A. Basyul** On the way to symbiotic brain–computer interface **(Invited)**	**15:00 F. Feldchtein** (*USA*)**, G. Altshuler, A. Belikov, and A. Skrypnik** Microbeams in laser dentistry and surgery – from drug delivery to pain-free tooth drilling **(Invited)**
	15:30 G. Acuna, S.F. Heucke, M. Handloser, and R. Kersting (*Germany*) Terahertz near-field microscopy with extreme subwavelength resolution **(Invited)**	**15:30 N.V. Manyakov and M.M. Van Hulle** (*Belgium*) Discrimination of attention in a cognitive invasive brain-machine interface	**15:30 D.C. Dumitras** (*Romania*)**, D.C.A. Dutu, M. Patachia, A.M. Bratu, M. Petrus, and C. Achim** Laser photoacoustic spectroscopy for exhaled biomarker measurements **(Invited)**
	16:00 N.N. Zinov'ev (*Russia*) Terahertz confocal imaging **(Invited)**	**15:50 K.V. Anokhin** (*Russia*) Imaging immediate-early gene activity of large population of neurons **(Invited)**	**16:00 A.A. Krasnovsky** (*Russia*) Singlet oxygen and mechanisms of biological action of laser radiation **(Invited)**
	16:30 C. Zhang (*China*) Some applications of terahertz imaging **(Invited)**	**16:20 E.S. Nikitin** (*Russia*) **and P.M Balaban** Optical recording of axonal spike processing and its alterations concomitant with long-term memory	**16:30 Yu. Vladimirov** (*Russia*) Mechanisms of biostimulating action of low-power laser and LED radiation **(Invited)**
17:00-17:30	**Coffee break**		
17:00	**Arrival in Cheboksary**		

Thursday, July 23 / evening

	HALL A	HALL B	HALL C
	Terahertz Diagnostics and Treatment	**Neuroimaging and Neurodynamics**	**Advanced Laser Applications in Biomedicine**
	Session: Terahertz spectroscopy and instrumentation **Chair: Kodo Kawase**	**Session: Experimental neurodynamics** **Chair: Alexander Dityatev**	**Session: Laser ion accelerators** **Chair: Alexander Sergeev**
17:30-19:00	**17:30 Y. Ozeki** (*Japan*) **and K. Itoh** Stimulated Raman scattering microscopy: Toward highly sensitive vibrational imaging in the terahertz regime **(Invited)**	**17:30 T. Hosoya** (*Japan*) Novel visual functions of the retina **(Invited)**	**17:30 T. Ceccotti** (*France*)**, A.Giulietti, and Ph. Martin** Laser accelerated protons and electrons in medical applications: Two different approaches to tumor treatment **(Invited)**
	18:00 B.A. Knyazev (*Russia*)**, V.S. Cherkassky, V.V. Gerasimov, and M.G. Vlasenko** Imaging ATR-spectroscopy and interferometry using intense monochromatic terahertz radiation **(Invited)**	**18:00 C.H. Chang, P.Y. Lai, and C.K. Chan** (*Taiwan*) Synchronization of neuronal cultures with and without glia **(Invited)**	**18:00 Y. Fukuda** (*Japan*)**, A.Ya. Faenov, M. Tampo, T.A. Pikuz, T. Nakamura, M. Kando, Y. Hayashi, A. Yogo, H. Sakaki, T. Kameshima, A.S. Pirozhkov, K. Ogura, M. Mori, T.Zh. Esirkepov, J. Koga, A.S. Boldarev, V.A. Gasilov, A.I. Magunov, R. Kodama, P.R. Bolton, Y. Kato, T. Tajima, H. Daido, and S.V. Bulanov** Novel path towards compact laser ion accelerators for hadron therapy: Tenfold energy increase in laser-driven multi-MeV ion generation using a cluster-gas target **(Invited)**
	18:30 S.M. Pershin (*Russia*)**, and A.F. Bunkin** THz four-photon spectroscopy of ortho/para H_2O spin-isomer in liquid water: Non-equilibrium ratio **(Invited)**	**18:30 I.V. Mukhina** (*Russia*)**, V.B. Kazantsev, L.G. Khaspekov, S.A. Korotchenko, and E.A. Koryagina** Network dynamics and spiking activity in cultured hippocampal neurons	
19:00-22:00	**Sightseeing in Cheboksary**		
22:00	**Departure from Cheboksary**		
22:00-24:00	**Conference Reception**		

Friday, July 24

7:30-8:30	**Breakfast**		
8:00	**Arrival in Makariev**		
8:30-11:30	**Excursion**		
12:00	**Departure from Makariev**		
12:00-12:30	**Coffee break**		
	HALL A	**HALL B**	**HALL C**
	Advanced Laser Applications in Biomedicine	**Neuroimaging and Neurodynamics**	**Terahertz Diagnostics and Treatment**
	Session: Fundamental sciences for medicine **Chair: Yury Vladimirov**		**Session: Terahertz spectroscopy and instrumentation** **Chair: Vladimir Bratman**
12:30-13:30	**Round Table Discussion on the Program of the Presidium of the Russian Academy of Sciences**	**Round Table Discussion**	**12:30 S.P. Belov** (*Russia*) Modern perspectives of the FASSST technique applications for the ultrahigh sensitive polar trace gases detection **(Invited)**
			13:00 A.F. Bunkin (*Russia*) **and S.M. Pershin** THz and GHz four-wave mixing spectroscopy of biopolymers and carbon nanotubes aqueous solutions **(Invited)**
13:30-15:00	**Lunch**		

	HALL A	HALL B	HALL C
	Optical Bioimaging	**Nanobiophotonics**	**Terahertz Diagnostics and Treatment**
	Session: DOT and tissue spectroscopy **Chair: Bruce Tromberg**	**Session: Biosensors** **Chair: Michael Schmitt**	**Session: Terahertz imaging** **Chair: Roland Kersting**
15:00-17:00	**15:00 D.C. Dutu** (*Romania*)**, D.C. Dumitras, M. Patachia, M. Dicu, X. Liang, H. Jiang, and N. Iftimia** Multispectral CW diffuse optical tomography system: testing and calibration	**15:00 D.V. Novikov** (*Russia*)**, A.V. Alyasova, V.V. Novikov, K.N. Kontorshikova, and D.I. Knyazev** Biochip for detection of mRNA of cancer/testis antigens	**15:00 R.E. Miles** (*UK*)**, M.R. Stringer, K. Ozanyan, Y. Zhang, P. Wright, J. Young, D. Richardson, and A. Malinowski** Diffraction effects in time-domain tomographic imaging **(Invited)**
	15:20 A.B. Konovalov (*Russia*)**, V.V. Vlasov, D.V. Mogilenskikh, O.V. Kravtsenyuk, and V.V. Lyubimov** Time-domain diffuse optical tomography based on the photon average trajectory method: Reconsruction, restoration and segmentation	**15:20 M.A. Usachev, E.N. Lukashev, M. Mamedov, G.V. Nizova, O.M. Sarkisov, A.Yu. Semenov, and V.A. Nadtochenko** (*Russia*) Mesoporous TiO_2 matrixes for immobilization of enzymes and photoenzymes and applications for photovoltaic and sensory devices	**15:30 K. Tanaka** (*Japan*) Real-time terahertz near-field microscope **(Invited)**
	15:40 A.G. Orlova (*Russia*)**, A.V. Maslennikova, G.Yu. Golubiatnikov, N.M. Shakhova, V.I. Plekhanov, V.A. Kamensky, and I.V. Turchin** Breast cancer detection by multispectral diffuse optical tomography	**15:40 A.V. Kraiski, T.V. Mironova, T.T. Sultanov, V.A. Postnikov, and A. A. Kraiski** (*Russia*) Optical properties of holographic sensors and measurement of sensors non-uniformity by colorimetric method based on a digital camera	**16:00 M. Tonouchi** (*Japan*) Laser terahertz emission microscope and its applications **(Invited)**
	16:00 A.V. Maslennikova (*Russia*)**, A.G. Orlova, G.Yu. Golubiatnikov, V.A. Kamensky, V.I. Plekhanov, L.B. Snopova, A.A. Babaev, T.I. Prianikova, N.M. Shakhova, and I.V. Turchin** Noninvasive detection of oxygen status of two tumor models using diffuse optical tomography	**16:00 V.A. Postnikov, A.V. Kraiskii, T.T. Sultanov, V.V. Deniskin, and A.V. Khamidulin** (*Russia*) Holographic glucose sensors	**16:30 E. Pickwell-MacPherson, Y. Chen and W.K. Ku** (*Hong Kong*) *In vivo* terahertz pulsed imaging – a potential medical imaging modality **(Invited)**
	16:20 D. Khoptyar (*Sweden*)**, T. Svensson, E. Alerstam, and S. Andersson-Engels** Ultra-wideband continuously tunable photon time-of-flight absorption/scattering spectrometer for analysis of biological tissues and pharmaceutical solids	**16:20 A.V. Nashchekin** (*Russia*)**, A.I. Sidorov, O.A. Usov, K.K. Turoverov, V.A. Tsekhomsky, N.V. Kurbatova, O.A. Podsvirov, N.V. Nikonorov, V.N. Nevedomskii, and R.V. Sokolov** SPR biosensors based on silver nanoparticles in photothermochromic glasses	
17:00	**Closing Session**		
17:30	**Arrival in Nizhny Novgorod**		
18:00-20:00	**Visit to the Institute of Applied Physics**		
21:00-22:00	**Departure from Nizhny Novgorod**		
21:00-24:00	**Night tour of Nizhny Novgorod** **(for the participants departing by Lufthansa)**		