

**Russian-Germany Conference on Biomedical Engineering «RGC-2019»
3 – 6 July 2019**

**Saint-Petersburg Electrotechnical University «LETI»,
Saint Petersburg, Professor Popov street, 5, phone (812) 234-2159**

CONFERENCE PROGRAM

3 July 2019

PARTICIPANTS REGISTRATION

9.00 – 10.00, Conference hall, University building №5

PLENARY SESSION

10.00 – 13.00, Conference hall, University building №5

10.00 – 10.10	Professor V.N. Sheludko Greetings of ETU Rector.
10.10 – 10.20	Program Committee. Greetings.
10.20 – 10.50	Professor Z. M. Yuldashev Heart rate disorders identification using superficial ECG and invasive electrogram
10.50 – 11.20	Professor Dr Mau Jochen Dynamics That Underlie Concepts of Entropy.
11.20 – 11.50	Professor S. I. Shchukin Technology of dynamic visualization of heart activity by multichannel electrical impedance measurements
11.50 – 12.20	Professor Walter Marian Hardware-in-the-loop test bench for artificial lungs.
12.20 – 12.50	T. M. Zimina Hybrid devices for express multiparametric biomedical diagnostics
12.50 – 13.00	Information of the Organizing Committee.
13.00 – 14.00	Lunch

SCIENTIFIC SESSION

BIOMATERIALS, IMPLANTS, ARTIFICIAL ORGANS

14.00 – 16.40, Conference hall, University building №5

14.00 – 14.10	Photodynamic fullerene-oxygene action on biological tissues: virtual lab N. G. Gogoleva, V. N. Mironov
14.10 – 14.20	Zero-Torque Control of an Exoskeleton Joint Actuator using a Disturbance Observer L Bergmann, L Liu, C Ngo, B Misgeld, S Leonhardt
14.20 – 14.30	Hardness maps analysis of the layered nanocomposites for tissue repair of the cardiovascular system A. Yu. Gerasimenko, L. P. Ichkitidze, U. E. Kurilova, D. T. Murashko, D. A. Potapov
14.30 – 14.40	Biological tissues selective damage by microbubbles formation: numerical modeling N. G. Gogoleva
14.40 – 14.50	Studies of Multilayer Composite Materials Obtained by Laser Printing U. E. Kurilova Yu. O. Fedorova, A. A. Polokhin, A. Yu. Gerasimenko
14.50 – 15.00	Geometrical design of LC-circuits as a part of inductive power supply systems for implantable medical devices R. R. Aubakirov, A. A. Danilov

- 15.00 – 15.10 Development of an Artificial Ventricle Control System
A. V. Shcherbachev, I. A. Kudashov, E. A. Bychkov, G. P. Itkin, A. S. Buchnev, M. A. Maslennikov, A. Z. Galyamov
- 15.10 – 15.20 Calculation of the induced electromagnetic pulse shape in the tissues of biological objects
V. D. Goncharov, E. G. Evdakova, R. V. Yashkardin
- 15.20 – 15.30 Powering of implantable medical devices: history, current status and prospects
A. A. Danilov
- 15.30 – 15.40 Investigation of Albumin Denaturation When Exposed to a Nanosecond Laser Source
M. S. Savelyev, N. O. Agafonova, P. N. Vasilevsky, D. I. Ryabkin, A. Y. Gerasimenko
- 15.40 – 15.50 Mathematical modelling of peritoneal dialysis and ultrafiltration for wearable artificial kidney with dialysate regeneration unit
B. M. Putrya, N.A. Bazaev, N.M. Zhilo, E.V. Streltsov, Ya.A. Shimarova
- 15.50 – 16.00 The study of electrokinetic properties of buccal epithelium
A. A. Rumyantseva, A. E. Kosorukov, G. A. Kolokolnikov, N. E. Norkin, A. K. Volkov
- 16.00 – 16.10 Electrical stimulation of cell growth on layers of composite material based on carbon nanotubes and polymers
P. Yu. Privalova, A. Yu. Gerasimenko, V. A. Petukhov, E. N. Shimarov, I. A. Suyetina, M A Mezentseva
- 16.10 – 16.20 Printed Disposable Electrochemical Sensor for Biomedical Applications
A. V. Pudova, T. M. Zimina, I. V. Mandric
- 16.20 – 16.30 The study of electrokinetic properties of buccal epithelium
A. A. Rumyantseva, A. E. Kosorukov, G. A. Kolokolnikov, N. E. Norkin, A. K. Volkov
- 16.30 – 16.40 Use of laser welding for combining hyaline cartilage and subchondral bone with a nanocomposite based on bovine serum albumin and carbon nanotubes
D. I. Ryabkin, N. A. Taritsyna, N. N. Zhurbina, D. A. Ignatov, A. Yu. Gerasimenko

SCIENTIFIC SESSION
DIAGNOSIS AND ANALYSIS IN SURGERY
14.00 – 16.20, Lecture room 5652

- 14.00 – 14.10 In silico comparison of control strategies of insulin therapy for type 1 diabetes during physical activity using the extended sorenson glucoregulatory model
B. Romanski, C. Benner, B. Glasmacher, S. Leonhardt, M. Walter
- 14.10 – 14.20 Development of biosensors for express-detection of protein markers of diseases in blood using peptide biorecognition elements
N. O. Sitkov, V. A. Karasev, V. V. Luchinin, T. M. Zimina
- 14.20 – 14.30 Method for estimating the heating temperature of biological tissue in electrosurgical myomectomy
V. A. Karpuhin, A. S. Fomenko, I. D. Panov
- 14.30 – 14.40 Differential diagnostics of skin pigmented lesions with the aim of early detection of precancerous changes based on the analysis of clinical images
E. N. Rinskaya, A. O. Schadko, A. N. Briko, I. A. Deshin, A. P. Nikolaev, I. V. Reshetov

- 14.40 – 14.50 VEP amplitude variability for the 3x3, 5x5 and 8x8 reversible checkerboard LED pattern size in multiple sclerosis diagnostic: Study on the health subjects
A. N. Dmitriev, E. D. Osintseva, V. V. Gress, I. S. Kuvshinova
- 14.50 – 15.00 X-ray microtomography: control of the internal structure of nanocomposites based on carbon nanofibers and the degree of their bioresorption
D. A. Ignatov, N. N. Zhurbina, V. V. Zar, N. G. Cherepanova, A. E. Semak, A. Yu. Gerasimenko
- 15.00 – 15.10 Trends in Animal Welfare and Veterinary Informatics
D. I. Kaplun, A. M. Sinitca, S. A. Romanov, A. Zamansky, S. Bleuer-Elsner, D. van der Linden
- 15.10 – 15.20 Electrode System Sensitivity Evaluation at Longitudinal-transverse Precardiac Impedance Heart Mapping
N. V. Seleznev, A. N. Briko, I. A. Deshin, A. N. Tikhomirov
- 15.20 – 15.30 Test method of vein hysteresis measurement
N. V. Belikov, A. S. Borde, I. V. Khaydukova, G. V. Savrasov
- 15.30 – 15.40 Comparative study of biosensing principles: FET, impedimetric, light scattering, with regard to operational efficiency in antibiotic resistance testing
T. M. Zimina, N. O. Sitkov, Yu. A. Volkov, D. D. Lobanov
- 15.40 – 15.50 Hybrid-integrated lab-on-a-chip for total express-microbiological analysis: state of the art and the nearest perspectives
T. M. Zimina, V. V. Luchinin, N. O. Sitkov, Yu. A. Gvozdev, V. E. Lemoserskii, Yu. D. Orekhov
- 15.50 – 16.00 Recognition of Certain Types of Pathologies on Medical X-ray Images
N. E. Staroverov, A. Yu. Gryaznov, E. D. Kholopova, K. K. Guk
- 16.00 – 16.10 Analyzer of malonic dialdehyde level in blood based on the method of derivative spectrophotometry
N. M. Safyannikov, O. I. Bureneva, N. L. Ronzhina, O. B. Kostrova, I. B. Landau
- 16.10 – 16.20 Compression elastography and endoscopic optical coherence tomography for biomechanical properties evaluation of cerebral arteries walls with aneurysm and their phantoms
S. V. Frolov, A. Yu. Potlov, T. A. Frolova, S. G. Proskurin

SCIENTIFIC SESSION
BIOMEDICAL SIGNAL AND DATA PROCESSING AND ANALYSIS
IMAGE RECOGNITION

4 July 2019

11.00 – 15.20, Lecture room 5652

- 11.00 – 11.10 Methodical support of monitoring the acoustic safety of flight personnel
S. P. Dragan, A. V. Bogomolov, V. N. Zinkin
- 11.10 – 11.20 Telemedicine System Model to Help Children with Autism Spectrum Disorders
R. Seepold, G. Lebedev, N. Martínez Madrid
- 11.20 – 11.30 Synthesis of Cardiac Signals using a Copula-Approach
Diogo Filipe Pereira, Fontes Fernandes Silva, Steffen Leonhardt, Christoph Hoog Antink
- 11.30 – 11.40 Development of Methods and Algorithms for Determining Heart Rhythm of the Patient with the Help of the Biomodule
A. A. Galyastov, Ph. Yu. Kopylov, D. V. Telyshev
- 11.40 – 11.50 Multichannel bioimpedance forearm mapping for biosignal management
A. N. Briko, S. E. Selutina

- 11.50 – 12.00 Development of software for the express diagnostics of skin pigmented lesions based on the analysis of clinical images
I. A. Deshin, E. N. Rinskaya, I. A. Apollonova, K. G. Kudrin, Z. B. Nursultanova, A. P. Nikolaev
- 12.00 – 12.10 Numerical simulation of single-photon emission computed tomography in a proportional scattering medium
A. Yu. Lysenko, S. A. Tereshchenko
- 12.10 – 12.20 Development of the method for impedance calibration in rheography
P. V. Luzhnov, A. V. Kobelev, S. I. Shchukin
- 12.20 – 12.30 Software development for contrast control of magnetic resonance images
Yu.V. Bogachev, A.V. Nikitina
- 12.30 – 12.40 Prediction of Hearing Aid Benefit with the Use of the Matrix Sentence Test
O. A. Markelov, D. I. Kaplun¹, I. P. Berdnikova, N. V. Maltseva, A. Warzybok, M. Yu. Boboshko, B. Kollmeier
- 12.45 – 12.50 Dynamic Analysis of Biomedical Signals in Phase Space Using the Poincaré Plot
A. P. Nemirko, L. A. Manilo, P. Y. Timofeeva
- 12.50 – 13.00 Simulation of the Surface Electromyogram Signal and Its Noise Interference During Registration
S. K. Kadirov, M. V. Markova, P. A. Shostak
- 13.00 – 14.00 Lunch
- 14.00 – 14.10 Algorithms for Effective Assessment of Physical Activity and Lifestyle in Gestational Diabetes Patients
E.A. Pustozherov, V.Ya. Chernykh, P.V. Popova, A.S. Tkachuk, E.A. Vasukova
- 14.10 – 14.20 Algorithm for detecting HCM signs based on the precordial rheocardial signals analysis
A. I. Malakhov, A. N. Tikhomirov, S. I. Shchukin, V. Y. Kaplunova, N. Y. Markova, N. V. Kozlova
- 14.20 – 14.30 About the features of three-dimensional visualization of the results of tomographic research
I. A. Larionov, V. B. Bessonov, V. V. Klonov
- 14.30 – 14.40 The study of the informativeness of the geometric facial parameters for the preliminary diagnosis of hereditary diseases
V. S. Kumov, A. V. Samorodov, I. V. Kanivets, K. V. Gorgisheli, V. G. Solonichenko
- 14.40 – 14.50 Decision support system modeling for the developing of a therapeutic strategy by a psychiatrist based on the dynamics of electrical conductivity parameters
T. V. Kukharova, I. M. Novozhilov
- 14.50 – 15.00 Development of a method and a system for evaluation sportsman's physiological reserves
N. M. T.guyen, Z. M. Yuldashev, Tr. T. Nguyen, Tr. H. Tran, E.A. Daminova, A.A. Tomchuk
- 15.00 – 15.10 The application of mathematical modeling to diagnose diseases of the digestive system
N. M. Sheliakina, G. A. Mashevsky, M. I. Skalinskaya, I. A. Rasmagina
- 15.10 – 15.20 Generalized Synchronization of the cortex as a mesh network of communicating neurons
V. E. Antsiperov, V. A. Kershner
- 17.00 – 20.00 Cultural program

SCIENTIFIC SESSION
MECHATRONICS AND BIOMEDICAL ENGINEERING
4 July 2019
11.00 – 15.20, Conference hall, University building №5

- 11.00 – 11.10 Methods for testing the firmware of the ECG continuous diagnostics module
I. N. Rodionov, D. V. Telyshev, I. V. Nesterenko
- 11.10 – 11.20 Behavioural Model of Memristors Used as Elements of Neuromorphic Systems
E. B. Solovyeva, H. Toepfer, H. Harchuk
- 11.20 – 11.30 Development of Biotechnical System for the Diagnosis of Lymphostasis
A. V. Shcherbachev, I. A. Kudashov, I. V. Reshetov, A. A. Zakirova, E. A. Bychkov, A. Z. Galiamov
- 11.30 – 11.40 Combined Magnetic Field Sensor with Nanoscale Elements
L. P. Ichkitidze, S. V. Selishchev, D. A. Potapov, D. V. Telyshev
- 11.40 – 11.50 A Topological Classification Method of the Portal Vein System Affluent Branches
A. A. Smirnov, E. M. Trunin, G. A. Mashevsky, Y. V. Timakova, A. L. Ovsepyan, A.I. Nazmiev, R. E. Topuzov, V. V. Petrova, P. A. Sizov
- 11.50 – 12.00 The Influence of the Relative Position of the Coils on the Biological Tissues Heating Caused by the Operation of Inductive Transcutaneous Energy Transfer System
E. V. Ryabchenko
- 12.00 – 12.10 Multifactorial rig for research of inductive powering systems with arbitrary orientation of the coils
A. A. Danilov, E. A. Mindubaev, K. O. Gurov
- 12.10 – 12.20 Mathematical Modeling of the Fontan Circulation – Ventricular Assist Device Interaction
E. N. Rubtsova, A. G. Markov, D. V. Telyshev
- 12.20 – 12.30 System for non-invasive monitoring of fetal activity
Yu. O. Bobrova
- 12.30 – 12.40 Animal trials of closed-loop insulin delivery system based on continuous non-invasive glucose monitoring
K.V. Pozhar, E.L. Litinskaia, P.A.Rudenko, N.A. Bazaev
- 12.45 – 12.50 The study of the process of radiowave removal of rhinophyma
V. A. Karpuhin, I. D. Panov, A. S. Fomenko
- 12.50 – 13.00 Application of the Random Forest Machine Learning Algorithm for Recognizing Patient Arm Movements While Using a Bionic Prosthesis
N. I. Burtsev, V. C. Shagdurov, I. O. Demkin
- 13.00 – 14.00 Lunch
- Lecture room 5552**
- 14.00 – 14.10 A Mathematical Model of Non-invasive Glucometer Based on Spectrometric Principle
B. S. Gurevich, V. V. Shapovalov, S. Yu. Dudnikov, I. G. Zagorskiy
- 14.10 – 14.20 Effect of Class E Power Amplifier Loading Network on Output Power and Efficiency of Inductive Powering System for Implantable Medical Devices
E. A. Mindubaev, A. A. Danilov
- 14.20 – 14.30 Wearable system for detecting epileptic episodes in real time
E. A. Daminova

- 14.30 – 14.40 Development of a concentration unit for the automated system for incorporating L-asparaginase into human erythrocytes
A. S. Makagonova, N. S. Kushnir, D. V. Borsakova, A. V. Samorodov, F. I. Ataulakhanov
- 14.40 – 14.50 Portable home use mammograph for detection breast tumors
A. V. Yastrebov, P. M. Trofimov, V. N. Osadchy, A. B. Kozyrev, V. V. Shapovalov
- 14.50 – 15.00 Features of the practical application of microfocus x-ray tomograph in biomedical engineering
A. V. Obodovskiy, V. B. Bessonov, I. A. Larionov.
- 15.00 – 15.10 Development and Trial of the Hardware-Software Complex of Infrared Diaphanoscopy of Parodont
A. V. Kolpakov, A. L. Makarov
- 15.10 – 15.20 Radar Sensor «Evalkit SiRad Simple 120» of «Silicon Radar» Company and its Usage in Bioengineering
K.V. Gorbatov, T. U. Mamaeva, A. K. Rugakov
- 17.00 – 20.00 Cultural program

**SCIENTIFIC SESSION
BIOMEDICAL SIGNAL AND DATA PROCESSING AND ANALYSIS
IMAGE RECOGNITION
5 July 2019**

11.00 – 13.00, Conference hall, University building №5

- 11.00 – 11.10 The study of the facial skin surface blood flow dynamics
I. P. Semchuk, N. P. Muravskaya, A. V. Samorodov
- 11.10 – 11.20 Computer system for analyzing vestibule-vegetative stability of operators of moving devices under conditions of intense vestibular load
T. B. Chistyakova, L. A. Glaznikov, I. V. Novozhilova, L. G. Buynov
- 11.20 – 11.30 Multi-parametric algorithm for premature ventricular contractions detection and counting
A. A. Sokolovaa, O. A. Markelov, M. I. Bogachev, Yu. D. Uljanitski
- 11.30 – 11.40 Joint influence of isometric hand grip force and electrode pressure on neuromuscular signals
A. N. Briko, A. D. Parnovskaya, M. H. Larionova, S. I. Dyachencova
- 11.40 – 12.10 Conference Program Committee.
Perspectives of the scientific and academic collaboration between Germany and Russian Universities
- 12.10 – 12.40 Discussion of the conference reports and conference results.
- 12.40 – 13.00 Information of the Organizing Committee.
- 13.00 – 14.00 Lunch

**6 July 2019
FREE DAY – A WALK AROUND THE CITY AND THE SURROUNDING AREA**