



23<sup>rd</sup> International Conference  
of Young Professionals in Electron  
Devices and Materials (EDM)

**30.06**

**4.07**  
**2022**

**CONFERENCE  
PROGRAM**

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- remote report

# Plenary Session

July 1, 9:30-13:00, Hall B

## 1. Conference Opening Ceremony – 9:30

Sergey Kharitonov  
Conference Chair

Head of the Power Electronics Institute, NSTU

Marina Khayrullina

Vice-Rector for Innovation and Development, NSTU

Ludmila Mozheikina

Vice-rector for educational work, NSTU

## 2. Digital Twins. Basic Notions, Development and Application in Aircraft Electric Power Engineering – 10:00

Sergey Khalyutin

Moscow State Technical University of Civil Aviation (MSTU CA)

## 3. New Realities of Measurements and Tests – 10:30

Bronislav Chislov

LLC "Scientific devices and systems"

## 4. Topological Insulators – 10:45

Dmitry Kozlov

Rzhanov Institute of Semiconductor RSB of RAS

## 5. First 5G New Radio in Novosibirsk: Basic Principles – 11:15

Vera Drozdova

SibSUTIS

## 6. How to Make Money on Technologies, or What Developers Need to Know about Technology Transfer – 11:45

Elena Khomenko

Novosibirsk State Technical University

**7. Transport Properties of Ge/Si Tunnel Coupled Quantum Dot Array – 12:00**

Natalia Stepina  
Rzhanov Institute of Semiconductor PSB of Russian Academy of Sciences

**8. Student Scientific Association of NSTU – 12:30**

Andrei Nikulin  
Novosibirsk State Technical University

# Section: Semiconductor Physics and Technology

July 2, 9:00-16:00, Hall A

Section Chair: Nataliya L. Shwartz, Dmitriy I. Ostertak

**1. Preparation of Silicon (111) Surface for Epitaxial Growth of III-Nitride Structures by MBE**

Denis Milakhin

Rzhanov Institute of Semiconductor Physics of the  
Siberian Branch of the RAS  
Novosibirsk, Russia

**2. Monte Carlo Simulation of Gold Drop Formation and Movement over a Silicon Substrate**

Snezhana Kudrich

Novosibirsk State Technical University  
Novosibirsk, Russia

**3. Optimal Structure of Lanthanum-Doped Hafnium Oxide: First-Principle Modeling**

Valeriya Kovzik

Novosibirsk State University, Rzhanov Institute of Semiconductor Physics  
of the Siberian Branch of the RAS  
Novosibirsk, Russia

**4. Nanolithography of Amorphous Vanadium Oxide Films Using an Atomic Force Microscope**

Nikita Mantsurov

Novosibirsk State Technical University,  
Rzhanov Institute of Semiconductor Physics of the  
Siberian Branch of the RAS  
Novosibirsk, Russia

**5. Transition from Sublimation to Growth in Thermal Smoothing and Roughening of GaAs Surfaces**

Dmitry Kazantsev  
Rzhanov Institute of Semiconductor Physics of the  
Siberian Branch of the RAS  
Novosibirsk, Russia

**6. Morphology of GaN Monolayers Grown on AlN Surface During Ammonia Flow Cycling**

Yan Maidebura  
Rzhanov Institute of Semiconductor Physics of the  
Siberian Branch of the RAS  
Novosibirsk, Russia

**7. JFET Direct Current Low Noise Amplifier at 77 K**

Dmitri Volkhin  
Novosibirsk State Technical University  
Novosibirsk, Russia

**8. Simulation of Electrical Conductivity in poly-Si Films under Joule Heating Using TCAD Sentaurus**

Margarita Ashikhmina  
Novosibirsk State Technical University  
Novosibirsk, Russia

**9. A System for Positioning an Optical Tunnel Measuring Transducer of a Microoptoelectromechanical Micro-g Accelerometer**

Evgenij Barbin  
Tomsk State University of Control Systems and Radioelectronics  
Tomsk, Russia

**10. Estimating the Sensitivity of Microoptoelectromechanical Micro-g Accelerometer**

Evgenij Barbin

Tomsk State University of Control Systems and Radioelectronics

Tomsk, Russia

**11. The Influence of the Dopant Concentration on the Ferroelectric Properties and the Trap Density in Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>:La Films During Endurance Cycling**

Timur Zalyalov

Rzhanov Institute of Semiconductor Physics of the Siberian Branch of the  
RAS

Novosibirsk, Russia

**12. Electrically Conductive Carbon Filled Polyester Resin with Improved Mechanical Properties**

Artem Shestakov

Novosibirsk State Technical University

Novosibirsk, Russia

**13. Tunable Cavity-based Chiral Microwave 3D-helical Metamaterial**

Alexey Gayduk

Rzhanov Institute of Semiconductor Physics of the

Siberian Branch of the RAS

Novosibirsk, Russia

**14. Directed Synthesis of Carbonized Materials from Agroindustrial Wastes for Supercapacitors**

Nikita Lazarenko

Novosibirsk State Technical University

Novosibirsk, Russia

**15. Searching Optimal Growth Parameters for HfO<sub>2</sub> Applied by Plasma-Enhanced Atomic Layer Deposition Method**

Irina Krasnova  
Novosibirsk State University,  
Rzhanov Institute of Semiconductor Physics of the  
Siberian Branch of the RAS  
Novosibirsk, Russia

**16. Gas-Sensors for NO<sub>2</sub> Detection Based on Multi-Walled Carbon Nanomaterials and Their Mixtures**

Nikita Lapekin  
Novosibirsk State Technical University  
Novosibirsk, Russia

**17. Analysis of Electromechanical Deformation of a MEMS Element of a Reflection-Type Dynamic Mask Based on a Torsional Micromirror**

Gleb Demin  
National Research University of Electronic Technology  
Moscow, Russia

**18. Complexities in Data Stream Generation of Model 3D Scenes for IR Time Differentiating Sensors**



Dmitry Ipatov  
Rzhanov Institute of Semiconductor Physics  
of the Siberian Branch of the RAS  
Novosibirsk, Russia

**19. VO<sub>2</sub> Nanocrystals Array for Low-Power Resistive Switches**



Kirill Kapoguzov  
Rzhanov Institute of Semiconductor Physics  
of the Siberian Branch of the RAS  
Novosibirsk, Russia



## 20. Permittivity Measurement Technique for Solid and Powder Materials



Sofia Malkina  
Ural Federal University  
Ekaterinburg, Russia

# Section: Microwave Technology and Telecommunications

July 1, 14:00-19:00, Hall B

July 2, 9:00-14:00, Hall B

Section Chair: Svetlana V. Vorobiova, Maksim A. Stepanov

## **FIRST DAY.**

### **1. Focusing the Radiation of Wireless Data Transmission Networks at Given Points in Space**

Denis Iuzvik  
Novosibirsk State Technical University  
Novosibirsk, Russia

### **2. Effect of Linear Antenna Array Thinning on Its Directional Pattern Parameters**

Alexey Karasev  
Novosibirsk State Technical University  
Novosibirsk, Russia

### **3. MIMO 2x2 2.45 GHz Antenna Array with Polarizing Channel Separation**

Vadim Sokolov  
Novosibirsk State Technical University  
Novosibirsk, Russia

### **4. A High-Performance Microwave Radiometer Design for Sensing High-Temperature Objects**

Artyom Shchegliakov  
Tomsk State University of Control Systems and Radioelectronics  
Tomsk, Russia

**5. Simulation of Radar Ship Reflections Using Matrix Simulators**

Anton Tayurov  
Novosibirsk State Technical University  
Novosibirsk, Russia

**6. Magnetic Frequency Doubler**

Ilya Govorun  
Kirensky Institute of Physics Siberian Branch RAS  
Krasnoyarsk, Russia

**7. Frequency Characteristics of PCB with Modal Reservation before and after Failure Using TALGAT**

Adnan Alhaj Hasan  
Tomsk State University of Control Systems and Radioelectronics  
Tomsk, Russia

**8. Application of Genetic Algorithm for Calibration of an X-band Vector-sum Phase Shifter with Integrated Auxiliary DAC**



Evgeniy Fedorov  
Tomsk State University of Control Systems and Radioelectronics  
Tomsk, Russia

**9. Evaluation of the Electrostatic Discharge Impact on the Printed Circuit Board: a Case Study**



Rustam Gazizov  
HSE University  
Moscow, Russia

**10. Analytical Models for Calculating the Time Response in a Turn of a Meander Line of Two Segments**

Zarina Kenzhegulova



Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

**11. Algorithm Of Radar Pattern Clustering In Passive Radar Systems**

Oleg Glukhov



Moscow Power Engineering Institute  
Moscow, Russia

**12. Modeling of Propagation and Scattering of Electromagnetic Signals in a Nonlinear Baseband Pulse Radar in the Planar Approximation**

Kirill Poltorykhin



Institute of High Current Electronics, Siberian Branch,  
Russian Academy of Sciences  
Tomsk, Russia

**13. Evaluation of the Reliability of a X-band Low-Noise Amplifier at Different Ambient Temperatures**

Danila Luzhaitsev



Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

**14. A New Reflective-type Element for Metasurface Based on a Bulk Lithium Niobate Crystal**

Artush Arutyunyan



Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

## **15. The Use of Polarization Modulation to Increase the Secrecy of Radio Systems**



Victor Nabilkin  
P.G. Demidov Yaroslavl State University  
Yaroslavl, Russia

### **SECOND DAY.**

#### **1. Projection Method for Inverse Problem in Antenna Measurement**

Alexandr Slobodyanenko  
Novosibirsk State Technical University  
Novosibirsk, Russia

#### **2. Nonlinear Approximation Algorithm for Object Trajectory Estimation in MLAT Systems**

Alexander Malyshev  
Moscow Power Engineering Institute  
Moscow, Russia

#### **3. Evaluation of GNSS Pseudorange Residual Error Mitigation Model**

Vladislav Zhilinskiy  
Russian Metrological Institute of Technical Physics and Radio Engineering  
Moscow, Russia

#### **4. Estimate of the Signal Delay in the Calibrator of the GNSS Signal Simulators**

Svyatoslav Burtsev  
Russian metrological institute of technical physics and radio engineering  
Moscow, Russia

**5. Comparative Analysis of an LC-Filter and a Reflection Symmetric Modal Filter**

Evgeniya Chernikova

Tomsk State University of Control Systems and Radioelectronics

Tomsk, Russia

**6. Computational Efficiency of Interpolated Band-Stop Filters for Even Spectral Bands**

Elena Skulina

Novosibirsk State Technical University

Novosibirsk, Russia

**7. Gradient Boosting Algorithms Application for Beamsteering in V2X Systems**

Ekaterina Lopukhova

Ufa State Aviation Technical University

Ufa, Russia

**8. Positioning with Single-Anchor Indoor Navigation System Using Phase Measurements**

Tatiana Brovko

Moscow Power Engineering Institute

Moscow, Russia

**9. Measuring Radiated Emission Levels and EMI Susceptibility of Protection Devices based on Modal Filtering**

Alexandr Lakoza

Tomsk State University of Control Systems and Radioelectronics

Tomsk, Russia

**10. Integrated Transceiver of Optical Vortex Signals with PAM-4**

Ivan Stepanov

Ufa State Aviation Technical University

Ufa, Russia

**11. Experimental Research of the Scattering Parameters of the Module Based on a Coplanar Strip Line Segment With a Lithium Niobate Crystal and its Possible Use**



George Malyutin  
Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

**12. Comparing Electrical Characteristics of Coplanar Waveguides and Modal Filters**



Maria Samoylichenko  
Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

**13. Parametric Optimization of Modal Filters with a Circular Cross Section in the Real Geometric and Electrophysical Parameters**



Natalya Vlasova  
Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

**14. Optimization of a 3-conductor Modal Filter with a Circular Cross Section by Evolutionary Strategies with Limitations**



Viktoriya Gordeyeva  
Tomsk State University of Control Systems and  
Radioelectronics  
Tomsk, Russia

**15. Analysis of Measurements of UWB PDoA Local Navigation System with Different Baselines**



Nikita I. Petukhov  
Moscow Power Engineering Institute  
Moscow, Russia

# Section: Mobile Systems and Telecommunications

July 1, 14:00-19:00, Hall C

Section Chair: Vera G. Drozdova

- 1. Enhanced Microwave Absorption Bandwidth in Aluminium-Encapsulated Iron Particles Fabricated with Magnetic Field of Rotating Permanent Magnets**

Ivan Shorstkii

Kuban State Technological University

Krasnodar, Russia

- 2. Adaptive Modulation Method for Communication Systems Using Signals with Orthogonal Frequency Multiplexing**

Danila Kondrashov

Tomsk State University of Control Systems and

Radioelectronics

Tomsk, Russia

- 3. Expanding the Horizon of Additive Printing Technologies Application in the Technique of Coupled Strip Lines with Heterogeneous Dielectric Filling**

Trinh To Thanh

Tomsk State University of Control Systems and Radioelectronics

Tomsk, Russia

- 4. User Equipment Mobility Affection Analysis on Modulation Performance in 5G New Radio**

Ruslan Akhpashev

Siberian State University of Telecommunications and Informatics

Novosibirsk, Russia



**5. Microstrip Emitter Design for Application in V2X Beamsteering Systems**

Elizaveta Grakhova  
Ufa State Aviation Technical University  
Ufa, Russia

**6. Numerical Evaluation of the Channel Estimation in 5G NR Based on Machine Learning**

Alexander Stenin  
Siberian State University of Telecommunications and Information Science  
Novosibirsk, Russia

**7. Sallen-Key High-Pass Filter with Unrelated Tune of Generic Parameters**



Nikolay Butyrlagin  
Don State Technical University  
Rostov-on-Don, Russia

**8. Multibeam Antenna Implementation Using Anisotropic Metasurfaces**



Anton Chesnitskiy  
Rzhanov Institute of Semiconductor Physics of the Siberian Branch of the RAS  
Novosibirsk, Russia

**9. Systematic Error Due to Receive Power Level in UWB Systems**



Dmitry Tsaregorodtsev  
Evocargo Autonomous Logistics  
Moscow, Russia

## **10. 5G NR Random Access Procedure Performance Evaluation**

Andrey Veyler



Siberian State University of Telecommunications and  
Information Science  
Novosibirsk, Russia

## **11. Broadband Millimeter Wave Notch Filter Based on Metamaterial Structure**



Grigory Kuleshov  
National Research Tomsk State University  
Tomsk, Russia

# Section: Optoelectronic Devices and Systems: Physics, Electronics, Application

July 2, 14:00-19:00, Hall D

Section Chair: Eugene V. Sypin

**1. Series of CPT Resonances with Multifrequency Pumping by a Diode Laser**

Konstantin Savinov  
Novosibirsk State Technical University  
Novosibirsk, Russia

**2. Semiconductor Excitation Sources for Bistatic Laser Monitors**

Nikolay Karasev  
V.E. Zuev Institute of Atmospheric Optics of  
Siberian Branch of the Russian Academy of Science  
Tomsk, Russia

**3. The Semiconductor Power Supply for Copper Bromide Laser Excitation**

Pavel Gembukh  
V.E. Zuev Institute of Atmospheric Optics of  
Siberian Branch of the Russian Academy of Science  
Tomsk, Russia

**4. Sensivity Optimization for a Coherent Optical Frequency-Domain Reflectometer Based on a Self-Sweeping Fiber Laser**

Alina Tkachenko

Institute of Automation and Electrometry of the  
Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

**5. Widely Tunable Automatic System for Multiple Gas Detection**

Evgenii Erushin

Novosibirsk State Technical University  
Novosibirsk, Russia

**6. Single-Frequency Holmium-Doped Fiber Laser with Saturable Absorber**

Anastasia Vladimirskaia

Institute of Automation and Electrometry of the  
Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

**7. Calibration and Demodulation for Signals in FBG-interrogator Based on Photonic Integrated Circuit**

Maxim Gaskov

Institute of Automation and Electrometry of the  
Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

**8. Effect of Thermal Treatment on the Properties of Proton-Exchange Waveguides in Lithium Niobate**



Aleksei Sosunov  
Perm State University  
Perm, Russia

## 9. Estimation of the Distance to the Pulse Sound Source by DAS for the Fiber-Optic Cable Tracking



Vladimir Gureev  
Povolzhskiy State University of Telecommunications and  
Informatics  
Samara, Russia

# Section: Power Electronics and Power Engineering

July 2, 9:00-16:00, Hall C

Section Chair: Denis A. Kotin

## **INVITED REPORT:**

### **Prospects for the Use of Asynchronous Generators in Autonomous Power Supply Systems**

Aleksandr Garganeev

Tomsk Polytechnic University

Tomsk, Russia

### **1. Enhancing Efficiency of Ensemble Machine Learning Models for Short-Term Load Forecasting through Feature Selection**

Nikita Sergeev

Novosibirsk State Technical University

Novosibirsk, Russia

### **2. Two-Level Voltage Inverter: Parametric Synthesis of Filter and Controllers**

Oleg Vavilov

Novosibirsk State Technical University

Novosibirsk, Russia

### **3. Dual 4-A High-Speed Low-Side Gate Driver IC for GaN and Si MOSFETs and IGBTs**

Maksim Karpovich

Sibis LLC

Novosibirsk, Russia

**4. Synthesis of the Control Algorithm for the Parallel Voltage Inverter as Part of the Starter-Generator System for Aircraft**

Regina Sarakhanova  
Novosibirsk State Technical University  
Novosibirsk, Russia

**5. Per-Phase Output Current Control of 4-Leg Active Power Filter Based on Adaptive Notch Filter**

Ivan Alexandrov  
Novosibirsk State Technical University  
Novosibirsk, Russia

**6. Investigation of Load Schedules of Electrical Machines of a Mining Enterprise Using Wavelet Analysis**

Alexander Khusnutdinov  
Novosibirsk State Technical University  
Novosibirsk, Russia

**7. Predictive Control and Production Process Forecasting Under Deterministic Chaos**

Alexander Khusnutdinov  
Novosibirsk State Technical University  
Novosibirsk, Russia

**8. Forecasting Electricity Consumption of Electrical Machines of a Coal Industry Enterprise Using the Wavelet Transform**

Alexander Khusnutdinov  
Novosibirsk State Technical University  
Novosibirsk, Russia

**9. Short-Term Wind Speed Forecasting for an Autonomous Hybrid Power Plant of a Traction Railway Substation**

Natalya Kiryanova  
Novosibirsk State Technical University  
Novosibirsk, Russia

**10. Formation of Digital Thermal Portraits of Lithium-Ion Accumulator Based on Modified Method of Final Volumes**

Elena Punt  
Moscow State Technical University of Civil Aviation  
Moscow, Russia

**11. Transformation Benefits of Boiler Houses to Mini-CHPP in the Russian Federation Regions**

Elizaveta Ivanova  
Novosibirsk State Technical University  
Novosibirsk, Russia

**12. The Way of Mini-CHPP in the Russian Regions**

Julia Bogomolova  
Novosibirsk State Technical University  
Novosibirsk, Russia

**13. Effect of Chemical Treatment of Multi-walled Carbon Nanotubes on the Capacitance of Supercapacitors**

Valeriy Golovakhin  
Novosibirsk State Technical University  
Novosibirsk, Russia

**14. Control Systems for Semiconductor Power Regulators Operating in Digital Electrical Networks**

Roman Krasnoperov  
Moscow Power Engineering Institute  
Moscow, Russia

**15. Structural Synthesis of Capacitor DC-DC Converters**

Ivan Bolshakov  
Novosibirsk State Technical University  
Novosibirsk, Russia



## **16. High-current Measurement of FDD Layouts**

Valentin Loman  
Novosibirsk State Technical University  
Novosibirsk, Russia

## **17. Circuits of Aviation Equipment, Built on the Basis of Amplitude-Frequency Characteristics**

Viktoria Pavlova  
Moscow State Technical University of Civil Aviation  
Moscow, Russia

## **18. Power System Stability Research in the Integration of Wind Power Plant in Almaty Region**

Aigerim Aman  
Almaty University of Power Engineering and Telecommunications named  
after Gumarbek Daukeev  
Almaty, Kazakhstan



## **19. Properties and Design Features of Single-Phase Voltage Source Inverters by Multi-Channel Type with PWM in Channels**

Myo Min Thant  
Moscow Power Engineering Institute  
Moscow, Russia



## **20. Self-Timed Storage Register Cases**

Yuri Diachenko  
Computer Science and Control of the RAS  
Moscow, Russia



## **21. Dynamic Characteristics of the Minigrid Synchronous Operation with the Electrical Network of a Centralized Electric Power System**



Andrey Marchenko  
Novosibirsk State Technical University  
Novosibirsk, Russia

## **22. Application of Automatic Device for Generator Connection to the Network by Method of Accelerated Synchronization**



Viktoriya Fyodorova  
Novosibirsk State Technical University  
Novosibirsk, Russia

# Section: Biomedical Electronics and Engineering

July 1, 14:00-19:00, Hall D

Section Chair: Gennady S. Evtushenko, Vladimir M. Generalov

## **INVITED REPORT:**

### **Some Requirements for the Preparation of the Documents Registration of Medical Devices**

Vladimir Generalov

FBRI SRC VB "Vector" Rospotrebnadzor  
Novosibirsk, Russia

#### **1. Investigation of the Frequency Characteristics of a Cold Plasma Jet Excited by a Sinusoidal Voltage**

Elena Milakhina

Rzhanov Institute of Semiconductor Physics of the Siberian Branch of  
the RAS  
Novosibirsk State Technical University  
Novosibirsk, Russia

#### **2. Compensatory Reorganization of Cortical Brain Activity Associated with Processing Emotional Information at Auditory Deprivation**

Olga Razumnikova

Novosibirsk State Technical University  
Novosibirsk, Russia

#### **3. Investigation on the Applying Polystyrene Microparticles as a Qualitative Standard of Polarizability**

Lidiya Dmitrieva

Russian metrological institute of technical physics and radio  
engineering  
Novosibirsk, Russia

**4. Mental Chronometry of Speech Comprehension and Data Science Approach to Intelligent Database in Cognitive Science**

Dmitri Lebedkin  
Novosibirsk State University  
Novosibirsk, Russia

**5. Verification Method of Hypothesis Based on Different EEG Data Statistical Processing**

Ksenia Ladonovskaya  
Scientific-Research Institute of Neurosciences and Medicine  
Novosibirsk, Russia

**6. Detection of Viral Particles Using a Biosensor**

Anastasia Cheremiskina  
State Scientific Center for Virology and Biotechnology "Vector"  
Koltsovo, Russia

**7. The Development of Pedograph and Methods for Diagnosing Gait Disorders**

Vitaly Tselishchev  
Novosibirsk State Technical University  
Novosibirsk, Russia

**8. Algorithm for Analysis of the Metabolic Activity of the Ex Vivo Perfused Liver**



Konstantin Shadrin  
Professor V.F. Voyno-Yasenetsky Krasnoyarsk State Medical University  
Krasnoyarsk, Russia

**9. Wide Frequency Impedance Meter Analysis**



Alexey Levin  
Penza State University  
Penza, Russia

**10. Experimental Substantiation of the Possibility of Ultrasonic Filtration of Process Fluids**

Yuri



Irina Zlobina  
Gagarin State Technical University of Saratov, National  
Research Center Kurchatov Institute  
Saratov, Russia

**11. Development and Analysis of Ultrasound Registrating and Performing Rodent Vocalization Device**



Maria Zolotenkova  
Moscow Aviation Institute  
Moscow, Russia

**12. Technologies for Optimization and Digitalization of Cardiological Care**



Ruslan Rakhmatullov  
Penza State University  
Penza, Russia

**13. Button Press Detection from EEG Signals Using Deep Learning**



Enes Esvet Kuzucu  
Novosibirsk State University  
Novosibirsk, Russia

**14. Blood Pressure and Photoplethysmography Signal Pairs Characterization by Dicrotic Notch**



Lucian Evdochim  
University POLITEHNICA of Bucharest  
Bucharest, Romania

**15. Photoplethysmography Signal Behavior in Relation with External Stimuli: Temperature and Compression Force**



Lucian Evdochim  
University POLITEHNICA of Bucharest  
Bucharest, Romania

**16. Development of a Depression Ontology as a Necessary Step for the Effective Implementation of IT in Psychopathology**



Timofei Semin  
Novosibirsk State University  
Novosibirsk, Russia

**17. Comparative Analysis of Soft Biological Tissue Ablation Characteristics Obtained by Electromagnetic Radiation of HF and UHF Ranges**



Ekaterina Vinskaya  
Novosibirsk State Technical University  
Novosibirsk, Russia

# Section: Robotics, Mechatronics, and Automation

July 2, 9:00-14:00, Hall D

Section Chair: Oleg V. Nos, Maksim A. Zharkov

## **INVITED REPORT:**

### **Theory and modeling of MHD processes in metallurgy**

Viktor Timofeev, Maxim Khatsayuk

SFU

Krasnoyarsk, Russia

### **Analysis and synthesis of an standalone three-phase power supply system with voltage quaternion control**

Alexander Korovin

SFU

Krasnoyarsk, Russia

## **1. Designing an Expert System for Detecting Polymer Particles in SLS 3D Printing**

Rustam Farahov

Kazan Federal University

Kazan, Russia

## **2. Speed and Current Vector Controlled Permanent Magnet Synchronous Motor Drive Based on Particle Swarm Optimization**

Denis Kotin

Novosibirsk State Technical University

Novosibirsk, Russia

**3. Magnetorheological Spring as the Element of Vibration Reduction System of Dynamically Active Equipment and Pipelines**

Vera Kachaeva  
Siberian Federal University  
Krasnoyarsk, Russia

**4. Applying Predictive Machine Learning Algorithms to Petroleum Refining Processes as Part of Intelligent Automation**

Vera Kachaeva  
Siberian Federal University  
Krasnoyarsk, Russia

**5. Development of Image Preprocessing Methods for Solving the Semantic Segmentation Problem in Duckietown**

Dasha Shabalina  
Novosibirsk State University  
Novosibirsk, Russia

**6. Continuous Wave THz Imaging System for Defectoscopy of Polymeric Ferroelectric Materials**

Viktoriya Moskalenko  
National Research Tomsk State University  
Tomsk, Russia

**7. Automation of Piezoresistive Properties Measurements of New Composite Materials**

Ruslan Kumarbaev  
Novosibirsk State Technical University, Nikolaev Institute of Inorganic Chemistry, Siberian Branch of RAS  
Novosibirsk, Russia



**8. Numerical Study of Magnetohydrodynamic Processes and Behaviour of Non-Conductive Disperse Particles in Molten Aluminium Within an Induction Channel Device**

Eduard Vinter  
Siberian Federal University  
Krasnoyarsk, Russia

**9. Solving the Direct Kinematics Problem of the Mechanical Manipulator of an Unmanned Aircraft**



Vladyslav Sherstnev  
Penza State University  
Penza, Russia

**10. Kinematic Control of the Hexapod Robot**



Ilya Urvaev  
Penza State University  
Penza, Russia

**11. Improved Dynamic Performance of PMSG Wind Energy Based on Controller Using Optimization Techniques**



Ahmed Lotfy Haridy Hassan  
Aswan University  
Egypt, Egypt

**12. Vector Control System for Induction Motor Drive with Signal Non-Parametric Autotuning**



Ekaterina Kucher  
Novosibirsk State Technical University  
Novosibirsk, Russia

**13. Application of the Harmonic Analysis to Estimate the Gain of the Mathematical Model of the Aircraft Structure Strength Test Bench**



Maksim Trubin  
Novosibirsk State Technical University  
Novosibirsk, Russia

**14. Universal Mechatronic Test Bench-Gait Simulator for Testing Lower Limb Prostheses**



Sean Güttler  
Universal Mechatronic Test Bench-Gait Simulator for  
Testing Lower Limb Prostheses  
Institute of Mechanics Technische Universität Berlin  
Berlin, Germany  
Sevastopol State University, Sevastopol, Russia

**15. Algorithm for the Synthesis of a Neural Network Controller for a Multi-Channel System**



Victor Shipagin  
Novosibirsk State Technical University  
Novosibirsk, Russia

**16. Features of Installations for Pulse Materials Processing Design and Numerical Simulation**



Artem Melnikov  
Saint Petersburg Electrotechnical University  
Saint Petersburg, Russia

# Section: Software Engineering and Cyber-Physical Systems

July 2, 14:00-19:00, Hall B

Section Chair: Vladimir E. Zyubin

## 1. **A Library for Visualizing Three-Dimensional Non-Euclidean Spaces**

Denis Migranov

Institute of Automation and Electrometry of the Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

## 2. **Temporal Requirements Language for Deductive Verification of Process-Oriented Programs**

Ivan Chernenko

Institute of Automation and Electrometry of the Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

## 3. **Semantic Classification of Event Driven Temporal Logic Requirements**

Anastasia Getmanova

Institute of Automation and Electrometry of the Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

## 4. **Towards Multi-User Mode in RIDE Web-IDE**

Vladimir Bondarchuk

Institute of Automation and Electrometry of the Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

**5. Methodology for the Study of Defects in Technical Structures at Construction Sites**

Liliya Snitsar

L.N. Gumilyov Eurasian National University  
Nur-Sultan, Kazakhstan

**6. Bottlenecks in Implementation of the Mode Decomposition Algorithm Based on Phase-Only Spatial Light Modulator**

Nikolai Smolyaninov

Institute of Automation and Electrometry of the Siberian Branch of the  
Russian Academy of Sciences  
Novosibirsk, Russia

**7. Towards E-Learning Support for Advanced PLC-Programming: Virtual Training Kit for a Sluice Controller with the poST Language**

Aleksandr Kharchenko

Novosibirsk State University  
Novosibirsk, Russia

**8. Optimization of Processing Power by Improving the Performance of Application Service**



Svetlana Romanchikova

L.N. Gumilyov Eurasian National University  
Nur-Sultan, Kazakhstan

**9. Methodology for the Synthesis of Acceptable Options for Organizational Functional Structure of the Security Management System of a Significant Object of Critical Information Infrastructure**



Midat Maksudov

Siberian State University of Geosystems and  
Technologies  
Novosibirsk, Russia

## 10. Towards to Load Balancing for Cooperative Multithreading Implementation of Process-Oriented Programs



Dmitry Permiashkin  
Institute of Automation and Electrometry Siberian  
Branch of the RAS  
Novosibirsk, Russia

## 11. Content Preprocessing Module for Distance Learning System



Tatyana Podkur  
Novosibirsk State University  
Novosibirsk, Russia

## 12. An Efficient Digital Hardware-Software Complex for Electricity Metering

L.N.



Bakhytzhan Suleimenov  
Gumilyov Eurasian National University  
Nur-Sultan, Kazakhstan

## 13. Automatic Generation of Verification Code for Dynamic Verification of Process-oriented Reflex Programs



Alexandra Grivtsova  
Institute of Automation and Electrometry of the  
Siberian Branch of the Russian Academy of Sciences  
Novosibirsk, Russia

## 14. Automation of the Smart Contract Development Using Situation Models



Ayya Galieva  
Novosibirsk State University  
Novosibirsk, Russia

## **15. Digital Game Development: Shaping the Storyline by Solving Time Paradoxes**



Igor Evchenko  
Moscow Engineering Physics Institute  
Moscow, Russia

## **16. Computer-Aided Analysis of Hybrid Dynamical Systems in the ISMA environment**



Alexey Garder  
Novosibirsk State Technical University  
Novosibirsk, Russia

# Section: History and Prospects for the Informatics and Electronics Development in the Context of Humanitarian Problems of Society Solving

July 1, 14:00-19:00, Hall A

Section Chair: Alexander N. Savostyanov

## **INVITED REPORT:**

### **Three Sources of Origin and Three Main Problems of Theoretical Informatics: Scientific-Historical Analysis**

Alexander Savostyanov

Scientific-Research Institute of Neurosciences and Medicine, Institute of  
Cytology and Genetics SB RAS, Novosibirsk State University  
Novosibirsk, Russia

#### **1. Monitoring in the Information and Measurement System for Analyzing the Digital Educational Environment**

Natalya Mikidenko

Siberian State University of Telecommunications and Information  
Science,  
Novosibirsk State Technical University  
Novosibirsk, Russia

#### **2. Connectivity Analysis for Measuring of DMN Activity**

Evgeny Zavarzin  
Novosibirsk State University  
Novosibirsk, Russia

**3. Functional Networks Based Diagnostics Concept for Depression Disorders**

Ksenia Ladonovskaya

Scientific-Research Institute of Neurosciences and Medicine

Novosibirsk, Russia

**4. Information Analysis of Resting-state EEG and Genetic Polymorphism of People for Searching of Markers of Mental Pathology**



Natalya Milakhina

Institute of Cytology and Genetics

Siberian Branch of the RAS

Novosibirsk, Russia

**5. University's Educational Environment Personalization Based on the Ontological Models**



Alexandra Pustovalova

Novosibirsk State Technical University

Novosibirsk, Russia

**6. An Ontology-Driven Knowledge Representation about Cognitive Functions**



Alexandra Pustovalova

Novosibirsk State Technical University

Novosibirsk, Russia

**7. Model and Procedure for Assessing the Qualification of a Software Developer**



Erchimen Gavriliev

Novosibirsk State Technical University

Novosibirsk, Russia

**8. A Look at the Ethical Principles of the Psychologist's Work in the Context of the Development of Information Technology**



Anna Osintseva

Novosibirsk State Technical University

Novosibirsk, Russia



## 9. The Quantitative Evaluation of the Pathos to Ethos Ratio in Scientific Texts



Ivan Pimenov  
Novosibirsk State University  
Novosibirsk, Russia