



| | 04.09 (Friday) | | | 05.09 (Saturday) | | | 06.09 (Sunday) | | | 07.09 (Monday) | | |
|-------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 13:30 | Opening Session | | | Plenary Session 2A | | | Plenary Session 3A | | | Plenary Session 4A | | |
| 14:00 | Regular Papers Session 1A | Regular Papers Session 1B | Regular Papers Session 1C | Regular Papers Session 2A | Regular Papers Session 2B | Regular Papers Session 2C | Regular Papers Session 3A | Regular Papers Session 3B | Regular Papers Session 3C | Regular Papers Session 4A | Regular Papers Session 4B | Regular Papers Session 4C |
| 14:15 | | | | | | | | | | | | |
| 15:00 | | | | | | | | | | | | |
| 15:30 | | | | | | | | | | | | |
| 16:00 | | | | | | | | | | | | |
| 16:30 | | | | | | | | | | | | |
| 17:00 | Plenary Session 1A | | | | | | | | | | | |
| 17:30 | | | | | | | | | | | | |
| 18:00 | | | | | | | | | | Closing Session | | |

SYMPOSIUM PROGRAM

First Day: September 4th, 2020 (Friday)

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| 14:00 — 14:15 | Opening Session, Conference Hall Dr. Yervant Zorian — <i>General Chair, Chief Architect and Fellow at Synopsys, USA</i> Vladimir Hahanov — <i>General Chair</i> |
| 14:15 — 16:45 | Regular Papers Session 1A “Automotive Reliability & Test”, “Applied Electronics – Automotive/Mechatronics” Moderator: Vladimir Hahanov, Dmitry Efanov |
| | #3. Classification of Errors in Ternary Code Vectors from the Standpoint of Their Use in the Synthesis of Self-Checking Digital Systems <i>Dmitry Efanov</i> |
| | #2. Generated Installation of Fuzzy Linear Automata <i>Dmitry Speranskiy, Dmitry Efanov</i> |
| | #14. Evaluating length of a shortest adaptive homing sequence for weakly initialized FSMs <i>Evgenii Vinarskii, Nina Yevtushenko</i> |
| | #62. RFID-Based Navigation of Subway Trains <i>Oleg N. Tyulyandin, Alexander Kostrominov, Alexander Nikitin, Michael Vasilenko, Alexander Osminin</i> |
| | #32. Monitoring and Control System of Three-Phase Electrical Loads on Railway Trains |



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| First Day: September 4th, 2020 (Friday) | |
| | <i>Sergei A Kalabanov, Rashid Ishmuratov, Rinat Shagiev, Michael Onischuk</i> |
| | #34. Coupled Piecewise Constant Memristor based Reactance-less Oscillators <i>Vladimir V. Rakitin, Sergey G. Rusakov</i> |
| | #38. Determining the Direction of True Meridian by Micromechanical Gyro <i>Lyalya Bakhtieva, Vladimir Bogolyubov</i> |
| | #75. The Integrated Approach to Automation and Digitalization of the Transport Processes in the Industrial Enterprises <i>Alexey Lekarev, Maxim Ammosov, Dmitry Efanov, German Osadchy, Natalia Goncharova</i> |
| 14:15 — 16:45 | Regular Papers Session 1B “Automotive Reliability & Test”, “Applied Electronics – Automotive/Mechatronics”, “Internet of Things Design & Test”, “Medical Electronics” Moderator: Eugenia Litvinova, Jakub Lojda |
| | #87. An IoT based Real-time Data-centric Monitoring System for Vaccine Cold Chain <i>Raisa Tahseen Hasanat, MD. Arifur Rahman, Dr. Nafees Mansoor, Nabeel Mohammed, Dr. Mohammad Shahriar Rahman, Mirza Rasheduzzaman</i> |
| | #113. Detection of motor imagery (MI) event in Electroencephalogram (EEG) signals using artificial intelligence technique <i>Muhammad Yeamim Hossain, Abul Barkat Sayeed</i> |
| | #78. Model of hybrid timetables for high speed urban tramway movement <i>Aleksei Gorbachev</i> |
| | #91. Efficient FPGA Implementation of Field Oriented Control for 3-Phase Machine Drives |



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| First Day: September 4th, 2020 (Friday) | |
| | <i>Burak Tufekci, H. Fatih Ugurdag, Bugra Onal, Hamza Dere</i> |
| | #123. Analysis of Software-Implemented Fault Tolerance: Case Study on Smart Lock <i>Jakub Lojda, Richard Panek, Jakub Podivinsky, Ondrej Cekan, Martin Krcma, Zdenek Kotasek</i> |
| | #88. Automatic control system for dedusting of gas-cleaning plant filtering element <i>Anton Zyma, Leonid Rebezyuk</i> |
| | #93. Model and Means of Timed Automata based Real time Adaptive Transit Signal Control <i>Mykhailo Lytvynenko</i> |
| | #69. Hardware implementation of timed logical control FSM <i>Dariia Rakhlis, Maryna Miroschnyk, Alexander Shkil, Elvira Kulak, Inna Filippenko, Mykyta Malakhov</i> |
| 14:15 — 16:45 | Regular Papers Session 1C “Sensors and Transducers” Moderator: Ivan Hahanov, Gul Nihal Gugul |
| | #8. The Method of Increasing of CMRR for CJFET Dual Differential Input Stages for the Tasks of Processing Sensor Signals Under Conditions of Cryogenic Temperatures and Penetrating Radiation <i>Nikolay Prokopenko, Alexey Andreevich Zhuk, Ilya Pakhomov, Petr Budyakov, Alexey Titov</i> |
| | #35. Appraisal of the Effective Number of Bits of the ADC for Sensors with Account for Dynamic Errors <i>Darya Denisenko, Leonty Samoilov, Nikolay Prokopenko</i> |
| | #49. An Indoor Smart Lamp For Environments Illuminated Day Time <i>Ayse Nur Cihan, Gul Nihal Gugul</i> |



First Day: September 4th, 2020 (Friday)

#106. Optimization Calculation of Thermolement Linear Dimensions for Microthermoelectric Generator

Vera Loboda

#115. SOI Instrumentation Amplifier for High-Temperature Applications

Evgenii V Balashov

#58. Measurement and Compact Modeling of Noise Characteristics in Complementary Junction Field-Effect Transistors

Alexandr M. Pilipenko, Fedor Tsvetkov, Nikolay Prokopenko

17:00 — 18:00 **Plenary Session 1A**

Moderator: **Vladimir Hahanov**

17:00 — 18:00 **Keynote Address**



New Trends in Design and Test

Dr. Yervant Zorian — *Chief Architect and Fellow at Synopsys, USA*

Second Day: September 5th, 2020 (Saturday)

14:15 — 15:00 **Plenary Session 2A**

Moderator: **Vladimir Hahanov**

14:15 — 15:00 **Invited Talk**



A Review of Particle Detectors for Space-Borne Self-Adaptive Fault Tolerant Systems

Dr. Zoran Stamenkovic – *IHP GmbH, Frankfurt (Oder), Germany*



Second Day: September 5th, 2020 (Saturday)

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| 15:00 — 18:00 | Regular Papers Session 2A “Signal and Information Processing” Moderators: Victor Djigan, Vladimir Hahanov |
| | #84. FPGA Implementation of a Low Latency and High SFDR Direct Digital Synthesizer for Resource-Efficient Quantum-Enhanced Communication <i>Nur Fajar Rizqi Annafianto, Jabir Marakkarakath Vadakkepurayil, Ivan Burenkov, H. Fatih Ugurdag, Abdella Battou, Sergey Polyakov</i> |
| | #13. Hyper Neural Network as the Diffeomorphic Domain for Short Code Soft Decision Beyond Backpropagation Decoding Problem <i>Vasily Usatyuk, Sergey Egorov</i> |
| | #20. Sampling Theorem in Time Domain for Infinite Duration Signal: Analytical Expression and Geometric Illustration <i>Gamlet S Khanyan</i> |
| | #102. Bit Depth Impact Analysis of the Gaussian Process Quantization Errors <i>Alexey Gvozdarev, Yury Bryukhanov</i> |
| | #92. Reception of DPSK-QAM Combined Modulation in Fast Fading Channels by Searching over DPSK Hypotheses <i>Alexander B. Sergienko</i> |
| | #104. Structure of the Transfer Function Numerator Coefficients as One of the Factors of the Structural Precision of IIR Digital Filters <i>Vladislav A. Lesnikov, Tatiana Naumovich, Alexander Chastikov</i> |
| | #105. Set-membership Sparsity-Aware Proportionate Normalized Least Mean Square Algorithms for Active Noise Control <i>Felix Albu</i> |



| Second Day: September 5th, 2020 (Saturday) | |
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| | #110. Weighted Total Least Squares for Frequency Estimation of Real Sinusoids Based on Augmented System <i>Dmitriy V Ivanov</i> |
| | #24. Fast RLS algorithms in Combined Adaptive Array and Fractionally-Spaced Feed-Forward/Feed-Backward Equalizer <i>Victor Djigan</i> |
| | #71. Antenna Arrays Calibration Using Recursive Least Squares Adaptive Filtering Algorithms Based on Inverse QR Decomposition <i>Victor Djigan, Vladislav Kurganov</i> |
| 15:00 — 18:00 | Regular Papers Session 2B “Signal and Information Processing” Moderator: Vladimir Khryashchev, Eugenia Litvinova |
| | #76. Modification of VGG Neural Network Architecture for Unimodal and Multimodal Biometrics <i>Anton Stefanidi, Artem Topnikov, Andrey Priorov, Igor Kosterin</i> |
| | #59. Markov model of quantized speech signal <i>Alexander Metelyov, Dmitry Prozorov</i> |
| | #86. Automatic Identification of Appendiceal Orifice on Colonoscopy Images Using Deep Neural Network <i>Anton Lebedev, Vladimir Khryashchev, Evgeniya Kazina, Anastasia Zhuravleva, Sergey Kashin, Dmitry Zavyalov</i> |
| | #28. On the issue of using digital radio communications of the DMR standard to control the train traffic on Russian railways <i>Igor Kushpil, Alexander Nikitin, Alexander Manakov, Alexander Kostrominov, Alexander Osminin</i> |



| Second Day: September 5th, 2020 (Saturday) | |
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| | #67. Convolution Neural Network Learning Features for Handwritten Digit Recognition <i>Zufar Kayumov, Dmitrii Tumakov</i> |
| | #31. Filtration of Diagnostic Data for Retrospective Analysis in Health Monitoring Systems of Engineering Structures <i>Dmitry Efanov, Valeriy Myachin, German Osadchy, Marina Zueva</i> |
| | #54. Minimax Modifications of Linear Discriminant Analysis for Classification with Rare Classes <i>Kseniya Bratanova, Iskander Kareev, Rustem Salimov</i> |
| | #85. Quarry Areas Segmentation on Satellite Images by Convolutional Neural Networks <i>Roman Larionov, Vladimir Khryashchev, Vladimir Pavlov, Alexander Ganin</i> |
| | #118. Exploiting EEG Signals for Eye Motion Tracking <i>Ruslan Kovtun, Sergiy Radchenko, Andrii Netroba, Oleksandr Sudakov, Roman Natarov, Zoya Dyka, Ievgen Kabin, Peter Langendörfer</i> |
| 15:00 — 18:00 | Regular Papers Session 2C “Automotive Reliability & Test”, “SoC Design & Test” Moderator: Ivan Hahanov, Narek Mamikonyan |
| | #60. A Review of Particle Detectors for Space-Borne Self-Adaptive Fault Tolerant Systems <i>Marko Andjelkovic, Junchao Chen, Aleksandar Simevski, Zoran Stamenkovic, Milos Krstic, Rolf Kraemer</i> |
| | #6. Increasing Self-Timed Circuit Soft Error Tolerance <i>Yury Diachenko, Igor Sokolov, Yury Stepchenkov, Yury Rogdestvenski, Denis Diachenko</i> |



Second Day: September 5th, 2020 (Saturday)

#79. Noise Reduction in Reset Domain Crossings Verification Using Formal Verification

Mohamed Elkholy, Ahmed Elgohary, Hala Ibrahim

#18. Deriving distinguishing sequences for input/output automata

Igor Burdonov, Nina Yevtushenko, Alexandr Kossachev

#4. Ternary Sum Codes

Dmitry Efanov

#100. DRAM structure with prioritized memory bank using multi-VT bit cells architecture

Narek Mamikonyan

#5. Features of JFET Computer Models in Microcurrent Mode on Exposure to Low Temperatures and Neutron Fluence

Oleg Dvornikov, Valentin Dziatlau, Vladimir Tchekhovski, Nikolay Prokopenko, Anna V. Bugakova

#101. IR drop estimation and optimization on DRAM memory using machine learning algorithms

Narek Mamikonyan, Nazeli Meliqyan, Ruben Musayelyan



Third Day: September 6th, 2020 (Sunday)

14:15 — 15:00 **Plenary Session 3A**

Moderator: Vladimir Hahanov

14:15 — 15:00 **Invited Talk**



**Training programs in Cybersecurity:
experiences and opportunities**

Paolo Prinetto — *CINI - Consorzio
Interuniversitario Nazionale per l'Informatica,
Direttore del Laboratorio Nazionale
Cybersecurity, Italy*

15:00 — 18:00 **Regular Papers Session 3A
“Algorithms”**

Moderator: Vladimir Hahanov, Dmitry Efanov

**#7. Synthesis of Approximate Combinational
Circuits based on Logic Regression Approach**
*Alexander Stempkovsky, Dmitry Telpukhov,
Roman Solovyev*

**#11. Kuramoto Model for Oscillators with
Fractional Frequencies Ratios in Circuit
Analysis Application**
Mark M. Gourary, Sergey G. Rusakov

**#12. Ultragraph model for ECE component
partitioning**
Daria Zaruba

**#19. Optimizing components of Multi-Module
Systems Based on Don't care Input
Sequences**
*Ekaterina Shirokova, Larisa Evtushenko, Andrey
Laputenko, Nina Yevtushenko*

**#21. Improving the Monitoring Systems
Algorithmic Support for Railway Automation
Equipment's Based on Dynamic
Questionnaires**
Valerii V. Khoroshev, Dmitry Efanov



| Third Day: September 6th, 2020 (Sunday) | |
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| | #39. Using Generative Adversarial Networks for Relevance Evaluation of Search Engine Results <i>Dmitry N. Galanin, Nail Bukharaev, Alexander Gusenkov, Alina Sittikova</i> |
| | #41. Using Additive Robust Modeling and Fault Simulation for Laser Ranging Measurements <i>Alexey Andreev, Yury Nefedyev</i> |
| | #43. The Study of Dynamic Parameters of Corporate Graphic Stations Using Methods of Adaptive Regression Multi-Parameter Modeling <i>Yury Nefedyev, Alexey Andreev, Natalya Demina</i> |
| | #66. Solving Problem of Electromagnetic Wave Diffraction by a Metal Plate Using CUDA <i>Dinara Giniyatova, Dmitrii Tumakov, Angelina Markina</i> |
| | #77. Building a recommendation subsystem for calculating the probability of a driver committing a violation using machine learning algorithms <i>Maksim A. Kulagin, Valentina Sidorenko</i> |
| 15:00 — 18:00 | Regular Papers Session 3B “Algorithms” Moderator: <i>Eugenia Litvinova, Vakhtang Beridze</i> |
| | #50. An Accuracy Improvement of the Neuromorphic Functional Models by Using the Parallel ANN Architecture <i>Sergey Mosin</i> |
| | #57. Developing a Multiple Testing Procedure in the D-Posterior Approach using the R Software Environment <i>Elena Fedotova, Sergei V. Simushkin</i> |
| | #64. Relationship Between Base Frequency of the Koch-Type Wire Dipole and Various |



| Third Day: September 6th, 2020 (Sunday) | |
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| | Dimensions <i>Ilya Pershin, Dmitrii Tumakov</i> |
| | #96. Iterative Methods for Multi-Valued Logical Equation System Solving while Digital System Simulating <i>Alexander Ivannikov</i> |
| | #72. Hybrid implementation of Twofish, AES, ElGamal and RSA cryptosystems <i>Elza Jintcharadze, Maksim Iavich</i> |
| | #80. Method for Assessing the Probability Indicators of Reliability and Safety of Redundant Structures of Railway Automation Systems <i>Konstantin E. Kovalev</i> |
| | #81. Bio-inspired approach to microwave circuit design <i>Vladislav V. Danilchenko, Yevgenia Vladimirovna Danilchenko, Viktor Mikhailovich Kureichik</i> |
| | #68. Designing a Single-Band Monopole Six-Tooth-Shaped Antenna with Preset Matching <i>Angelina Markina, Dmitrii Tumakov</i> |
| | #103. Algorithm of Generalized Solution an Optimal Control Problems for First-Order Differential Equations with Riemann-Hilbert Boundary Conditions <i>David Devadze, Vakhtang Beridze</i> |
| | #120. Intellectual Functional Diagnosis of Large Objects Using Sensor Networks <i>Gennady Krivoulya, Vladyslav Shcherbak</i> |
| 15:00 — 18:00 | Regular Papers Session 3C “Hardware Security and Design for Security” Moderator: Ivan Hahanov, Alexander Adamov |
| | #29. Geometry-Based Rolling-Stock Identification System Insensitive to Speed Variations <i>Valery Zasov</i> |



Third Day: September 6th, 2020 (Sunday)

#83. Development of ICT Models in Area of Safety Education

Oleksandr V. Drozd, Kostiantyn Zashcholkin, Oleksandr Martynyuk, Julia Drozd, Yulian Sulima

#107. SEkey: A Distributed Hardware-based Key Management System

Nicolò Maunero, Matteo Fornero, Paolo Prinetto, Antonio Varriale

#108. Hardware-based Capture-The-Flag Challenges

Paolo Prinetto, Gianluca G Roascio, Antonio Varriale

#117. Co-Embedding Additional Security Data and Obfuscating Low-Level FPGA Program Code

Kostiantyn Zashcholkin, Oleksandr V. Drozd, Ruslan Shaporin, Olena Ivanova, Myroslav Drozd

122. Reinforcement Learning for Anti-Ransomware Testing

Alexander Adamov, Anders Carlsson

#53. Software Development of Electronic Digital Signature Generation at Institution Electronic Document Circulation

Larisa Cherckesova, Nikita Chesnokov, Denis Korochentsev, Olga Safaryan, Vladislav Chumakov, Irina Pilipenko

#121. Metal Fillers as Potential Low Cost Countermeasure against Optical Fault Injection Attacks

Dmytro Petryk, Zoya Dyka, Jens Katzer, Peter Langendörfer

#74. Cryptographic Algorithm Implementation for Data Encryption in DBMS MS SQL Server

Larisa Cherckesova, Olga Safaryan, Evgenia Roshchina, Elena Pinevich, Andrey Lobodenko, Boris Akishin



Fourth Day: September 7th, 2020 (Monday)

14:15 — 15:00 **Plenary Session 4A**

Moderator: Vladimir Hahanov

14:15 — 15:00 **Invited Talk**



**Simulation of Digital Integrated Circuits with
Consideration of Destabilizing Factors**

Dr. Vazgen Melikyan — *Corresponding Member
of RA NAS, Armenia*

15:00 — 18:00 **Regular Papers Session 4A**

**“SoC Design & Test”, “System-in-Package
and 3D Design & Test”**

Moderator: Vladimir Hahanov, Nina Yevtushenko

**#65. Miniature Broadband Power Divider in
Modern Maritime Communications**

Hung Quang Luu

**#9. Typical Signal Correction Structures
Based on Duplication with the Integrated
Control Circuit**

*Dmitry Efanov, Valery Sapozhnikov, Vladimir
Sapozhnikov*

**#33. Modelling Error Pulses in a CMOS Triple
Majority Gate while Exposed to an Ionizing
Particle**

Yury Katunin, Vladimir Stenin

**#40. Implementing a virtual network on the
SDN data plane**

*Igor Burdonov, Nina Yevtushenko, Alexandr
Kossachev*

**#10. The Noise Immunity of CMOS Elements
During their Switching and Exposure to an**



| Fourth Day: September 7th, 2020 (Monday) | |
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| | Ionizing Particle <i>Yury Katunin, Vladimir Stenin</i> |
| | #89. Similarity–Difference Analysis and Matrix Fault Diagnosis of SoC-components <i>Vladimir Hahanov, Mikhail Karavay, Vladislav Sergienko, Svetlana Chumachenko, Eugenia Litvinova, Anna Hahanova, Tariq Hama Salih</i> |
| | #114. Big Data Critical Computing Based on the Similarity-Difference Metric <i>Vugar Hacimahmud Abdullayev, Lyudmila Shapa, Vladimir Hahanov, Oleksandr Mishchenko, Olga Shevchenko, Svetlana Chumachenko, Eugenia Litvinova</i> |
| | #116. Quantum Deterministic Computing <i>Wajeb Gharibi, Vladimir Hahanov, Ka Lok Man, Svetlana Chumachenko, Eugenia Litvinova, Ivan Hahanov</i> |
| | #109. Hardware Obfuscation Techniques on FPGA-Based Systems <i>Valeriy Gorbachov, Abdulrahman Kataeba Batiaa, Olha Ponomarenko, Oksana Kotkova</i> |
| 15:00 — 18:00 | Regular Papers Session 4B “Design of Integrated Passive Components”, “System-in-Package and 3D Design & Test”, “Optical signals in communication and Information Processing” Moderator: Eugenia Litvinova, Denis Letavin |
| | #55. Integrated-Optics Quantum Processor Based on Entangled Photons in Coupled Cavities <i>Farid Ablayev, Sergey Andrianov, Sergey Moiseev, Alexander Vasiliev</i> |
| | #15. Investigation of a Broadband Five-Stub 3 dB Coupler Using Microstrip Cells <i>Denis Letavin, Ilya Terebov</i> |



| Fourth Day: September 7th, 2020 (Monday) | |
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| #48. Modeling of smart clothing packet and its porosity | <i>Mikhail Fedorovich Mitsik; Marina Byrdina; Svetlana Kurenova; Anastasiya Movchun</i> |
| #17. Phase shifter designs based on miniature couplers | <i>Denis Letavin, Ilya Terebov</i> |
| #56. Smart fabric thermal conductivity modeling | <i>Mikhail Fedorovich Mitsik; Marina Byrdina; Svetlana Kurenova; Dmitry Kelekhsaev</i> |
| #36. Unidirectional Emission of Active Eccentric Microring Cavities | <i>Anna I. Repina, Alina Oktyabrskaya, Evgenii Karchevskii</i> |
| #61. Thermoregulation of smart clothing based on Peltier elements | <i>Mikhail Fedorovich Mitsik; Marina Byrdina</i> |
| #119. Bit-Stream Online Power Function Computer | <i>Bogdan D. Larchenko, Lina Larchenko, Alexander Shkil</i> |