

FINAL PROGRAMME

30th INTERNATIONAL CONFERENCE ON MICROELECTRONICS

Niš, Serbia
October 9th-11th, 2017



organized by
IEEE Serbia and Montenegro Section - ED/SSC Chapter



in cooperation with



Serbian Academy of Science and Arts - Branch in Niš
Faculty of Electronic Engineering, University of Niš



under the co-sponsorship of
IEEE Electron Devices Society



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MINI-COLLOQUIUM ON NANO ELECTRONICS

Monday, October 9th

UNIVERSITY OF NIŠ, Univerzitetski trg 2, Niš

12:00	Registration
13:45	Introductory Remarks and Opening Address Ninoslav Stojadinović, University of Niš, Serbia Chairmen: Marko Topič, University of Ljubljana, Slovenia Tomislav Suligoj, University of Zagreb, Croatia
14:00	More Moore, More than Moore, 3D Integration and Diversifications Simon Deleonibus, CEA/LETI, France
14:30	Silicon Nanodevices for Intelligent Communications Shunri Oda, Tokyo Institute of Technology, Japan
15:00	Silicon in the Nanoscale and the Scaling Issues of Nanowire MOS Transistors Hei Wong, City University of Hong Kong, Hong Kong
15:30	Coffee Break Chairmen: Simon Deleonibus, CEA/LETI, France Shunri Oda, Tokyo Institute of Technology, Japan
16:00	Non-Volatility by Spin in Modern Nanoelectronics Siegfried Selberherr, Technical University Wien, Austria
16:30	Photovoltaics as Macroelectronics Applying Nanostructures as Nanoelectronics Marko Topič, University of Ljubljana, Slovenia
17:00	Innovative Bipolar-CMOS Integration for RF Communication Circuits with Low-Cost High-Performance Horizontal Current Bipolar Transistor (HCBT) Tomislav Suligoj, University of Zagreb, Croatia

CONFERENCE PROGRAMME

Monday, October 9th

UNIVERSITY OF NIŠ, Univerzitetski trg 2, Niš

18:00	Conference Opening Chairmen: N. Stojadinović, University of Niš, Serbia S. Deleonibus, CEA/LETI, France S. Dimitrijević, Griffith University, Nathan, Australia S. Oda, Tokyo Institute of Technology, Japan H. Wong, City University of Hong Kong, Hong Kong
18:30	Welcome Cocktail

CONFERENCE PROGRAMME

Tuesday, October 10th

FACULTY OF ELECTRONIC ENGINEERING, Aleksandra Medvedeva 14, Niš

SESSION: DEVICE PHYSICS, TECHNOLOGY AND TESTING **Room A**

Chairmen: A. Paskaleva, Bulgarian Academy of Sciences, Sofia, Bulgaria
S. Dimitrijev, Griffith University, Nathan, Australia

- 9:00 **Functional Role of Ca²⁺ Currents within the Stereocilia as Bio-MEMS: A Modeling Study**
D.L. Sekulic, M.V. Sataric, A.V. Jozic
University of Novi Sad, Serbia
- 9:15 **Memristor state transition in reconfigurable microwave filter**
I. Marković, M. Potrebić, D. Tošić
University of Belgrade, Serbia
- 9:30 **Simulation of Solo GaN IGBTs**
S. Faramehr, P. Iglić
Swansea University, United Kingdom
- 9:45 **A Case Study of C-V Hysteresis Instability in Metal-High-k-Oxide-Silicon Devices with ZrO₂/Al₂O₃/Zr₂O₅ Stack as a Charge Trapping Layer**
A. Skeparovski, D. Spassov[†], A. Paskaleva[†], N. Novkovski
"Ss. Cyril and Methodius" University, Skopje, Macedonia
[†]Bulgarian Academy of Sciences, Sofia, Bulgaria
- 10:00 **A Comparison of the Tri-Layer Transmission Line Model and a Finite Element Model for Ohmic Contact Analysis**
F. Algahtani, S. Luong, Y. Pan, M.S. Alnassar, A. Holland
RMIT University, Melbourne, Australia
- 10:15 **SOI Based Double Source Tunnel FET (DS-TFET) with High On-Current and reduced Turn-on Voltage**
N. Bagga, A. Kumar and S. Dasgupta
Indian Institute of Technology Roorkee, India
- 10:45 **Coffee Break**

	Chairmen: Z. Stamenkovic, IHP, Frankfurt (Oder), Germany D. Osipov, University of Bremen, Germany
11:15	Implementation of Fuzzy Logic Operators as Digital Asynchronous Circuits in CMOS Technology T. Talaśka UTP University of Science and Technology, Bydgoszcz, Poland
11:30	Parallel Matrix Multiplication in 2-gain Kalman Filter Realized in Hardware I. Zbierska ¹ , T. Talaśka ² , R. Długosz ^{1,2} ¹ Delphi Poland, Krakow, Poland ² UTP University of Science and Technology, Bydgoszcz, Poland
11:45	Energy-Efficiency vs. Performance Optimization in Low-Power Wireless Transmission N. Zogović Institute Mihajlo Pupin, University of Belgrade, Serbia
12:00	Analog ASIC TID Behavior in a Temperature Range A.Y. Borisov, L.N. Kessarinskiy, M.M. Vanzha, M.P. Belova, Y.M. Moskovskaya, D.V. Boychenko, A.Y. Nikiforov, V.V. Enns ¹ National Research Nuclear University "MEPhI", Moscow, Russia ¹ Design center "SOYUZ", Zelenograd, Moscow, Russia
12:15	Integrated Current Sensor for Automotive Power Switches R. Brata, A. Danchiv ¹ , L. Dobrescu, D. Dobrescu "Politehnica" University of Bucharest, Romania ¹ Infineon Technology Romania, Bucharest, Romania
12:30	Plastic Encapsulated ICs Bonding Reliability Risk Assessment at HT Automotive Application M. Blyzniuk, A. Devos ¹ , M. Furman Branch Establishment "Melexis-Ukraine", Kyiv, Ukraine ¹ Melexis NV, Sint Krispijnstraat, Ieper, Belgium
13:00	Lunch Restaurant

SESSION	PLENARY SESSION 1	Room A
	Chairmen: H. Wong, City University of Hong Kong, Kowloon, Hong Kong A. Napieralski, Lodz University of Technology, Poland	
14:30	SiC Power MOSFETs: The Current Status and the Potential for Future Development S. Dimitrijev Griffith University, Nathan, Australia	
15:00	An Overview of the Modeling and Simulation of the Single Event Transients at the Circuit Level M. Andjelkovic, A. Ilic, Z. Stamenkovic, M. Krstic, R. Kraemer IHP, Frankfurt (Oder), Germany	
15:30	Basic Trends in Electronic Components Product Range Development: Radiation Hardness Aspects A.Y. Nikiforov, D.V. Boychenko, V.A. Telets, A.A. Smolin, V.V. Elesin, A.V. Ulanova, L.N. Kessarinskiy National Research Nuclear University "MEPhI", Moscow, Russia	
16:00	Coffee Break	
16:30-17:30	POSTERS 1	
SESSION:	DEVICE PHYSICS, TECHNOLOGY AND TESTING	Lobby
	Chairmen: P. Igić, Swansea University, United Kingdom D. Vasiljević Radović, University of Belgrade, Serbia	
A1	Tailorable Effective Optical Response of Dual-metal Plasmonic Crystals M. Obradov, J. Lamovec, I. Mladenović, Z. Jakšić ¹ , S. Vuković, G. Isić, D. Tanasković University of Belgrade, Serbia ¹ IHTM-CMTM, Serbia	
A2	Stochastic Time Response of Adsorption-Based Micro/Nanobiosensors with a Fluidic Reaction Chamber: the Influence of Mass Transfer I. Jokić, Z. Djurić ¹ , K. Radulović, M. Frantlović University of Belgrade, Serbia ¹ Serbian Academy of Sciences and Arts, Belgrade, Serbia	
A3	Effect of High Energy Ball Milling on the Morphology and Magnetic Properties of Powder Prepared from HD Nd₂₁₄Fe₁₄B Material V. Jović, J. Lamovec, D. Sojer, D. Lončarević, I. Mladešović, D. Vasiljević Radović University of Belgrade, Serbia	

- A4 **Characterization of Yttrium Orthoferrite (YFeO_3) Nanoparticles as Humidity Sensor Materials at Room Temperature**
D.L. Sekulic, Z. Lazarevic¹, C. Jovalekic¹, N. Romcevic¹
University of Novi Sad, Serbia
¹University of Belgrade, Serbia
- A5 **On the Design of Compact Intelligent Industrial Transmitters Based on Piezoresistive MEMS Pressure Sensors**
M. Frantlović, P. Poljak, I. Jokić, D. Randjelović, D. Vasiljević Radović
University of Belgrade, Serbia
- A6 **Electrical and Charge Trapping Properties of $\text{HfO}_2/\text{Al}_2\text{O}_3$ Multilayer Dielectric Stacks**
V. Davidović¹, A. Paskaleva², D. Spassov², E. Guziewicz³, T. Krajewski³,
S. Golubović¹, S. Djorić-Veljković¹, I. Manić¹, D. Danković¹, N. Stojadinović^{1,4}
¹University of Niš, Serbia
²Bulgarian Academy of Sciences, Sofia, Bulgaria
³Polish Academy of Sciences, Warsaw, Poland
⁴Serbian Academy of Sciences and Arts, Belgrade, Serbia
- A7 **Modelling of Threshold Voltage Shift in Pulsed NBT Stressed P-Channel Power VDMOSFETs**
D. Danković, I. Manić, N. Stojadinović¹, Z. Prijić, S. Djorić-Veljković, V. Davidović,
A. Prijić, A. Paskaleva², D. Spassov², S. Golubović
¹Serbian Academy of Sciences and Arts, Belgrade, Serbia
²Bulgarian Academy of Sciences, Sofia, Bulgaria
- A8 **GaN HEMT Small-Signal Modelling:
Neural Networks versus Equivalent Circuit**
Z. Marinković, G. Crupi¹, A. Caddemi¹, V. Marković
University of Niš, Serbia
¹University of Messina, Italy
- A9 **Compact Thermal Modelling of Power LED Light Sources**
T. Torzewicz, K. Baran¹, T. Raszkowski, A. Samson, H. Wachta¹, A. Napieralski
Lodz University of Technology, Poland
¹Rzeszow University of Technology, Poland
- A10 **Estimation Technique for LED Sensitivity to Structural Damage based on Minority Carriers Lifetime Measurements**
R.K. Mozhaev, M.E. Cherniak, A.V. Ulanova, A.Y. Nikiforov
National Research Nuclear University "MEPhI", Moscow, Russia
- A11 **Power MOSFET Single Event Burnout Hardness Increasing by Neutron Preirradiation**
L. Kessarinskiy, D. Boychenko, A. Nikiforov, A. Polokhov¹, T. Kristskaya¹, G. Davydov
National Research Nuclear University "MEPhI", Moscow, Russia
¹JSC "Angstrem", Zelenograd, Moscow, Russia
- A12 **Temperature Influence on the TID effects in RadFETs**
V. Felitsyn, B. Podlepetsky, A. Bakerenkov, A. Rodin, Yu. Sukhoroslova
National Research Nuclear University "MEPhI", Moscow, Russia
- A13 **Joint Model of Dose Rate Radiation Effects in Bipolar Devices**
V. Pershenkov, A. Bakerenkov, V. Telets, V. Belyakov, V. Shurenkov,
V. Felitsyn, A. Rodin
National Research Nuclear University "MEPhI", Moscow, Russia

- A14 **Numerical Computation of the Physical Shielding Factor for Different Structures of MOSFET in Gamma Irradiation Field**
S. Stanković, R. Ilić, A. Jakšić¹, D. Nikolić, N. Kržanović
University of Belgrade, Serbia
¹University College Cork, Ireland
- A15 **Influence of High Voltage Pulse Trimming on Thick-Film Resistor Quality Indicators**
I. Stanimirović, Z. Stanimirović
Institute for Telecommunications and Electronics IRITEL, Belgrade, Serbia
- A16 **Electrical Properties of Rare Earth Doped BaTiO₃ Ceramics**
V. Paunović, V. Mitić, M. Đorđević, Z. Prijović
University of Niš, Serbia
- A17 **Evaluation of the Mechanical and Tribological Properties of Multilayer CrN/TiN Films Deposited at Low Temperatures**
L. Kolaklieva, S. Rabadzhiyska, R. Kakanakov, V. Chitanov, T. Cholakova,
V. Rupetchov¹, G. Mishev¹
Bulgarian Academy of Sciences, Plovdiv, Bulgaria
¹Paisii Hilendarski University Plovdiv, Bulgaria
- A18 **Analysis of Low-pressure DC Breakdown in Air**
E. Živanović
University of Niš, Serbia
- A19 **Capacitance Model for MOSFET Operated in all Regions**
A. Benfdila, A. Lakhlef
University M. Mammeri, Tizi-Ouzou, Algeria
- A20 **Investigation on Cylindrical Gate-All-Around (GAA) Tunnel FETS Scaling**
M. Kessi, A. Benfdila, A. Lakhlef
University M. Mammeri, Tizi-Ouzou, Algeria

18:00 **Departure for Gala Dinner**
Faculty of Electronic Engineering
Gala Diner - Wine Cellar Malcha

Wednesday, October 11th

FACULTY OF ELECTRONIC ENGINEERING, Aleksandra Medvedeva 14, Niš

SESSION: SYSTEM DESIGN AND TESTING

Room A

Chairmen: V. Milovanovic, University of Kragujevac, Serbia
R. Dlugosz, Delphi Poland, Krakow, Poland

9:00	An HDL Model of a Digitally Controlled Oscillator for Rapid Digital PLL Prototyping V. Milovanovic, B. Nikolic ¹ University of Kragujevac, Serbia ¹ University of California at Berkeley, USA
9:15	Low Power SAR ADC with Two-Step Switching Scheme in 65 nm Standard CMOS Process D. Osipov, St. Paul University of Bremen, Germany
9:30	The Implementation of Harmonic Analysis Methods in Active Power Filters Control B. Jovanović, P. Petković, S. Milenković University of Niš, Serbia
9:45	Comparison of the SET Sensitivity of Standard Logic Gates Designed in 130 nm CMOS Technology M. Andjelkovic, M. Krstic, R. Kraemer IHP, Frankfurt (Oder), Germany
10:00	Classification of Nonlinear Loads Based on Artificial Neural Networks M. Andrejević Stošović, D. Stevanović ¹ , M. Dimitrijević University of Niš, Serbia ¹ Innovation Centre of Advanced Technologies (ICAT), Niš, Serbia
10:15	32-channel Self-triggered ASIC for GEM Detectors E. Atkin, I. Bulbakov, V. Ivanov ¹ , P. Ivanov, E. Malankin, D. Normanov, S. Petrovskiy, V. Shumikhin, A. Voronin, V. Samsonov ¹ National Research Nuclear University "MEPhI", Moscow, Russia ¹ National Research Centre Kurchatov Institute, Gatchina, Russia
10:30	Coffee Break

SESSION	PLENARY SESSION 2	Room A
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Chairmen: A.Y. Nikiforov, NRNU "MEPhI", Moscow, Russia
M. Janicki, Lodz University of Technology, Poland

11:00	Energy and Variability Efficient (EVE) Era is Ahead of Us S. Deleonibus CEA/LETI, France	
11:30	The Scaling Issues of Subnanometer EOT Gate Dielectrics for the Ultimate Nano CMOS Technology J. Zhang, H. Wong, V. Filip University of Hong Kong, Kowloon, Hong Kong University of Bucharest, Magurele, Romania	
12:00	High Sensitivity Magnetic Sensors Compatible with Bulk Silicon and SOI IC Technology P. Igić, O. Kryvchenkova, S. Faramehr, S. Batcup, N. Janković ¹ Swansea University, United Kingdom ¹ University of Niš, Serbia	
12:45	Lunch	Restaurant

14:00-15.00 **POSTERS 2**

SESSION:	CIRCUIT DESIGN AND TESTING	Lobby
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Chairmen: T. Talaśka, UTP University of Science and Technology, Poland
M. Andrejević Stošović, University of Niš, Serbia

B1	Real-time Locating Systems for Smart City and Intelligent Transportation Applications M. Banach, R. Dlugosz ¹ Poznan University of Technology, Poland ¹ Delphi Poland, Krakow, Poland
B2	Selected Aspects and Tradeoffs in Transistor Level Implementation of Genetic Algorithms S. Jezewski, R. Dlugosz ¹ Institute of Informatics, College of Social and Media Culture, Torun, Poland ¹ Delphi Poland, Krakow, Poland
B3	Advanced Stand for Transient Thermal Measurements T. Torzewicz, A. Sobczak, M. Janicki, A. Napieralski Lodz University of Technology, Poland

- B4 **A Low-Latency Medium Access Control Protocol for Industrial Wireless LAN Applications**
N. Odhah, K. Tittelbach-Helmrich, Z. Stamenković
IHP, Frankfurt (Oder), Germany
- B5 **Comparison of On-Chip ADC Testing Techniques**
A.Yu. Egorov, I.A. Mozhaev, P.V. Nekrasov, D.V. Boychenko, I.O. Loskutov
National Research Nuclear University "MEPhI", Moscow, Russia
- B6 **SEFI Cross-section Evaluation by Fault Injection Software Approach and Hardware Detection**
I.O. Loskutov, P.V. Nekrasov, I.I. Shvetsov-Shilovskiy, D.V. Boychenko,
V.M. Uzhegov¹
National Research Nuclear University "MEPhI", Moscow, Russia
¹TSNIIMASH, Korolev, Russia
- B7 **FRAM Test Memory Cells Radiation Hardness Research**
I.I. Shvetsov-Shilovskiy, A.B. Boruzdina, A.V. Ulanova, O.M. Orlov¹,
Y.A. Matveev, D.V. Negrov
National Research Nuclear University "MEPhI", Moscow, Russia
¹TSNIIMASH, Korolev, Russia
- B8 **Investigation of Ionizing Transients by Femtosecond X-ray Source Ionization**
M.P. Belova, L.N. Kessarinskiy, A.Y. Borisov, A.I. Chumakov, D.V. Boychenko
K.A. Ivanov¹, I.N. Tsymbalov¹, R.V. Volkov¹, A.B. Savel'ev¹
National Research Nuclear University "MEPhI", Moscow, Russia
¹M.V. Lomonosov Moscow State University, Moscow, Russia
- B9 **Optimal Laser Wavelengths for Transient Ionizing Response Simulation of CMOS SOI Devices with 0.24 μm Design Rules**
S.B. Shmakov, P.K. Skorobogatov¹, A.V. Ulanova, A.B. Boruzdina¹,
G.G. Davydov, A.Y. Nikiforov
Specialized Electronic Systems, Moscow, Russia
¹National Research Nuclear University "MEPhI", Moscow, Russia
- B10 **Total Ionizing Dose Hardness Nondestructive Individual Estimation and Predictive Grading for Silicon-on-insulator ICs**
Y.M. Moskovskaya, G.G. Davydov, A.V. Sogoyan, A.Y. Nikiforov, I.B. Yashanin¹
National Research Nuclear University "MEPhI", Moscow, Russia
¹Scientific Institute of Measurement Systems, N. Novgorod, Russia
- B11 **Total Ionizing Dose Degradation of CMOS 8-transistor Image Sensor with Column ADC**
M. Cherniak, A. Smolin, R. Mozhaev, A. Ulanova, A. Nikiforov
National Research Nuclear University MEPhI, Moscow, Russia
- B12 **Process Parameters Variations Influence on CMOS IC's Hardness to Total Ionizing Dose**
Y.M. Moskovskaya, A.Y. Nikiforov, D.V. Bobrovskiy, A.V. Ulanova, A.A. Zhukov¹
National Research Nuclear University "MEPhI", Moscow, Russia
¹SMC «Technological Centre», Zelenograd, Moscow, Russia

B13	Battery Capacity Estimation of Wireless Sensor Node G. Nikolić, T. Nikolić, M. Stojčev, B. Petrović, G. Jovanović University of Niš, Serbia
B14	Analog Device Design for Testability in the Case of Oscillation Based Testing M. Petrović, M. Milić University of Niš, Serbia
B15	The Prediction for Single Event Latchup Sensitivity Parameters of Digital CMOS ICs Based on its Technological Features A.E. Rudenkov, A.O. Akhmetov, D.V. Bobrovsky, A.I. Chumakov, A.V. Yanenko, V.M. Uzhegov ¹ National Research Nuclear University "MEPhI", Moscow, Russia ¹ TSNIIMASH, Korolev, Russia

SESSION: SYSTEM DESIGN AND TESTING **Lobby**

C1	Chairmen: M. Stojčev, University of Niš, Serbia M. Zogović, Institute Mihajlo Pupin, Serbia
C2	Asynchronous Early Output Section-Carry Based Carry Lookahead Adder with Alias Carry Logic P. Balasubramanian, C. Dang, D.L. Maskell, K. Prasad ¹ Nanyang Technological University, Singapore ¹ Auckland University of Technology, New Zealand
C3	Approximate Ripple Carry and Carry Lookahead Adders – A Comparative Analysis P. Balasubramanian, C. Dang, D.L. Maskell, K. Prasad ¹ Nanyang Technological University, Singapore ¹ Auckland University of Technology, New Zealand
C4	Dual-Phase-Lag Thermal Model of Test Microchip Structure Dedicated to Electronic Circuit Thermal Properties Estimation using Artificial Intelligence T. Raszkowski, A. Samson, M. Zubert, M. Janicki Lodz Technical University, Poland
C5	Flip-chip ICs SEE Testing Technique D.V. Bobrovsky, A.A. Pechenkin, A.A. Novikov, A.I. Chumakov, N.V. Ryasnoy ¹ , Y.V. Churilin ¹ National Research Nuclear University "MEPhI", Moscow, Russia ¹ JSC SRC «Progress», Samara, Russia
	Compendium of TID Influence on SEE Sensitivity Investigation A.A. Novikov, A.A. Pechenkin, A.I. Chumakov, A.N. Tsirkov, M.P. Belova National Research Nuclear University "MEPhI", Moscow, Russia

- C6 **Frequency Dependence of SEU in 0.18um Processor**
V.A. Marfin, P.V. Nekrasov, I.O. Loskutov, A.Y. Nikiforov
National Research Nuclear University "MEPhI", Moscow, Russia
- C7 **Experiments on Electrical Overstress Influence on Digital ICs Depending on the Input/Output Port Configuration**
A.N. Shemonaev, K.A. Epifantsev, P.K. Skorobogatov
National Research Nuclear University "MEPhI", Moscow, Russia
- C8 **The Specialized Pulse Voltage Generator EMI-0502**
A.N. Shemonaev, K.A. Epifantsev, P.K. Skorobogatov
National Research Nuclear University "MEPhI", Moscow, Russia
- C9 **Design and Testing Issues of a High-Speed SOI CMOS Dual-Modulus Prescaler for Radiation Tolerant Frequency Synthesizers**
D.I. Sotskov, V.V. Elesin, K.M. Amburkin, G.N. Nazarova,
N.A. Usachev, A.Y. Nikiforov
National Research Nuclear University "MEPhI", Moscow, Russia
- C10 **SPICE-Level Layout-Aware Single Event Effects Simulation of Majority Voters**
A.O. Balbekov¹, M.S. Gorbunov^{1,2}, G.I. Zebrev²
¹Scientific Research Institute of System Analysis, Russian Academy of Sciences,
Moscow, Russia
²National Research Nuclear University "MEPhI", Moscow, Russia
- 15:15 **Conference Closing**
Best Paper Awards

30th INTERNATIONAL CONFERENCE ON MICROELECTRONICS

FINAL PROGRAMME

MONDAY, October 9th

UNIVERSITY OF NIŠ

Univerzitetski trg 2, Niš

12:00

Registration

13:45

**MINI-COLLOQUIUM
ON NANO ELECTRONICS**

18:00

Conference Opening

18:30

Welcome Cocktail

TUESDAY, October 10th

FACULTY OF ELECTRONIC ENGINEERING

Aleksandra Medvedeva 14, Niš

9:00

Session:
**DEVICE PHYSICS,
TECHNOLOGY AND TESTING**

Room A

Session:
**SYSTEM DESIGN
AND TESTING**

Room A

9:00

Coffee Break

10:30

Coffee Break

11:00

Session:
**CIRCUITS DESIGN
AND TESTING**

Room A

11:30

PLENARY SESSION 2

12:45

Lunch

Restaurant

13:15

PLENARY SESSION 1

Room A

14:30

Lunch

14:00

Posters 2
Session: **CIRCUIT DESIGN
AND TESTING**

Lobby

15:00

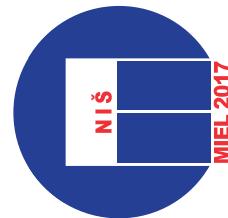
Posters 1
Session: **SYSTEM DESIGN
AND TESTING**

Lobby

15:15

Conference Closing
Best Paper Awards

Departure for Gala Dinner



IMPORTANT ADDRESS

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