



TECHNICAL UNIVERSITY of SOFIA



Faculty of Electronic Engineering and Technologies



IEEE XXVI INTERNATIONAL SCIENTIFIC CONFERENCE

# ELECTRONICS ET 2017

IEEE CONFERENCE RECORD #41615

## PROGRAMME

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Science Days of Technical University of Sofia

Hotel “Lazur”

September 13 - 15, 2017

Sozopol, Bulgaria

**THE XXVI INTERNATIONAL SCIENTIFIC CONFERENCE “ELECTRONICS ET 2017” IS ORGANIZED BY TECHNICAL UNIVERSITY OF SOFIA, FACULTY OF ELECTRONIC ENGINEERING AND TECHNOLOGIES, BULGARIA IN CO-OPERATION WITH DELFT UNIVERSITY OF TECHNOLOGY, THE NETHERLANDS**

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**Wednesday, September 13, 2017**

2.00 p.m.	Registration of participants
4.00 p.m.	<p>Official opening of the Conference Plenary session</p> <p><b>1. M. M. De Souza, A. Kumar, P. Pillai and X. Song.</b> Beyond Dual Energy Landscape Landau Switches. <i>University of Sheffield, UK</i></p> <p><b>2. E. M. S. Narayanan, V. Unni, A. Nakajima, H. Amano, S. Yagi and H. Kawai.</b> Polarisation Super Junction Technology in Gallium Nitride – a Platform for Integration of Power and Gate Drive Technologies. <i>University of Sheffield, UK</i></p> <p><b>3. S. Ouzounov.</b> Microelectronics for Healthcare in the 21<sup>st</sup> Century, with Some Recent Examples of ASIC Innovation. <i>Philips, The Netherlands</i></p>
7.30 p.m.	Cocktail-party

**Thursday, September 14, 2017**

8.30 a.m.	Preparation of posters for Session <b>A</b> (Hall 1)
9.00 a.m.	<p>Session <b>A</b> (Hall 1)</p> <p>Quantum, Nuclear and Optoelectronics Biomedical Engineering Circuits and Systems</p>
1.30 p.m.	Preparation of posters for Session <b>B</b> (Hall 1)
2.00 p.m.	<p>Session <b>B</b> (Hall 1)</p> <p>Power Electronics</p>
7.30 p.m.	Official dinner

**Friday, September 15, 2017**

8.30 a.m.	Preparation of posters for Session <b>C</b>
9.00 a.m.	<p>Session <b>C</b> (Hall 1)</p> <p>Education and Learning Technologies Embedded Systems Testing, Quality and Reliability Microelectronics Nanoelectronics and Technologies in Electronics</p>
1.30 p.m.	Preparation of posters for Session <b>D</b>
2.00 p.m.	<p>Session <b>D</b> (Hall 1)</p> <p>Instrumentation and Measurement</p>

### Session A

#### Chairman – Georgy Mihov

- A.1. I. Antonova, S. Ceravolo, G. Corradi, G. Georgiev, V. Kozhuharov, M. Mitev, P. Valente, M. Raggi, L. Tsankov.** A Test System for the Front-End Electronics of the PADME Charged Particle Detector System. *Technical University of Sofia, Bulgaria, INFN, Italy, University of Sofia, Bulgaria - 20 min*
- A.2. D. Kiesewetter, V. Malyugin, A. Reznik, A. Yudin, N. Zhuravleva.** Experimental Setup for Investigation of Optically Inhomogeneous Objects by the Spectral-correlation Method. *Peter the Great Saint Petersburg Polytechnic University, Russian Federation -20 min*
- A.3. I. Uzunov, B. Nikov, S. Ouzounov, M. Hristov.** Frequency Compensation in a Two-Integrator Loop Gm-C Biquad when Realized with Single Stage OTAs. *Smartcom Bulgaria, Melexis Bulgaria, Philips Research Europe, The Netherlands, Technical University of Sofia, Bulgaria -20 min*

### Quantum, Nuclear and Optoelectronics

#### Chairman – Georgy Mihov

- A.P1. Y. Favre, G. Mitev and E. Noah.** Synchronization of the Distributed Readout Frontend Electronics of the Baby MIND Detector. *University of Geneva, Switzerland, Bulgarian Academy of Sciences, Bulgaria - 5 min*
- A.P2. C. Dutsov, M. Mitev, L. Tsankov, K. Mitev.** Electronic Circuits for the High Voltage Supply and Additional Sensors for the Polyphemus <sup>222</sup>Rn in Soil-Gas Scintillation Detector. *University of Sofia, Technical University of Sofia, Bulgaria - 5 min*
- A.P3. N. Peev, M. Mitev.** A Nanosecond-resolution Method of TDC Implementation, Based on Time-to-time Converters in Addition to Programmable Logic. *Technical University of Sofia, Bulgaria - 5 min*
- A.P4. N. Peev, M. Mitev.** Constant Fraction Discriminator Input Noise Filtering and Initialization. *Technical University of Sofia, Bulgaria - 5 min*
- A.P5. P. Mashkov, H. Beloev, B. Gyoch, R. Kandilarov, T. Pencheva.** LED Equipment for Light Influence on Photosynthesis Investigations. *University of Ruse, Bulgaria - 5 min*
- A.P6. R. Kandilarov, P. Mashkov, B. Gyoch, H. Beloev, T. Pencheva.** Method and Equipment for Controlling LED Lamp for Therapeutic Purposes. *University of Ruse, Bulgaria - 5 min*
- A.P7. S. Sadinov, K. Angelov, P. Kogias and M. Malamatoudis.** Iterative Estimation and Simulation Analysis of the Amplifying Sections in Optical Communication Network. *Technical University of Gabrovo, Bulgaria, Technological Educational Institute of Eastern Macedonia and Thrace, Kavala, Greece - 5 min*

## Biomedical Engineering

### Chairman – Ivo Iliev

- A.P8. **I. Iliev, S. Tabakov and K. Koshtikova.** Telemetry of Patients with Pacemaker Using ECG Sonification. *Technical University of Sofia, Medical University – Sofia, Bulgaria - 5 min*
- A.P9. **G. Mihov and D. Badarov.** Testing Digital Filters for Power Line Interference Removal from ECG Signals. *Technical University of Sofia, Bulgaria - 5 min*
- A.P10. **G. Petrova and G. Yanev.** Arduino Based Module for Return Electrode Contact Quality Monitoring in the Electrosurgical Instruments. *Technical University of Sofia, Plovdiv branch, Bulgaria - 5 min*

## Circuits and Systems

### Chairman – Angel Popov

- A.P11. **S. Lozanova, S. Noykov, A. Ivanov and C. Roumenin.** In-plane Magnetosensitive Double Hall Device. *Bulgarian Academy of Sciences, Bulgaria -5 min*
- A.P12. **I. Ruskova, E. Gieva, V. Yantchev, M. Hristov.** COMSOL Modeling of Hall Sensors Efficiency. *Technical University of Sofia, Bulgaria, Chalmers University of Technology, Goteborg, Sweden - 5 min*
- A.P13. **E. Manolov.** Design of Cascode Current Mirror OTA in Ultra-Deep Submicron CMOS Technology. *Technical University of Sofia, Bulgaria -5 min*
- A.P14. **G. Panov and A. Popov.** Replica Biased Complementary CMOS Comparator. *Technical University of Sofia, Bulgaria -5 min*
- A.P15. **V. Barzinska.** A Fast Comparator with Integrated Small Dual Hysteresis and Offset Control. *Technical University of Sofia, Bulgaria -5 min*
- A.P16. **D. Vrachkov and D. Todorov.** Mixed Signals Technique for Offset Reductions. *Technical University of Sofia, Bulgaria -5 min*
- A.P17. **G. Kuzmanov, T. Marinov and M. Mitev.** Investigation of ADC Using “Sliding Scale” Technique and its Impact on Differential Nonlinearity. *Technical University of Sofia, Bulgarian Academy of Sciences, Bulgaria -5 min*
- A.P18. **D. Vrachkov and D. Todorov.** Median technique for noise reductions. *Technical University of Sofia, Bulgaria -5 min*
- A.P19. **N. Nikolov, V. Lukov and M. Alexandrova.** Discrete Adaptive Real-Time State Observer Development Using Least-Squares Method. *Technical University of Varna, Bulgaria -5 min*
- A.P20. **J. Genoff.** A Floating-Gate Array Based Discrete True-Random Stream Generator. *Technical University of Sofia, Plovdiv branch, Bulgaria - 5 min*

## Session B

### Chairman – Vencislav Valchev

- B.1. V. Valchev, T. Todorova and A. Van den Bossche.** Comparison and Design of DC Chokes Based on Different Magnetic Materials. *Technical University of Varna, Bulgaria, Ghent University, Belgium - 20 min*
- B.2. Z. Duranay and H. Guldemir.** Fuzzy Logic Based Harmonic Elimination in Single Phase Inverters. *Firat University, Elazig, Turkey - 20 min*
- B.3. M. Şen and B. Kul.** IoT-Based Wireless Induction Motor Monitoring. *Uludağ University of Bursa, Turkey - 20 min*
- B.4. A. Antipin, V. Udintcev, V. Frizen, S. Nazarov.** Improving the Energy Efficiency of Electric Distribution Networks. *Ural Federal University, Yekaterinburg, Russian Federation - 20 min*
- B.5. R. Stoyanov, V. Valchev, D. Stefanov.** Selection Guidelines for BMSs Used in Ultralight Electric Vehicles. *Technical University of Varna, Bulgaria - 20 min*

### Power Electronics

### Chairman – Dimitar Arnaudov

- B.P1. T. Grigorova, B. Pachedjieva and A. Lechkov.** Investigation of the Modified Phase-Shifted Pulse Modulation Resonant DC/DC Converter. *Technical University of Sofia, Plovdiv branch, Bulgaria - 5 min*
- B.P2. N. Hinov, D. Arnaudov, V. Valchev and S. Vuchev.** Comparative Loss Analysis of Boost and Synchronous Boost DC-DC Converters. *Technical University of Sofia, Technical University of Varna, Bulgaria - 5 min*
- B.P3. A. Vuchev, N. Bankov and A. Lichev.** A Control Technique for a Bidirectional Series Resonant DC-DC Converter. *University of Food Technologies - Plovdiv, Bulgaria - 5 min*
- B.P4. D. Dankov and P. Prodanov.** Analysis and Design of Quasi-resonant ZVS Inverter for Induction Heating in a Magnetic Circuit. *Technical University of Gabrovo, Bulgaria - 5 min*
- B.P5. T. Hranov and N. Hinov.** Modeling of Electronic Energy Converter for Induction Heating Using LabVIEW. *Technical University of Sofia, Bulgaria - 5 min*
- B.P6. E. Popov, N. Hinov and T. Hranov.** Investigating the Steady State Mode of Power Inverters for Induction Heating. *Technical University of Sofia, Bulgaria - 5 min*
- B.P7. V. Valchev, D. Mareva and D. Yudov.** Analysis and Improvements of a Buck Converter Based LED Driver. *Technical University of Varna, Burgas Free University, Bulgaria - 5 min*
- B.P8. E. Kovatchev and N. Evstatieva.** Design of a Digitally Controlled Boost Converter for Automotive Headlamp Applications. *University of Ruse, Bulgaria - 5 min*

- B.P9. **E. Kovatchev.** Design of a MOSFET Bypass Switch for Individual Pixel Control in a Matrix LED Headlamp Application. *University of Ruse, Bulgaria* - 5 min
- B.P10. **V. Dimitrov, P. Goranov and D. Hvarchilkov.** Methods and Power Converters for Charging/Formation of VRLA Batteries. *Technical University of Sofia, Bulgaria* - 5 min
- B.P11. **D. Arnaudov.** Influence of Asymmetry in Multiphase Resonant Converters for Energy Storage Systems. *Technical University of Sofia, Bulgaria* - 5 min
- B.P12. **D. Spirov, N. Komitov.** Design of Induction Motor Drive with Parallel Quasi-Resonant Converter. *University of Food Technologies - Plovdiv, Bulgaria* - 5 min
- B.P13. **T. Košťál.** Induction Machine Parameters Identification Method Suitable for Self-commissioning. *Czech Technical University in Prague, Czech Republic* - 5 min
- B.P14. **N. Madzharov, V. Petkov, K. Panagiotis and K. Konstantinos.** Analysis of High-speed Rotary Wireless Power Transmitters. *Technical University of Gabrovo, Bulgaria, Technological Educational Institute of Eastern Macedonia and Thrace, Kavala, Greece* - 5 min
- B.P15. **R. Stanev, T. Asenov, T. Simeonov.** Micro and Nanogrid Active Power Management in Stand Alone and Grid Connected Operation. *Technical University of Sofia, Bulgaria* - 5 min
- B.P16. **S. Zahariev, K. Kirilov and M. Alexandrova.** Energy Performance Modeling of a Stand-Alone PV System Using Real Meteorological Data. *Technical University of Varna, Bulgaria, Delft University of Technology, The Netherlands* -5 min

### Session C

#### Chairman – Tania Vasileva

- C.1. J. Vankeirsbilck, V. Thati, J. Van Waes, H. Hallez and J. Boydens.** Control Flow Aware Software - Implemented Fault Injection for Embedded CPUs. *KU Leuven, Belgium* - 20 min
- C.2. J. Van Waes, J. Vankeirsbilck, D. Pissoort and J. Boydens.** Electromagnetic Interference in the Internet of Things: An Automotive Insight. *KU Leuven, Belgium* - 20 min
- C.3. J. Van Waes, J. Vankeirsbilck, D. Pissoort and J. Boydens.** Functional Safety Standard's Techniques and Measures in Light of Electromagnetic Interference. *KU Leuven, Belgium* - 20 min
- C.4. A. Tzanov.** Fast Modeling of SAM Layers for Electronics. *New York University, New York, USA* - 20 min

### Education and Learning Technologies

#### Chairman – Tania Vasileva

- C.P1. R. Radonov and V. Videkov.** Further Development of the „E-Management“ Platform for Electronic Management and Control of the Education. *Technical University of Sofia, Bulgaria* - 5 min
- C.P2. T. Vasileva, S. Stefanova and R. Gercheva.** Implementing University Learning Approaches in Secondary School Education. *Technical University of Sofia, Bulgaria* - 5 min
- C.P3. V. Bozhikova, M. Stoeva, B. Georgiev and D. Nikolaeva.** Improving the Software Quality - an Educational Approach. *Technical University of Varna, Bulgaria* - 5 min
- C.P4. D. Badarov and V. Manoev.** Teaching Methodology for Digital Pulse Width Modulation and Phase Angle Control. *Technical University of Sofia, Bulgaria* - 5 min
- C.P5. N. Hinov and T. Hranov.** Development of Series Resonant Converter Models with Output Transformer. *Technical University of Sofia, Bulgaria* - 5 min
- C.P6. K. Angelov, S. Sadinov and P. Kogias.** Practical Model for Management, Monitoring and Research of Passive Optical Network. *Technical University of Gabrovo, Bulgaria, Technological Educational Institute of Eastern Macedonia and Thrace, Kavala, Greece* - 5 min



## Embedded Systems

### Chairman – Grisha Spasov

- C.P7. **P. Yakimov, A. Iovev and N. Tuliev.** Implementation of Internet of Things based Solution of Universal Power Transducer. *Technical University of Sofia, Bulgaria - 5 min*
- C.P8. **M. Lyaskov, G. Spasov, G. Petrova.** A Practical Implementation of Smart Home Energy Data Storage and Control Application based on Cloud Services. *Technical University of Sofia, Plovdiv branch, Bulgaria - 5 min*
- C.P9. **B. Petrov, I. Gochev.** Increasing of the Number of the Controllable Axes Using TDM Mode of SPORT Interface between DSP and FPGA. *Technical University of Sofia, Plovdiv branch, Bulgaria - 5 min*

## Testing, Quality and Reliability

### Chairman – Grisha Spasov

- C.P10. **A. Stoyanova, B. Bonev and P. Avramov.** Corrosion Evaluation with Stepped Induction Thermography. *Technical University of Sofia, Bulgaria - 5 min*
- C.P11. **T. Papanchev, A. Georgiev and N. Nikolov.** Dynamical Reliability Estimation and Critical State Early Detection by Application of FIDES Guide 2009. *Technical University of Varna, Bulgaria - 5 min*
- C.P12. **A. Stoyanova and B. Bonev.** Infrared Survey in Electrical Preventive Maintenance. *Technical University of Sofia, Bulgaria - 5 min*

## Microelectronics

### Chairman – Stoyan Nihtyanov

- C.P13. **R. Rusev, G. Angelov, K. Angelov and D. Nikolov.** A model for Reverse Electrowetting with Cost-effective Materials. *Technical University of Sofia, Bulgaria - 5 min*
- C.P14. **D. Kolev, V. Todorova.** Some Peculiarities when Interfacing Resonance Tactile Array Sensors. *Technical University of Gabrovo, Bulgaria - 5 min*
- C.P15. **R. Rusev.** Hydrogen Bonding Network as a Logic Gate. *Technical University of Sofia, Bulgaria - 5 min*
- C.P16. **E. Gieva.** A Microelectronic Circuit in CADENCE Analogous to Michaelis Complex of  $\beta$ -lactamase Protein. *Technical University of Sofia, Bulgaria - 5 min*

## *Nanoelectronics and Technologies in Electronics*

### *Chairman – Stoyan Nihtyanov*

- C.P17. **A. Zahariev, B. Tzaneva, C. Girginov, S. Andreev.** Kinetics of Reanodization of Porous Anodic Oxide Films on Aluminium Formed in Pore-forming Solutions of Various Acids. *Technical University of Sofia, University of Chemical Technology and Metallurgy, Sofia, Bulgaria - 5 min*
- C.P18. **V. Tsenev, V. Videkov.** Experimental Study of the Melting of a Solder Paste. *Technical University of Sofia, Bulgaria - 5 min*
- C.P19. **I. Uzunov, M. Terzieva, B. Nikolova and D. Gaydzhiev.** Extraction of Modified Butterworth – Van Dyke Model of FBAR Based on FEM Analysis. *Smartcom Bulgaria, Technical University of Sofia, Bulgaria - 5 min*
- C.P20. **S. Andreev, K. Chernyakova, B. Tzaneva, V. Videkov and I. Vrublevsky.** Study of Thermal Conductivity of Nanoporous Anodic Alumina Layer Formed in Sulphuric Acid Using Steady-State Heat Flow Technique. *Technical University of Sofia, Bulgaria, Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus - 5 min*

### Session D

#### Chairman – Zivko Kokolanski

- D.1. T. Shuminoski.** The Internet of Things and Emerging Internet of Everything Galaxy. *Ss. Cyril and Methodius University of Skopje, Macedonia* - **20 min**
- D.2. B. Kul.** IoT-GSM-Based High-Efficiency LED Street Light Control System (IoT-SLCS). *Uludağ University of Bursa, Turkey* - **20 min**
- D.3. B. Kul and M. Şen.** Energy Saving IoT-Based Advanced Load Limiter. *Uludağ University of Bursa, Turkey* - **20 min**
- D.4. L. T. V. Quyen, N. M. Thang, N. H. Vu, N. T. Truyen, V. Malyugin, D. Kiesewetter.** Device for Measuring Parameters of the Meteorological Precipitation. *Vietnam Research Institute of Electronics, Informatics and Automation, Hanoi, Vietnam, Peter the Great Saint Petersburg Polytechnic University, Russian Federation* - **20 min**
- D.5. Z. Kokolanski, M. Simic, C. Gavrovski, D. Denic, V. Dimcev, D. Zivanovic, D. Taskovski.** Realization and Testing of PC-based Power Quality Signal Generator. *Ss. Cyril and Methodius University of Skopje, Macedonia, University of Nis, Serbia* - **20 min**

### Instrumentation and Measurement

#### Chairman – Marin Marinov

- D.P1. A. Antipin, D. Tomashevskii, S. Mironov, M. Volhin.** Topical Application of the Drive Systems through the Stepper Motors in the Process Equipment, Manipulators, Pushers without Feedback. *Ural Federal University, LLC «Complex Develop and Introduction automated Systems», Yekaterinburg, Russian Federation* - 5 min
- D.P2. M. Hrabal, I. Zhivkov, N. Tuliev, G. Dobrikov, L. Omasta, M. Vala.** Voltage Source for AC Electroluminescent Measurements. *Brno University of Technology, Czech Republic, Bulgarian Academy of Sciences, Technical University of Sofia, Bulgaria* - 5 min
- D.P3. M. Marinov, S. Hensel, B. Ganev and G. Nikolov.** Experimental Set-up for Performance Evaluation of Low-cost Particulate Matter Sensors. *Technical University of Sofia, Bulgaria, University of Applied Sciences Offenburg, Germany* - 5 min
- D.P4. T. Marinov and V. Gurev.** Long Term Performance of Data Acquisition System for Parameters of the Environment. *Technical University of Sofia, Sofia University, Bulgaria* - 5 min
- D.P5. D. Iliev, M. Mitev and V. Gourev.** Design of Strain Gauge Anemometer for Work in Antarctic Conditions. *Technical University of Sofia, Sofia University, Bulgaria* - 5 min
- D.P6. T. Djamiykov, K. Asparuhova, I. Mitev.** Sun Tracker with Sensor – Photovoltaic Cell. *Technical University of Sofia, Bulgaria* - 5 min
- D.P7. D. Vrachkov and D. Todorov.** Electronic Scoring System - Algorithm for Microcontroller Unit. *Technical University of Sofia, Bulgaria* - 5 min

- D.P8. **G. Nikolov, I. Ruskova, E. Gieva and B. Nikolova.** System for Multi-frequency Capacitance-Voltage Characterization. *Technical University of Sofia, Bulgaria* - 5 min
- D.P9. **M. Todorov, B. Nikolova and G. Nikolov.** Cross-platform Sensor Networks. *Technical University of Sofia, Bulgaria* - 5 min
- D.P10. **R. Yordanov, R. Miletiev, P. Kapanakov and E. Iontchev.** Design of a Portable System for Sensor Data Acquisition and Transmission. *Technical University of Sofia, Bulgaria* - 5 min

#### MAIN TOPICS:

- **Biomedical Engineering**
- **Circuits and Systems**
- **Instrumentation and Measurement**
- **Embedded Systems**
- **Education and Learning Technologies**
- **Microelectronics**
- **Power Electronics**
- **Quantum, Nuclear and Optoelectronics**
- **Nanoelectronics and Technologies in Electronics**
- **Testing, Quality and Reliability**

#### Poster presentation

The authors presenting their papers at the Poster sessions will have at their disposal a panel in format A0 (840 X 1188 width x height). In the beginning of each Poster session an introduction is planned. The authors will present their work very briefly in front of the audience: 2-5 slides, within 5 minutes. The questions and discussions will be continued at the Poster panels.

The conference rooms will be equipped with a computer and multimedia projector. For computer presentation we provide MS Office 2010 components (Word, Power Point, Excel), Acrobat Reader. For other software please contact the organizers.

The slides have to be given to the organizers in electronic form before the beginning of the session.

