MEMSTECH'2018

CONFERENCE PROGRAM

XIVth International Conference
PERSPECTIVE TECHNOLOGIES AND METHODS IN MEMS DESIGN

18-22 April 2018, Polyana, Ukraine

MEMSTECH 2018 Timetable

	Wednesday, April 18
17^{00}-18^{00}	**REGISTRATION**
	Thursday, April 19
11^{00}-12^{45}	**REGISTRATION**
13^{00}-13^{15}	**OPENING CEREMONY**
13^{15}-14^{40}	**Plenary Session** Chairman: Prof. Mykhaylo Lobur Secretary: Dr. Mykhaylo Melnyk
14^{40}-15^{00}	**Coffee Break**
15^{00}-16^{45}	**Session 1** Chairmen: Prof. Jan Dziuban, Dr. Rafal Walczak Secretary: Dr. Oleksandr Striamets
17^{00}-19^{00}	**Session 2** Chairmen: Prof. Marek Iwaniec, Dr. Cezary Maj Secretary: Dr. Nazariy Jaworski
	Friday, April 20
08^{00}-13^{00}	Trip to Kosyno (Thermal Resort, Spa and Wellness) - additional charge
14^{30}-16^{15}	**Session 3** Chairmen: Prof. Mykola Dyvak, Prof. Viktor Shevchenko Secretary: Dr. Oleksandr Striamets
16^{15}-16^{30}	**Coffee Break**
16^{30}-17^{00}	**POSTER Session 4 (Poster size A1)** Chairmen: Prof. Igor Atamanyuk, Prof. Mykhaylo Andriychuk Secretary: Dr. Mykhaylo Melnyk
17^{15}-19^{00}	**Session 5** Chairmen: Dr. Michal Szermer, Dr. Wojciech Zabierowski Secretary: Dr. Nataliia Bokla
19^{30}-23^{00}	**Banquet**
	Saturday, April 21
11^{00}-12^{45}	**Session 6** Chairmen: Dr. Uliana Marikutsa, Dr. Yuriy Stekh Secretary: Dr. Pavlo Denysyuk
13^{00}-14^{45}	**Session 7** Chairmen: Prof. Yaroslav Matviychuk, Dr. Ihor Farmaga Secretary: Dr. Rostyslav Kryvyy
	Sunday, April 22
11^{00}-13^{00}	**Final Session** Chairman: Prof. Mykhaylo Lobur Secretary: Dr. Mykhaylo Melnyk

TIME OF PRESENTATIONS
Paper presentation at the plenary session - 20 min.
Paper presentation at the regular session - 7 min. Discussion, questions - 5 min.

MEMSTECH'2018

XIVth International Conference
"PERSPECTIVE TECHNOLOGIES AND METHODS IN MEMS DESIGN"

Organized by:

Lviv Polytechnic National University,

CAD Department, Ukraine

IEEE Ukraine Section (West)

MTT/ED/AP/CPMT/SSC

Societies Joint Chapter

Warsaw University of Technology,

Institute of Telecommunication, Poland

AGH-University of Science and Technology,

The Faculty of Mechanical Engineering and Robotics, Poland

Technical Co-Sponsors:

1. Lviv Polytechnic National University
2. IEEE MTT/ED/AP/CPMT/SSC West Ukraine Chapter

CONFERENCE ORGANIZING COMMITTEE

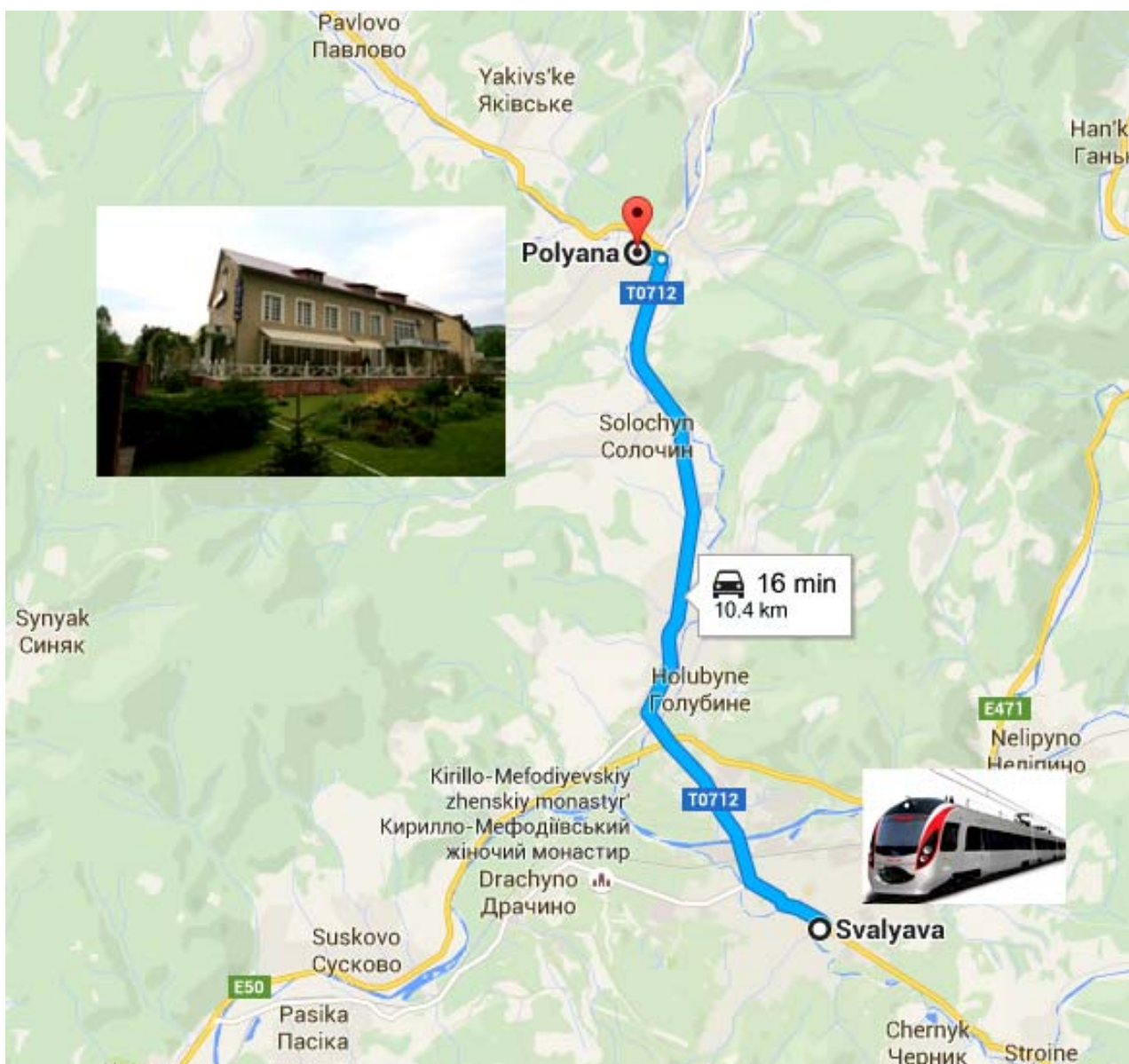|	
Prof. Mykhaylo Lobur	**Co-Chairman,** Head of CAD Department, Lviv Polytechnic National University, Ukraine
Prof. Andrzej Jakubiak	**Co-Chairman,** Faculty of Electronics and Information Technology, Warsaw University of Technology, Poland
Prof. Marek Iwaniec	**Co-Chairman,** Faculty of Mechanical Engineering and Robotics, AGH-University of Science and Technology, Poland
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Dr. Mykhaylo Andriychuk	**Member,** IEEE MTT/ED/AP/CPMT/SSC West Ukraine Chapter, Ukraine
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Dr. Nataliia Bokla	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Pavlo Denysyuk	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Rostyslav Kryvyy	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Uliana Marikutsa	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
Prof. Oleh Matviykiv	**Member**, CAD Department, Lviv Polytechnic National University, Ukraine
Prof. Vasyl Teslyuk	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
BSc. Andrii Pavliuk	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Igor Farmaga	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine
BSc. Vitalii Yaremko	**Member,** CAD Department, Lviv Polytechnic National University, Ukraine

INTERNATIONAL PROGRAM COMMITTEE

M. Lobur	**Chairman**, Lviv Polytechnic National University, Ukraine
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A. Dziedzic	Wroclaw University of Technology, Poland
J. Dziuban	Wroclaw University of Technology, Poland
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T. Kamisinski	AGH-University of Science and Technology, Poland
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A. Lukaszewicz	Bialystok University of Technology, Poland
O. Matviykiv	Lviv Polytechnic National University, Ukraine
A. Napieralski	Lodz University of Technology, Poland
W. Pleskacz	Warsaw University f Technology, Poland
I. Rangelow	Ilmenau University of Technology, Germany
D. Sankowski	Lodz University of Technology, Poland
L. Starzak	Lodz University of Technology, Poland
D. Fedasyuk	Lviv Polytechnic National University, Ukraine
V. Hahanov	Kharkiv National University of Radio Electronics, Ukraine
M. Szermer	Lodz University of Technology, Poland
A. Jakubiak	Warsaw University of Technology, Poland
E. Yashchyshyn	Warsaw University of Technology, Poland

LOCATION

The conference will be held in Polyana, Svalyava region, Zakarpattya, Ukraine in the Carpathian Mountains approximately 190 km drive south of Lviv. Lviv is one of the oldest cities in Europe, an industrial and educational centre of the West Ukraine. There are an international airport, a railway, and bus stations in Lviv. We hope that the wonderful scenery and healthful air of the Carpathian Mountains will make for the fruitful work at the conference and leave pleasant memories about it.

Hotel "Fortuna", Address: 61, Duhnovycha Str, Polyana – Svalyava.

REGISTRATION

Wednesday, April 18	17^{00}-18^{00}

REGISTRATION

Thursday, April 19	11^{00}-12^{45}

OPENING CEREMONY

Thursday, April 19	13^{00}-13^{15}

Chairman: Prof. Mykhaylo Lobur

Secretary: Dr. Mykhaylo Melnyk

Speech of the Conference's Chairman - *Prof. Mykhaylo Lobur*, Head of CAD Department of the Lviv Polytechnic National University

PLENARY SESSION

Thursday, April 19	13^{15}-14^{40}

Chairmen: Prof. Mykhaylo Lobur

Secretary: Dr. Mykhaylo Melnyk

1. **High Vacuum MEMS**
    Jan Dziuban
2. **Accuracy of Marker Location Identification for Investigation into Mechanics of Ball**
    Joanna Iwaniec, Marek Iwaniec
3. **Influence of Geometry scaling on Comb-drive Accelerometer Performance**
    Michal Szermer, Piotr Zajac, Lukasz Starzak
4. **DFT simulation of Stacking Faults in 4H-SiC**
    Janusz Wozny, Andrii Kovalchuk, Zbigniew Lisik, Jacek Podgorski, Piotr Bugalski, Andrzej Kubiak, Lukasz Ruta

SESSION 1

Thursday, April 19	15 ^{00}-16^{45}

Chairmen: Prof. Jan Dziuban, Dr. Rafal Walczak

Secretary: Dr. Oleksandr Striamets

1. **Automation of Publication and Subscription of embedded systems with MEMS sensors**

   Maksim Brazhenenko, Pavlo Kozachok, Viktor Shevchenko, Maksim Tkachenko

2. **Computer Simulation of Field-Controlled Percolation in 3D System of Straight Nanotubes**

   Yuri Olenych, Ivan Karbovnyk, Halyna Klym

3. **Current Trajectory Model of Unbalanced Load used for 3P-3W Voltage Source Inverter Control**

   Tomasz Binkowski

4. **Electrical Equivalent Model of MEMS Accelerometer in Matlab/SIMULINK Environment**

   Jacek Nazdrowicz, Andrzej Napieralski

5. **Fully Differential Read-out Circuitry Components for MEMS-based Accelerometers**

   Mariusz Jankowski, Piotr Zajac, Andrzej Napieralski

6. **MEMS Accelerometer in Hexapod Intellectual Control**

   Igor Nevliudov, Ganna Ponomaryova, Viktoriia Bortnikova, Svitlana Maksymova

7. **Meshing of Symmetric Structures in Example of Comb-drive Accelerometer**

   Cezary Maj, Piotr Amrozik, Wojciech Zabierowski

8. **Modeling and Analysis of integrated precise joule micro-heater for Lab-Chip diagnostic devices**

   Oleh Matviykiv, Tamara Klymkovych, Nataliia Bokla

9. **Using MEMS to Adapt Ultrasonic Welding Processes Control in the Implementation of Modular Robots Assembly Processes**

   Igor Nevliudov, Svitlana Maksymova, Anastasiia Funkendorf, Olena Chala, Kirill Khrustalev

SESSION 2

Thursday, April 19	17^{00}-19^{00}

Chairmen: Prof. Marek Iwaniec, Dr. Cezary Maj
Secretary: Dr. Nazariy Jaworski

1. **A Prototype of the Mobile Stethoscope for Telemedical Application**
   Marcin Kajor, Dominik Grochala, Marek Iwaniec, Eliasz Kańtoch, Dariusz Kucharski

2. **Control of the uniform distribution of a medical laser energy in space using MEMS scanners**
   Viktor Shevchenko, Alina Shevchenko, Dmitry Rabchun

3. **Ensemble Monte Carlo Simulation of 4H-SiC for Electrons Mobility Calculation**
   Andrii Kovalchuk, Janusz Wozny, Zbigniew Lisik, Jacek Podgorski, Piotr Bugalski, Petro Kosobutskyy, Mykhaylo Lobur

4. **GPU-Based Biomedical Image Processing**
   Oleh Berezsky, Oleh Pitsun, Lesia Dubchak, Petro Liashchynskyi, Pavlo Liashchynskyi

5. **Implementation Features of Cellular Composites Microlevel Structural Models Construction based on Voronoi Tessellation and OpenCL Technology Usage**
   Nazariy Jaworski, Marek Iwaniec, Mykhaylo Lobur

6. **IoT Application Testing Features Based on the Modelling Network**
   Svitlana Popereshnyak, Olha Suprun, Oleh Suprun, Tadeusz Wieckowski

7. **Research of Image Processing Methods in Publishing Output Systems**
   Bohdan Durnyak, Bohdana Havrysh, Oleksandr Tymchenko, Doroshenko Anastasiya

8. **Sandwich Beam Micro-Vibration Suppression with Magneto-Reological Core Using Refined Layer-Wise Theory**
   Bohdan Diveyev, Orest Horbay, Ivan Kernytskyy

9. **Tools for the Recurrent Laryngeal Nerve Stimulation in the Tasks of its Monitoring**
   Mykola Dyvak, Volodymyr Tymets, Andriy Dyvak, Viktor Shidlovsky, Vasyl Brych

10. **Ways to improve the dynamic performance of MEMS scanners for medicine**
    Viktor Shevchenko, Maxim Tkachenko, Alina Shevchenko

SESSION 3

Friday, April 20	14^{30}-16^{15}

Chairmen: Prof. Mykola Dyvak, Prof. Viktor Shevchenko
Secretary: Dr. Oleksandr Striamets

1. **Computer Investigation of The Process of Thermoelastic Energy Dissipation in Electroconductive Hollow Cylinder Under the Radioimpulse Action**
   Roman Musii, Khrystyna Drohomyretska, Myroslava Klapchuk, Olga Veselovska, Liubomyr Goshko, Adrian Nakonechnyy

2. **On Qualitative Methods in the Investigation of the Nonlinear Oscillations Mathematical Models in Some Electromechanical Systems**
   Petro Pukach, Volodymyr Il'kiv, Zinovii Nytrebych, Myroslava Vovk

3. **Computer Prediction of Operability of Bimetal Cylindrical Sensors Under the Influence of Radio-Frequency Pulses**
   Roman Musii, Nataliya Melnyk, Veronika Dmytruk, Yevheniia Levus, Oksana Oryshchyn, Rostyslav Nakonechny

4. **Fluctuations of Internal Electromagnetic Fields as the Means of Electronic Device Authentication**
   Elena Nyemkova, Zenoviy Shandra

5. **Generalized Method for Prediction of the Electronic Devices and Information Systems' State**
   Igor Atamanyuk, Vyacheslav Shebanin, Yuriy Kondratenko, Yuriy Volosyuk

6. **Mathematical Modelling of Multi-Layer Filter Parameters Calculation Depending on Application Field**
   Anastasiya Vecherkovskaya, Svitlana Popereshnyak

7. **MSoC Device Based on SOI-Structures**
   Anatoly Druzhinin, Igor Kogut, Victor Holota, Anton Lukianchenko, Yuriy Khoverko

8. **Implementation Features of Wounds Visual Comparison Subsystem**
   Nazariy Jaworski, Ihor Farmaha, Taras Farmaha, Vasyl Savchyn, Uliana Marikutsa

9. **Radiation Properties of Plane Array Consisting of Impedance Micropatricles**
   Mykhaylo Andriychuk, Volodymyr Senyk

POSTER SESSION 4

Friday, April 20	16^{30}-17^{00}

Chairmen: Prof. Igor Atamanyuk, Prof. Mykhaylo Andriychuk
Secretary: Dr. Mykhaylo Melnyk

1. **Algorithms of Automated Formulation of the Condition of Operability of Complex Technical Systems**
   Maksym Seniv, Yuriy Bobalo, Ivan Symets

2. **3D MOS-Transistor Elements in Smart-Sensors Based on SOI-Structures**
   Anatoly Druzhinin, Igor Kogut, Victor Holota, Yuriy Khoverko

3. **Application of Memes Sensors to the Automation of a Laboratory Stand for the Measuring of the Flow Resistance of Porous Materials**
   Mykhaylo Melnyk, Tadeusz Kamisinski, Jaroslaw Rubacha

4. **High-Speed Three Phase Motor Supplied From a Single to Three Phase Converter**
   Dariusz Sobczyński, Jacek Bartman

5. **Impact of Bluetooth Low Energy on Energy Consumption in Android OS**
   Piotr Czurak, Cezary Maj, Michal Szermer, Wojciech Zabierowski

6. **Software for Visualization of Reliability Block Diagram and Automated Formulation of Operability Conditions of Technical Systems**
   Maksym Seniv, Vitaliy Yakovyna, Ivan Symets

7. **Special Processor of Information Entropy Estimates Calculation of Fixed-Size Signals Binary Realizations**
   Iryna Manulyak, Artur Voronych, Stepan Melnychuk, Lyubov Nykolaychuk

8. **Synthesis of Non-Equidistant Location of Sensors in Sensor Network**
   Oleg Riznyk, Olexandr Povshuk, Yurii Kynash, Maria Nazarkevich, Iryna Yurchak

9. **Using Websocket Technology in a Web Application Supporting the Management of Academic Campus**
   Marcin Korycki, Cezary Maj, Michal Szermer, Wojciech Zabierowski

SESSION 5

Friday, April 20	17^{15}-19^{00}

Chairmen: Dr. Michal Szermer, Dr. Wojciech Zabierowski
Secretary: Dr. Nataliia Bokla

1. **Analysis of Metal Defects by Distributed Cumulative Histogram**
   Roman Melnyk, Yurii Kalychak
2. **Application of Fractional Order Transfer Function with Zero and Pole in Approximation of Electromechanical Systems High Order Objects**
   Bohdan Kopchak, Marianna Kopchak
3. **Data Processing Method for Public Transport Passenger Flow of the "Smart" City**
   Oleh Boreiko, Vasyl Teslyuk, Mariana Baran, Mariya Navytka
4. **Image Contrast Enhancement in Automatic Mode by Nonlinear Stretching**
   Sergei Yelmanov, Yuriy Romanyshyn
5. **Image filtration using the Ateb-Gabor filter in the biometric security systems**
   Mariya Nazarkevych, Dana Havrysh, Ivanna Klyujnyk, Iryna Maslanych, Hanna Nazarkevych
6. **Machine Learning Gait Analysis Algorithm for Ontogenetic Features Compensation**
   Jakub Dąbroś, Mateusz Patyk, Marek Iwaniec, Jacek Wesół
7. **Mathematical Model and Boundary Equilibrium of the Cylindrical Shell with Elastic Filling Depended by the Internal Crack**
   Yaroslav Pelekh, Iryna Kostenko, Yulia Prokopovych, Ivanna Zashkilnyak
8. **Reduction Principle of the Mathematical Model and its Applications**
   Yaroslav Matviychuk, Olga Matviychuk
9. **Some Methods for Predicting Recommendations for User Communities**
   Mykhaylo Lobur, Mykhaylo Shvarts, Yuriy Stekh, Ihor Demkiv
10. **User Movement Intention Detection Based on Gait Cycle Capturing Using Force Sensitive Resistors**
    Jakub Dąbroś, Mateusz Patyk, Marek Iwaniec, Jacek Wesół

FINAL SESSION

Sunday, April 22	11^{00}-13^{00}

Chairman: Prof. Mykhaylo Lobur
Secretary: Dr. Mykhaylo Melnyk

1. Concluding reports of Section's Chairmen.
2. Discussion.
3. Conference summary.
4. Conference closing.