



MEMSTECH'2020

CONFERENCE PROGRAM



**XVIth International Conference
PERSPECTIVE TECHNOLOGIES AND METHODS IN MEMS
DESIGN**

22-26 April 2020, Lviv, Ukraine

MEMSTECH 2020 Timetable

	Wednesday, April 22
16 ⁰⁰ -17 ⁰⁰	TEST CONNECTION
Link to connect	https://us04web.zoom.us/j/78269547073?pwd=UjhEUktKTzFhOXAvM1JtYTQ2L0E5dz09 Meeting ID: 782 6954 7073 Password: 6aFtzp
	Thursday, April 23
11 ⁰⁰ -11 ¹⁵	OPENING CEREMONY
11 ¹⁵ -12 ⁴⁰	https://us04web.zoom.us/j/75952682617?pwd=SGJ3OHBEUUVVYTkVkl1J4OG5Bc0Ewdz09 Meeting ID: 759 5268 2617 Password: 0aZvwe
	Plenary Session
	Chairman: Prof. Mykhaylo Lobur Secretary: Dr. Mykhaylo Melnyk
12 ⁴⁰ -13 ⁰⁰	Coffee Break
13 ⁰⁰ -15 ⁰⁰	Session 1
	https://us04web.zoom.us/j/73206071428?pwd=Q0tVQ0J5RmpldW1lRjhzMDR3Sjcxdz09 Meeting ID: 732 0607 1428 Password: 9SKZFB
	Chairmen: Prof. Jan Dziuban, Secretary: Dr. Nazary Jaworski
15 ⁰⁰ -15 ²⁰	Coffee Break
15 ²⁰ -17 ²⁰	Session 2
	https://us04web.zoom.us/j/76633578584?pwd=cHJ2WnQzUzhyZ2MvMTVsYkxnRFRBdz09 Meeting ID: 766 3357 8584 Password: 9N1KVC
	Chairmen: Dr. Michal Szermer, Dr. Cezary Maj Secretary: Dr. Nataliia Bokla
	Friday, April 24
11 ⁰⁰ -13 ³⁰	Session 3
	https://us04web.zoom.us/j/73054475667?pwd=OENmNIBPbGJUUI1doK3k4eWprL3RwZz09 Meeting ID: 730 5447 5667 Password: 0ghwei
	Chairmen: Prof. Marek Iwaniec Secretary: Dr. Olexander Belej
13 ³⁰ -14 ⁰⁰	Coffee Break
14 ⁰⁰ -16 ³⁰	Session 4
	https://us04web.zoom.us/j/75382243510?pwd=YVJ2UVZoWmJiREV6SGN4UHk2NjJnZz09 Meeting ID: 753 8224 3510 Password: 5L6bR8
	Chairmen: Prof. Mykhaylo Andriychuk Secretary: Dr. Andriy Zdobytyskiy
	Saturday, April 25
11 ⁰⁰ -13 ⁰⁰	Final Session
	Chairman: Prof. Mykhaylo Lobur Secretary: Dr. Mykhaylo Melnyk

TIME OF PRESENTATIONS

Paper presentation at the plenary session - 15 min.

Paper presentation at the regular session - 7 min.

Discussion, questions - 5 min.

MEMSTECH'2020
XVIth 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/EP/SSC
 Societies Joint Chapter



Wroclaw University of Science and Technology,
 Faculty of Microsystem Electronics and Photonics, 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 Ukraine Section (West) MTT/ED/AP/EP/SSC Societies Joint Chapter

Sponsor:



CONFERENCE ORGANIZING COMMITTEE

Prof. Mykhaylo Lobur	Co-Chairman , Head of CAD Department, Lviv Polytechnic National University, Ukraine
Prof. Jan Dziuban	Co-Chairman , Faculty of Microsystem Electronics and Photonics, Wroclaw University of Science and Technology, Poland
Prof. Marek Iwaniec	Co-Chairman , Faculty of Mechanical Engineering and Robotics, AGH-University of Science and Technology, Poland
Dr. Mykhaylo Melnyk	Secretary , CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Mykhaylo Andriychuk	Member , IEEE MTT/ED/AP/EP/SSC West Ukraine Chapter, Ukraine
Dr. Nazariy Andrushchak	Member , CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Nataliia Bokla	Member , CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Pavlo Denysyuk	Member , CAD Department, Lviv Polytechnic National University, Ukraine
Dr. Uliana Marikutsa	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

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J. Dziuban	Wroclaw University of Technology, Poland
M. Iwaniec	AGH-University of Science and Technology, Poland
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A. Napieralski	Lodz University of Technology, Poland
W. Pleskacz	Warsaw 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
M. Weyrich	University of Stuttgart, Germany
E. Yashchyshyn	Warsaw University of Technology, Poland

LOCATION

We are really interesting to conduct the MEMSTECH Conference in a regular way and in scheduled time. However, this time, the COVID-19 coronavirus and related quarantine in the whole world make definite adjustments to our plans.

Due to the current situation, we must hold MEMSTECH 2020 not as an in-person conference in beautiful city Lviv as originally planned, but as an online virtual conference. for the first time, Memstech 2020 conference will be held online.

TEST CONNECTION

Wednesday, April 22	16⁰⁰-17⁰⁰
Link to connect: https://us04web.zoom.us/j/78269547073?pwd=UjhEUktKTzFhOXAvMlJtYTQ2L0E5dz09 Meeting ID: 782 6954 7073 Password: 6aFtzip	

OPENING CEREMONY

Thursday, April 23	11⁰⁰-11¹⁵
Link to connect: https://us04web.zoom.us/j/75952682617?pwd=SGJ3OHBEUUVVYTkVklJ4OG5Bc0Ewdz09 Meeting ID: 759 5268 2617 Password: 0aZvwe	

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 23	11¹⁵-12⁴⁰
Link to connect: https://us04web.zoom.us/j/75952682617?pwd=SGJ3OHBEUUVVYTkVklJ4OG5Bc0Ewdz09 Meeting ID: 759 5268 2617 Password: 0aZvwe	

Chairmen: Prof. Mykhaylo Lobur

Secretary: Dr. Mykhaylo Melnyk

1. **Nanosatellite Activity in my Group and Possible Collaboration**
Jan Dziuban
2. **Influence of fringing fields on parallel plate capacitance for capacitive MEMS accelerometers**
Cezary Maj, Michał Szermer
3. **Predicting the Use of Solar Photovoltaic Panels for Generating Electricity in the Area with Air Pollution**
Krzysztof Pytel, Mykhaylo Melnyk, Wiktor Hudy, Franciszek Kurdziel, Adam Kalwar, Stanislaw Gumula
4. **Simulation Analysis of Noise Influence on Operational of Capacitive Sensor Readout Circuit**
Mariusz Jankowski

SESSION 1

Thursday, April 23	13⁰⁰-15⁰⁰
https://us04web.zoom.us/j/73206071428?pwd=Q0tVQ0J5RmpldWlRjhzMDR3Sjcxdz09 Meeting ID: 732 0607 1428 Password: 9SKZFB	

Chairmen: Prof. Jan Dziuban

Secretary: Dr. Nazariy Jaworski

1. Acquisition of Signals in a Wind Tunnel Using the DasyLab Software Package

Krzysztof Pytel, Zygmunt Szczerba, Ihor Farmaga, Franciszek Kurdziel, Adam Kalwar, Stanislaw Gumula

2. Adaptive Numerics for Linear ODE Systems with Time-Dependent Data, with an Application in Photovoltaics

Winfried Auzinger, Petro Pukach, Roksolyana Stolyarchuk, Myroslava Vovk

3. Application of Correlation Analysis for Impact Assessment of Air Quality on the Possibility of Using Chosen Source of Renewable Energy

Krzysztof Pytel, Wiktor Hudy, Franciszek Kurdziel, Adam Kalwar, Stanislaw Gumula, Mohamed Hassan Soliman

4. Application of Information Technology Engineering Tools to Simulate an Operation of a Flow

Machine Rotor

Krzysztof Pytel, Uliana Marikutsa, Zygmunt Szczerba, Franciszek Kurdziel, Adam Kalwar, Mohamed Hassan Soliman

5. Assisted Living System Architecture Based on Bluetooth Low Energy and Wearable Sensors

Marcin Kajor, Dominik Grochala, Michał Grochala, Marek Iwaniec, Justyna Lemejda

6. Capacitance Deviations for Deformed Parts of Solid MEMS Sensors

Jacek Nazdrowicz, Adam Stawiński, Andrzej Napieralski

7. Development of Nano Cavities in Aluminum Oxide Membrane for Bioparticle Manipulation by Acoustophoresis Method

Yatin Patel, Giedrius Janusas, Arvydas Palevicius, Justas Ciganas

8. Simulation of Acoustoforetic Separation of Microplastic Particles in mkFluidic Lab-chip

Oleh Matviyiv, Tamara Klymkovych, Nataliia Bokla, Mykhailo Lobur, Mykhaylo Melnyk, Anna Timofiejczuk

SESSION 2

Thursday, April 23	15²⁰-17²⁰
https://us04web.zoom.us/j/76633578584?pwd=cHJ2WnQzUzhyZ2MvMTVsYkxnRFRBdz09 Meeting ID: 766 3357 8584 Password: 9N1KVC	

Chairmen: Dr. Michal Szermer, Dr. Cezary Maj

Secretary: Dr. Nataliia Bokla

1. **Application of Fractional Order Transfer Functions in Approximation of Voltage Divider With Supercapacitor Model**
Bohdan Kopchak , Andrii Kushnir, Marianna Kopchak
2. **L-C- Electronic Elements Based on Silicon Microstructures**
Anatoly Druzhinin, Igor Kogut , Yuriy Khooverko, Nazar Kucherepa
3. **Sensitive Data Transmission System for Biopotential Measurements in Wearable Application**
Dominik Grochala, Marcin Kajor, Michał Grochala, Paweł Smoleń, Marek Iwaniec, Justyna Lemejda
4. **Stability Analysis of Micro-Electrostatic Actuator's Dynamic**
Roman Voliansky, Vitaliy Kuznetsov, Oleksiy Sinkevych
5. **Stiffness Matrix of MEMS on the Stress-Strain Method Basis**
Igor Nevliudov , Victor Palagin, Iryna Botsman, Nataliia Demska, Victoria Nevlyudova, Kostyantyn Kolesnyk
6. **The Development of Operation Algorithm of Heat Detector with Variable Response Parameters**
Andrii Kushnir, Bohdan Kopchak , Andrii Gavryliuk
7. **The Studying of Hydrogen Diffusion Non-Stationary Processes Near a Crack in the Field of Heterogeneous Mechanical Tensions for the Encapsulated MEMS Devices**
Winfried Auzinger , Yaroslav Pelekh, Mykola Ihnatyshyn, Roksolyana Stolyarchuk , Oksana Kozar , Serhii Mentynskyi
8. **The use of Automation Systems in Ventilation Stations as a Support in the Process of Generating Cold for the Needs of Central air Conditioning**
Krzysztof Pytel, Mykhailo Lobur, Franciszek Kurdziel, Adam Kalwar, Stanislaw Gumula, Bassel I. Nesser

SESSION 3

Friday, April 24	11⁰⁰-13³⁰
https://us04web.zoom.us/j/73054475667?pwd=OENmNIBPbGJUUIdoK3k4eWprL3RwZz09 Meeting ID: 730 5447 5667 Password: 0ghwei	

Chairmen: Prof. Marek Iwaniec

Secretary: Dr. Olexander Belej

1. Arduino Based Ambient Air Pollution Sensing System

Mykhailo Lobur, Dmytro Korpyljov, Nazariy Jaworski, Marek Iwaniec, Uliana Marikutsa

2. Built-In Processor for Sharing Passwords Through the Open Information Space

Volodymyr Shevchenko, Denis Berestov, Igor Sinitcyn, Viktor Shevchenko

3. Determination of Dispersion Medium Parameters by Intelligent Microelectromechanical System

Andriy Zdobytskyi, Mykhailo Lobur, Volodymyr Dutka, Mykola Prodanyuk, Olha Senkovich

4. Errors Compensation of Ring-Type MEMS Gyroscopes Operating in Differential Mode

Valeriy V. Chikovani, Olha A. Sushchenko, Valeriy M. Azarskov, Yurii M. Bezkorovainyi, Volodymir M. Korolov, Olha V. Korolova

5. High-Sensitive Sensors Based on QCR for Smart Devices

Volodymyr Savchenko, Oksana Mnushka

6. Identification of Combinations of Faults in Multilevel Information Systems

Olena Nechyporuk, Ivan-Farkhod Kashkevich, Olha Suprun, Vitaliy Nechyporuk, Oleksiy Poburko, Nataliya Apenko

7. Simulation of the Temperature-Force Regime of a Conductive Cylindrical Implant in Unsteady Electromagnetic Fields

Roman Musii, Nataliia Melnyk, Veronika Dmytruk, Uliana Marikutsa, Hanna Shayner, Valentyn Shynder

8. Synchronous Auscultation of Temporomandibular Joints Using Electronic Stethoscopes

Justyna Lemejda, Marcin Kajor, Dominik Grochala, Marek Iwaniec, Jolanta E. Loster

9. The Importance of Factors for UV Ink Printing by Digital Printers

Vyacheslav Repeta, Olena Tsimer, Ihor Myklushka

10. The Comparison of Microservice and Monolithic Architecture

Konrad Gos, Wojciech Zabierowski

SESSION 4

Friday, April 24	14⁰⁰-16³⁰
https://us04web.zoom.us/j/75382243510?pwd=YVJ2UVZoWmJiREV6SGN4UHk2NjJnZz09 Meeting ID: 753 8224 3510 Password: 5L6bR8	

Chairmen: Prof. Mykhaylo Andriychuk

Secretary: Dr. Andriy Zdobytskyi

1. **Algorithm of Tuning Heating Source Thermophysical Parameters in Smart Home**
Oleh Sinkevych, Liubomyr Monastyrskii, Bohdan Sokolovskii, Yaroslav Boyko, Zenyk Matchyshyn, Daniil Berezhansky
2. **Analysis of a Mathematical Model of Plate Structures Oscillations in MEMS**
Oksana Malanchuk, Maria Vistak, Ruslan Politanskyi, Ivanna Andrusyak
3. **EM Wave Scattering on Thin Flexible Films Supplemented by a Set of Micro Particles**
Mykhaylo Andriychuk, Yarema Kuleshnyk, Volodymyr Senyk
4. **Information Technology of the Increasing Sensors Term of Use Considering Their Movement**
Volodymyr Petrivskyi, Victor Shevchenko, Oleksiy Bychkov, Maksym Brazhenenko
5. **Modeling and Computer Analysis of Temperature of a Dental Crown Made Of Isotropic Functionally Gradient Metal-Ceramics**
Roman Musij, Uliana Zhydyk, Khrystyna Drohomiretska, Nataliia Melnyk
6. **Modeling of the Temperature-Force Regime of an Electrically Conductive Spherical Implant in Unstable Electromagnetic Fields**
Roman Musij, Mykhaylo Melnyk, Khrystyna Drohomiretska, Oksana Oryshchyn, Svitlana Tsymbrylo, Valentyn Shynder
7. **Organization of Decentralized Real-Time Information-Control System**
Vitaliy Mazur
8. **Simulation Modelling of Reliability of the Embedded Systems With Consideration for Failures**
Mykola Dekhtyaruk, Viacheslav Cherevik
9. **Simulation of Corrugated Graphene Structure by Microlevel Cellular Models and Gaussian Random Field**
Nazariy Jaworski, Marek Iwaniec, Nazariy Andrushchak, Janusz Woźny, Mykhailo Lobur, Volodymyr Karkulovskyy
10. **Developing a Model of Cloud Computing Protection System for the Internet of Things**
Olexander Belej, Natalia Nestor, Orest Polotai, Sofiia Panchak

FINAL SESSION

Saturday, April 25	11⁰⁰-13⁰⁰
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Chairman: Prof. Mykhaylo Lobur

Secretary: Dr. Mykhaylo Melnyk

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

In this conference, we will use the web conferencing system Zoom.

SHORT INSTRUCTION

<https://www.youtube.com/watch?v=3VebiA5pGq0>

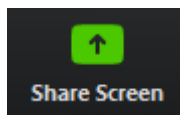
1. Install the App here: <https://otago.zoom.us/client/latest/ZoomInstaller.exe>

Go to <https://otago.zoom.us/join> and Enter the Meeting ID that you have been provided with in the appropriate field and click 'Join' (the Meeting ID will be a 9 or 10 digit number)

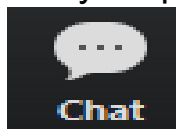
Join a Meeting



- 2 According to the conference program, we recommend that you connect 10-15 minutes before the section begins



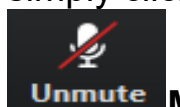
2. **Share Screen:** Start [sharing your screen](#) so participants can see your presentation.



3. **Chat:** Using chat. You can use the Chat tool to send a text question to all participants or privately to certain members.



4. **Audio only.** It is possible that during the conference participants will be ask to turn off their cameras and move to audio only, particularly if there are problems with the available bandwidth. To do this simply click on the camera icon at the bottom of the Zoom window.



5. **Mute/Unmute:** This allows you to mute or unmute your microphone. Please mute the microphone if you are not the speaker.