

**47<sup>th</sup> INTERNATIONAL CONFERENCE  
ON MICROELECTRONICS,  
DEVICES AND MATERIALS**

**and the WORKSHOP on**

**ORGANIC SEMICONDUCTORS,  
TECHNOLOGIES AND DEVICES**



**CONFERENCE 2011**

**CONFERENCE PROGRAM**

**September 28<sup>th</sup> – September 30<sup>th</sup>, 2011  
Ajdovščina, SLOVENIA**



MINISTRY OF HIGHER EDUCATION,  
SCIENCE AND TECHNOLOGY



REPUBLIKA SLOVENIJA  
MINISTRSTVO ZA VISOKO ŠOLSTVO,  
ZNANOST IN TEHNOLOGIJO



SLOVENIAN RESEARCH AGENCY



Slovenia Chapter

**CONFERENCE MIDEM 2011 with WORKSHOP ON ORGANIC  
SEMICONDUCTORS, TECHNOLOGIES AND DEVICES**

**PRELIMINARY SHORT PROGRAM**

AJDOVŠČINA, September 28. - September 30. 2011

<b>DAY/ HOUR</b>	<b>28. 9. 11 Wednesday</b>	<b>29. 9. 11 Thursday</b>	<b>30. 9. 11 Friday</b>
8:00			
8:15		<b>WORKSHOP OPENING</b>	
8:30		<b>WORKSHOP</b>	
8:45		<b>INVITED PAPERS</b>	
9:00	<b>OPENING CEREMONY- G. Bratina</b>	Chairperson: G. Bratina Roberto Lazzaroni Martin Baumgarten Sybille Allard	<b>SESSION ON OPTOELECTRONICS</b>  Chairperson: M. Topič
9:15	<b>INVITED PAPER</b>		
9:30	<b>Chairperson: S. Amon</b>		
9:45	<b>M. Richter</b>		
10:00	<b>COFFE BREAK</b>		
10:15	<b>SESSION ON SENSORS AND ACTUATORS</b>		<b>COFFEE BREAK</b>
10:30		<b>COFFEE BREAK</b>	
10:45			<b>SESSION ON THICK AND THIN FILMS</b>
11:00	Chairperson: S. Amon	<b>WORKSHOP</b>	Chairperson: M. Hrovat
11:15		<b>INVITED PAPERS</b>	
11:30		Chairperson: G. Bratina	
11:45		Marta Mas	
12:00		Stefano Casalini	
12:15	<b>LUNCH</b>	<b>LUNCH</b>	<b>CLOSING CEREMONY</b>
12:30			
12:45			
13:00			
13:15			
13:30			
13:45			
14:00			<b>INVITED PAPER</b>
14:15	H. Suzuki		
14:30	Chairperson: B. Malič		
14:45	<b>SESSION ON</b>		
15:00	<b>INTEGRATED CIRCUITS</b>		
15:15	Chairperson: J. Trontelj		
15:30		<b>COFFEE BREAK</b>	
15:45	<b>COFFE BREAK</b>		
16:00	<b>SESSION ON</b>		
16:15	<b>INTEGRATED CIRCUITS</b>		
16:30	Chairperson: J. Trontelj	<b>COFFEE BREAK</b>	
16:45			
17:00		<b>WORKSHOP-regular papers</b> Chairperson: G. Bratina	
17:15	<b>COFFE BREAK</b>		
17:30	<b>SESSION ON</b>	<b>SESSION ON ELECTRONICS</b> Chairperson: A. Žemva	
17:45	<b>MATERIALS, TECHNOLOGIES</b>		
18:00	<b>AND DEVICES</b>		
18:15	Chairperson: B. Malič		
18:30			
18:45			
19:00			
19:15			
19:30	<b>WINE TASTING</b>	<b>DINNER</b>	
19:45			
20:00			
20:15			
20:30			
20:45			
21:00			

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## **ORGANIZER**

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**MIDEM - Society for Microelectronics, Electronic Components and Materials,**  
Stegne 7, 1000 Ljubljana, SLOVENIA

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## **CONFERENCE SPONSORS**

**Slovenian Research Agency, Ljubljana**

**IMAPS, Slovenia Chapter**

**ZAVOD TC SEMTO, Ljubljana**

**Ministry of Higher Education, Science and Technology, Ljubljana**

**Slovenian Technology Agency, Ljubljana**

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## **CONFERENCE PROGRAMME COMMITTEE**

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Aleksej Majkić, University of Nova Gorica, Slovenia

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Marko Topič, University of Ljubljana, Faculty of electrical engineering, Ljubljana, Slovenia

Danilo Vrtačnik, University of Ljubljana, Faculty of electrical engineering, Ljubljana, Slovenia

Matej Možek, University of Ljubljana, Faculty of electrical engineering, Ljubljana, Slovenia

## **CONFERENCE ORGANIZING COMMITTEE**

Prof. dr. Gvido Bratina, University of Nova Gorica

Igor Pompe, MIDEM Society

dr. Iztok Šorli, Mikroiks d.o.o., Ljubljana

Polona Šorli, MIDEM Society

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## GENERAL INFORMATION

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Welcome to the 47<sup>th</sup> International Conference on Microelectronics, Devices and Materials, (MIDEM 2011) and joint Workshop on Organic Semiconductors, Technologies and Devices. This conference continues the tradition of annual international meetings organized by MIDEM - Society for Microelectronics, Devices and Materials, Ljubljana, Slovenia. These conferences have always attracted a large number of Slovene and foreign experts as well as distinguished guest speakers. At the conferences scientists have the opportunity to present their activities and research progress to the international audience and to discuss trends and problems related to their fields of work with other colleagues. This year, 42 regular and 10 invited participants will present their achievements during three days from Wednesday to Friday. The contributions are grouped in 6 conference sessions: Materials, technology and devices, Electronics, Optoelectronics, Thin and thick films, Integrated circuits, Sensors and actuators and in the conference workshop.

This year MIDEM workshop focuses on organic semiconductors (OSs) and related technologies and devices. This exciting field of science and technology is rapidly growing mostly because of the possibility that electronic and optical properties of OSs can be tailored to a particular application by changing chemical composition of the pertinent molecule. In addition OSs promise the fabrication of devices that are compatible with flexible substrates allowing thereby to design optoelectronic devices that are not possible by using inorganic semiconductors. In the past fifteen years the development in this area made great strides, so that we are now faced with first commercial organic light emitting diodes (OLEDs) and displays fabricated on thin, flexible foils. Organic thin film transistors, although not as fast as their inorganic counterparts have also found their position in some organic/inorganic compound devices. Significant progress has been also recorded in the area of organic solar cells (OSCs).

A key to this rapid progress is close cooperation between organic synthetic chemists and physicists. Advanced methods of synthetic organic chemistry result in molecules whose electronic and optical parameters can be matched to a particular device. Both, small-molecule materials and polymers are also compatible with relatively uncomplicated deposition techniques such as dip-coating, spin-coating and even printing. The possibility to fabricate optoelectronic devices by printing opened a completely new way of thinking in electronic industry. For example, large-scale fabrication techniques, coupled with relatively low cost source materials can compensate for the currently lower efficiency and lifetime of OSCs.

The workshop on Organic semiconductors, devices and technologies gathers invited contributions from the leading research groups working on chemistry of advanced organic materials, devices and theoretical treatment of electronic, optical and structural properties of these materials.

We would like to express our thanks to invited speakers and contributors of regular papers for their valuable scientific contributions to the conference sessions and to the workshop. The members of the International Scientific Board of the conference, who made the review of the contributions, are gratefully acknowledged. We also thank the Conference Organizing Committee members who did their best to make the conference successful.

We hope that all of you will enjoy the conference talks and events, and that you will have an interesting and pleasant stay in Ajdovščina.

## **CONFERENCE VENUE**

The Conference is held from September 28<sup>th</sup> to September 30<sup>th</sup>, 2011 at University of Nova Gorica in Ajdovščina, Slovenia.

## **CONFERENCE PROCEEDINGS**

Invited and accepted papers are published in the Conference Proceedings distributed at the Conference registration.

## **LANGUAGE**

The official Conference language is English.

## **REGISTRATION**

The registration fees are as follows :

- FULL registration fee : **250 EUR**
- MIDEM Society members, MIDEM Sponsors : **200 EUR**

The fee includes Conference Proceedings and free access to all Conference events (Visit to Wine Cellar in Vipava and Dinner at hotel Gold club in Ajdovščina).

Accompanying persons who do not take part in the conference may join other conference events at an extra charge (Visit to Wine Cellar: 20 EUR, Dinner: 45 EUR, additional conference materials: 100 EUR ).

Undergraduate students have free access to all Conference sessions on submitting their study papers. For other Conference events there will be an additional charge.

## **SOCIAL EVENTS**

Visit to Wine Cellar in Vipava is scheduled for Wednesday, September 28<sup>th</sup>. Bus leaves at 19:30 in front of the entrance of hotel Gold Club.

The Conference Dinner will be held on Thursday, September, 29<sup>th</sup> in hotel Gold Club restaurant at 20:00.

## **ACCOMMODATION**

Please send your room reservations by filling the reservation forms, that are on the web page of the Society MIDEM, indicating " for MIDEM 2011 Conference", directly to:

**[info@hotelgoldclub.eu](mailto:info@hotelgoldclub.eu)**

or send the reservations to fax number + **386 (0)5 36 44 710**.

## **Programme and Organizing Committee, MIDEM 2011 Conference**

Igor Pompe

Zavod TC SEMTO

Stegne 25

1521 Ljubljana, SLOVENIA

tel. +386 (0)1 5191281

fax. +386 (0)1 5111 295

email: [semto@guest.arnes.si](mailto:semto@guest.arnes.si)

Iztok Šorli  
MIKROIKS d.o.o.  
Stegne 11  
1521 Ljubljana, SLOVENIA  
tel. +386 (0)1 5133 768  
fax. +386 (0)1 5133 771  
email: [iztok.sorli@guest.arnes.si](mailto:iztok.sorli@guest.arnes.si)

Prof. dr. Gvido Bratina  
Vice rector for science  
University of Nova Gorica  
Vipavska 13  
5001 Nova Gorica  
Slovenia  
tel.: +386 (0)5 365 35 00  
+386 (0)5 365 35 01  
Fax: +386 (0)5 365 35 27  
web. [www.ung.si](http://www.ung.si)

**Contact person for the Workshop on ORGANIC SEMICONDUCTORS,  
TECHNOLOGIES AND DEVICES**

**Prof. dr. Gvido Bratina**  
Vice rector for science  
University of Nova Gorica  
Vipavska 13  
5001 Nova Gorica  
Slovenia  
tel.: +386 (0)5 365 35 00  
+386 (0)5 365 35 01  
Fax: +386 (0)5 365 35 27  
web. [www.ung.si](http://www.ung.si)  
E-mail: [gvido.bratina@ung.si](mailto:gvido.bratina@ung.si)

**Conference Web page:** <http://www.midem-drustvo.si/conf2011>

Konferenca MIDEM 2011 in Delavnica o organskih polprevodnikih, tehnologijah in napravah sta delno financirani s pomočjo sredstev Ministrstva za visoko šolstvo, znanost in tehnologijo v sodelovanju z Javno agencijo za tehnološki razvoj.

Conference MIDEM 2011 and Workshop on organic semiconductors, technologies and devices are partially financed with subsidy of Ministry of Higher Education, Science and Technology in association with Public Agency for Technology of the Republic of Slovenia.

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# CONFERENCE PROGRAM

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**WEDNESDAY, SEPTEMBER 28**

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## **09:00 WELCOME AND OPENING CEREMONY**

### **09:15 INVITED PAPER**

**CHAIRPERSON: G. Bratina**

**09:15 M. Richter, M. Wackerle, S. Kibler**

Technology and Applications of Microdosing Systems

### **10:00 COFFEE BREAK**

## **10:15 SESSION ON SENSORS AND ACTUATORS**

**CHAIRPERSON: S. Amon**

**10:15 A.-P. Abellard, D. Kuščer, J. Holc, F. Levassort, O. Noshchenko, M. Lethiecq, M. Kosec**

Fabrication and Modeling of Piezoelectric Transducers for High-frequency Medical Imaging

**10:30 U. Aljančič, A. Meglič, S. Djorđević, S. Tomažič, M. Možek, D. Resnik, D. Vrtačnik, S. Amon**

Feasibility Study of Piezoresistive Muscle Contraction Sensor Prototype for modified TMG measurement

**10:45 D. Belavič, M. Santo Zarnik, M. Hodnik, S. Kocjan, M. Hrovat, K. Makarovič**

Temperature Behavior of LTCC-based Pressure Sensors

**11:00 M. Maček, F. Novak, B. Cacovich**

Passive Detection of THz Radiation by Uncooled Detectors

**11:15 B. Pečar, D. Resnik, U. Aljančič, D. Vrtačnik, M. Možek, S. Amon**

Bubble Tolerant HValveless Piezoelectric HMicro pump for Liquid and Gases

**11:30 D. Resnik, U. Aljančič, D. Vrtačnik, M. Možek, B. Pečar and S. Amon**

Electrostatic Bonding for MEMS Applications

**11:45 M. Santo Zarnik, D. Belavič**

Investigation of the Effect of Humidity on the Stability of Ceramic Pressure Sensors

## **12:15 LUNCH**

**14:00 INVITED PAPER**  
**CHAIRPERSON: B. Malič**

**14:00 H. Suzuki**  
CSD-derived Ferroelectric Thin Films  
Molecular-design for Properties

**14:45 SESSION ON INTEGRATED CIRCUITS**  
**CHAIRPERSON: J. Trontelj**

**14:45 B. Šmid, J. Trontelj**  
Magnetic System for Absolute Force Measurement with Improved Linearity

**15:00 A. Sešek, J. Trontelj**  
Solenoid Current Signature for Driving Optimization and Fail-safe Operation

**15:15 D. Raič, J. Trontelj**  
Serial Processing in Multi-cycle Data Paths

**15:30 A. Švigelj, J. Trontelj**  
THz Signal Processing Optimization

**15:45 COFFEE BREAK**

**16:00 D. Strle**  
System Design Issues of Integrated Impedance Spectroscopy Chip used for Impedance Measurements on Bio-sensors Array

**16:15 U. Nahtigal, E. Zupanič, I. Muševič, D. Strle**  
Problems Associated with Measurements of Small Traces of Vapor TNT, DNT and RDX

**16:30 A. Pleteršek, M. Sok, K. Polh**  
An Application of Integrated Low Power Gas Sensor for Remote Sensing of Chemical Agents using RFID Infrastructure

**16:45 M. Trifković, D. Raič, D. Strle**  
Evaluation of Power Distribution Problems in CMOS Mixed Signal Systems

**17:00 R. Ribnikar, D. Strle**  
Post-layout Design Methodology for Finding and Eliminating Parasitic Capacitors in Mixed-signal Circuits



**17:15 COFFE BREAK**

**17:30 SESSION ON MATERIALS, TECHNOLOGIES AND DEVICES**

**CHAIRPERSON: B. Malič**

**17:30 N. Jelić, L. Kos, J. Kovačič, T. Gyergyek**

Towards Optimisation of Gas Discharge Tubes

**17:45 J. Kovačič, T. Gyergyek, N. Jelić, L. Kos**

Particle-in-cell Simulation Approach to Gas Discharge Tube Study

**18:00 M. Žveglič, N. Hauptman, M. Klanjšek Gunde**

Electrical Properties of Capacitors Printed on Different Paper Substrates

**18:15 M. Milostnik, B. Lipar, M. Potočnik**

Influence of “Via in Pad” during Design, Production and the Use of Alternative Solutions for Eliminating Soldering Failures

**18:30 D. Vrtačnik, D. Resnik, U. Aljančič, M. Možek, B. Pečar and S. Amon**

Optimization of DRIE Silicon Microstructures with Bosch Process

**18:45 K. Futera, D. Belavič, J. Sitek, M. Hrovat, M. Santo Zarnik, M. Kościelski, K. Janeczek, D. Kuščer Hrovatin, M. Jakubowska**

An Investigation of Inkjet-Printing Deposition on LTCC Substrates

**19:30 DEPARTURE**

**VISIT TO WINE CELLAR in VIPAVA**

## **THURSDAY, SEPTEMBER 29**

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### **08:15 WORKSHOP ON ORGANIC SEMICONDUCTORS, TECHNOLOGIES AND DEVICES-OPENING**

### **08:30 WORKSHOP – INVITED PAPERS**

**CHAIRPERSON: G. Bratina**

**08:30 R. Lazzaroni**

Organic Semiconducting Nanostructures Via Conjugated Polymer Self-Assembly

**09:15 M. Baumgarten**

Polyphenylene Nanostructures for Devices

**10:00 S. Allard, U. Scherf**

Conjugated Polymers for Electronic Applications

### **10:45 COFFEE BREAK**

### **11:15 WORKSHOP – INVITED PAPERS**

**CHAIRPERSON: G. Bratina**

**11:15 M. Mas-Torrent, R. Pfattner, J. Veciana, C. Rovira**

Molecular and Crystal Engineering in Tetrathiafulvalene Organic Field-Effect Transistors

**12:00 S. Casalini, F. Leonardi, F. Biscarini**

Self-assembled Monolayers for Organic Thin-film Transistors

### **12:45 LUNCH**

### **14:15 WORKSHOP – INVITED PAPERS**

**CHAIRPERSON: G. Bratina**

**14:15 V. Palermo, A. Liscio**

Electrical Characterization of Organic Nanostructures, Photovoltaic Blends and Transistors by Scanning Probe Microscopy

**15:00 E. Orgiu, N. Crivillers, P. Samorì**

Multicomponent Strategies to the Chemical Tuning of Interfaces and Electroactive Organic/Polymeric Supramolecular Materials: Fabrication of Functional Devices

**15:45 N. Stingelin**

Interrelation of Processing, Microstructure and Device Performance in Polymer Semiconductor Devices

**16:30 COFFEE BREAK**

**17:00 WORKSHOP – REGULAR PAPERS**

**CHAIRPERSON: G. Bratina**

**17:00 E. Buchaca-Domingo, F. C. Jamieson, N. Kopidakis, G. Portale, J. Durrant, G. Rumbles, N. Stingelin**

Surfactant-assistant Supramolecular Control of Poly(2,5-bis(3-tetradecylthiophen-2-yl)Thieno[3,2-*b*]thiophene) (pBTTT): [6,6]-phenyl C61-butyric Acid Methyl Ester (PCBM[60]) Blend Microstructures

**17:15 M. Koželj, B. Cvikl**

On Influence of Charge Traps on Free Electron Transport in Conjugated Polymers

**17:30 L. Yu, X. Li, E. Pavlica, G. Portale, G. Bratina, C. Kjellander, G. Gelinck, N. Stingelin**

Influence of solid-state microstructure on device reproducibility of organic small molecules semiconductors

**17:45 E.Pavlica, D.M.Cho, M.Baumgarten, G.Bratina**

Time-of-flight photocurrent characterization of high-mobility semiconducting polymer layers

**18:00 SESSION ON ELECTRONICS**

**CHAIRPERSON: A. Žemva**

**18:00 M. Možek, D. Vrtačnik, D. Resnik, U. Aljančič, B. Pečar, S. Amon**

Testing and Calibration System for Wireless Sensor Network Modules

**18:15 A. Biasizzo, F. Novak**

FPGA Implementation of a Multi-alphabet Arithmetic Coding Algorithm

**18:30 J. Podržaj, G. Babič, J. Trontelj**

Current Path Optimization of Power Modules with Parallel MOSFET Transistors

**18:45 A. Dolinar, A. Žemva**

Flexible Hardware Platform for Innovative Access Technologies

**19:00 G. Kutin, M. Topič**

Analysis of Switching Circuits in Photovoltaic Systems using MATLAB

**19:15 J. Tomažič, A. Žemva**

On Battery Management and Keeping Electric Aircraft Flying for Years to come

**20:00 DINNER AT HOTEL GOLD CLUB**

## **FRIDAY, SEPTEMBER 30**

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### **09:00 SESSION ON OPTOELECTRONICS**

**CHAIRPERSON: M. Topič**

**09:00 M. Herman, M. Jankovec, M. Topič**

A Method for Determination of I-V Curve Scan Time of Solar Cells

**09:15 M. Šverko, A. Linić and V. Gradišnik**

A Comparative Study of Parameters Extraction Four- and Five-points Methods for a-Si:H Solar Cell

**09:30 J. Stepan, M. Jankovec, M. Topič**

Comparison of Temperature Sensors and their Attachment to PV Modules

**09:45 M. Filipič, F. Smole, M. Topič**

2D Simulation of Interdigitated Back Contact HIT Solar Cell using ASPIN2

**10:00 M. Bokalič, M. Topič**

Luminescence Imaging Techniques for Solar Cell Local Efficiency Mapping

**10:15 M. Berginc, M. Hočevar, U. Opara Krašovec, M. Drev, M. Topič**

Influence of Cell Temperature and Tri-iodide Concentration in the Electrolyte on the Lifetime of Electrons within Nanoporous TiO<sub>2</sub> Layer of the Dye-sensitized Solar Cells

### **10:30 COFFEE BREAK**

### **11:00 SESSION ON THICK AND THIN FILMS**

**CHAIRPERSON: M. Hrovat**

**11:00 M. Hrovat, K. Kielbasinski, K. Makarovič, D. Belavič, M. Jakubowska**

Thick-film Lead-free Resistors Processed on LTCC Substrates

**11:15 A. Kupec, B. Malič, B. Kužnik, M. Kosec, B. Rožič and Z. Kutnjak**

Lead Lanthanum Zirconate Titanate Thin Films with a Giant Electrocaloric Effect Prepared by Chemical Solution Deposition

**11:30 T. Ohno, K. Fukamachi, N. Sakamoto, D. Fu, N. Wakiya, T. Matsuda, H. Suzuki**

Electrical Properties of Barium Titanate Thin Film on a Lanthanum Nickel Oxide Electrode

**11:45 M. Podlogar, J. J. Richardson, N. Daneu, M. Strojnik, A. Rečnik and S. Bernik**  
Preparation and Characterization of Undoped and Al-doped  
ZnO Films on Glass from Aqueous Solution at 90°C

**12:00 M. Hrovat, D. J. Jovan, B. Malič, J. Cilenšek, K. Makarovič, D. Belavič, J. Maček, M. Kosec**  
Investigation of Carbon based Materials as Possible  
Sacrificial Layers in 3D LTCC Structures

**12:15 V. Sedlakova, J. Majzner, P. Sedlak, M. Kopecky, J. Sikula, M. Santo Zarnik, D. Belavic, M. Hrovat**  
Noise in Thick-film Pressure Sensors

**12:30 CLOSING CEREMONY**