

**43<sup>rd</sup> INTERNATIONAL CONFERENCE  
ON MICROELECTRONICS,  
DEVICES AND MATERIALS**

**and the WORKSHOP on  
ELECTRONIC TESTING**



**CONFERENCE 2007**



*SLOVENIAN RESEARCH AGENCY*



**Slovenia Chapter**

**CONFERENCE PROGRAM**

**September 12. – September 14. 2007  
Hotel ASTORIA, Bled, SLOVENIA**

# MIDEM 2007 – SHORT CONFERENCE PROGRAM

DAY/ HOUR	September 12 Wednesday	September 13 Thursday	September 14 Friday	
9:00	<b>OPENING</b>	<b>WORKSHOP ON ELECTRONIC TESTING</b> Chairperson : F.Novak Invited papers S.Hellebrand Z.Peng	<b>SESSION ON OPTOELECTRONICS</b> Chairperson : M.Topič	
9:15	<b>INVITED PAPER</b> D.Strle Chairperson : S.Amon			
9:30				
9:45				
10:00	<b>Coffee Break</b>		<b>Coffee Break</b>	
10:15	<b>SESSION ON DEVICE PHYSICS, MODELING AND TECHNOLOGY</b> Chairperson: D.Resnik	<b>Coffee Break</b>	<b>SESSION ON INTEGRATED CIRCUITS</b> Chairperson : J.Trontelj	
10:30		<b>WORKSHOP ON ELECTRONIC TESTING</b> Chairperson : F.Novak Invited papers M.Renovell H.Wunderlich		
10:45				
11:00				
11:15				
11:30				
11:45				
12:00				
12:15	<b>LUNCH</b>	<b>LUNCH</b>	<b>CLOSING OF THE CONFERENCE</b>	
12:30				
12:45				
13:00				
13:15				
13:30				
13:45				
14:00				
14:15	<b>SESSION ON DEVICE PHYSICS, MODELING AND TECHNOLOGY</b>	<b>WORKSHOP ON ELECTRONIC TESTING</b>		
14:30				
14:45				
15:00				<b>REGULAR SESSION</b> Chairperson : R. Ubar
15:15				
15:30				
15:45	<b>SESSION ON ELECTRONICS</b> Chairperson: M.Topič			
16:00	<b>Coffee Break</b>	<b>Coffee Break</b>		
16:15	<b>SESSION ON THICK AND THIN FILMS</b> Chairperson:D.Belavič	<b>WORKSHOP ON ELECTRONIC TESTING</b>		
16:30				
16:45				
17:00				
17:15				<b>REGULAR SESSION</b> Chairperson : A. Žemva
17:30				
17:45				
18:00	<i>Bus to Bled Castle</i>	<b>CONFERENCE DINNER HOTEL ASTORIA</b>		
18:15	<b>WELCOME PARTY</b>			
18:30				
18:45				
19:00				
19:15				
19:30	<b>BLED CASTLE</b>			
19:45				
20:00				
20:15				
20:45		<i>Bus back to Hotel Astoria</i>		

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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**

**IMAPS**, Slovenia Chapter

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**Conference Chair:** Janez Trontelj, University of Ljubljana (SLO)

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Igor Pompe, MIDEM, Ljubljana, Slovenia, **chair**

Iztok Šorli, MIKROIKS d.o.o., Ljubljana, Slovenia

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## GENERAL INFORMATION

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Welcome to the **43<sup>nd</sup> International Conference on Microelectronics, Devices and Materials, MIDE M 2007** and joint **Workshop on electronic testing**. This conference continues the tradition of annual international meetings organized by MIDE M - Society for Microelectronics, Devices and Materials, Ljubljana, Slovenia. These conferences have always attracted a large number of Slovene and foreign experts working in these fields as well as involved distinguished guest speakers. Once a year, scientists have the opportunity to present their activities and research results to an international audience and to discuss trends and problems related to their fields of work with other colleagues.

This year, 47 regular papers and five invited presentations, in conference five sessions and in joint Workshop on electronic testing, will be presented during three days from Wednesday to Friday. The conference presentations are grouped in the following sessions: Device physics, modelling and technology; Electronics; Thick and Thin Films; Optoelectronics; and Integrated Circuits.

Joint workshop is this year devoted to electronic test addressing challenging problems of providing high-quality cost-effective tests and coping with ever-increasing design complexity of modern electronic devices. Testing, debugging and diagnosing nano-scale systems, thermal-aware SoC testing and system-in-package test are hot topics covered by invited papers. The two afternoon sessions include interesting papers in the areas of digital, MEMS and mixed-signal test and provide a unique forum for the exchange of ideas and contacts.

We would like to express our thanks to the technical program members who made the review of the papers. We also would like to thank the Conference Organizing Committee members who have tried their best to make the conference successful. Likewise, we thank all participants for attending the conference.

Finally, we hope that all of you will enjoy the conference talks and events, and that you will have an interesting and pleasant stay in Bled, in the nice Slovenian mountainous atmosphere.

### CONFERENCE VENUE

The Conference is held from September 12<sup>th</sup> to September 14<sup>th</sup>, 2007, in Hotel ASTORIA, Bled, 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**(\*)
  - MIDE M Society members, MIDE M Sponsors : **200 EUR**
- (\*) full registration fee applies to non MIDE M society members only and includes a two year full MIDE M Society membership.

The fee includes Conference Proceedings and free access to all Conference events ( Welcome party and Conference dinner ).

Accompanying persons who do not take part in the conference may join other conference events at an extra charge ( Welcome party: 35EUR, conference dinner : 50EUR, 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**

Welcome party is scheduled for Wednesday, September 12<sup>th</sup> at 18:00 at Bled castle. Transportation to the castle and back is organized. The bus leaves to Bled castle at 18:00 and back at 20:15.

The Conference dinner will be held on Thursday, September 13<sup>th</sup> at 19:15 in hotel ASTORIA.

### **ACCOMMODATION**

Please send your room reservations indicating " for MIDEM 2007 Conference", directly to :

Višja strokovna šola za gostinstvo in turizem Bled  
Prešernova 44, 4260 Bled, Slovenija  
Tel: +386 (0)4 579 44 00, Fax: +386 (0)4 579 44 01  
e-mail: [astoria@vgs-bled.si](mailto:astoria@vgs-bled.si)  
<http://www.hotelastoria-bled.com>

### **Programme and Organizing Committee, MIDEM 2007 Conference**

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### **Contact person for the Workshop on ELECTRONIC TESTING**

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[franc.novak@ijs.si](mailto:franc.novak@ijs.si)

Conference Web page: <http://www.midem-drustvo.si/conf2007/>

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# CONFERENCE PROGRAM

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**WEDNESDAY, SEPTEMBER 12**

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**09:00 WELCOME AND OPENING CEREMONY**

**09:15 INVITED PAPER**

CHAIRPERSON : S.Amon

**09:15 D.Strle, V.Kempe**

MEMS based inertial systems

**10:00 COFFEE BREAK**

**10:15 SESSION ON DEVICE PHYSICS, MODELLING AND TECHNOLOGY**

CHAIRPERSON : D.Resnik

**10:15 B.Cvikl, M.Koželj, P.Gorley, D.Korošak, B.Glumac, R.Jecl**

On the »backward diode« I–U electrical characteristics of the ionized cluster beam deposited *ITO/CuPc(1200nm)/Al* organic structure

**10:30 B.Cvikl, M.Koželj, D.Korošak, P.Gorley, B.Glumac, R.Jecl**

The C-U characteristics of ionized cluster beam deposited bilayer *Al/PTCDA/CuPc/ITO* metal-organic structure with imbedded oxygen and water ions

**10:45 F.Koplan, Z.Balantič**

Automation of visual inspection of plated SmCo magnets

**11:00 D.Vrtačnik, D.Resnik, U.Aljančič, M.Možek, S.Penič, S.Amon**

Dry etching of silicon structures with positive sloped sidewalls

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

Numerical modeling of PZT/SiO<sub>2</sub> microcantilever with interdigitated electrodes

**11:30 B.Seliger**

Power MOS devices and improved technologies

**11:45 B.Sviličić, V.Jovanović, T.Suligoj**

Vertical silicon-on-nothing FET: analytical model of subthreshold slope

**12:00 A.Vesel, I.Junkar, J.Kovač, M.Mozetič**

Activation of PTFE foil by treatment in oxygen and nitrogen plasma

**12:15 A.Drmota, A.Košak, A.Žnidaršič**

Synthesis and characterization of magnetic fluids for applications in electronic devices

**12:30 LUNCH**

**14:30 SESSION ON DEVICE PHYSICS, MODELLING AND TECHNOLOGY**

CHAIRPERSON : D.Resnik

**14:30 V.P.Makhniy, V.V.Mel'nyk, M.M.Sletov, O.V.Kinzerskaya, B.Cvikl, D.Korošak, P.N.Gorley, P.P.Horley**

Optical properties of ZnO:Mn heterolayers with quantum-scale surface formations

**14:45 P.N.Gorley, B.Cvikl, D.Korošak, V.M.Frasunyak, S.V.Bilichuk, P.P.Horley, O.M.Slyotov**

ZnO and ZnO:Co films: Technology and optical properties

**15:00 SESSION ON ELECTRONICS**

CHAIRPERSON: M. Topič

**15:00 B.Drnovšek, V. B.Bregar**

Characterization of EM absorber materials

**15:15 J.Kurnik, K.Brecl, M.Jankovec, M.Topič**

Comparison of fixed, 1-axis and 2-axis tracking PV system performances

**15:30 M.Možek, D.Vrtačnik, D.Resnik, U.Aljančič, S.Penič, S.Amon**

USB – ZACWire sensor communication module

**15:45 B.Seliger**

Electron devices and safety problems

**16:00 COFFEE BREAK**

**16:15 SESSION ON THICK AND THIN FILMS**

CHAIRPERSON: D. Belavič

**16:15 U.Aljančič, M.Vukadinović, D.Resnik, D.Vrtačnik, M.Možek, S.Penič, S.Amon**

Cantilever characterization method for static behaviour of PZT thin films

**16:30 M.Hrovat, D.Belavič, J.Kita, J.Holc, J.Cilenšek, L.Golonka, A.Dziedzic**

A study of PTC and NTC thick film thermistors on LTCC substrates

**16:45 D.Resnik, B.Malič, U.Aljančič, D.Vrtačnik, M.Možek, S.Penič, S.Drnovšek, M.Kosec, S.Amon**

Characterization of bondable Cr-Au metallization on PZT thin films

**17:00 M.Vukadinović, J.Koruza, B.Kužnik, B.Malič, M.Kosec, V.Sherman, T.Yamada, N.Setter**

Uniformity of properties of Ba<sub>0.3</sub>Sr<sub>0.7</sub>TiO<sub>3</sub> thin film planar capacitors made by a collective fabrication process

**17:15 M.Maček, M.K.Gunde, N.Hauptman**

Chemical sensors with epoxy-based polymer SU8

**18:00 WELCOME PARTY – BLED CASTLE**

## **THURSDAY, SEPTEMBER 13**

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**09:00 WORKSHOP ON ELECTRONIC TESTING**

CHAIRPERSON : F. Novak

INVITED PAPERS

**09:00 S.Hellebrand, C. G.Zoellin, H. J.Wunderlich, S.Ludwig, T.Coym, B.Straube**

Testing and monitoring nanoscale systems – Challenges and strategies for advanced quality assurance

**09:45 Z.Peng, Z.He, P.Eles**

Challenges and solutions for thermal-aware SoC testing

**10:30 COFFEE BREAK**

**10:45 WORKSHOP ON ELECTRONIC TESTING**

CHAIRPERSON : F. Novak

INVITED PAPERS

**10:45 P.Cauvet, S.Bernard, M.Renovell**

Design & test of system-in-package

**11:30 H. J.Wunderlich, M.Elm, S.Holst**

Debug and diagnosis: mastering the life cycle of nano-scale systems on chip

**12:30 LUNCH**



## **14:30 WORKSHOP ON ELECTRONIC TESTING**

CHAIRPERSON : R. Ubar

REGULAR SESSION

### **14:30 O.Novák**

Efficient test pattern compression and decompression system

### **14:45 B.Dugonik, Z.Brezočnik**

Seed selection algorithms for LFSR test pattern generator in BIST

### **15:00 K. K.Duganapalli, A. K.Palit, P.Anandapu, W.Anheier**

Automatic test pattern generation for crosstalk faults between on-chip aggressor and victim

### **15:15 R.Ubar, S.Devadze, J.Raik, A.Jutman**

Parallel fault backtracing for calculation of fault coverage

### **15:30 P.Puhar, A.Žemva**

Simulation-based functional verification of video processing intellectual property block

### **15:45 M.Wegrzyn, F.Novak, A.Biasizzo, M.Renovell**

Functional test of processor cores in FPGA-based applications

## **16:00 COFFEE BREAK**

## **16:15 WORKSHOP ON ELECTRONIC TESTING**

CHAIRPERSON : A. Žemva

REGULAR SESSION

### **16:15 D.Strle**

Efficient testing of high-resolution  $\Sigma$ - $\Delta$  A/D converters

### **16:30 M.Santo Zarnik, D.Belavič, S.Maček**

Benefiting from numerical simulations in diagnosing electromechanical systems

### **16:45 J.Brenkuš, V.Stopjaková**

Catastrophic faults detection in operational amplifier by the supply current oscillation test strategy

### **17:00 M.Pavlin, B.Hudoklin, M.Santo Zarnik**

Multichannel sensor bridge testing

### **17:15 P.Mrak, A.Biasizzo, F.Novak**

A case study of histogram based ADC testing in SoC

### **17:30 M.Pavlin, S.Kocjan, J.Gramc**

Over-the-air calibration in wireless sensors

**17:45 B.Seliger**

Semiconductor leakage current measurements with insulation resistance tester

**19:15 CONFERENCE DINNER – HOTEL ASTORIA**

**FRIDAY, SEPTEMBER 14**

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**09:00 SESSION ON OPTOELECTRONICS**

CHAIRPERSON : M. Topič

**09:00 M.Berginc, U.Opara Krašovec, M.Hočevar, B.Lipovšek, M.Topič**

Dark characteristics and influence of light intensity on I-V characteristics of dye-sensitized solar cell

**09:15 A.Levstek, M.Pirc**

Autonomous measuring station of diffuse solar radiation

**09:30 B.Lipovšek, J.Krč, A.Čampa, M.Topič**

Back reflector study in thin-film silicon solar cells

**09:45 M.Nerat, G.Černivec, F.Smole, M.Topič**

Grain boundary effect 2D-simulation in silicon solar cell

**10:00 COFFEE BREAK**

**10:15 SESSION ON INTEGRATED CIRCUITS**

CHAIRPERSON : J.Trontelj

**10:15 A.Sešek, J.Trontelj**

Accurate measurement of magnetic field with autocalibration of system

**10:30 A.Pleteršek**

CMOS design techniques for integrated-battery powered systems

**10:45 J.Podržaj, J.Trontelj**

Optimization of low side and high side power switches in mixed signal CMOS process

**11:00 R.Ribnikar, D.Strle**

Analysis and modeling of passive S-C adder used in high order, single-loop  $\Sigma\Delta$  modulators

**11:15 B.Šmid, J.Trontelj**

Magnetic microsystem for distance measurement with nanometer resolution in millimetre range

**11:30 S.Starašinič**

Dual modulus prescaler

**11:45 A.Švigelj, J.Trontelj**

Automatic gain control of integrated amplifier array

**12:00 D.Raič**

Synthesis of synchronous systems for switching noise reduction

**12:15 J.Trontelj**

Offset voltage optimization comparator array

**12:30 J.Trontelj jr.**

Development of a dedicated low cost ASIC test system for fully automatic wafer prober

**12:45 CLOSING OF THE CONFERENCE**