

**49th INTERNATIONAL CONFERENCE
ON MICROELECTRONICS,
DEVICES AND MATERIALS**

and the WORKSHOP on

DIGITAL ELECTRONIC SYSTEMS



CONFERENCE 2013

CONFERENCE PROGRAM

**September 25th – September 27th, 2013
Kranjska Gora, SLOVENIA**

**CONFERENCE MIDEM 2013 with WORKSHOP ON
DIGITAL ELECTRONIC SYSTEMS**

**PRELIMINARY SHORT PROGRAM, Kranjska Gora
September 25. - September 27, 2013**

DAY/ HOUR	Wednesday, 25. 9. 2013	Thursday, 26. 9. 2013	Friday, 27. 9. 2013
8:00	REGISTRATION	REGISTRATION	REGISTRATION
8:30	OPENING CEREMONY M. Topič		
8:45	INVITED PAPER Franz Dielacher	WORKSHOP OPENING A. Žemva, A. Trost	INVITED PAPER Igor Mušević
9:00	Chairperson: M. Topič	WORKSHOP INVITED PAPERS Chairperson: A. Trost	Chairperson: M. Hrovat
9:15			
9:30	SESSION ON OPTOELECTRONICS	P. Bulić	SESSION ON THICK AND THIN FILMS
9:45	Chairperson: M. Topič	A. Biasizzo	Chairperson: M. Hrovat
10:00			
10:15		COFFEE BREAK	
10:30			
10:45			
11:00	COFFEE BREAK	WORKSHOP INVITED PAPERS Chairperson: A. Trost	COFFEE BREAK
11:15			
11:30	SESSION ON	F. Brglez	SESSION ON
11:45	MATERIALS, TECHNOLOGY AND DEVICES	J. Rodrigues	INTEGRATED CIRCUITS AND SYSTEM ON CHIP
12:00	Chairperson: B. Malič		Chairperson: J. Trontelj
12:15		LUNCH - 2H	
12:30			
12:45			
13:00	LUNCH - 2H		CLOSING CEREMONY
13:15			
13:30			
13:45			
14:00			
14:15			
14:30			
14:45		WORKSHOP INVITED PAPERS Chairperson: A. Trost	
15:00	SESSION ON SENSORS AND MEMS	D. Strle	
15:15	Chairperson: S. Amon	Z. Brezočnik	
15:30			
15:45		COFFEE BREAK	
16:00			
16:15	COFFEE BREAK		
16:30		SESSION ON ELECTRONICS	
16:45	SESSION ON SENSORS AND MEMS	Chairperson: D. Strle	
17:00	Chairperson: S. Amon		
17:15			
17:30			
17:45			
18:00			
18:15			
18:30	Bus departure in front of Larix hotel		
18:45			
19:00	VISIT AND WELCOME PARTY IN ALPINE MUSEUM IN MOJSTRANA		
19:15			
19:30		CONFERENCE DINNER Larix restaurant	
19:45			
20:00			
20:15			
20:30			
20:45			
21:00			

ORGANIZER

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

CO – ORGANIZER

Centre of Excellence NAMASTE, Jamova 39, 1000 Ljubljana

CONFERENCE SPONSORS

Slovenian Research Agency, Ljubljana

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Co-chairman, Workshop Chair:

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CONFERENCE ORGANIZING COMMITTEE

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

GENERAL INFORMATION

Welcome to the 49th International Conference on Microelectronics, Devices and Materials, (MIDEM 2013) and the joint Workshop on Digital Electronic Systems. 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, 43 reviewed regular papers and eight invited papers will be presented over the three days, 25 – 27 September 2013.

The standard conference contributions presented on the first and third days are grouped into six sessions: Materials, technology and devices; Electronics; Optoelectronics; Thin and Thick Films; Integrated Circuits and System on Chip and Sensors and MEMS. On the second day the work will be organised as the Workshop on Digital Electronic Systems. The distinguished speakers will talk about new approaches in low-power design, testing of programmable devices, combinatorial optimization, designing ultra-low voltage circuits, signal processing in integrated biological and chemical sensors, and model checking in formal verification.

We would like to express our thanks to the invited speakers and the 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 all the Session Chairs and the members of the Conference Organizing Committee, who did their best to make the conference a success.

We hope that you will remember this event, not only for the importance of the papers and discussions, but also for the new friendships and the pleasant memories of the country.

We wish you a pleasant stay in Kranjska Gora and in Slovenia.

A. Žemva, chairman of the MIDEM Conference 2013

Kranjska Gora, September 2013



SLOVENIAN RESEARCH AGENCY



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CONFERENCE VENUE

The Conference is held from September 25th to September 27th, 2013 at hotel Larix in Kranjska Gora, 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 (VAT included)

- FULL registration fee: **300 EUR**
- MIDEM Society members, MIDEM Sponsors: **244 EUR**

The fee includes Conference Proceedings and free access to all Conference events (Welcome party at Alpine Museum in Mojstrana and Conference dinner in hotel Larix).

Accompanying persons who do not take part in the conference may join other conference events at an extra charge (Welcome party: 30 EUR, Dinner: 35 EUR, additional conference materials: 100 EUR).

Undergraduate students have free access to all Conference sessions on submitting their student card / index. For other Conference events there will be an additional charge.

SOCIAL EVENTS

Welcome party at Planinski muzej (Alpine Museum) in Mojstrana is scheduled for Wednesday, September 25th at 19:00. The bus will leave in front of the hotel at 18:30.

The Conference Dinner will be held on Thursday, September 26th in hotel Larix at 19:30.

ACCOMMODATION

Please send your room reservations by filling the reservation forms that are on the web page of the Society MIDEM, indicating "for MIDEM 2013 Conference", directly to:

info@hitholidays-kg.si

or call this number + **386 (0)4 588 41 00**.

Programme and Organizing Committee, MIDEM 2013 Conference

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Conference Web page: <http://www.midem-drustvo.si/conf2013>

CONFERENCE PROGRAM

WEDNESDAY, SEPTEMBER 25

08:00 REGISTRATION

08:30 WELCOME AND OPENING CEREMONY

08:45 INVITED PAPER

CHAIRPERSON: M. Topič

08:45 F. Dielacher

Integrated Circuits and MMIC's for mm-Wave Transceivers

09:30 SESSION ON OPTOELECTRONICS

CHAIRPERSON: M. Topič

09:30 T. Vidmar, U. Opara Krašovec, M. Topič

Inkjet Printing of Chromogenic Devices

09:45 M. Čančula, M. Ravnik and S. Žumer

Modelling Light Propagation through
Optically Non-uniform Anisotropic Materials

10:00 M. Kovačič, J. Krč, B. Lipovšek and M. Topič

Diffraction Gratings for Optical Filtering in Fluorescence
Detection of Biomolecules

10:15 M. Jošt, J. Krč and M. Topič

Camera-based Measurement of Light Scattering Intensity Distribution

10:30 M. Sever, J. Krč and M. Topič

Optical Optimisation of Periodic Surface Textures in
Thin-film Silicon Solar Cells with Realistic Layer
Growth Consideration

10:45 B. Kirn, K. Brecl, M. Jankovec and M. Topič

Degradation of Multi-crystalline Silicon PV Modules
in Open-circuit or Maximum Power Point Conditions

11:00 COFFEE BREAK

11:30 SESSION ON MATERIALS, TECHNOLOGIES AND DEVICES

CHAIRPERSON: B. Malič

11:30 Z. Šorn, B. Mušič, N. Rajnar, N. Figar
Effect of the Concentration of Tetraethyl Orthosilicate on
Physical Properties of SiO₂ Aerogel, Incorporated into
Melamine Substrate and Dried at Ambient Pressure

11:45 B. Bertoncelj, K. Vojisavljević, J. Rihtaršič, G. Jelenc, B. Malič
Characterization of Glass Fiber Reinforced Composites for
Housing of Electrical Motors

**12:00 A.-P. Abellard, D. Kuščer, M. Lethiecq,
J.-M. Grégoire, B. Malič and F. Levassort**
Lead Zirconate Titanate Multi-element Structure by
Electrophoretic Deposition

**12:15 N. Jelić, L. Kos, J. Krek, J. Kovačič, T. Gyergyek, A. J. Christlieb, J. P.
Verboncoeur**
Ionization Front in a Gas-filled Diode During Electrical Breakdown

12:30 T. Gyergyek, J. Kovačič, N. Jelić, L. Kos
Sheath Formation in Front of a Negative Electrode Close to
Plasma Potential Studied by PIC Simulations

12:45 S. Bernik, M. Pribošek
Construction and Characteristics of a Z-meter Setup for
Thermoelectric Measurements of Materials

13:00 LUNCH

15:00 SESSION ON SENSORS AND MEMS

CHAIRPERSON: S. Amon

**15:00 D. Resnik, D. Vrtačnik, U. Aljančič, M. Možek, T. Dolžan,
B. Pečar, A. Janež, V. Urbančič, S. Amon**
Microfabricated Si Microneedle Array for in Vitro Skin Penetration

**15:15 D. Vrtačnik, D. Resnik, U. Aljančič, M. Možek,
B. Pečar, T. Dolžan and S. Amon**
Fabrication of Silicon Microneedles for Transdermal Drug Delivery

**15:30 E. K. Juvan, T. Dolžan, B. Pečar, U. Aljančič,
M. Možek, D. Vrtačnik, D. Resnik, S. Amon**
Development of a Dry Etching System using Xenon Difluoride

**15:45 B. Pečar, D. Križaj, D. Vrtačnik, D. Resnik, M. Možek,
U. Aljančič, T. Dolžan, S. Amon**

Influence of an Excitation Signal Waveform on Micropump Operation - Numerical Simulation Analysis

**16:00 T. Dolžan, D. Vrtačnik, D. Resnik, U. Aljančič, M. Možek,
B. Pečar, S. Amon**

Automated Characterization of Micropumps

16:15 COFFEE BREAK

16:45 M. Mraović, A. Pleteršek, T. Muck, U. Bogataj, M. Đokić

Performances of the Screen Printed Capacitive Humidity Sensors on Recycled Paper and Cardboard

**17:00 U. Aljančič, R. Bošnjak, M. Benedičič, D. Resnik,
D. Vrtačnik, T. Dolžan, B. Pečar, M. Možek, S. Amon**

Photoplethysmograph Prototype for Clinical Use

17:15 G. Batistell and J. Sturm

Simulation and Implementation of a Filter-less CMOS Color Detector

17:30 M. Pavlović, M. Santo Zarnik, S. Kocjan, M. Stušek, D. Belavič

Preliminary Media-compatibility Tests for LTCC-based Pressure Sensors

17:45 G. Matič, M. Jankovec, D. Jurman, M. Topič

Tilt Determination Procedure for All-rotating Unmanned Aerial Vehicles

18:30 THE BUS DEPARTURE FROM HOTEL LARIX

19:00 VISIT AND WELCOME PARTY AT ALPINE MUSEUM IN MOJSTRANA

THURSDAY, SEPTEMBER 26

08:00 REGISTRATION

08:45 WORKSHOP ON DIGITAL ELECTRONIC SYSTEMS - OPENING

09:00 WORKSHOP – INVITED PAPERS

CHAIRPERSON: A. Trost

09:00 P. Bulić

Fixed Point Multiplication and Division in the Logarithmic Number System: the Way to Low-power Design

09:45 A. Biasizzo

On-line Testing and Recovery of Systems with Dynamic Partial Reconfiguration

10:30 COFFEE BREAK

11:00 F. Brglez

On Self-avoiding Walks across n-dimensional Dice and Combinatorial Optimization: An Introduction

11:45 J. Rodrigues

Design Aspects for Ultra-low Voltage Circuits

12:30 LUNCH

14:30 WORKSHOP – INVITED PAPERS

CHAIRPERSON: A. Trost

14:30 D. Strle, J. Trontelj

Signal Processing for Integrated, High Performance, Low Noise Chemical/Biological Sensor Interface

15:15 Z. Brezočnik

Spin Model Checking Using SpinRCP

16:00 COFFEE BREAK

16:30 SESSION ON ELECTRONICS

CHAIRPERSON: D. Strle

16:30 A. Sešek, J. Trontelj

Measurement System for Sea Wave Monitoring

16:45 P. Kogej

New Approaches in Magnetic Absolute Position Encoding

17:00 M. Kočevar

The Effect of Number of Scratches on Fingerprint Image Distortion and Efficiency of Fingerprint Image Enhancement

17:15 I. Fajfar, Á. Búrmen

Understanding Memristors

17:30 M. Celestina, A. Trost

Hardware Implementation of 1/1 and 1/3 Octave Band Filters

17:45 J. Podržaj, J. Trontelj

Design for Improved Reliability of the Three Phase Motor Power Module

18:00 G. Ergaver, J. Trontelj

Conducted and Radiated Emissions Characterization and Mitigation of Direct Current Brush-commutation Motor

18:15 M. Podhraški, J. Podržaj, J. Trontelj

The Impact of Solder Voids on Thermal Performance of a Power Module: A Numerical Evaluation

19:30 CONFERENCE DINNER AT LARIX RESTAURANT

FRIDAY, SEPTEMBER 27

08:00 REGISTRATION

08:45 INVITED PAPER

CHAIRPERSON: M. Hrovat

8:45 I. Muševič

Integrated and Topological Liquid Crystal Photonics

09:30 SESSION ON THICK AND THIN FILMS

CHAIRPERSON: M. Hrovat

09:30 M. Vrabelj, H. Uršič, B. Rožič, Z. Kutnjak, S. Drnovšek, B. Malič

Electrocaloric Properties of $0.7\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3-0.3\text{PbTiO}_3$
Ceramics Prepared from Mechanochemically Activated Powder

09:45 T. Pečnik, S. Glinšek, B. Kmet, R. C. Frunzã, B. Malič

Solution Derived $\text{Ba}_{0.5}\text{Sr}_{0.5}\text{TiO}_3$ Thin Films on Polycrystalline
Alumina Substrates

10:00 R. C. Frunzã, B. Kmet, K. Rachut, M. Jankovec, M. Topič, A. Klein and B. Malič

Solution-derived Ta_2O_5 -based Dielectric Thin Films
for Transparent Electronic Devices

10:15 R. Rudež, S. Bernik

Studies of Concentrated Inks for the Screen Printing
of Thick-film Varistors

10:30 G. Dolanc, D. Belavič, M. Hrovat, P. Fajdiga, S. Hočevar, A. Pohar, K. Makarovič

System with Ceramic LTCC Micro-reactor for Steam Reforming

10:45 M. Hrovat, D. Belavič, K. Makarovič

“Green” Thick Film Resistors on Various Substrates

11:00 M. Drev, U. Opara Krašovec, M. Topič

Sol-gel Processed Down-converters for DSSC

11:15 COFFEE BREAK

**11:45 SESSION ON INTEGRATED CIRCUITS
and SYSTEM ON CHIP**

CHAIRPERSON: J. Trontelj

11:45 U. Nahtigal, D. Strle

Interface Circuitry for High Accuracy Optical Detection Systems

12:00 B. Šmid, J. Trontelj

Extended Design of Integrated Micro-coil for
Onboard Magnetic Field Generation

12:15 M. Trifković, D. Raič, D. Strle

Serial Clock Tree Synthesis Based on Adjacency Matrix Manipulation

12:30 S. Starašinič

A PICC to PCD Decoder Based on ISO 14443A - 106 kbit/s Bit Rate

12:45 R. Ribnikar, D. Strle

Generating High Accuracy Signal with a Digital Oscillator

13:00 D. Štraus and A. Pleteršek

Amplitude Modulated Backscattered Signals in Reader's
RF Front-end

13:15 CLOSING CEREMONY