



3<sup>rd</sup> International Conference  
on Microelectronic Devices and Technologies

# Conference Programme

22-23 October 2020

Tenerife (Canary Islands), Spain  
Virtual format in ZOOM



## Message from Chairman

On behalf of Organizing Committee I would like to welcome you to the 3<sup>rd</sup> International Conference on Microelectronic Devices and Technologies (MicDAT '2020), 22-23 October 2020, which is organized in this year in the virtual format.

The MicDAT conference is a forum for presentation, discussion, exchange of information and latest research and development results in both theoretical and experimental research in microelectronics and their related fields. It brings together researchers, developers, and practitioners from diverse fields including international scientists and engineers from academia, research institutes, and companies to present and discuss the latest results in the mentioned field. The first MicDAT conference have been hold in Barcelona, Spain in 2018, and the 3<sup>rd</sup> – in Amsterdam, The Netherlands.

The MicDAT' 2020 conference is focusing any significant breakthrough and innovation in microelectronic devices and technologies with broadest concept.

The conference is organized by the International Frequency Sensor Association (IFSA) with media partners MDPI Open Access journal *Micromachines* (ISSN 2072-666X), Switzerland, in technical cooperation with *IFSA Publishing, S.L.* Spain.

We trust that you will find MicDAT' 2020 conference professionally rewarding and stimulating as well as enjoyable. Welcome to MicDAT' 2020 !

*Prof., Dr. Sergey Y. Yurish*  
*MicDAT' 2020 Conference Chairman*

### Conference web site:

<http://www.micdat-conference.com/>

### Language

The official language of the Conference is English. There will be no simultaneous interpretation.

## **Special Issue of *Sensors & Transducers* Open Access Journal**

Selected and extended papers from the conference will be published by IFSA Publishing in a special issue of open access *Sensors & Transducers* journal (ISSN: 2306-8515, e-ISSN 1726-5479) in both: print and electronic formats. The journal has SRJ 0.115 (2017) and RG Journal Impact: 0.45 (2018).

All authors of selected papers will be invited by the editor-in-chief of *Sensors & Transducers* journal after the conference to submit their extended papers. The publication in *Sensors & Transducers* will be free of charge for all MicDAT' 2020 conference participants. Submission deadline for extended papers is 30 November 2020. The special issue will be published in January-February 2020.

## **Special Issue of *Micromachines* Open Access Journal**

Appropriate papers on micro/nano-scaled structures, materials, devices, systems as well as related micro- and nanotechnology topics can be published in the *Micromachines* (ISSN 2072-666X) open access journal's special issue entitled 'Microelectronic Devices and Technologies'. The journal is indexed in EI, Scopus, PubMed and Web of Science, and has an Impact Factor of 2.523 (2019). The Article Processing Charge (APC) for publication in this open access journal is 1600 CHF (Swiss Francs), approximately 1490 EUR.

## **'Advances in Microelectronics: Reviews' Open Access Book Series**

The limited number of full-page papers published in the *Sensors & Transducers* journal will be selected by the journal's Editorial Board to extend for book chapters for the '*Advances in Microelectronics: Reviews*', Vol. 3 Book Series. This open access book will be published in the mid of 2021. The 1<sup>st</sup> and 2<sup>nd</sup> volumes were published in 2018 and 2019 respectively and have accepted by all Microelectronic Community with a great enthusiasm.

## Organizing Committee

### Chairman

**Prof., Dr. Sergey Y. Yurish** (*IFSA, Spain*)

### Advisory Chairmen

**Prof. Dr. Edward Hrynkiewicz** (*Silesian University of Technology, Poland*)

**Prof. Petrosyants K. O.** (*Moscow Institute of Electronics and Mathematics, Russia*)

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### Industry Advisory Chairman

**Dr. Rozalia Beica** (*The Dow Chemical Company, USA*)

### Conference and Publication Manager

**Mrs. Tetyana Zakharchenko** (*IFSA Publishing, S.L., Spain*)

## Sponsors and Media Partners:



## Keynote Presentations



**Dr. Hamid Sadabadi**

*Wireless Fluidics, Inc., University of Calgary  
and University of British Columbia, Canada*

### **Modular Thin-Layer Microfluidics with Microwave Sensing: A Sensitive Platform for Biomedical and Organ-on-Chip Applications**

#### **Abstract**

A novel, sensitive, low-cost, and reproducible sensing platform is presented using integrated microwave, microfluidics, and thin membrane interfacing technologies. In this work we explain how this technology could be used for measurement of flow rate within a microchannel in a real-time, noncontact, and nonintrusive manner. The flow in a microchannel deforms a thin circular membrane. Consequently, the permittivity and conductivity over the sensitive zone of the microwave resonator device (which is located under the membrane) will be altered. With proper calibration, such permittivity sensing method enables high-resolution detection of flow rate in microfluidic channels using non-contact microwave as a standalone system. The proposed flow sensor is reproducible with the error of 0.1 % for measurement of flow rates as low as 1 $\mu$ l/min. Since, the sensing element is not directly in contact with the liquid, it is highly compatible with several bio-applications. The proposed technology is an ideal candidate to be integrated onto microfluidic-based lab-on-chips, organ-on-chip, and bioreactors platforms.

#### **Short Biography:**

Dr. Hamid Sadabadi is an entrepreneur and senior microfluidics scientist. His main research interests are applied microfluidics, organ-on-chip, sensors, and biosensors. Dr. Sadabadi received his PhD degrees in Mechanical Engineering from Concordia University (Montreal, Canada) in 2013. He has extensive experience in design and analysis of integrated microfluidic and mechanical systems with applications in both life science and energy sector. He has the recipient of numerous prestigious industrial and academic awards and scholarships. Dr. Sadabadi holds 12 US Patents, and is co-founder of Wireless Fluidics, Inc., and affiliated with University of Calgary and University of British Columbia.



**Dr. Sergey Y. Yurish**

*International Frequency Sensor Association (IFSA),  
Barcelona, Spain*

## **Capacitance-to-Digital Converters Based on Universal Sensors and Transducers Interface (USTI)**

### **Abstract**

This presentation devoted to a highly digital Universal Sensors and Transducers Interface (USTI-MOB) with low power consumption, working in the capacitance measurement mode. The developed ASIP has the input capacitance range from 50 pF to 0.1  $\mu$ F and average relative error  $< \pm 0.3$  %. The USTI-MOB has 1.5 mW power consumption at +1.8 V supply voltage, and use a 4 MHz quartz oscillator. The IC has three popular serial interfaces: I2C, SPI and RS232/USB. Due to high metrological performances and technical characteristics the energy-efficient USTI-MOB is well suitable for such application as sensor systems for IoT, wearable and mobile devices. The ICs can also work with any quasi-digital capacitance converters, in which the capacitance is converted to frequency, period, time interval, duty-cycle or pulse width of square wave signals.

### **Short Biography:**

Dr. Sergey Y. Yurish is a president of International Frequency Sensor Association (IFSA) – one of the major professional association serving for sensor and MEMS industry and academy more than 20 years. Dr. Yurish is a founder of four companies, two of them related to microelectronics. Sergey Yurish is editor-in-chief of international peer-reviewed journal *Sensors & Transducers* and editor of open access Book Series on *'Advances in Microelectronics: Reviews'*. Dr. Yurish has got his PhD degree in 1996 from the National University Lviv Polytechnic (UA). He has published more than 170 articles and papers in international peer reviewed journals and conference proceedings. Sergey Yurish holds 9 patents and is an author and co-author of 12 books. He delivered more than 90 speeches, tutorials and keynotes presentations at industries, peer institutions, and professional conferences in over 30 countries. His research fields are precision frequency-to-digital converters, smart sensors and sensor systems.

## Programme at Glance

Date / Time	22.10.2020 Thursday
15:00-15:30	<p style="text-align: center;"><b>Opening Session</b> <i>(Sergey Y. Yurish, Chairman, IFSA, Spain)</i></p>
15:30-17:30	<p style="text-align: center;">Regular Session: <b>Emerging Devices and Circuits</b></p>
17:30-18:00	<p style="text-align: center;">Keynote Presentation</p> <p style="text-align: center;"><b>Modular Thin-Layer Microfluidics with Microwave Sensing: A Sensitive Platform for Biomedical and Organ-on-Chip Applications</b> <i>(Hamid Sadabadi, Wireless Fluidics, Inc., University of Calgary and University of British Columbia, Canada)</i></p>

Date / Time	23.10.2020 Friday
10:00-10:30	<p style="text-align: center;">Keynote Presentation</p> <p style="text-align: center;"><b>Capacitance-to-Digital Converters Based on Universal Sensors and Transducers Interface (USTI)</b> <i>(Sergey Y. Yurish, International Frequency Sensors Association (IFSA), Barcelona, Spain)</i></p>
10:30-12:30	<p style="text-align: center;">Regular Session: <b>Emerging Technologies, Processing, Packaging and Testing</b></p>
12:30-13:00	<p style="text-align: center;"><b>Closings Session</b> <i>(Sergey Y. Yurish, Chairman, IFSA, Spain)</i></p>

# Technical Conference Programme

*Day 1, 22 October 2020, Thursday*

## Regular Session: Emerging Device Technologies and Circuits

- 1. Mont-Blanc 2020 NoC: A low-power and high bandwidth Network on Chip generator**  
Pierre-Axel Lagadec, Said Derradji, Zoltan Menyhart  
and Alejandro Nocua (*France*)
- 2. Determination of temperature dependent optical properties of amorphous silicon thin films at high heating rates for CMOS compatible laser crystallization processes**  
Florian Fuchs, Christian Vedder, Jochen Stollenwerk  
and Johannes Henrich Schleifenbaum (*Germany*)
- 3. Pupil position estimation error in an eye tracking system based on the MEMS mirror scanning method**  
Mateusz Pomianek, Marek Piszczek, Marcin Maciejewski  
and Piotr Krukowski (*Poland*)
- 4. Digital micromirror design for manufacturing and high performance**  
Cuiling Gong (*USA*)
- 5. Digital single-electron astrocyte signaling implementation**  
Beatriz Câmara and Janaina Guimaraes (*Brazil*)
- 6. A sensitive platform for toxic gas detection in dust-filled environment using integrated microwave-microfluidics**  
Hamid Sadabadi, Ali Bostani and Amin Esmaeili  
(*Canada, Kuwait, Qatar*)

*Day 23 October 2020, Friday*

**Regular Session: Emerging Technologies,  
Packaging and Testing**

- 1. Characterization and modeling of prepregs applied in MEMS sensor packages with a focus on moisture dependence**  
Mahesh Yalagach, Peter Filipp Fuchs, Thomas Antretter, Michael Feuchter, Markus Weber and Tao Qi (*Austria*)
  
  - 2. TCAD-SPICE investigation of SEU sensitivity for SOI and DSOI CMOS SRAM cells in temperature range up to 300° C**  
Konstantin Petrosyants, Dmitriy Popov, Bo Li and Yuchong Wang (*Russia, China*)
  
  - 3. Physical alloying of carbide nanocomposite coating by carbon nanostructure**  
Philipp Vysikaylo, Valeriy Mitin and Vladimir Mashchenko (*Russia*)
  
  - 4. Nanoporous anodic alumina membranes as passive luminance enhancers for LCD**  
George Basov, Dmitry Shimanovich, Valentina Yakovtseva and Vladimir Shulgov (*Belarus*)
  
  - 5. Internal stress in aluminum layers deposited on dielectric substrates**  
Vladimir Shulgov, Dmitry Shimanovich, Valentina Yakovtseva and George Basov (*Belarus*)
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