



**8th International Conference on Sensors
and Electronic Instrumentation Advances (SEIA '2022)**

4th IFSA Frequency & Time Conference (IFTC '2022)

**4th International Conference on Microelectronic Devices
and Technologies (MicDAT '2022)**

Conference Programme

**Corfu, Greece
21-23 September 2022**



Message from Chairman

On behalf the Organizing Committee I would like to welcome you to the 8th *International Conference on Sensors and Electronic Instrumentation Advances (SEIA' 2022)*, 4th *International Conference on Microelectronic Devices and Technologies (MicDAT '2022)* and 4th *IFSA Frequency & Time Conference (IFTC' 2022)*, in Corfu, Greece.

In 2022, after two hard COVID-19 years, these events are turned again to the traditional, in-person conference format with physical, face-to-face oral, poster keynote and invited presentations.

This conference umbrella is a forum for presentation, discussion, exchange of information and latest research and development results in both theoretical and experimental research in appropriate areas. 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 field of sensors, microelectronics and frequency-time measurements.

Next to all the technical subjects, a major function of this series of events lies in the opportunities for meeting colleagues and the future partners for joint research projects. This aspect of our IFSA events has always been giving high marks and we continue to pay much attention to it. Coffee breaks, welcome cocktail, Gala Dinner and farewell cocktail are the best opportunity for social contacts.

The conferences are organized by the *International Frequency Sensor Association (IFSA)* - one of the major professional association serving for the sensor industry and academy more than 23 years, in technical cooperation with the IFSA Group company: *IFSA Publishing S.L.* (Spain), and media partners - open access MDPI journals: *Sensors* (ISSN 1424-8220), *Chemosensors* (ISSN 2227-9040), *Remote Sensing* (2072-4292), *Low Power Electronics and Applications* (ISSN 2079-9268) and *Micromachines* (ISSN 2072-666X).

We trust that you will find this conference umbrella professionally rewarding and stimulating as well as enjoyable. Welcome to SEIA' 2022, MicdDAT' 2022 and IFTC' 2022 !

Prof., Dr. Sergey Y. Yurish
Chairman

Conferences Venue

The Conferences will take place on 21-23 September 2022 in Kerkira (Corfu Island), Greece, *Corfu Holiday Palace* hotel, conference rooms *Kerkyra* and *Ithaka*.

Registration

The Registration Desk is opened in the Corfu Holiday Palace event hotel:

- Tuesday, 20 September, from 20:00-21:30 (in the Welcome Cocktail area)
- Wednesday, 21 September, from 8:45-18:00 (near the room *Kerkyra*)
- Thursday, 22 September, from 8:45-18:00 (near the room *Kerkyra*)
- Friday, 23 September, from 8:45-12:00 (near the room *Kerkyra*)

Language

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

Insurance and Liability

The conferences organizers do not accept responsibility for any individual, medical, travel or personal insurance policies as necessary.

Conference Identification Tag

The Organizing Committee request that you wear your identification tag (badge) at all times during the conference. Your conference identification tag will serve as your admission to all conference paper presentation sessions.

Coffee/Tea Refreshment

Coffee/tea will be served at the times indicated in the programme.

Conferences' web sites:

- SEIA' 2022: <http://www.seia-conference.com>
- MicDAT' 2022: <http://www.micdat-conference.com>
- IFTC' 2022: <http://www.iftc-conference.com>

Special Issues of Journals

Selected papers from conferences will be published in special issues of open access journals: *Sensors & Transducers* journal (ISSN: 2306-8515, e-ISSN 1726-5479) in both: print and electronic formats; *MDPI Sensors* (ISSN 1424-8220), *MDPI Chemosensors* (ISSN 2227-9040), *MDPI Low Power Electronics and Applications* (ISSN 2079-9268) and *MDPI Micromachines* (ISSN 2072-666X), electronic format. All authors of selected papers will be invited after the conference by the Chairman to submit their extended papers into the appropriate journals.

Chapters in Book Series

Authors will be also invited to submit book chapters for the 'Advances in Sensors: Reviews', Book Series, Vol. 9, 'Advances in Microelectronics: Reviews' Book Series, Vol. 4 or 'Frequency & Time: Measurements, Control and Transfer', Book Series, Vol. 1. This open access books volumes will be published in 2022/2023.

Organizing Committee

Chairmen

Prof., Dr. Sergey Y. Yurish (*IFSA, Spain*)
Dr. Daneshmand Malayeri, Amin (*Asia-SAME, UAE*)

Advisory Chairmen

Prof. Vincenzo Piuri (*Universit' degli Studi di Milano, Italy*)
Prof. Vijyakumar Varadarajan (*Univ. of New South Wales, Australia*)
Prof. José Miguel Pereira (*Instituto Politécnico de Setúbal, Portugal*)
Prof. George Kiriakidis (*European Materials Research Society France*)
Prof. Gennaro Conte (*University Roma Tre, Italy*)
Prof. Arkady Zhukov (*University of the Basque Country, Spain*)
Dr. Pavel Shuk (*, USA*)
Dr. Marius Gheorghe (*Ideal Aerosmith, Inc., USA*)
Dr. Paolo Dabove (*Politecnico di Torino, Italy*)

Conference and Publication Manager

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

Welcome Cocktail

20 September 2022, Tuesday (20:00-22:00). The Welcome Cocktail will take place in the *Corfu Holiday Palace* event hotel. Do not miss this opportunity to say the first "hello" to attendees and committee members.

Please do not forget to collect your badge (ID tag) at the registration desk before the Welcome Cocktail. The registration desk will be opened in the Welcome cocktail area from 20:00 to 22:00.

Gala Dinner

22 September 2021, Thursday (20:00-23:30). The Gala Dinner will take place in the *Corfu Holiday Palace* event hotel, *Nausica Ballroom*.

Local Time

The local time in Corfu is: GMT+3, Athens

Sponsors & Media Partners:



sensors



chemosensors

an Open Access Journal by MDPI



micromachines

an Open Access Journal by MDPI



Journal of
*Low Power Electronics
and Applications*

an Open Access Journal by MDPI



remote sensing

an Open Access Journal by MDPI

SMC Soft Measurement
and Computing
Scientific journal

Keynote Speakers



Prof., Dr. Sergey Y. Yurish

International Frequency Sensor Association (IFSA), Barcelona, Spain

Smart and Artificial Intelligence-Enable Sensors Based on Advanced Integrated Frequency-to-Digital Converters

Abstract

Today more and more companies are manufacturing smart sensors with embedded machine learning processing. However, such smart sensors require much higher level of integration. The presence of plenty of analog components in such sensors such as operation amplifiers, analog filters, voltage and current references, ADC, etc. significantly decreases the level of integration and increase the power consumption at low voltage power supply, especially at standard CMOS technological processes below 90 nm. In order to increase the level of integration, it was proposed to use frequency output sensing elements together with advanced frequency-to-digital converter (pure digital component), based on the novel, patented method of frequency-to-digital conversion. Such design approach allows to eliminate the complex analog blocks such as signal condition circuit and ADC, improve the metrological performances and significantly increase the level of integration.

Short Biography:

Dr. Sergey Y. Yurish is a president of *International Frequency Sensor Association (IFSA)* – one of the major professional association serving for sensor industry and academy more than 23 years. Dr. Yurish is a founder of three IFSA Group's companies. He is editor-in-chief of international peer-reviewed journal *Sensors & Transducers* and editor of open access multivolume Book Series on '*Advances in Sensors: Reviews*', '*Advances in Biosensors: Reviews*' and '*Advances in Measurements and Instrumentation: Reviews*' He has published more than 180 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.



Prof., Dr. Richard B. Jackman
*University College London (UCL),
London Centre for Nanotechnology,
Department of Electronic and Electrical
Engineering, London, UK*

Diamond Sensors for Extreme Environments: From the laboratory to the Ocean

Abstract

Diamond, a wide band gap semiconductor with superlative electronic properties, can be readily doped p-type with boron enabling a wide range of high performance electronic devices to be realized, including field-effect transistors. Further, diamond is chemically resilient, whilst its surface can be readily chemically functionalized, has an extremely 'wide' electrochemical window, and is transparent at optical wavelengths. Diamond has also been shown to resist biofouling in marine environments. This leads to the idea that diamond may be an ideal platform for sensors destined for use in extreme environments, including ocean deployment. That high quality single crystal diamond grown by laboratory methods is now a commercially available material at modest cost, it is timely to explore its use in just such a context. This presentation will consider two distinct types of diamond sensor, those based on electronic signals, as compared to optical sensor technology.

Short Biography:

Prof. Richard Jackman holds UCL's Chair in Electronic Devices and heads UCL's Diamond Electronics Group (DEG) whose laboratories are within the London Centre for Nanotechnology. Richard moved to UCL in 1988, having previously held the Royal Society Eliz. Challenor Research Fellowship at the University of Oxford, to establish one of the first teams dedicated to studying the electronic properties of the then newly emerging material, diamond, grown by chemical vapour deposition (CVD) methods. Since then UCL's DEG has been responsible for licensing some of the first diamond device technology to reach commercial development by industry and has published patents relating to such. The group enjoys an international reputation and having published more than 250 journal articles relating to diamond technology, Richard regularly presents papers at the major conferences in the field. Pertinent to the current conference, Richard is currently heading a > \$ 2M 4-year programme, funded by BAE Systems, relating to Diamond Sensor Technology for use in extreme environments. Professor Jackman is a Fellow of both the IET and IoP.



Prof., Dr. Gerald Gerlach
*Technische Universität Dresden,
Department of Electrical and Computer
Engineering, Institute of Solid-State
Electronics, Dresden, Germany*

Hydrogel-based Chemical and Biochemical Sensors

Abstract

Hydrogels are cross-linked polymer networks able to absorb or to release large amounts of water. The water uptake is associated with a considerable volume change. In doing so, hydrogels show remarkable properties: (i) The strong volume change can be excited by a large spectrum of different physical and (bio-) chemical quantities (ii) This swelling process is reversible (iii) The energy density of hydrogels is very high what easily enables miniaturization. Hence, hydrogel-based microsystems enable novel sensor solutions in microsystem technology with a high potential for miniaturization and cost-effective fabrication, in particular by using silicon-based MEMS technologies. These properties of hydrogels can be easily exploited for chemical or biochemical sensors. This can be done simply by coupling the hydrogel to a corresponding transducer which converts the change in hydrogel properties into an electrical signal. In addition to good sensitivity, chemical sensors should also exhibit high selectivity, good long-term stability and short response times. The presentation will present promising sensor concepts that are being worked on at the Institute for Solid-State Electronics.

Short Biography:

Gerald Gerlach received M.Sc. and Dr.-Ing. degrees in electrical engineering from the Technische Universität Dresden, Germany, in 1983 and 1987, respectively. Between 1983 and 1991 he worked in research and development in the field of sensors and measuring devices for several companies. In 1993 he became a full professor at the Department of Electrical and Computer Engineering at TUD and since 1996 he is Head of the Solid-State Electronics Laboratory there. His research is focused on sensor and semiconductor technology, simulation and modelling of micromechanical devices, the development of solid-state sensors and polymer-based actuators. He has (co-)authored more than 250 papers in scientific journals and is (co-)author and (co-)editor of 10 textbooks and monographies. He is also inventor or co-inventor of more than 50 patents. More than 75 PhD students have earned their doctorate under his supervision. Between 2012 and 2021 he served as Associate Editor-in-Chief of the IEEE Sensors Journal.



Dr. Koon Hoo Teo

Strategy Project Leader and Senior Principal Scientist, Mitsubishi Electric Research Labs (MERL), Cambridge, MA, USA

The Conundrum of Uncertainty in a Semiconductor World of Certainty

Abstract

In the past, often it was the semiconductor industry that drives the outcome of many products. Lately, however, new, and powerful applications are increasingly driving and spurring innovations in the semiconductor industry. For "More Moore", smartphones and the like continue to exert pressure for packing higher and higher number of devices, only to be restrained by thermal performance in the 2D and currently the 3D Silicon integration technology. As for the "For more than Moore", we have, for example, 3D device architecture using nanoribbon and FinFet technology with Si and other semiconductor materials to drive the limits of 3D Si VLSI. For "Beyond CMOS", especially for space, mining, factory automation and quantum computing applications, ultra-low and ultra-high temperature electronics using GaN and the like are being aggressively explored. Ultimately, the success in integration technology is the key to the success of new and emerging semiconductor technologies such as Gan technology and the like. Integration technologies, technology integration and interpenetration technology for GaN technology will be discussed and explored as a case study.

Short Biography

Dr. Teo worked at Nortel Networks for about 15 years where main R&D thrusts were in 3G and 4G Wireless Communication Systems and Mesh Networks. Currently working at Mitsubishi Electric Research Labs (MERL), Cambridge, MA, USA. He is one of the main authors of ANSI C63.17 for the unlicensed bands and a contributor to WiMAX and LTE standards in the PHY and MAC layers. He is author and co-author of over 150 reviewed journal and conference papers and three chapter books. In addition, he is also an inventor and co-inventor of over 200 granted patents and patent applications which span across areas that include Nano and Surface Physics, Superconductor, Thermal Physics, Semiconductor Power Devices, Metamaterial, Wireless Communications, Cognitive Radio, Game Theory, RF and Power Electronics, Battery Charging and Wireless Power Transfer, GaN technology, and motor technology. Currently he is working as a strategy project leader at MERL.



Prof., Dr. Freddy Gabbay
*TECHNION, Israel Institute of Technology,
Haifa, Israel*

Asymmetric Aging Effect on Modern Microprocessors

Abstract

Reliability, a crucial requirement in any modern microprocessor, assures correct execution over its lifetime. As mission critical components are becoming common in commodity systems, the demand for reliable processing continues to grow. The latest process technologies have aggravated the situation by causing microprocessors to be highly vulnerable to reliability concerns. This talk presents our study on the asymmetric aging phenomenon, which is a major reliability concern in advanced process nodes. In this phenomenon, logical elements and memory cells suffer from unequal timing degradation over their lifetimes and, consequently, raise reliability concerns. Previous design approaches attempted to handle asymmetric aging from a circuit or physical design viewpoint, but these solutions were quite limited and suboptimal. In this talk, an asymmetric aging-aware microarchitecture is introduced that aims to reduce the phenomenon's impact. In addition, a design flow and tool to minimize asymmetric aging in datapath structures is introduced. The tool can be integrated into standard design flows of large-scale circuits. Experimental analysis reveals the approach eliminates reliability concerns while introducing minor overhead.

Short Biography

Freddy Gabbay received his B.Sc., M.Sc. and Ph.D. in Electrical Engineering from the Technion – Israel Institute of Technology, Haifa, Israel. In 1998, he worked as a researcher at Intel's Microprocessor Research Lab. In 1999 he joined Mellanox Technologies and held various positions in leading switch product line architecture and ASIC design. In 2003, he joined Freescale Semiconductor as a senior design manager and led the design of baseband ASIC products. In 2012 he rejoined Mellanox Technologies where he served as Vice President of Chip Design. Today he is an associate professor and the Dean of Engineering Faculty at the Ruppin Academic Center, Emek Hefer, Israel. Prof. Gabbay also serves as an Adjunct Associate Professor at the Technion, Israel Institute of Technology, Haifa, Israel. His research interests include VLSI design, microelectronics, computer architecture, machine learning and domain-specific accelerators. Prof. Gabbay holds 19 patents and is a senior member of IEEE.



Prof. Dr. Rainer Bermbach
*Ostfalia University of Applied Sciences,
Wolfenbüttel, Germany*

Security in Packet-Based Time Synchronization Protocols

Abstract

The time synchronization of devices and networks is the basis for reliable operation and interoperability. Attacks on the time distribution and the synchronization process can therefore result in serious consequences. For this reason, we provide an overview on the topic of security in time distribution. At first, we show which distribution mechanisms exist in packet-based networks and then focus on the widely used Network Time Protocol (NTP) and Precision Time Protocol (PTP). These time protocols are good examples to illustrate which attacks are possible and how they can be mitigated or fended off. However, this is not trivial because some security functions (e.g., certificate verification) depend on the correct time and cryptographic protection can influence the synchronization accuracy. Moving forward, we look at the Network Time Security (NTS) protocol, which provides a first practical solution for NTP in this context. The current PTP version 2.1 also provides first security mechanisms, which are classified in so-called prongs. However, the PTP standard only defines approaches for their utilization, so that it cannot be used out-of-the-box. Fortunately, some solutions are already in the development process to equip PTP with a key management system and to cryptographically secure the time messages.

Short Biography

Prof. Rainer Bermbach received a Dipl.-Ing. degree in Communications Engineering from Technical University Darmstadt, Germany, where he also made his doctorate on time signal receivers. Starting in 1985 he gained industrial experience (e.g., image processing HW/SW, X-ray systems for luggage and container screening). His last position was Director R&D at Heimann Systems, Wiesbaden, Germany. Since 1994 Rainer Bermbach holds a professorship at Ostfalia University of Applied Sciences, Wolfenbüttel, Germany, concentrating on various aspects of computer architecture, embedded systems, smart metering/smart grid and secured time distribution.



Mr. Martin Langer
*Ostfalia University of Applied Sciences,
Wolfenbüttel, Germany*

Short Bio

Mr. Martin Langer is a research assistant at the Ostfalia University of Applied Sciences and currently PhD student in the field of secured time transmission using packet-based time protocols. After his bachelor from Magdeburg-Stendal University of Applied Sciences, Martin Langer received his master's degree in electrical engineering from Ostfalia University in 2016. Since 2015 he has been involved in the co-development of the Network Time Security Protocol and developed the world's first NTS-secured NTP time servers.

IFSA

Easy and quick sensors systems development

Development Board UFDC-1/UFDC-1M-16

- 16 measuring modes, 2 channels for frequency measurements
- Frequency range from 0.05 Hz up to 7.5 MHz (120 MHz)
- Programmable accuracy from 1 % up to 0.001 %
- RS232 (USB optional)

sales@sensorsportal.com
http://www.sensorsportal.com/HTML/E-SHOP/PRODUCTS_4/Evaluation_board.htm

Programme at Glance

Day 1: 21 September 2022, Wednesday

Time / Room	Conference Room <i>Kerkyra</i>
8:45-9:00	Registration
9:00-9:15	* Opening Session
9:15-10:00	Keynote presentation: <i>Smart and Artificial Intelligence-Enable Sensors Based on Advanced Integrated Frequency-to-Digital Converters</i> (Prof., Dr. Sergey Y. Yurish, Spain)
10:00-10:30	<i>Coffee Break</i>
10:30-12:30	Regular Session: <i>Sensor Instrumentation and Measurements</i>
12:30-13:30	<i>Lunch on your own</i>
13:30-14:15	Keynote presentation: <i>Diamond Sensors for Extreme Environments: from the laboratory to the Ocean</i> (Prof., Dr. Richard B. Jackman)
14:15-16:15	Regular Session: <i>Physical Sensors</i>
16:15-16:45	<i>Coffee Break</i>
16:45-18:45	Regular Session: <i>Sensors Applications I</i>

* Must attend session.

Day 2: 22 September 2021, Thursday

Time / Room	Conference Room <i>Kerkyra</i>	
8:45-9:00	Registration	
9:00-9:15	* Daily Notifications	
9:15-10:00	Keynote presentation: <i>Hydrogel-based Chemical and Biochemical Sensors</i> (Prof., Dr. Gerald Gerlach, Germany)	
10:00-10:30	<i>Coffee Break</i>	
10:30-12:30	Regular Session: <i>Chemical Sensors & Biosensors</i>	
12:30-13:30	<i>Lunch on your own</i>	
13:30-14:15	Keynote presentation: <i>The Conundrum of Uncertainty in a Semiconductor World of Certainty</i> (Dr. Koon Hoo Teo, USA)	
<i>Parallel Sessions:</i>		
	Conference Room <i>Kerkyra</i>	Conference Room <i>Ithaka</i>
14:15-16:15	Regular Session: <i>Optical and Fiber Optical Sensors: Design & Applications I</i>	Regular Session: <i>Electronic Materials & Nanotechnologies (MicDAT'2022)</i>
16:15-16:45	<i>Coffee Break</i>	
16:45-18:45	Regular Session: <i>Optical and Fiber Optical Sensors: Design & Applications II</i>	Special Session: <i>Microsystems (MicDAT'2022)</i>
18:45-20:00	-	-
20:00-23:30	Gala Dinner (<i>Nausica Ballroom</i>)	

* Must attend session.

Day 3: 23 September 2022, Friday

Time / Room	Conference Room <i>Kerkyra</i>	
8:45-9:00	Registration	
9:00-9:15	* Daily Notifications	
9:15-10:00	Invited presentation: <i>Security in Packet-Based Time Synchronization Protocols</i> (Prof., Dr. Rainer Bermbach and Mr. Martin Langer, Germany)	
10:00-10:30	<i>Coffee Break</i>	
	<i>Parallel Sessions:</i>	
	Conference Room <i>Kerkyra</i>	Conference Room <i>Ithaka</i>
10:30-12:30	Regular Session: <i>Artificial Intelligent Sensors & Systems</i>	Regular Session: <i>Frequency & Time (IFTC'2022)</i>
12:30-13:30	<i>Lunch on your own</i>	
13:30-14:15	Keynote presentation (Conference Room <i>Kerkyra</i>): <i>Asymmetric Aging Effect on Modern Microprocessors</i> (Prof., Dr. Freddy Gabbay, Israel)	
	<i>Parallel Sessions:</i>	
	Conference Room <i>Kerkyra</i>	Conference Room <i>Ithaka</i>
14:15-16:15	Regular Session: <i>Sensors Applications II</i>	Regular Session: <i>ICs Simulation and Design (MicDAT' 2022)</i>
16:15-18:15	<i>Farewell Cocktail & Poster Session</i>	-
18:15-18:30	* Closing Session	-

* Must attend session.

Technical Conference Programme

Day 1

21 September 2022, Wednesday

Regular Session: Sensor Instrumentation & Measurements (Conference Room *Kerkyra*)

Chairman: Prof., Dr. Arkady Zhukov
University of the Basque Country, Spain

- 1. Lead-free Thick-film Ultrasound Sensors for Industrial Process Monitoring**
Mandana Kariminejad, Christopher O'Hara, David Tormey and Marion McAfee (*Ireland*)
- 2. Maximum-likelihood Estimation of Power-law Prefactor and Exponent from Ultrasonic Images**
Dinah Maria Brandner, Bernhard G. Zagar (*Austria*)
- 3. Microcalorimeter Development and Calibration Based on a Twin Micro-heater Platform**
L. Harasztosi, I. A. Szabo, F. Biró and G. Battistig (*Hungary*)
- 4. Walking on a Capacitive Sensing Floor**
S. Janaqi, M. Sannier, G. Dray, B. Bardy (*France*)
- 5. High Spatiotemporal Resolution Ultrasound Imaging Based on Simultaneous Transmission of Plane Waves in Multiple Directions Using M-sequence Coding (pre-recorded video)**
Y. Saito and N. Tagawa (*Japan*)
- 6. Assessment of Motion Restrictions Using Smart Insoles (pre-recorded video)**
T. Funayama, Y. Uchida, Y. Kogure (*Japan*)

Regular Session: Physical Sensors
(Conference Room *Kerkyra*)

Chairman: Prof., Dr. Richard B. Jackman
University College London (UCL), UK

- 1. Resistors as Electromagnetic Sensors: $4kT/R$ C_2/Is (or A_2/Hz)**
J. I. Izpura (*Spain*)
- 2. High Frequency Giant Magnetoimpedance Effect in Magnetic Microwires**
A. Zhukov, P. Corte-Leon, M. Ipatov, J.M. Blanco J. Olivera and V. Zhukova (*Spain*)
- 3. Determination of the Weight of Pharmaceutical Capsules with Dual Energy X-ray Transmission**
C. Bauer, R. Wagner, J. Leisner (*Germany*)
- 4. Health Monitoring System Using a Pressure Sensor 2D Array Placed on Floor Mats**
Y. Uchida, T. Funayama, K. Hori, M. Yuge, N. Shinozuka and Y. Kogure (*Japan*)
- 5. Electrical Characterization and Analytical Modeling for Predicting Stress-strain Behavior of Electroactive Polymer-based Sensors Under Multiaxial Loads (pre-recorded video)**
Nitin Kumar Singh, Kazuto Takashima and Shyam S. Pandey (*Japan*)
- 6. Atomic Magnetometer Modulated by Magnetic Vector Potential (pre-recorded video)**
Y. Shoji, K. Chida, T. Terato and M. Daibo (*Japan*)

Regular Session: Sensors Applications I (Conference Room *Kerkyra*)

Chairman: Prof., Dr. Bernhard G. Zagar
Johannes Kepler University Linz, Austria

1. Energy Harvesting Supported Humidity Sensor for Agriculture Applications

A. Nadeem, D. Chatzichristodoulou, L. Vassiliou, P. Vryonides,
and S. Nikolaou (*Cyprus, Pakistan*)

2. All-fiber Coupled Laser Heterodyne Radiometer (LHR) for Greenhouse Gas and Their Isotopes Measurements in the Atmospheric Column

Tingting Wei, Jingjing Wang, Fengjiao Shen, Tu Tan, Zhensong Cao,
Xiaoming Gao, Pascal Jeseck, Yao-Veng Te, Stéphane Plus,
Lei Dong, Weidong Chen (*France, China*)

3. Development of the Mechanical and Electrical Systems for the HPGe Detectors of the N3G Project

S. Capra, G. Secci, B. Million, L. Manara, S. Coelli, D. Desalvador,
D. Napoli, W. Raniero and A. Pullia (*Italy*)

4. Walking-the-Wall and its Impact Within Trampoline Parks Using Accelerometry

D. Eager, I. Hossain, S. Zhou, K. Ishac, E. Lind and L. Sharwood
(*Australia*)

5. Theoretical and Experimental Analysis of Trampoline Double Bounce

D. Eager, S. Zhou, K. Ishac, I. Hossain, A. Richards
and L. Sharwood (*Australia*)

6. Systematic Review on the Applicability of Principal Analysis Components for the Study of Movement in the Older Adult Population (pre-recorded video)

J. Moreira, B. Silva, H. Faria, R. Santos and A. S. P. Sousa
(*Portugal*)

Day 2
22 September 2022, Thursday

Regular Session: Chemical Sensors & Biosensors
(Conference Room *Kerkyra*):

Chairman: Prof., Dr. Gerald Gerlach
Technische Universität Dresden, Germany

- 1. Miniaturised Control of Acidity in Multiplexed Microreactors**
Divya Balakrishnan, Janwa El Maiss, Wouter Olthuis and Cesar Pascual Garcia (*Luxembourg*)

- 2. Polyaniline/Polystyrene/Au Nanocomposite-based Electrochemical Biosensor Platform for Diagnosing COVID-19: Detection of Spike Protein**
Špela Trafela, Kristina Žagar Soderžnik, Anja Korent, Abhilash Krishnamurthy, Kristina Žužek and Sašo Šturm (*Slovenia*)

- 3. Development of Two Impedimetric Biosensors Based on Urease and Glucose Oxidase for Determination of Heavy Metal Ions**
V. M. Pyeshkova, Bakhmat V.A., O. O. Soldatkin, S. V. Dzyadevych and A. P. Soldatkin (*Ukraine*)

- 4. Tuning of in Situ Gold Nanoparticles Formation in PDMS Matrix for Biosensor Development**
T. Poerio, R. Mazzei and Lidietta Giorno (*Italy*)

- 5. Polymer Based Impedance Sensor for Environmental Monitoring (pre-recorded video)**
L. Bonaccorsi, A. Donato, A. Fotia, P. Frontera and A. Malara (*Italy*)

- 6. Gas Sensing Properties of ZnO/CuO Nanocomposite Prepared by an Organometallic Approach: Towards Sensitive and Selective CO Detection (pre-recorded video)**
Justyna Jońca, Katia Fajerweg, Myrtil Khan, Ph. Menini, Pierre Fau (*France*)

Regular Session:
Optical & Fiber Optical Sensors:
Design & Applications I
(Conference Room *Kerkyra*)

Chairman: Prof., Dr. Stefano Capra
University of Milan (Italy)

- 1. Development of a Prism-based Optical Cavity for High-sensitive Sensing of Trace Gas and Aerosol Over the Spectral Region From the UV to Near-IR (Invited presentation)**
Ruyue Cui, Gaoxuan Wang, Azer Yalin, Lingshuo Meng, Cécile Coeur, Lei Dong, Weidong Chen (*France, China, USA*)
- 2. Optical Fiber Sensor Systems for Data Infrastructure Protection**
P. Munster and T. Horvath (*Czech Republic*)
- 3. Realization, Calibrations and Spatialization of β -(Al)Ga₂O₃ UVC Photodetectors of Extreme Solar Blindness for Pace Observations**
L. Damé, P. Maso, L. Conan, C. Dias, H. Ghorbel, P. Gilbert, M. Meftah, D. Bolsée, N. Pereira, A. Caria, C. De Santi, M. Buffolo, M. Meneghini, P. Bove, V. Sandana, R. Rogers and F. Teherani (*France, Belgium, Italy*)
- 4. Sensoric Fiber Bragg Grating Design for Scanning Interrogation**
František Urban, Radek Helán and František Urban (*Czech Republic*)
- 5. Fiber Optic Seismic Hydrophones for Underwater Monitoring**
M. Janneh, F. A. Bruno, S. Guardato, G. P. Donnarumma, G. Iannaccone, G. Gruca, S. Werzinger, A. Gunda, N. Rijnveld, A. Cutolo, M. Pisco, A. Cusano (*Italy*)
- 6. Bidimensional Displacement Optical Sensor (pre-recorded video)**
L. Santamaria Amato, D. Bianco (*Italy*)

Regular Session:
Optical & Fiber Optical Sensors:
Design & Applications II
(Conference Room *Kerkyra*)

Chairman: Prof., Dr. Petr Munster
Brno University of Technology, Czech Republic

- 1. Silica Based Optical Fibers for Mid-infrared Sensors**
W. Belardi, A. Pastre, S. Plus, R. Habert, K. Baudelle, L. Bigot, G. Bouwmans, P. J. Sazio, P. Jaworki, P. Koziol, G. Dudzik and K. Krzempek (*France, UK, Poland*)
- 2. New Methods for Estimating Flat Field and Stray Light Images from the ACS-NIR Spectrometer on Board TGO**
A. Irbah, J-L. Bertaux, F. Montmessin, L. Scheveiler, N. Rouanet, A. Trokhimovskiy, O. Korablev and A. Fedorova (*France, Russia*)
- 3. Optical Sensing Platform Based on Carbocyanine Dyes for the Discrimination of Samples and Individual Compounds**
Skorobogatov E. V., Shik A. V., Stepanova I. A., Baytler M. O., Bliznyuk U. A., Doroshenko I. A., Podrugina T. A., Beklemishev M.K. (*Russia*)
- 4. A Discrete Charge-Sensitive Preamplifier for Nuclear Spectroscopy with Silicon Photodiodes Optimized for Short Shaping Times**
S. Capra, A. R. Petri, G. Secci and A. A. Malafronte (*Italy*)
- 5. High-Accuracy Underwater 3D Sensor Based on Structured Illumination (pre-recorded video)**
C. Bräuer-Burchardt, C. Munkelt, M. Bleier, M. Heinze, I. Gebhart, P. Kühmstedt, and G. Notni (*Germany*)
- 6. Selection of Measurement Site for Predictive Maintenance of Blood Coagulation in an Extracorporeal Circulation Circuit Using LED Photoacoustic Imaging and an Extracorporeal Circulation Device (pre-recorded video)**
Takahiro Wabe, Ryo Suzuki, Akimitsu Fujii, Yohsuke Uchida, Kazuo Maruyama and Yasutaka Uchida (*Japan*)

Regular Session:
Electronic Materials & Nanotechnologies
(Conference Room *Ithaka*):

Chairman: Dr. Koon Hoo Teo

Mitsubishi Electric Research Labs (MERL), Cambridge, MA, USA

- 1. Dielectric and Thermal Properties of $Zn_4B_6O_{13}$ - Zn_2SiO_4 Substrates for Microwave and Terahertz Electronics**
Dorota Szwagierczak, Beata Synkiewicz-Musialska, Jan Kulawik, Agata Strojny-Nędzza and Elżbieta Czerwińska (*Poland*)
- 2. Nanostructured Zincite Thin-films Modified with Squaraines for Solar Energy Harvesting (Invited presentation)**
Vilko Mandić, Ivana Panžić, Dragana Vuk and Thomas Rath (*Croatia, Austria*)
- 3. Impact of Mask Tapering on SF_6/O_2 Plasma Etching**
Josip Bobinac, Tobias Reiter, Julius Piso, Xaver Klemenschits, Zlatan Stanojevic, Georg Strof, Oskar Baumgartner, Markus Karner and Lado Filipovic (*Austria*)
- 4. Gallium Nitride Trench FET Development (pre-recorded video)**
S. Faramehr, L. Mavrovounioti, J. Evans, M. Elwin, R. Harper, and Petar Igic (*UK*)

Special Session: Microsystems
(Conference Room *Ithaka*):

Chairman: Prof., Dr. Vilko Mandić

University of Zagreb, Croatia

- 1. Application and Prospect of Artificial Intelligence Method in Signal Integrity Design of Microsystem**
Guoliang Li, Guangbao Shan, Chaoyang Xing and Yanwen Zheng (*China*)

- 2. Microsystem Thermal Intelligent Optimization Based on Particle Swarm Algorithm**
Xudong Wu, Guangbao Shan, Chaoyang Xing and Guoliang Li
(China)
- 3. Finite Element Analysis of Stress Distribution in CIS Package under Thermal Cycling Condition**
Jing Geng, Jun Lv, Yongzhi Li, Shu Zheng, Yuxiong Xue and Yang Liu (China)
- 4. Study of Total Ionizing Dose on RF Microsystem**
Lihong Yang, Zhumeng Li, Yu Fu, Guoliang Li and Qijun Lu (China)
- 5. Total Ionizing Dose Effect on the 3D Interconnection Structure of Microsystem**
Xingan Wang, Yang Liu, Rongxing Cao and Yuxiong Xue (China)
- 6. Radiation Resistant Reinforcement Strategy for Three-dimensional Interconnection of Microsystems**
Youxin Zhang, Yang Liu, Rongxing Cao and Yuxiong Xue (China)
- 7. A Compact E-shaped Millimeter-Wave Antenna with Bandwidth Enhancement based on Through Glass Vias (TGV)**
Zhen Fang, Jihua Zhang, Libin Gao, Hongwei Chen, Wenlei Li, Xingzhou Cai, Weicong Jia, Huan Guo and Yong Li (China)

Day 3
23 September 2022, Friday

Regular Session:
Artificial Intelligent Sensors & Systems
(Conference Room *Kerkyra*)

Chairman: Prof., Dr. Marion McAfee
Atlantic Technological University, Ireland

1. **Fluorescence Kinetics Based Intelligent Sensor for Diagnosis of Health Condition in Tomato Plants**
X. E. Pantazi, A. L. Lagopodi, A. A. Tamouridou, N. N. Kamou, I. Giannakis, G. Lagiotis, E. Stavridou, P. Madesis, G. Tziotziou, K. Dolaptsis, K. Pliatsidis and D. Moshou (*Greece*)
2. **Smart 3D Camera Pose Estimation for Complex Augmented Reality Environments Using Deep Learning Techniques**
F. Ababsa and M. A. Touil (*France*)
3. **High-Resolution Ultrasound Imaging by Frequency and Plane Wave Compounding Using Deep Learning (pre-recorded video)**
E. Aiura and N. Tagawa (*Japan*)
4. **Implementing Deep Multi-Task Metric Learning for Change Detection in 3D Camera Data via an Edge Neural Accelerator (pre-recorded video)**
Niall O' Mahony, Anshul Awasthi, Juan-Wian Coetzer, Joseph Walsh and Daniel Riordan (*Ireland*)
5. **SAW Multi Sensor Array for the Detection of Different Vapors by Applying Artificial Neural Network (ANN) (pre-recorded video)**
Sanjeeta Rani, V. Bhasker Raj, Arijit Chowdhuri, A. T. Nimal, Manisha Verma (*India*)

IFTC Session: Frequency & Time
(Conference Room Ithaka):

Chairman: Prof., Dr. Rainer Bermbach
Ostfalia University of Applied Sciences, Germany

- 1. High Performance Industrial Cesium Beam Clock**
P. Berthoud, M. Haldimann, F. Kroll and V. Dolgovskiy (*Switzerland*)
- 2. Influence of Multiple Valence States and Lattice Locations of Sb and Mn co-dopants on the Piezoelectric Behavior of PZT ceramics**
L. Amarande, C. F. Miclea, M. C. Cioangher, V. Toma, I. Pasuk, M. Stefan, C. Negrila, A. C. Joita (*Romania*)
- 3. An Rauch-Tung-Striebel Algorithm to Improve the End Effect of Static GNSS PPP (pre-recorded video)**
Mengshi Chen, Haibo Yuan, Jihai Zhang, Hong Zhang, Zongyuan Li and Yiheng Wang (*China*)
- 4. Design of Low Phase Noise 100 MHz VCXO with Wide Frequency Pulling Range (pre-recorded video)**
Songtao. Jiang, Haijun. Wu, Changming Dai, Kaizhong Zhan, Lin Xu and Feng Tan (*China*)
- 5. Radio Wave Underground Sounding by the SDI K-5 Radar for Obtaining 3D Topographic Images of Geological Structures**
A.M. Kudelya, Yuriy Vashpanov, Jung-Young Son and Tatyana Podousova (*Ukraine, South Korea*)
- 6. Dependence of Acousto-Optical Properties of PbMoO₄ Crystals on Direction of Wave Vector of Acoustic Waves**
F. R. Akhmedzhanov, M. I. Elboeva and S. Z. Mirzaev (*Uzbekistan*)

Regular Session:
Sensors Applications II
(Conference Room *Kerkyra*)

Chairman: Prof., Dr. Xanthoula Eirini Pantazi
Aristotle University of Thessalonki (Greece)

- 1. Comparison of Image Processing and Classification Algorithms for Automated Analysis of Veterinary Ultrasound Images**
Zainab Saleem, Malgorzata J. McEvoy, Alan Hemon, Leo Creedon and Marion McAfee (*Ireland*)

- 2. Multi-channel Phase Readout Instrument for Picometer-level Precision in Optical Accelerometers**
J.J. Esteban Delgado (*Germany*)

- 3. Evaluation of Intrusion Detection Systems from Edge-IIoT-2022**
A. Al Hantoobi, R. Al Zaabi, E. Al Shehhi, S. Al Naqbi, M. Al Tenejji, S. Al Hamoudi and A. Al Badawi (*UAE*)

- 4. In-situ Assessment of Mandarin Crop Water Stress Index Using CWSI Infrared Camera**
Appiah, S. A., Li, J., Alordzinu, K.E., Issaka, F., Afful, E. A., Asenso, E., Darko, R. O., AL Aasmi, A. (*China, Ghana*)

- 5. Biological Signals Measured by Telemonitoring Technologies in Older Adults: An Umbrella Review (pre-recorded video)**
J. Félix, J. Moreira, R. Santos, E. Kontio, A. S. P. Sousa (*Portugal, Finland*)

- 6. Design of Spectrum Processing Chiplet Based on FFT Algorithm (pre-recorded video)**
Baoping Meng, Guangbao Shan, Hao Xiang and Yanwen Zheng (*China*)

Regular Session: ICs Design & Simulation (Conference Room *Ithaka*)

Chairman: Prof., Dr. Freddy Gabbay
TECHNION, Israel Institute of Technology, Haifa, Israel

- 1. Electromigration-Aware Instruction Execution for Modern Microprocessors**
Freddy Gabbay and Avi Mendelson (*Israel*)
- 2. Negative Voltage Analysis Model for Evaluation on Control IC Driving of MOSFET Application (pre-recorded video)**
Ching-Guo Chen, Shiu-Hui Lee, Chih-Ming Yu, Wen-Nan Huang, Jin-Shyan Lee, Hsiang-Chi Meng and Tung-Ming Lai (*Taiwan*)
- 3. Physical Features of Branched Circuits with Contact Potential Differences (pre-recorded video)**
Nikolay Parfentev and Parfenteva Natalia (*Russia*)
- 4. Distributed Neural Network for Electrothermal Circuit Model of SiC Power MOSFET Differences (pre-recorded video)**
Ales Chvala, Lubos Cernaj, Juraj Marek, Jozef Kozarik, Angelo Alberto Messina, Vincenzo Vinciguerra and Daniel Donoval (*Slovakia, Italy*)
- 5. Design of a Novel Low Power Memory Controller: Challenges and Efficient Techniques for Reducing Active Energy in Non-Volatile Memory (pre-recorded video)**
Rezaul Haque and Siraj Mossa (*USA*)
- 6. Implementation Tool Qualification Methodology (pre-recorded video)**
Ang Boon Chong, Quek Li Chuang, Lee Chia Cheng, Koh Jid Ian, Tan Say Hong, Phang Eng Hong, Loh Jih Keat (*Malaysia*)

Poster Session (Conference Room *Kerkyra*):
23 September 2022 (16:15-18:15)

- 1. Low Fouling Self-assembled Monolayer for Aptasensors**
F. V. Oberhaus, P. Binder and D. Frense (*Germany*)
- 2. Miniaturized Cavity Ring-Down Spectrometer with 5 cm Cavity for Water Isotopic Measurements**
Junpei Murayama, Chihiro Yamanaka, Ko Hashizume, Hisashi Abe and Shun Takigami (*Japan*)
- 3. Creating Dynamic Vibrotactile Output using Magnetorheological Fluid as Signal Mediator**
A. Farooq, J. Rantala and R. Raisamo (*Finland*)
- 4. Recent Advances in the Realization of a Low-cost Integrated Photonic Platform Developed via a Sol-gel Dip-coating Method**
M. A. Butt, Andrzej Kaźmierczak, C. Tyszkiewicz, Paweł Karasiński, R. Piramidowicz (*Poland*)
- 5. Microcontroller Based Machine Learning for Research on Wildlife's Behaviour**
Jan Baer, Anne Berger (*Germany*)
- 6. Magnetic Properties and Applications of Glass-coated Ferromagnetic Microwires**
V. Zhukova, P. Corte-Leon, M. Ipatov, J.M. Blanco and A. Zhukov (*Spain*)
- 7. Polymer-based Electrochemical Sensor for Diabetes Diagnostics**
R. Gorejová, I. Šišoláková, F. Chovancová, M. Motiei, P. Sába, F. A. Ngwabebhoh and Renáta Oriňaková (*Slovakia*)
- 8. Development of Chitosan-based Electrochemical Sensor for Insulin Determination**
R. Oriňaková, F. Chovancová, I. Šišoláková, M. Motiei, P. Sába and F. A. Ngwabebhoh (*Slovakia*)

- 9. Nickel Modified Electrochemical Sensor for Diabetes Diagnostics**
I. Šišoláková, N. Jašňáková, O. Petruš and R. Oriňaková (*Slovakia*)
- 10. Circular Economy: Material Sorting in Waste Streams Using Dual Energy X ray Transmission**
J. Leisner, C. Bauer and R. Wagner (*Germany*)
- 11. A Review on the Use of Virtual Reality on Therapy and Diagnosis of Schizophrenia**
Andreia Mendes, Duarte Duque and Vítor Carvalho (*Portugal*)
- 12. Photodiode Preamplifier for Pound-Drever-Hall Laser Cavity Stabilization with Separate DC-AC signal paths**
S. Capra, G. Secci, E. Suerra and S. Cialdi (*Italy*)
- 13. Ultra Mini-multipass Cell (MPC) for High-sensitivity Gas Sensing**
Ruyue Cui, Hongpeng Wu, Lei Dong, Weidong Chen (*France, China*)
- 14. Wall Heat Transfer Measurement Using Thermopile Sensors in Transitional Impinging Jet Flow**
Z. Antošová and Z. Trávníček (*Czech Republic*)
- 15. Direct Optical Particle Tracking for Particle Size Distribution Assessment**
D. Chicea and Alexandra Maranciuc (*Romania*)
- 16. Comparison of X-ray and RGB-based Component Detection on Waste PCBs for Recycling**
M. Firsching, M. Ottenweller, S. Rüger and J. Leisner (*Germany*)
- 17. Environmental Sound Classification on Low Power Edge Device**
A. Ahmed, Y. Serrestou, K. Raouf and J. F. Diouris (*France*)
- 18. Neural Network for Fast Temperature Profile Extraction in Distributed BOTDA Sensor**
A. Madaschi, J. Morosi, M. Brunero and P. Boffi (*Italy*)
- 19. Small Range Cartography System Using Ultrasonic and Infrared Sensors**
L. A. Szolga (*Romania*)

20. Electrode Design of an EIS System for Fouling Detection in a Heat Exchanger

F. A. Dias, M. Schubert, E. Schleicher, F. Scholz and U. Hampel
(Germany)

21. ELECTROMED: a Programmable Peptide-protein Screening Platform

Divya Balakrishnan (Luxembourg)

22. Synthesis and thermal stabilization properties of phase change materials and their application in the composite with LiCuPO₄

Beata Synkiewicz-Musialska, Piotr Zachariasz and Elżbieta Szostak
(Poland)

23. Study of Phonon-limited Electron Transport in Monolayer MoS₂

Laura Gollner, Robin Steiner and Lado Filipovic (Austria)

Sponsored by:

