

AMSTERDAM
SEIA'18



**4rd International Conference
on Sensors and Electronic
Instrumental Advances**

Conference Programme

**19-21 September 2018
Amsterdam, The Netherlands**

Organized by:



Message from Chairmen

On behalf the Organizing Committee we would like to welcome you to the 4th International Conference on Sensors and Electronic Instrumentation Advances (SEIA' 2018) in Amsterdam, The Netherlands. The 4th conference is a forum for presentation, discussion, exchange of information and latest research and development results in both theoretical and experimental research in sensors, transducers 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 field of sensors and measurements. The first SEIA conference was held in Dubai (UAE), 21-22 November 2015, the second – in Barcelona (Spain), 22-23 September 2016 and the third – in Moscow (Russia), 20-22 September 2017.

The SEIA conference is focusing any significant breakthrough and innovation in Sensors, Electronics, Measuring Instrumentation and Transducers Engineering Advances and its applications with broadest concept.

The conference is organized by the International Frequency Sensor Association (IFSA) and Asian Society of Applied Mathematics and Engineering (ASAME) in technical cooperation with IFSA Publishing S.L. (Spain) and F2D, Ltd. (Ireland) (IFSA Group companies), and media partners: Open Access MDPI journals Sensors (ISSN 1424-8220), Chremosensors (ISSN 2227-9040), Micromachines (ISSN 2072-666X) and Instruments (ISSN 2410-390X), Switzerland.

We trust that you will find SEIA' 2018 conference professionally rewarding and stimulating as well as enjoyable. Welcome to SEIA' 2018 !

Prof., Dr. Sergey Y. Yurish

Dr. Amin Daneshmand Malayeri

Registration

The Registration Desk is open in the Mövenpick Hotel's Meeting Centre 2 on:

- Wednesday, 19 September, from 8:45-18:00 near the 'Hanoi' conference room.
- Thursday, 20 September, from 8:45-13:00. At the same place.

Language

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

Insurance and Liability

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

Coffee/Tea Refreshment

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

Special Volume of Sensors & Transducers

Selected papers from the conference will be published by IFSA Publishing in a special volume of *Sensors & Transducers* journal (print and electronic). 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. Submission deadline will be 30 November 2018. The special issue will be published at the end of 2018 – beginning of 2019.

'Advances in Sensors: Reviews' Book Series

The limited number of full-page papers published in the journal will be selected by the *Sensors & Transducers* journal's Editorial Board to extend for book chapters for the 'Advances in Sensors: Reviews', Vol. 7, Book Series. This open access book will be published in mid of 2019.

Organizing Committee

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Conference web site:

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

Keynote Speakers:



Dr. Radislav A. Potyrailo

Principal Scientist

*GE Global Research Center, Niskayuna, NY,
USA*

Electronics Analytics: Multivariable Sensors Research at GE

Abstract

Existing and emerging applications of sensors – for industrial and environmental surveillance, process monitoring, medical diagnostics, food safety, personal health, homeland security, and many others – demand reliable, high-performance, yet affordable and unobtrusive sensors. We are developing new generation of such sensors that bridge the gap between existing and required capabilities. Our sensors utilize radio-frequency and optical detection principles and achieve required performance via electronics analytics. The electronics analytics is our methodology to deliver high performance sensing via new sensor design rules that include transducer with several uncorrelated outputs, sensed environment with diverse intrinsic properties detected by the transducer, and multivariate signal processing algorithms. Our methodology allows quantitation of individual chemical or biological components in mixtures, rejection of interferences, and correction for environmental instabilities. Examples of scenarios where such developed multivariable sensors will be important include wearable and remotely deployed sensors, autonomous robotics, home health, and many others where reliability and high-performance cannot be traded-off for low power, weight, and size.

Short Biography:

Dr. Radislav Potyrailo is a Principal Scientist at GE Global Research in Niskayuna, New York, leading the growth of wireless, wearable, and harsh environment sensing technologies for GE applications. He holds Optoelectronics degree from Kiev Polytechnic Institute and PhD in Analytical Chemistry from Indiana University. He has developed sensing technologies for GE Healthcare, Water, Security, Corporate Environmental, Consumer & Industrial, Energy, Transportation, and other GE businesses. Radislav has been serving as a Project Leader on numerous GE programs and as a Principal Investigator on US Government programs funded

by NIH, AFRL, DARPA, TSWG, DHS, and NIOSH. Radislav has 100+ granted US Patents and 150+ publications, coauthored/coedited eight books, and serves as an editor of the Springer book series Integrated Analytical Systems. He is Senior Member of IEEE and Fellow of SPIE.



Dr. Pavel Shuk
Distinguished Technologist
Rosemount Measurements and Analytical
Emerson Automation Solution, Emerson Electric
Corp., Shakopee, MN, USA

Methane Gas Sensing Technologies for Combustion Process

Abstract

Major methane gas sensing technologies for the application in combustion process will be reviewed with many theoretical and practical aspects as well as operation basics details. A comprehensive CH₄ gas sensing technologies review would be supported with the latest developments trends and instrumentation available on the market. Performance and applications options for methane measurements in the process using calorimetric, mixed potential electrochemical CH₄-sensor, Quantum Cascade Laser (QCL) and Tunable Diode Laser (TDL) spectroscopy in extractive mode, across the duct or in in-situ probe for power generation, chemicals production, heating, process control, safety, and quality will be discussed. Special attention will be given to these technologies application, special installation requirement, limits and analyzer's sampling system.

Short Biography:

D. Sc. Pavel Shuk is a Distinguished Technologist at Rosemount Measurement and Analytical (Emerson Process Management, Emerson Electric Corp, Shakopee, MN, USA). He graduated with a first-class honor BS and MS degrees in Physical Chemistry ('summa cum laude') from Belarus State University, Minsk and completed his Ph. D with 'magna cum laude' in high temperature electrochemistry with Prof. Hans-Heinrich Möbius, inventor of zirconia oxygen technology, at *Ernst-Moritz-Arndt* University of Greifswald (Germany). He obtained his D.Sc from Greifswald University (Germany) for "Contribution to noble metal free electrochemical cells development" and was in 1992-93 Humboldt Fellow with Prof.

Wolfgang Göpel in Center for Interface Analysis and Sensors at Eberhard Karls University of Tübingen (Germany). Since 1999 he is with Rosemount Measurements and Analytical, Emerson Automation Solution (USA), world leader in analytical instrumentation, working on the new advanced gas sensor products R & D for the combustion process and new gas sensing technologies evaluation. He developed many new solid state advanced sensors, i.e., CO₂-, CO-, O₂-, pH- and high temperature humidity sensor. Pavel Shuk has published over 125 peer reviewed papers, 19 patents, 7 books chapters and a book on chemical sensors, 39 special reports. D. Sc. Pavel Shuk is a member of the Editorial Board of “J. Solid State Electrochemistry” (Springer). He was a Keynote Speaker at Solid State Ionics and Sensors and Electronic Instrumentation Advances International Conferences and Member of International Program Committee of “International Conference on Sensing Technology” in 2007-2018.

Sponsors:



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Programme at Glance

| Time/Date | 19.09.2018 Wednesday | 20.09.2016 Thursday | 21.09.2018 Friday |
|--------------------|---|--|--|
| | <i>Room Bangkok</i> | | |
| 8:40-9:00 | Registration | - | <i>Post conference tours on your own</i> |
| 9:00-9:15 | Opening Session | Registration | |
| 9:15-9:45 | Industrial Presentation | House Keeping | |
| 9:45-10:45 | Keynote Speaker I Pavel Shuk (<i>Emerson Electric Corp., USA</i>) | Keynote Speaker II Radislav A. Potyraiilo (<i>GE, USA</i>) | |
| 10:45-11:15 | <i>Coffee Break</i> | <i>Coffee Break</i> | |
| 11:15-13:15 | Special Session: <i>Gas Sensors</i> | Regular Session: <i>Physical Sensors</i> | |
| 13:15-14:30 | <i>Poster Session (Room Hanoi) & Lunch on your own</i> | <i>Lunch on your own</i> | |
| 14:30-16:30 | Regular Session: <i>Chemical Sensors and Biosensors</i> | Regular Session: <i>Environmental Sensors</i> | |
| 16:30-17:00 | <i>Coffee Break</i> | Closing Session | |
| 17:00-18:00 | Panel Discussion on High-end Sensors | - | |
| 19:00-21:45 | - | * <i>Gala Dinner</i> | |

***Gala Dinner:** The Gala Dinner will take place in the Amsterdam Dinner Train - only train restaurant in Western Europe. The Amsterdam Dinner Train takes our participants through the so called 'Green Heart' of the Netherlands, while savouring the gala dinner. Departing from Amsterdam Central station (see information displays for the departure platform), we will ride through Breukelen, Gouda, Rotterdam noord, Den Haag HS, Leiden and Haarlem. Back to Amsterdam central at the end (21:45). We welcome our guests 15 minutes prior to the tour's departure at 19:15.

Technical Conference Programme

Day 1

19 September 2018, Wednesday (Room Bangkok)

Industrial Presentation

1. High Performance Sensors and Sensor Systems Based on Novel Frequency-to-Digital Converters

Javier Cañete (*Frequency-to-Digital (F2D), Ltd., Ireland*)

Special Session: Gas Sensors

Chairman: Pavel Shuk (*Emerson Electric Corp., USA*)

1. How to apply a gas sensor to a real world problem ? – Indoor air quality

Franziska Naepelt, Christian Meyer, Ronald Schreiber and Debra Deininger (*Germany, USA*)

2. Application of highly c-axis oriented single-crystalline ZnO layers grown by sputter epitaxy to hydrogen gas sensor and UV sensor

Ki Ando, Toshiya Kumei, Arika Watanabe, Ai Mizuno, Hiroyuki Shinoda and Nobuki Mutsukura (*Japan*)

3. Co-doped SnO₂ sensor for detection of hydrogen peroxide vapors

Vladimir Aroutiounian, Valeri Arakelyan, Mikayel Aleksanyan, Gohar Shahnazaryan, Artak Sayunts and Berndt Joost (*Armenia, Switzerland*)

4. Study of MWCNTs/SnO₂ nanocomposite H₂O₂ vapor sensors

Zaven Adamyanyan, Artak Sayunts, Emma Khachaturyan, Valeri Arakelyan, Vladimir Aroutiounian and Berndt Joost (*Armenia, Switzerland*)

5. Flexible gas detector

Vahan Kirakosyan and Vladimir Aroutiounian (*Armenia*)

6. The features of natural gas dew point measurement

Vladimir Shapar and Alla Savchuk
(*Ukraine*)

**Regular Session:
Chemical Sensors and Biosensors**

Chairman: Ki Ando (*Tokyo Denki University, Japan*)

1. WO₃ nanoflakes based sensor device for breath analysis to detect kidney disease

Onur Alev, Leyla Çolakerol Arslan, Serkan Büyükköse and Zafer Ziya Öztürk (*Turkey*)

2. Sensitive humidity sensor based on functionalized graphene

Tilek Kuanyshbekov, Arkady Ilyin, Gary Beall, Nazim Guseinov and Malika Tulegenova (*Kazakhstan, USA*)

3. Comparison of aflatoxin B1 measurement efficiencies of 5 MHz and 120 MHz love wave sensors

Serife Seyda Pirincci, Ozlem Ertekin, Zafer Ziya Ozturk and Selma Ozturk (*Turkey*)

4. Piezoelectric Quartz Crystal Sensor for Amoxicillin Quantification Coupled with Molecular Imprinting Technology

Benilda Ebarvia and Elizabeth Santos (*Philippines*)

5. Nanomechanical label-free sensing of miRNA as biomarkers for cancer and adverse drug affects

James Duffy, Francesco Padovani, Victor Usov, Giulio Brunetti, Ulrich Certa and Martin Hegner (*Ireland, Switzerland*)

Poster Session

19 September 2018, Wednesday, 13:15-14:30 (Room Hanoi)

- 1. Digital manufacturing for welding and joining technologies (Invited Presentation)**
Darren Williams (UK)
- 2. Smart wearable sign language Interpretation system with flex and pressure sensors**
Boon Giin Lee and Teak Wei Chong (*South Korea*)
- 3. Thin film sensor for heat flux distribution measurement of concentrated solar irradiance**
Bertrand Garnier, Julien Camus, Ahmed Ould El Moctar, Cyril Caliot and Emmanuel Guillot (*France*)
- 4. Estimating of skin moisture kinetics with sorption methods of humidity measuring**
S.A. Krutovertsev, O.M. Ivanova, M.V. Chuprin, A.N. Larionov and Y.S. Sazhinev (*Russia*)
- 5. The development of automation clean intermittent catheterization medical device**
Chen-Hsun Weng, Ming-Chien Hung and Ming-Huang Chen (*Taiwan*)
- 6. Polymer-coated silicon microcantilevers as a highly sensitive and selective sensing tools**
Mauricio Dantus, Shai Meltzman, Ariel Shemesh and Yoav Eichen (*Israel*)
- 7. Research on precise time-difference correction of smart sensor device that can measure sound and vibration signal in wireless communication environment.**
Bongsu Yang, Du-Byeong Yun and Soon-Sung Moon_(*South Korea*)

Day 2
20 September 2018, Thursday (Room Bangkok)

Regular Session: Physical Sensors

Chairman: Radislav A. Potyrailo (*GE Global Research Center, USA*)

- 1. Novel sensor package improves response time of micro-mechanical quartz oscillator for density measurements**
Axel Kramer, Teresa Jorge, Mariya Porus, Thomas Alfred Paul and Dieter Zeisel (*Switzerland*)

- 2. Advanced ASIC with Internally generated dynamic magnetic field simulating its moving**
Miha Gradisek, Damjan Berčan, Aleksander Sesek and Janez Trontelj (*Slovenia*)

- 3. Remote and head-mount-device frame alignment in AR/VR systems for different gyroscope specifications**
Zhanlue Zhao and Bryan Cook (*USA*)

- 4. Analog linearization of resistance temperature detectors (RTD) using the intrinsic curvature of bandgap voltage references**
Jose Siqueira Dias, Pedro Carvalahes-Dias, Ivan Padua Ferreira, Flavio J.O. Morais and Luis Caparroz Duarte (*Brazil*)

- 5. Sensing by dynamics of laser with optical feedback**
Bin Liu, Yuxi Ruan, Yanguang Yu, Jiangtao Xi, Qinghua Guo and Jun Tong (*Australia*)

- 6. Improve sensitivity for a self-mixing laser diode sensor by applying a pre-feedback**
Yuxi Ruan, Bin Liu, Jiangtao Xi, Qinghua Guo, Jun Tong and Yanguang Yu (*Australia*)

Regular Session: Environment Sensors

Chairman: **Alexander Barzilov** (*University of Nevada Las Vegas, USA*)

1. Demonstration of simultaneous imaging of neutrons and gamma rays using a CLYC detector with a dual mode rotational collimator

Alexander Barzilov and Amber Guckes (*USA*)

2. Integration of CZT and CLYC radiation sensors into a UAS platform

Monia Kazemeini, Alexander Barzilov, Woosoon Yim and Joon Lee (*USA*)

3. An IoT-based framework for environmental pollution monitoring and control system of a smart environment

Sani Abba and Beauty Ejiroghene Patrick (*Nigeria*)

4. Development of infrared-sensor for detecting water pollution based on selenide waveguide

Marion Baillieul, Aldo Gutierrez-Arrovo, Emmanuel Rinnert, Emeline Baudet, Petr Nemeč, Joël Charrier, Loïc Bodiou, Florent Colas, Karine Michel and Virginie Nazabal (*France*)

5. Design and simulation of a soil sensor using microstrip lines and neural networks

Juan Domingo González, Roque Torres, Fulgencio Soto Valles, Ana Belén Toledo, Manuel Jiménez and José Alfonso Vera (*Spain*)

6. Confirmation the Traceability of Ultrasound Power Meter Calibration Method For Testing the Therapeutic Ultrasound

Patchariya Petchpong (*Thailand*)

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