

## Opening Address to the 20<sup>th</sup> IFSA Anniversary – SEIA' 2019, Adeje, Canary Islands (Tenerife), Spain, 25 – 27 September 2019

**Dan Mihai ȘTEFANESCU**  
Romanian Measurement Society, Romania  
E-mail: stefidanro@yahoo.com

*Received: 30 August 2019 /Accepted: 27 September 2019 /Published: 30 November 2019*

---

**Abstract:** This is a jubilee paper written on the occasion of twenty years IFSA activity. The Past – Present – Future sequence is approached in the light of the author's contributions during the second decade of existence of IFSA.

**Keywords:** International Frequency Sensor Association, IFSA, SEIA conference

---

### 1. Introduction

International Frequency Sensor Association (IFSA) has celebrated its 20 years of activity at the 5<sup>th</sup> *International Conference on Sensors and Electronic Instrumentation Advances (SEIA' 2019)* & 1<sup>st</sup> *IFSA Frequency & Time Conference (IFTC' 2019)*, Adeje, Tenerife (Canary Islands), Spain, between 25 and 27 September 2019 [1].

With this occasion, in the conference opening address, Dr. Sergey Yurish, President of IFSA, presented a review of the extensive activity carried out during the two decades life of this world organization [2], whose main goals are: promotion of international interchange of scientific and technical information as well as co-operation among scientist and engineers from research and industry in the field of sensor instrumentation.

### 2. DMS's Welcome Greeting

In the afternoon of the same day, within a Panel of the five keynote and invited speakers, Dr. Dan Mihai

Ștefănescu (DMS) gave his welcome address to the conference [3] (Fig. 1), illustrated with 14 spectacular slides, some of which are inserted in this paper too.

And then, each panelist (Fig. 2) gave a short summary of the speech scheduled for this jubilee event, with the participation of 103 experts from 31 countries, presenting 95 papers grouped in 13 scientific sessions plus a poster session.

### 3. Panel Discussion in Sensor Community

Keynote and invited speakers (with a quartet of authors, of which two Romanians, whose names end in ...escu) covered a wide area of topics, as follows:

**Dr. Boris Farber**, Vice President, Technology Senior Scientist, Zircoa Inc., USA:

*Pulse Discharge Technique: A New Method for Multi-gas Measurements with a Zirconia Oxygen Sensor;*

**Dr. Simona M. Cristescu**, Radboud University, Institute for Molecules and Materials, The Netherlands, *Laser-based Gas Sensors for Breath Analysis: from Research to the Clinic;*

**Dr. Dan Mihai Ștefănescu**, Senior Scientist,  
Romanian Measurement Society, Romania,  
*Strain Gauges and Wheatstone Bridges in  
Multicomponent Force and Moment Transducers:  
Current Concepts and Applications;*

**Dr. Carlos Ruiz Zamarreño**, Institute of Smart  
Cities (ISC), Public University of Navarra, Spain,  
*Label-free Optical Fiber Sensing Platform Based on  
Lossy Mode Resonances;*

**Prof. José Miguel Dias Pereira**, Polytechnic  
Institute of Setúbal, Portugal, *A/D Conversion*

*Techniques Based on the Usage of Pulse Width  
Modulated (PWM) Signals: Applications for Digital  
Sensors and Sensor Systems.*

In the slide in Fig. 3, I evoked IFSA achievements  
during the first 10 years (1999 – 2009), just like they  
were systematically arranged by Dr. Sergey Yurish in  
the centenary Issue of ‘*Sensors & Transducers*’  
journal [4].



**Fig. 1.** First slide of the September 25, 2019 presentation, at the IFSA conference in Tenerife.



**Fig. 2.** Participants in the Panel from Sept. 25, 2019, at the IFSA conference in Tenerife.

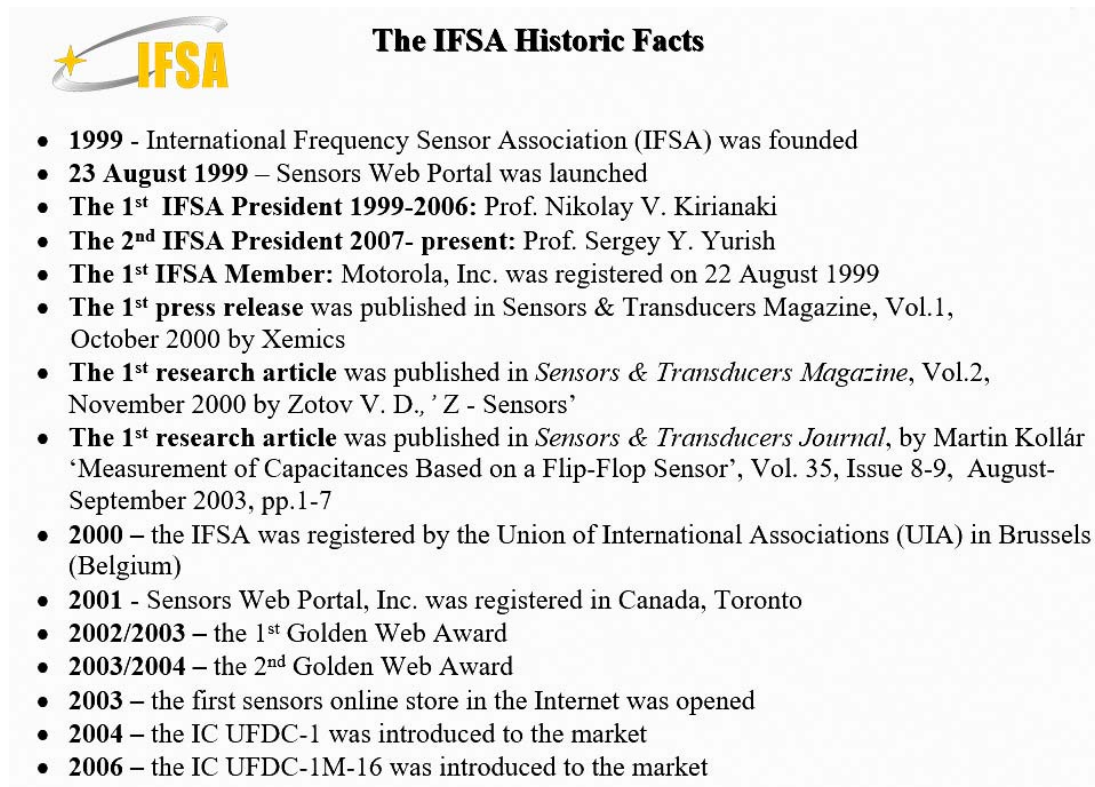


Fig. 3. Self-explaining review in the first decade of activity of the International Frequency Sensor Association (Yurish S. Y., *Sensors & Transducers*, Vol. 100, No. 1, January 2009).

#### 4. First DMS Paper for IFSA

The undersigned was honoured to take part in the IFSA publishings starting from 2011. The first published paper [5] was co-authored by my mentor, Dr. Aurel Millea (founder of the Romanian Measurement Society) (Fig. 4). Apart from the three specific representations (European – tree of knowledge, Asian – planetary system, and American –

subway map), reference is made to the general metrology science. In Fig. 4,b a comparison is shown of four ways of expressing Power, under Mechanical, Electrical, Chemical, and Thermo-Dynamic visions. The new SI, entered into force on May 20, 2019 (the World Metrology Day), is based on seven universal constants – see for details the second volume of my 'Handbook of Force Transducers' (Springer-Verlag).

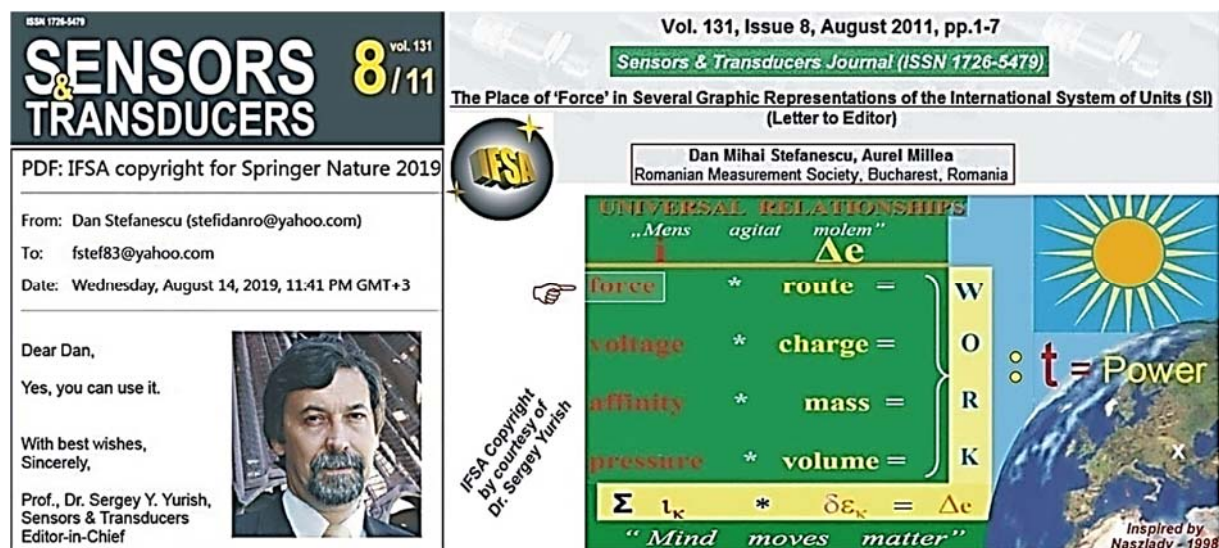


Fig. 4. Copyright granted by IFSA for my 'Handbook of Force Transducers' (Volume 2) (a), for an image from the paper published in *Sensors & Transducers* journal in 2011 (b).



## 5. First DMS Conference and Book Chapter for IFSA

My first book chapter was published in 2016 within the IFSA Book Series [6], following the SEIA' 2015 conference held in Dubai in 2015 (Fig. 5). There, I was the first Invited Speaker and presented the 1<sup>st</sup> volume of '*Handbook of Force Transducers*' [7], and Dr. Amin Daneshmand Malayeri, Chairman of the Organizing Committee, exclaimed at the end of my speech: *Brilliant!*

I inserted (*in Italics*), in the title's first part of this volume edited by Dr. Sergey Yurish, topics from my preferred area of interest: '*Sensors (strain gauges), transducers (force), signal conditioning (Wheatstone bridges)*', with the mention "*covering Electrical Measurement of Mechanical Quantities*"! Continuity of this concern is also visible in the title of my SEIA'2019 conference [8], forming the basis of a chapter in the new volume '*Advances in Sensors: Reviews*' Book Series 8 (in 2020).



**Fig. 5.** SEIA'2015 conference in Dubai (UAE): Dr. DMS (a) and the universal audience, meeting the “political correctness” requirements (b); Fragments of the volume cover [6] (c).

## 6. Second DMS Conference for IFSA

Main ideas developed in the Tenerife presentation on September 26, 2019, with 38 slides:

- Did you know that apart from resistive strain gauge there exist also capacitive, magnetoelastic, piezoelectric, SAW (surface acoustic wave), optical (Bragg grating, photoelastic or Fabry-Perot cavity) and “digital” (resonant cavity) ones?
- The original Wheatstone bridge was a group of four resistors connected in a bridge configuration, with a DC voltage supply in one of the diagonals and a null detector in another. Later on, this concept was extended to other bridge topologies: differential transformer (LVDT), magnetoresistive “bridge”, galvanomagnetic transducer (Hall-effect), and biparametric ( $R - L$  or  $L - C$ ) half-bridge.
- Strain gauges and Wheatstone bridge represent the most wide-spread combination in achieving force transducers. One can take over from the finite elements programs the colour code for stressing elastic elements (red for tension and blue for compression) and adapt it to the bridge resistances (increasing and, respectively, decreasing).

• Did you think that in connection with multicomponent force and moment transducers there are certain confusions in terminology (sensor with transducer, torque with moment) and a regulation is not established for the coordinate axes representation (e.g. the “right hand screw rule”)?

• All these aspects will be discussed, starting with examples from materials testing, Robotics, aerodynamic balances for wind tunnels, and biomedical applications (e.g. TensioDentar equipment for virtual instrumentation).

## 7. Practical Accomplishments of the IFSA Companies

Ideas of presentations in these conferences (2015 and 2019) also show up in the outstanding practical achievements of the IFSA companies, fully confirming the slogan “*Connecting Academy and Industry*” in the title [2].

Since its founding in 2018, F2D, Ltd. (Ireland) – the IFSA Group Company, is continuing design and production of integrated circuits and sensor systems

solutions based on precision measurements of frequency-time parameters of signals [9].

The Universal Sensors and Transducers Interface (USTI) (Fig. 6) is a fully digital CMOS integrated circuit of universal, 2-channel, high precision, multifunctional converter with special function blocks

like RESISTANCE and RESISTIVE BRIDGE. It is remarkable the perfect agreement with the graphical symbolism proposed at the Tenerife conference [8] by DMS (acronym meaning in German *DehnungsMessStreifen*, i.e. in English “strain gauge”).



Fig. 6. Universal Sensors and Transducers Interface, innovation and industrial implementation on the market by company F2D, Ltd.

Combining the impeccable organization with the picturesque locations selected, social program offered at Hard Rock Hotel Tenerife at the end of the professional day was at the highest level: cocktail in Sky Lounge Bar, on the roof of Nirvana Tower building (24 September), banquet in Lagoon restaurant, near the Atlantic beach (26 September), and farewell party near the Wembley conference room (27 September 2019).

A line from George Harrison sits above the check-in area (Fig. 7). It reads: “Here comes the sun and I say, it’s all right!”, a fitting message for Hard Rock, which owns the largest rock memorabilia collection in the world [10].

## 8. First DMS Book for IFSA

It may be said that the International Frequency Sensor Association is a worldwide INTEGRATOR of experts, companies, products and publications. For my pleasure, there is a connection also with my professional evolution: Past – the 2011 paper, Present – the Tenerife conference, 2019 and Future – promising a DMS book at IFSA in 2020 (Fig. 8).

As Dr. Yurish mentioned in IFSA Publishing *Book Catalog* [11]: “Our authors, who are located around the world and whom we consider to be experts in their fields, write for practitioners, engineering and educational staff. This catalogue features all related publications and also includes bestsellers, handbooks and encyclopedias.”

Now, here’s that *educational* and *encyclopedia* topics are also present within the enlarged portfolio of IFSA titles! Where will you find 18 conference-touristic illustrated reports on all continents (without Antarctica)?

*Dr. Dan Mihai Ștefănescu, in his book “Beyond Europe”, successfully builds a text rich in information and accompanied by spectacular images, offering a natural and inedited discourse on his experiences in exotic lands from Asia, America, Africa and Oceania. This journey agenda and, at the same time, intimate series of reports reflects the author’s impressions in his contacts with cultural environments much different from Europe, narrated in a fresh, ingenious, original and humorous style. In a multidisciplinary spirit, his book is full of historical, geographical, religious and economic information, presented with an unusual ability and easiness. Therefore, the reader feels like a direct participant in the world’s and life’s spectacle, as it develops at thousands of kilometers far from Europe (Dr. Aurel Millea in the foreword of the book).*

*Dear Dan, I personally have read your book chapter (Dubai 2015) with a great pleasure! It is written well and interesting. I am also traveling a lot for different conferences (30 countries) and the topic is well known and useful for me (Dr. Sergey Yurish in [12]).*

## 9. Conclusions

The paper reviews the rich palette of IFSA activities, over the two decades of fruitful existence. The next edition of the SEIA conference will be held at Porto, Portugal, in the autumn of 2020.

On my part, pleased by the increasing DMS publishing in connection with IFSA, conclude with a heart full wish: *Long live IFSA!*





**Fig. 7.** A Beatles song lyric in the check-in area of the Hard Rock Hotel in Tenerife (Credit: Roberto Lara) and triptych of images appearing in 2019, a bit blurred, like in a dream, and then fulfilled: DMS in Speakers' Room Wembley (25 Sept.) (a), meeting... Paul McCartney (26 Sept.) (b), and at coffee break (27 September) with Mrs. Tetyana Zakharchenko, IFSA Conference & Publication Manager, and Prof. Dr. Sergey Yurish, Chairman of the Organizing Committee of SEIA'2019 (c).



**Fig. 8.** Crescendo of the DMS publishing activity at IFSA: paper in 2011 (+ this one in 2019) (a), book chapter in 2016 (+ one new in 2020) (b), and proposed book 'Beyond Europe' (c).

## References

- [1]. 5<sup>th</sup> International Conference on Sensors and Electronic Instrumentation Advances & 1<sup>st</sup> IFSA Frequency & Time Conference, *Conference Programme*, Adeje, Tenerife (Canary Islands), Spain, 25 – 27 September 2019, PDF created on 17 September 2019.
- [2]. S. Y. Yurish, IFSA Activity report: Connecting Academy and Industry, Foreword, PDF created on 3 September 2019.
- [3]. D. M. Ștefănescu, International Frequency Sensor Association Celebrating the 20<sup>th</sup> Anniversary in Canary Islands (Tenerife), Spain, 25 – 27 September 2019, *Panel at Hard Rock Hotel*, Adeje, Tenerife Island, 25 September 2019.
- [4]. S. Y. Yurish, International Frequency Sensor Association (IFSA) Celebrates the 10<sup>th</sup> Anniversary, *Sensors & Transducers Journal*, Vol. 100, Issue 1, January 2009, pp. I-XII.
- [5]. D. M. Ștefănescu, A. Millea, The Place of "Force" in Several Graphic Representations of the International

- System of Units (SI), *Sensors & Transducers*, Vol. 131, Issue 8, August 2011, pp. 1-7.
- [6]. D. M. Ștefănescu, Advances in Intelligent Force Transducers, in *Sensors, Transducers, Signal Conditioning and Wireless Sensors Networks*, in *Advances in Sensors: Reviews* (S. Y. Yurish, Ed.), Vol. 3, *IFSA Publishing*, Barcelona, 2016, pp. 21–36.
- [7]. D. M. Ștefănescu, Handbook of Force Transducers – Principles and Components, 1<sup>st</sup> Edition, *Springer-Verlag*, Berlin, Heidelberg, 2011.
- [8]. D. M. Ștefănescu, Strain gauges and Wheatstone bridges in multicomponent force / moment transducers – Current concepts and applications, *Abstract in the Final Programme of the 5<sup>th</sup> International Conference on Sensors and Electronic Instrumentation Advances (SEIA' 2019)*, Tenerife, Spain, 25 – 27 September 2019, pp. 8-9.
- [9]. Universal Frequency-to-Digital Converter (UFDC) & Universal Sensors and Transducers Interface (USTI) ICs, Product Overview and Price List, *F2D Catalog*, PDF created on 4 June 2019.
- [10]. A. Montgomery, Celebrate Live Music and Entertainment at the Hard Rock Hotel Tenerife, *The Telegraph*, 7 July 2017.
- [11]. S. Y. Yurish, Publisher's Letter, Book Catalog, *IFSA Publishing*, PDF created on 29 May 2019. [http://www.sensorsportal.com/HTML/IFSA\\_Publishing.htm](http://www.sensorsportal.com/HTML/IFSA_Publishing.htm)
- [12]. S.Y. Yurish, private communication by e-mail, 30 December 2018.



Published by International Frequency Sensor Association (IFSA) Publishing, S. L., 2019 (<http://www.sensorsportal.com>).

## International Frequency Sensor Association



**International Frequency Sensor Association (IFSA)** is one of the major professional, non-profit association serving for sensor industry and academy more than 20 years, created with the aim to encourage the researches and developments in the area of quasi-digital and digital smart sensors and transducers.

**IFSA Membership is open to all organizations and individuals worldwide who have a vested interest in promoting or exploiting smart sensors and transducers and are able to contribute expertise in areas relevant to sensors technology.**

More than 750 members from 71 countries world-wide including ABB, ams, Analog Devices, Bosh, Cadence, Caterpillar, Freescale, General Electric, Honeywell, Huawei, Bell Technologies, John Deere, imec, Keller, Mazda, Meggit, Melexis, Mentor, Memsis, Motorola, PCB Piezotronics, Philips Research, Sandia Labs, Tata, TDK, Texas Instruments, Yokogawa, NASA, US Navy, National Institute of Standard & Technology (NIST), National Research Council, etc.



For more information about IFSA membership, visit  
**<http://www.sensorsportal.com>**