

We recall the 45th ISSE - International Spring Seminar on Electronics Technology, held in Hotel Springer Schössl, Vienna, from May 11 to May 15, 2022 and announce the 46th ISSE taking place from May 10 to May 14, 2023 in Timisoara, Romania.

The International Spring Seminar on Electronics Technology (ISSE) is one of the renowned conferences organized as an IEEE EPS conference event with a four and a half decades long tradition encompassing all topics around electronics technology and is attended every year by more than 100 experts and particularly young researchers from all over the world.

Since the Corona pandemic came over Europe in March 2020, the two ISSE events in 2020 (organized by Alena Pietrikova and her team at University of Technology in Kosice, Slovakia) and in 2021 (Organized by Heinz Wohlrabe and this team at TU Dresden, Germany) were held as a two-days web-based conference with a condensed technical program.

This year's event, the 45th in the ISSE series, guided by the motto "Electronics Technology Innovations towards Green Electronics" [1], was held for the first time as hybrid conference in the Hotel Springer Schössl, in the beautiful green vicinity of Schloss Schönbrunn, in Vienna, Austria, Europe [2] with the usual mode as a four-days event for the personally present attendance with an extensive cultural program and the full access to all technical sessions for the on-line participants including the active participation in discussions.

But before coming to more details of this year's event we want to introduce the ISSE to you with a short historical overview and the main goals, peculiarities, and ambitions of ISSE [3].

This annual conference series was founded already in 1977 in Weissig, Germany, as a collaboration of three universities, namely the Czech Technical University in Prague (Czech Republic), the Dresden University of Technology (TUD, Dresden, Germany), and the Budapest University of Technology and Economics (Budapest, Hungary), to provide an international platform for exchanging knowledge and presenting scientific results on electronics technology mainly for their diploma and doctoral students. Astonishingly, even in these early years when Russian was an obligatory language in these countries, English was chosen as the official conference language already from the very beginning. This periodically held seminar series thrived with the years and continued attracting attendees also from middle and western Europe after the fall of the iron curtain in 1991. In 1998 the ISSE conference was held the first time in a western European nation: in Neusiedel am See, Austria. In 2001, when this conference was organized in Călimănești Călcăuș, Romania by the Polytechnic University of Bucharest, it took place for the first time under the patronage of IEEE.

The ISSE conference series is steered by a committee composed of members from European research institutes and universities that decides about the location of each event at least two years in advance.

The main objectives of the ISSE are manifold: ISSE provides a forum for knowledge exchange on electronics technology and related areas, encourages especially young researchers to develop their interest and engagement in these multidisciplinary fields, and represents an academic network to initiate and settle also long-term international research collaborations.

For many young scientists, the ISSE is their first international conference experience, and it is our goal that they keep this event well in their mind and understand the importance of international conferences for their professional development.



ISSE Steering Committee meeting, May 11, 2022; from left to right: Maria Vesna Nikolic, Madalin Moise, Johann Nicolics, Klaus Wolter, Detlef Bonfert, Paul Svasta, and Heinz Wohlrabe.

Current ISSE conferences cover typically following topics:

- New Materials, Embedded Components, and Processes
- Power Electronics and Thermal Management
- Advanced Packaging and Interconnection Technologies
- Testing, Reliability and Quality Management
- Process Modeling and Simulation
- Environmental and Ecological Aspects in Electronics Technology
- Nanotechnology, Nanomaterials, and Nanoelectronics
- Signal Integrity and Electromagnetic Compatibility
- Sensors, Actuators, and Microsystems
- Education and Information Technologies in Electronics Manufacturing

Technical sessions are usually introduced by plenary lectures of invited speakers, followed by orally presented papers on subjects with broader interest. Typically at ISSE conferences, the major part of regular papers is presented as posters, allowing researchers to have intensive and detailed discussions with interested attendees in front of their posters. Intentionally, the local conference organizers try to have enough space for attaching all posters at the same time and allowing attendees to get in touch with the presenters throughout the entire conference duration. Enough space in front of the posters was always seen as an ideal condition to provide a convenient atmosphere allowing to form new collaborations spontaneously.

This year a new mode was experienced: All poster authors were allowed first to introduce their posters with some slides orally in front of the entire audience in altogether 12 poster sessions. Physically present poster authors had the chance to participate in additional six poster sessions in front of their posters. Using Zoom as conference tool we were able to have discussions and direct information exchange between all kind of participants (online and onsite) during all sessions.

We recall with pleasure the opening session on Thursday, May 11 where **Golta Khatibi**, local Conference Chair, TU Wien, and **Heinz Wohlrabe**, Chair of the ISSE Steering Committee, TU Dresden, welcomed our participants in the lecture hall of the Springer Schössl and the online participants in their homes.



Golta Khatibi



Heinz Wohlrabe



We proudly recall our prominent keynote speakers:

Oliver Schilling, Infineon Warstein, Germany, opened the first session with his keynote entitled "Power semiconductors – reliable components for green energy management". In his talk he outlined some examples and the role of power semiconductors in the topology of the related systems and gave some facts and figures about their contribution to "green energy".

Elke Kraker, Materials Center Leoben Forschung GmbH, MCL, Austria, considered the ongoing miniaturization in micro-electronic devices and the need for thorough investigation of thermal aspects to avoid loss of reliability and device performance in her keynote talk about "Challenges of thermal management in microelectronics".

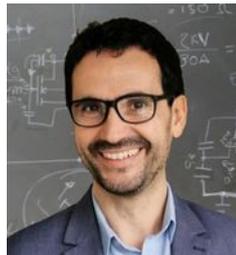
Francesco Iannuzzo surprised his audience with his keynote talk about "Liquid Interconnections for Improved Reliability of Power Electronic Components" where he highlighted the incredibly enlarged life expectancy promised by this technology as well as the inevitable challenges related to making chemically-stable interconnects.



Oliver Schilling



Elke Kraker



Francesco Iannuzzo



Toni Mattila



Michael Nelhiebel



Maria Vesna Nikolic

Toni Mattila, Head of Sustainable Manufacturing at Business Finland, focused on the global warming and its reasons in his keynote "Sustainability in Electronics". Though, electronics industry is not one of the biggest primary greenhouse gas emitters but due to its energy intensity, the environmental impact

is considerable and not constrained purely to the production phase. All emissions from use of the product until their disposal are also included within the carbon footprint of the producer. Thus, there is a lot to be achieved with more efficient recycling and use of renewable materials in electronic devices.

Michael Nelhiebel, KAI GmbH, Infineon Technologies Austria, Villach, Austria, spoke about "The 2nd Shell: Research on Power Semiconductor Reliability between Industry and Academia". Semiconductor technology extends way beyond device physics and microelectronic engineering. In particular power semiconductors, featuring new materials like silicon carbide and gallium nitride, thick metallization layers and extremely thin silicon substrates, during operation being exposed to severe thermal and thermo-mechanical loads, necessitate a large portfolio of competences to ensure stable manufacturing and good reliability. Some examples that are dealt with at the dedicated competence center KAI are discussed. He also pointed to the conceptual aspects of applied research across domains, "between industry and academia".

Maria Vesna Nikolić, Institute for Multidisciplinary Research, University of Belgrade, Serbia, highlighted the importance of "Semiconducting Metal Oxide Nanoparticles in Sensors, Optoelectronics and Electronic Devices" in her keynote. She explained the earth abundant multifunctionality of semiconducting metal oxides stemming from their complex and widely varied electronic structure and properties making them the subject of continuous research, especially in the form of nanoparticles for application in sensors, optoelectronics and electronic devices. Metal oxides still remain the first choice for application in sensors, especially gas sensors due to their ease of fabrication, low cost, high sensitivity, and stability. Nonetheless, reduced power consumption and reliable sensing of devices for environmental and industrial applications, especially at room temperature, remain a significant scientific and technological challenge.

Our **cultural program** was divided in two parts: On Friday, May 13, consisted of a walk through the "Burggarten", a visit of the Hofburg, the Houses of Parliaments, and an invitation to a dinner in the Rathauskeller from the Major of Vienna, Michael Ludwig.



Walk through Burggarten



Dinner in the Rathauskeller



ISSE participants in the Vienna Houses of Parliaments

The second part of the cultural program on Saturday, May 14, afternoon, included a walk through the Schönbrunner Schlosspark and a view over the city of Vienna from the Gloriette.



Walk to Schloss Schönbrunn and the Gloriette



The conference ended with the awarding session which took place in the restaurant of the Springer Schössl followed by a barbecue, and accompanied by a folks music trio conducted by Martin Evanzin with extensive opportunity to dance.



We congratulate our this year's **award winners** for their remarkable contributions:

Hanying Wen, PhD student at the Fraunhofer Institute for Photonic Microsystems (IPMS), Dresden, Germany, for presenting her paper "Improved Near-infrared Photoresponse of Si-based Schottky Diode by Nanophotonic Structures";

Daniel Utsch, Young Scientist at the Institute for Factory Automation and Production Systems (FAPS), Friedrich-Alexander-University, Erlangen, Germany, for his poster paper on "Additive Manufacturing of 3D Circuit Carriers with Improved Thermal Conductivity";

Martin Lederer, Senior Scientist at the Institute of Chemical Technology and Analytics, TU Wien, Vienna, Austria, for the best presentation entitled "Accelerated Fatigue Testing and Lifetime Modelling of Solder Interconnects in Power Electronics";

Jiří Navrátil, Senior Scientist, University of West Bohemia, Pilsen, Czech Republic, for the best poster paper "Preparation and Application of Carbon Nanotubes Ink for Aerosol Jet Printing System";

Johannes Drechsel, Young Scientist at the Fraunhofer-Institut für Keramische Technologien und Systeme (IKTS), Hermsdorf, Germany, for outstanding presentation of his paper "Handling and Analysis of Large Datasets Using the Example of Partial Discharge Measurement";

Ran Yin, PhD student at Institute of Electronic Packaging Technology (IAVT), TU Dresden, Germany, for an excellent presentation of her paper "Process Developments on Sheet Molding and Redistribution Deposition for Cu-Pillar Chips";

Rebeka Kovács, Young Scientist at the Department of Electronics Technology, Budapest University of Technology and Economics (BME), Hungary, for her excellent poster paper "Numerical simulations of shear stress in microfluidic channel models";

Shireen Zangana, PhD student at the Department of Electronics Technology, Budapest University of Technology and Economics (BME), Hungary, for her excellent poster paper "Determination and Comparison of the SERS Enhancement Factor for Nanocomposite Substrates";

Anna Pražanová, PhD student at the Department of Electrotechnology, Czech Technical University in Prague, Czech

republic, for her excellent poster paper on "Evolution of Lithium-ion Battery Model Parameters for CubeSats Missions";

Dmytro Solonenko, Senior Scientist at Silicon Austria Labs GmbH (SAL), Austria, for his excellent poster paper on "Spectroscopic Ellipsometry Study of Parylene AF4";

Martin Hirman, Senior Scientist at the Department of Materials and Technology, University of West Bohemia, Pilsen, Czech Republic, for his excellent poster paper "Higher Temperature Washing of Electrically Connected SMD Components onto the Textile Ribbons";

Agnieszka Betzwar Kotas, Senior Scientist at the Institute of Chemical Technology and Analytics, TU Wien, Vienna, Austria, for presenting her excellent poster entitled "Mechanical reliability of lead-free solder joints - Comparative study of Sn3.5Ag versus SnSbAg solder alloy", and finally

Robert Langwieser, Senior Researcher at the Institute of Telecommunications, TU Wien, Vienna, Austria, for an excellent presentation of his paper on "Silver Ink Printed Logarithmic Spiral Antenna".

Altogether, the ISSE 2022 counted 136 active participants from 13 nations (Austria, Bulgaria, Czech Republic, Germany, Great Britain, Hungary, Poland, Romania, Serbia, USA, Slovakia, South Africa, Ukraine), coming from 33 universities, scientific institutions, and companies. Eventually, 77 scientific papers were submitted for publication at IEEE Xplore. The organizers want to use this opportunity to gratefully acknowledge our reviewers for their thorough evaluation of the submitted extended abstracts:

Table: International board of Reviwers for ISSE 2022

Reinhard Bauer	Tomáš Blecha	Karlheinz Bock	Detlef Bonfert
Attila Bonyar	Radu Bozomitu	Mihai Branzei	David Busek
Emilian Ceuca	Rupert Chabicovsky	Gabriel Chindris	Norocel Codreanu
Bernhard Czerny	Mirjana Damjanovic	Jurij Durisin	Karel Dušek
Andrzej Dziedzic	Jan Felba	Paul Fulmek	Attila Géczy
Walter Gschossmann	Peter Haumer	Balazs Illes	Ciprian Ionescu
Andreas Kainz	Golta Kathibi	Ryszard Kisiel	Oliver Krammer
Pero Krivic	Martin Lederer	Ioan Lita	Peter Lukasz
Pavel Mach	Piotr Markowski	Petko Maskov	Ali M.-Nejadari
Bálint Medgyes	Goran Miskovic	Martin Mündlein	Johann Nicolies
Maria V. Nikolic	Alena Pietriková	DanPitica	Ovidiu Pop
Frantisek Steiner	Stoyan Stoyanov	Anna Stoynova	Paul Svasta
Ivan Szendiuch	Adrian Tulbure	Jiri Tupa	Michael Unger
Heinz Wohlrabe	Klaus Wolter	Ljiljana Zivanov	

The organizers of this year's ISSE would also like to express their gratitude for receiving the many pleasant and motivating comments as feedback from numerous attendees.

The next ISSE event will be co-organized by Prof. Aurel Gontean, Politehnica University Timisoara, and Cosmin Moisa, Continental Automotive Romania, together with their team in the picturesque historical town Timisoara, Romania.



Aurel Gontean



Cosmin Moisa



Timisoara Historical Center

Knowing the ambition of these organizers we are convinced this conference will again be on a high level at moderate fees in order to make this event particularly attractive also for our younger researchers.

We are pleased to announce herewith the 46th ISSE, taking place in Timisoara, Romania <<https://isse-conf.eu/index.php/location/>>.

Acknowledgements

The ISSE 2022 was rigorously sponsored by the Vienna Business Agency [4], the Major and governor of Vienna, Dr. Michael Ludwig [5], and the Vienna Convention Bureau [6].

The organizers want to express their gratitude to Thomas Walter, Nicole Kretschy, Agnieszka Kotas, Irina Wodak, and Bernhard Czerny, for their untiring efforts during preparing and running the conference event.

References

- [1] <<https://www.isse2022.at/isse-2022>>
- [2] <<http://www.springer-schloessl.at/en/>>
- [3] History of ISSE; <<https://www.isse2022.at/history/past-isse>>
- [4] <<https://viennabusinessagency.at/>>
- [5] <<https://www.wien.gv.at/english/politics/citygovernment/mayor.html>>
- [6] <<https://www.vienna.convention.at/de>>

Authors:

Johann Nicolics, Vienna University of Technology, Austria, Technical Program Committee Chair and Publications Chair

Golta Khatibi, Vienna University of Technology, Austria, Local Conference Organizer of ISSE 2022

Heinz Wohlrabe, Dresden University of Technology, Germany, Old Chairman of the ISSE Steering Committee till 2022

Olivér Krammer, Budapest University of Technology and Economics, Hungary, new Chairman of the ISSE Steering Committee for the next period.



Johann Nicolics



Golta Khatibi



Heinz Wohlrabe



Olivér Krammer