The 43rd ISSE - International Spring Seminar on Electronics Technology

The International Spring Seminar on Electronics Technology (ISSE) is one of the renowned conferences encompassing all topics around electronics technology and is attended every year by more than 100 experts and young researchers from all over the world.
This year's event, the 43rd in the ISSE series, was planned to be held in Hotel Grand Jasna, in the beautiful Demanovska Valley - Slovakia, Europe (<https://isse2020.fei.tuke.sk/>). However, due to the Corona pandemic which came over Europe in last March we decided to organize this event as a web-based conference, since the abstract submission, the review process, and a draft of the conference technical program was already completed at that time. The change from the usual mode of a four-day event with personal attendance with an extensive cultural program to a two-day on-line conference with a condensed technical program was a big one.
But before coming to 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.
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 their 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 already chosen as the official conference language 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 by the Polytechnic University of Bucharest in Calimanesti Caciulata, Romania, it took place for the first time under the patronage of IEEE. The ISSE 2020 is now the 20th event technically co-sponsored by IEEE and since years listed on the EPS conference site (<https://eps.ieee.org/conferences.html>). The ISSE conference series is steered by a committee composed of members from European universities who decides about the location of each event at least two years in advance. This picture shows the Steering Committee in 2011, when the ISSE took place in Tatranská Lomnica, Slovakia.

ISSE Steering Committee, May 2011; from top left to bottom right: Boris Tsiganok, Stoyan Stoyanov, Zsolt Illyefalvi-Vitéz, Reinhard Bauer, Heinz Wohlrabe, Norocel Codreanu, Chris Bailey, Ivan Szendiuch, Leszek Golonka, Ciprian Ionescu, Jan Felba, Pavel Mach, Dan Pitica,

Andrzei Dziedzic, Johann Nicolics, Marko Hrovat, Alena Pietriková, Klaus Wolter, Tamara Pencheva, Paul Svasta.

The main objectives of the ISSE are twofold, providing a forum for knowledge and information exchange on electronics technology, and encouraging especially young researchers to develop their interest and engagement in the field of material science for electrical engineering, electronics technology, and in particular microelectronics packaging technology. 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. Typical topics are

- New Materials, Components and Processes
- 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
- Educational and Information Technologies in Electronics Manufacturing
- Discrete and Integrated Components

Technical sessions are usually introduced by plenary lectures of invited speakers, followed by orally presented papers on subjects with broader interest. Typically, 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 throughout the entire conference duration. Besides this, the ISSE also serves as a platform for initiating, developing, and continuing international research collaborations and is an essential multidisciplinary networking base since its beginning.

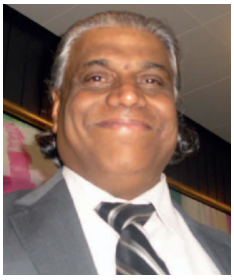
We proudly recall some prominent keynote speakers in the past decade (incomplete): Jan Felba, Chris Bailey (2011, Tatranská Lomnica, Slovakia), Rolf Aschenbrenner, Andreas Ostmann, Hannes Stahr, Franz Zerobin, Toni Mattila, Eric Beyne (2012, Bad Aussee, Austria), Gheorghe Brezeanu, Delia Chiricescu, Jihad Haidar, Gabor Harsanyi, Oliver Sbanski, Klaus-Jürgen Wolter (2013, Alba Iulia, Romania), Venky Sundaram, Jürgen Wolf, Alexandru Romanescu, Melinda Varga, James Morris (2014, Dresden, Germany), Karlheinz Bock, Jozsef Gyulai, András Szabó, János Mizsei, Hervé Fanet, Nihal Sinnadurai, Bálinth Balog (2015, Eger, Hungary), Martin Hedges, Tomás Syrový, Craig Hillman, Danick Briand, Radek Soukup, Markus Strecker, Stanislav Nespurek (2016, Pilsen, Czech Republic), Zsolt Illyefalvi-Vitez, James E. Morris, Klaus Wolter, Rao Tumala, Rajan Ambat, Chris Bailey, Mihail Margaritov, Ivan Ivanov (2017, Sofia, Bulgaria), Mirjana Videnović-Mišić, Vladimir V. Srdic, Djuradj Budimir, Branka Jokanovic, David Busek (2018, Zlatibor, Serbia), Jan Felba and Leszek Golonka, Ephraim Suhir, Zoran Stamenkovic (2019, Wroclaw, Poland).


Branka Jokanovic


Chris Bailey

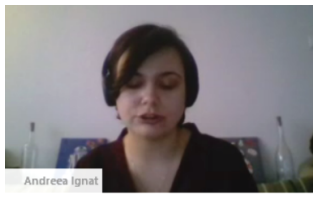

Djuradj Budimir


Hannes Stahr

 Franz Zerobin	 Klaus Wolter	 Mirjana Videnovic-Misic	 Nihal Sinnadurai
 Rajan Ambat	 Rolf Aschenbrenner	 Toni Mattila	 Zsolt Illyevalvi-Vitez
 James E. Morris May 2020	 Attila Bonyár May 2020	 Golta Khatibi May 2020	 Vladimir Sitko May 2020

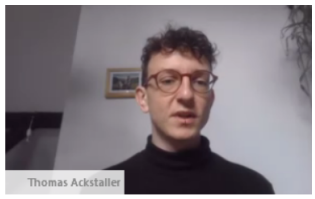
This year's ISSE had the motto ”Trends in Microelectronics Packaging and Interconnection Technology” and, due to the Corona-virus pandemic, was held for the first time as a life web-based conference (without recording) on May 14th and 15th, 2020. The web-based conference replaced our standard of a four-day conference, usually including an extensive national cultural programme.
We are proud to have had the support of 5 keynote speakers and renowned experts who made this conference event strong and attractive despite all the adverse circumstances:
James E. Morris, Electrical & Computer Engineering at Portland State University, Oregon, and professor emeritus at the State University of New York at Binghamton (USA) together with prof. Attila Bonyar (Budapest University of Technology and Economics) presented a keynote speech on the relationship between electronics packaging and nanotechnology – on the occasion of the establishment of the IEEE Hu&Ro EPS&NTC joint chapter.
Professor Chris Bailey, University of Greenwich, London, Great Britain, President of IEEE EPS (Electronics Packaging Society), introduced the Electronics Packaging Society to the audience with its over 2400 members, 35 Chapters, and more than 4500 attendees at 25 conferences worldwide one of which is the ISSE. He also reported about the increasing number of ISSE paper downloads from Xplore in recent years. He presented an excellent overview of the current developments in electronics packaging (heterogeneous integration: definition, platforms, and roadmap) and the related design challenges and difficulty to solve the cost problem in conjunction with the incredibly ongoing miniaturization.
Prof. Golta Khatibi, TU Wien, Austria, focused on lifetime prediction and reliability of multilayer structures in electronic applications in her keynote speech. She discussed the importance to

understand the different failure modes for relevant and correct lifetime prediction of power electronic components. Accelerated tests based on thermally induced mechanical stress is related to long (and costly) testing procedures. An alternative to that, pure mechanical testing by ultrasonic application allows to speed it up by a factor of 10- to 100-thousand. However, the type of loading is quite different from thermomechanical stressing. The comparison of different accelerated testing methods is a field of material science and under research in her group. First power assembly manufacturers show a high interest in this testing method.
Vladimir Sitko is a founder and managing director of PBT Works (Check Republic) and a recognized manufacturer of cleaning systems for electronic assemblies, maintenance cleaning in electronics and microelectronic applications. His invited lecture was devoted to the topic ”How to fulfill demands for future electronic assemblies”.
Taking into account the unpleasant boundary condition given by the pandemic, the interest in this ISSE was comparatively high: the number of registered participants was 83. The participants were distributed over 10 nations (Austria, Hungary, Romania, Czech Republic, Germany, Bulgaria, Serbia, USA, GB, Slovakia). Altogether we received papers from 11 oral and 71 poster presentations. Oral presentations had a duration of 30 minutes, poster presentations were organized as 10 minutes oral presentation, both followed with the option of questions and answers. Screen copies of Andreea Ignat from Department of Applied Electronics, Technical University of Cluj-Napoca, Cluj-Napoca, Romania, presenting her paper on "Renewable Energy Microgrid Model using MATLAB - Simulink", Jiri Navratil from Brno University of Technology, Czech Republic, taken during his presentation on "Preparation of Nitrogen Dioxide Sensor Utilizing Aerosol Jet Printing Technology", Thomas Ackstaller from the Institute of Electronic Packaging Technology, University of Technology Dresden, Germany, talking about "A Finite Element Study on Acceleration of Reliability Testing for Solder Interconnects", and of Reinhard Seidel from the Institute for Factory Automation and Production Systems (FAPS), Nuremberg, Germany, while talking about "Prediction of the Solder Rise in Selective Wave Soldering Comparing Decision Tree and Logistic Regression" are exemplarily depicted below.



Andreea Ignat,
Cluj-Napoca, Romania

Jiri Navratil,
Brno, Czech Republic



Thomas Ackstaller
Dresden, Germany

Reinhard Seidel,
Nuremberg, Germany

Following an old tradition, the conference was terminated with an awarding session. Throughout the entire conference all presentations were evaluated by a large committee consisting of around 20 members who rated the novelty, technical significance, correctness, presentation clarity/quality, and readiness/suitability of all contributions for IEEE Xplore.
We would like to use this opportunity to express our high appreciation to all our volunteers and are happy to announce the following award winners:

- Best Paper Award: Peter Lukacs; Department of Technologies in Electronics, Faculty of Electrical Engineering and Informatics, Technical University of Kosice, Slovakia, for the paper "Embedding of Passive SMD Components into the Microvia"
- Best Paper Award for Young Scientists: Philipp Zink; University of Applied Sciences and Fraunhofer Institute for Material and Beam Technology, Dresden, Germany, for the paper "Joining and Characterization of PLA Aluminium Compounds for Industrial Applications"
- Excellent Paper Award for Young Scientists: Nils Thielen; Institute for Factory Automation and Production Systems (FAPS), Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany, for the paper "A Machine Learning Based Approach to Detect False Calls in SMT Manufacturing"

- Best Poster Award: Igor Vehec; Department of Technologies in Electronics, Technical University of Kosice, Slovakia, for the paper "Capacitive Sensors for Saturated Vapor Height Sensing in Vapor-Phase Soldering"
- Best Poster Award for Young Scientists: Ágoston Gabor Nagy; Department of Electronics Technology and Nanobiosensorics Laboratory, Institute of Technical Physics and Materials Science, Centre for Energy Research, Budapest, Hungary, for the paper "Assembly of Epithelial Monolayers and Transmigration of Cancer Cells Captured with Phase Holographic Imaging"
- Excellent Poster Award for Young Scientists: Dániel Straubinger; Budapest University of Technology and Economics, Department of Electronics Technology, Budapest, Hungary, for the paper "Simulation of Reflow-Based Heat Transfer on Different Thermocouple Constructions"
- Excellent Poster Award for Young Scientists: Carolin Henning; Faculty of Electrical Engineering, University of Applied Sciences Dresden, Dresden, Germany, for the paper "Realization of Double-Sided Wiring Boards of Biopolymers"

The organization of ISSE as an on-line life conference brought a new perspective to this event series. At the beginning we were afraid that personal meetings and traditional discussion opportunities could not be replaced by a per-distance meeting. However, looking back it is possible to perceive this form of the conference as an event with many positive aspects. The participants did not have to travel, and this made renowned experts also from abroad easier to attend the conference. Also noticeable was the authenticity of the live presentations and the discussions thereafter.

Finally, the organizers of this year's ISSE received many pleasant and motivating comments as feedback from numerous attendees, some of which should be partially cited here:
- Chris Bailey, Greenwich University, London, UK: "It was a pleasure to present at ISSE and meet you again. I was so impressed with yesterdays organisation and how well the event run. My sincere thanks to all the committee for taking this event forward. I have next year's ISSE in my diary."
- Maria-Vesna Nikolic, Institute for Multidisciplinary Research, University of Belgrade, Belgrade, Serbia: "Dear Organizer, it was really nice to see colleagues on-line Thursday and Friday and congratulations on how well the ISSE conference went in these unusual circumstances. I enjoyed the presentations and also the discussions, lots of new ideas to think about, since science and research develops in many directions."
- Franz-Peter Wenzl, Materials, Joanneum Research, Austria: "The ISSE is the perfect place to learn about the latest state of the art of many topics in the field of electronics, topics for which it is important to know about for someone’s daily work, but which are maybe not in the direct focus. The concept of the ISSE, bringing world-famous scientists together with young ones and to exchange knowledge in a friendly and familiar environment emphasized by the organizers, makes it nowhere else that easy and inspiring to learn than at ISSE."

Authors:
Johann Nicolics, Vienna University of Technology, Austria, Technical Program Committee Chair
Alena Pietriková, Technical University of Košice, Slovakia, this year's Conference Organizer
Heinz Wohlrabe, Dresden University of Technology, Germany, Chairman of the ISSE Steering Committee
Olivér Krammer, Budapest University of Technology and Economics, Hungary, ISSE Secretary

			
Johann Nicolics	Alena Pietriková	Heinz Wohlrabe	Olivér Krammer