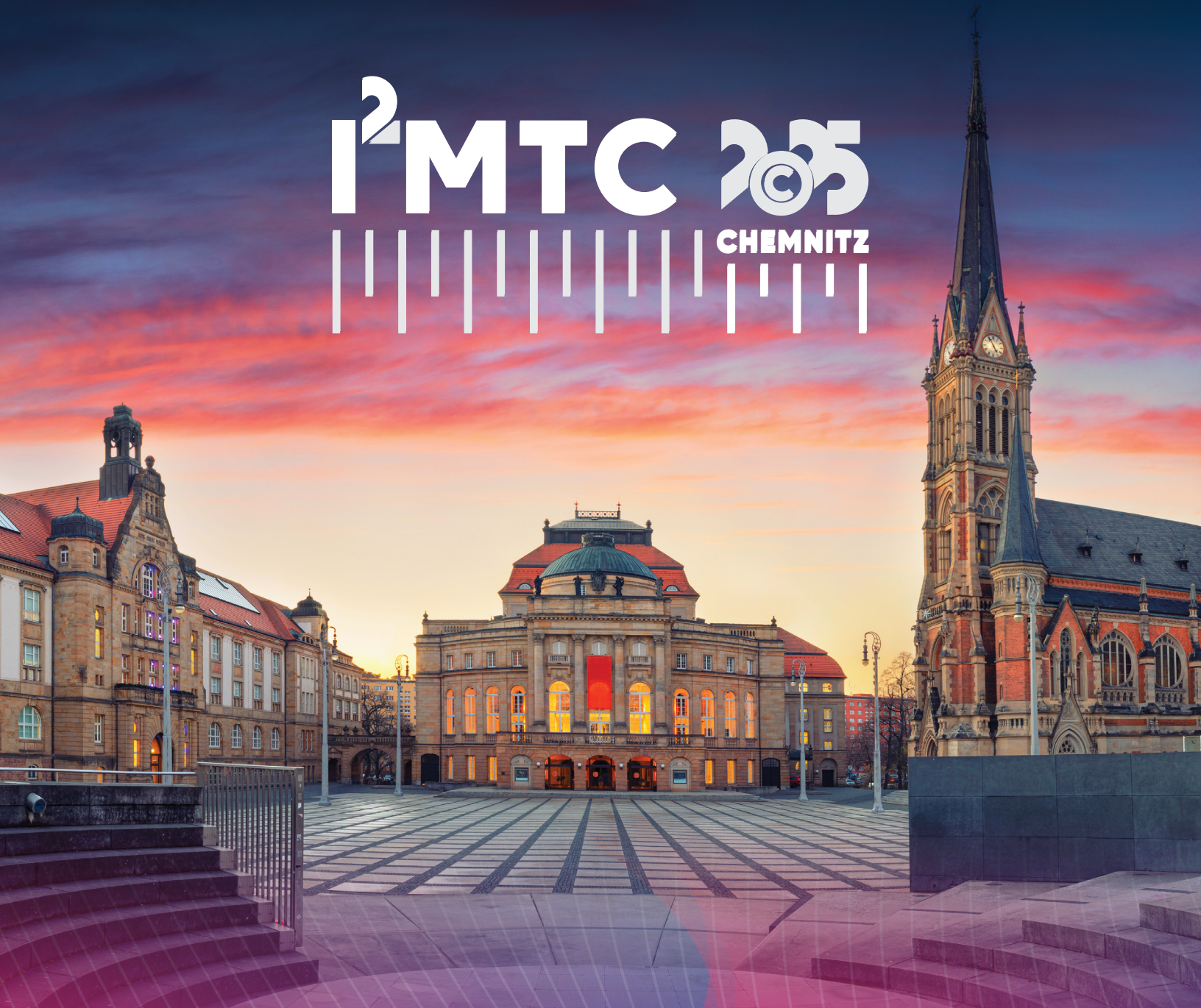

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Welcome Message from the General Chairs

On behalf of the Organizing Committee of the IEEE International Instrumentation and Measurement Technology Conference (I2MTC) 2025, the I2MTC Board of Directors, and the IEEE Instrumentation and Measurement Society (IMS), we are delighted to welcome you to Chemnitz, Germany, the host city of I2MTC 2025.

The IEEE International Instrumentation and Measurement Technology Conference (I2MTC) is the flagship conference of the IEEE Instrumentation and Measurement Society (IMS) and one of the world's leading conferences for measurement technology and instrumentation. Every year, the I2MTC brings together leading scientists, industry experts and other specialists to present the latest research findings, innovative applications and current trends in measurement science and technology.

A special highlight of this year's edition is the 75th anniversary of the IEEE Instrumentation and Measurement Society (IMS). To mark the occasion, attendees can look forward to a series of exclusive celebrations and special events. Among others, an international student competition will be held to promote young talents and to provide innovative impetus for the future of metrology. We extend our gratitude to the IMS leaders, entities, and members for their invaluable support in organizing the celebration. Special thanks to Prof. Juan Manuel Ramirez Cortes for his dedicated efforts in revisiting the history of the IM Society for the anniversary.

We’re delighted to invite you to experience Chemnitz’s hospitality in 2025, the year it serves as the European Capital of Culture. This unique opportunity offers fascinating perspectives for interdisciplinary dialogue and global networking. In addition to a top-class scientific program, conference participants will enjoy an inspiring cultural program, a symbiosis where innovation and cultural life go hand in hand.

The theme of I2MTC 2025, "Boosting Digital Transformation by Modern Instrumentation," highlights the vital role of instrumentation as the foundation of digitalization across various sectors. Advanced measurement technologies enable a. o. smarter automation, AI-driven insights, and data-driven decision-making, driving progress in Industry 4.0 and beyond. Chemnitz, with its strong engineering heritage, provides the ideal setting to explore how modern instrumentation enhances efficiency, reliability, and sustainability in an increasingly digital world.

I2MTC 2025 covers tutorials, keynotes, an industry panel, and special sessions that are dedicated to instrumentation and measurement in highly interesting topics. I2MTC 2025 attracted contributions on the latest advancements shaping modern instrumentation and digital transformation. Key focus areas include measurement and sensing technologies, industry applications, emerging technologies, digitalization technologies, and artificial intelligence, as well as theoretical and metrological foundations, which provide the scientific basis for these technological developments.

We are pleased to announce that I2MTC 2025 received an exceptional number of paper submissions, with 506 papers undergoing review. Of these, 309 were accepted for regular and special sessions, 14 for the Transactions in Instrumentation and Measurement (TIM) Poster Session, 11 for the Late Results Poster Session, and 6 as Live Demos. In total, 340 authors will present their work through oral, poster, or live demo contributions. We sincerely thank all authors for their commitment to maintaining the high standards of I2MTC.

I2MTC 2025 features outstanding plenary speakers, including Prof. Oliver G. Schmidt (Chemnitz University of Technology), a ‘Highly Cited Scientist,’ on ‘Micro-Origami-Robots,’ and Prof. Stephan

Schlamminger (National Institute of Standards, USA) on 'Chasing Precision,' a key topic in instrumentation. A plenary talk will be given by the recipient of the 2025 Joseph Keithly Award, Prof. Alexander Bergmann who will deliver a keynote presentation on contributions to pollution measurement and leadership in environmental sensing and emissions abatement. We sincerely thank these esteemed speakers for their invaluable contributions to I2MTC 2025. Their dedication and expertise enrich the conference, providing profound insights and inspiring discussions that drive advancements in instrumentation and measurement.

A special highlight of the Chemnitz edition is an industry panel on Advancing Instrumentation by AI for Overcoming Complexity in Semiconductor Testing that will shed light on the central role of measurement technology and Artificial intelligence in the semiconductor industry. The panel will be chaired by Prof Harald Kuhn, Director of the Fraunhofer Institute for Electronic Nano Systems (ENAS) in Chemnitz.

We extend our sincere gratitude to our sponsors and exhibitors. These include the continuous valued conference sponsors, Chroma, ISAD, Scio Spec, South China University of Technology, and IEEE I&M. Additionally, we would like to express our appreciation to our exhibitors InfraTec, ISEG, Telemeter, National Applied Research Laboratories, IfU GmbH, and Chemnitz University of Technology.

On Monday evening, the City of Chemnitz will host a Tutorial/YP Reception, where delegates will be welcomed by the mayor at the distinguished historical city hall. This event offers a wonderful opportunity to experience Chemnitz's warm hospitality and to know about the cultural events in the city in this special year. We sincerely thank the City of Chemnitz for its generous support for I2MTC 2025.

This conference would not be possible without the dedication of the organizing committee, who have generously devoted their time to ensuring its success. We would like to acknowledge the contributions of the following members of the Organizing Committee: Sergio Rapuano, Thomas Fröhlich, Ralf Zichner for the high-level oversight in coordinating and organizing the Special Sessions; Ghada Bouattour, Octavian Postolache, Datong Liu and Antonello Monti for evaluating the tutorial proposals and making out of them an outstanding tutorials day; Christian Viehweger and Rim Barioul, our Exhibition Chairs who led the effort to advertise for conference sponsorship; Mariem Hafsa and Florian Strakosch, our Local arrangement Chair who organized local arrangements for the society delegation meetings; our Industry Liaison chairs Nils Krömer, Andreas Mangler, Pasquale Arpaia, Harald Kuhn, and Publicity Chairs Kushsairy Abdul Kadir, Ahmed Abdelgawad, Abdellah Kouzou who did an outstanding job at promoting the conference and organizing excursions for young professionals; Enza Panzardi and Chi Hung Hwang for overseeing the organization of an engaging Demo Session; Thomas Keutel, Slim Naifar and Ferdinanda Ponci for kindly acting as our Conference Treasurer; and Hamza Boughanmi leader of the IEEE Student Branch of Chemnitz University of Technology, and the Student Council of the faculty of electrical engineering and information Technology of TU Chemnitz for organizing the volunteers team supporting the smooth running of the conference.

During the three-year preparation phase leading up to the conference, several members of the Professorship of Measurement and Sensor Technology (MST) dedicated their efforts to ensuring an excellent organization and local coordination. We would like to extend a special thank you to Dr. Slim Naifar (Conference BID), Dr. Thomas Keutel (Conference Venue, Society Celebration Events), Dr. Christian Viehweger (Local Organization, Society Celebration Events), Dr. Rim Barioul (Local Organization), Kristin Schütze (Hotels), Franziska Keil (Venue and Hotels), Mariem Hafsa (Delegation

Visit), Tianqi Lu (Delegation Visit, Conference Photos), She Ge (Conference Photos) for their hard work and commitment.

Many thanks to Laura LeBlanc from the Conference Catalysts for her exemplary performance as the Conference Manager, ensuring the event stayed on schedule and handling numerous requests and challenges with great expertise. We also extend our thanks to Margaret Brown for her invaluable support.

We sincerely appreciate the tremendous efforts of the members of the Technical Program Committee (TPC) Sabrina Grassini, Mohamed A. Abou-Khousa and Pawel Niewczas for their dedication in putting together an exceptional technical program. Their hard work in organizing and overseeing the paper review process was instrumental in ensuring timely and high-quality reviews.

We also extend our sincere thanks to the members of the Associate Technical Program Committee (ATPC) and all the reviewers whose invaluable contributions made this successful outcome possible.

We hope you have a fantastic time at the conference, reconnecting with familiar faces, engaging with professional colleagues, staying informed about the latest advancements in your field, and building new connections that may lead to valuable future collaborations.

We also hope you enjoy your time in Chemnitz and Germany, making the conference a truly memorable experience.

Olfa Kanoun, Faouzi Derbel and Carlo Trigona

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- Zheng Liu and Wuliang Yin

Data Acquisition Systems
- Amitava Chatterjee and Federico Tramarin

Digitalization, Machine Learning and Big Data for Instrumentation and Measurement
- Dario Petri, Pasquale Coscia, and Fernando Álvarez

Image Processing and Vision Based Measurement
- Chi Hung Hwang and Marco Carratù

Instrumentation and Measurement for Advanced Manufacturing
- Gabrile Patrizi and Ghada Bouattour

Instrumentation and Measurement for Chemical and Biological Quantities
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Instrumentation and Measurement for Non-Destructive Testing and Evaluation
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- Mihaela Albu, Judy Amanor-Boadu, and Sebastian Bader

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- Christian Schuss and Daniel Watzenig

Instrumentation and Measurement for the Energy and Power Industry
- Ferdinanda Ponci and Antonello Monti

Instrumentation and Measurement for the Oil and Gas Industry
- Chao Tan and Marco Jose Da Silva

Associate Technical Program Chairs (continued)

Instrumentation and Measurement in Aerospace and Space Systems
- Pasquale Daponte and Lorenzo Ciani

Instrumentation and Measurement in Agriculture, Food Production and Food Safety
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Instrumentation and Measurement in Environmental Monitoring
- Tarikul Islam and Valentina Bianchi

Instrumentation and Measurement in Medical, Biomedical and Healthcare Systems
- Gianfranco Miele, Octavian Postolache, and Mohamad Forouzanfar

Instrumentation and Measurement Systems for Robotics
- Ruqiang Yan and Shen Hin Lim

Micro- and Nanotechnology for Instrumentation and Measurement
- Bruno Ando and Aimé Lay-Ekuakille

Optical and Fiber Optic Instrumentation and Measurement
- Thomas Kissinger and Mohamad Farhat

Real-time Measurement Systems
- Salvatore Graziani and Eduardo Cabal-Yepez

Sensors and Transducers
- Tayeb Al Qaseer and Yuan Gao

Signal Processing for Instrumentation and Measurement
- Grazia Iadarola, Antonio Moschitta, and Shibin Wang

Special Session Organizers

Non-Destructive Inspection Systems for Zero Defect Manufacturing
- Milena Martarelli

Instrumentation and measurement for reliable and safe applications to support Digital Transformation – Supported by TC32
- Lorenzo Ciani
- Ye Chow Kuang
- Loredana Cristaldi
- Giulio D'Emilia

Machine learning algorithms in regulated measuring instruments
- Marko Esche

Impedance Bridges
- Stephan Schlamminger

TC37 Special Session on Measurement methods and metrological characterization for Time Sensitive Networking (TSN) systems and applications
- Alberto Morato
- Federico Tramarin
- Gianfranco Miele

Small Force Metrology and Applications
- Thomas Fröhlich
- Suren Vasilyan

TC10 Special Session on the Measurement, Modeling, and Prediction of Jitter in Space-grade Optical Transceivers
- Razvan Ciocan

Applications of Time-Frequency Analysis for Instrumentation and Measurement
- Yong-June Shin

Indirect Sensing in Harsh Technical Environments
- Markus Neumayer

Inertial Measurement Units: From Testing and Characterization of MEMS Sensors to Advanced Position and Orientation Estimation Algorithms
- Gabriele Patrizi
- Marco Carratù

Special Session Organizers (continued)

Artificial Intelligence in Instrumentation and Measurement: theoretical fundamentals and applications
- Antonio Pietrosanto
- Marco Carratù

Ultra-low power and energy-autonomous wireless sensor systems
- Sebastian Bader
- Alessandro Pozzebon

Advanced Hyperspectral Imaging and Its Applications
- Chi-Hung Hwang
- Chun-Jen Weng
- Lijuan Wang

From Rigid to Flexible: Advances in Flexible Conformal Sensing
- Nan Li
- Yunjie Yang
- Alberto Ferrari

Sensing and Measurement for Smart Transportation Systems
- Hongrui Wang
- Zhigang Liu
- Daniel Watzenig

Advances in Gas Sensing: emerging technologies and metrological challenges
- Giovanni Gugliandolo
- Mariangela Latino
- Antonino Quattrocchi

Advanced Techniques for Predictive Maintenance
- J. M. Dias Pereira

Rydberg Arrays for Enhanced RF Direction Finding
- Charles L.A. Cerny

Sensors Related Technologies for AIoT Applications
- Cheng-Tang Pan
- Kuo-Cheng Huang
- Wen-Tse Hsiao
- Chi-Hung Hwang

Special Session Organizers (continued)

Calibration and Blind Calibration using Machine Learning

- Amit Kumar Mishra
- Sebastian Meyer

Sensors, Instrumentation, and Networks Technologies for Environmental Measurement and Intelligent Forecasting

- Chi-Hung Hwang
- Tuan Guo
- Faouzi Derbel
- Huan Liu
- Alexander Knut
- Der-Chen Huang

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Keynote Speakers

Stephan Schlamminger
National Institute of Standards and Technology (NIST)

Chasing Precision: How Fundamental Constants Are Determined

Abstract: An adage among scientists and engineers says that before you conclude nothing happened, make sure it was plugged in, turned on, and calibrated. This seems especially important when measuring fundamental constants of nature. These constants are built into the fabric of our universe and are, as the name implies, constant in space and time. It is in our human desire to find estimates of the numerical values as close as possible to the true but hidden value of these beautiful and eternal constants.

While the fundamental constants are perfect, they are measured by humans. Naturally, the human condition, imperfect apparatus, and general messiness of life get in between the shining fundamental constants and our assessment of their values. In this talk, I'll take you on a journey from Olaf Roemer's first measurement of the speed of light in 1676 to all the measurements required to revise the definition of the international system of units, the SI, in 2019 on defining constants.

At its heart, this is a human story about setbacks, ingenuity, and relentless pursuit. But it is also a story about instruments and measurements.

Biography: Stephan Schlamminger earned his diploma in physics from the University of Regensburg, Germany, in 1998, followed by a Ph.D. in experimental physics from the University of Zurich, Switzerland, in 2002, where his thesis focused on determining the gravitational constant. From 2002 to 2010, he worked at the University of Washington, conducting experimental tests of the equivalence principle.

In 2010, Stephan joined the National Institute of Standards and Technology (NIST), where his research centered on the watt balance, a key tool in redefining the kilogram. He became the group leader of NIST's Fundamental Electrical Measurement Group in 2016. He also taught physics at the Regensburg University of Applied Sciences from 2017 to 2018.

Since the Fall of 2018, Stephan has continued his work as a physicist at NIST, focusing on the realization of the unit of mass and impedance measurements. Throughout his career, he has achieved the rare feat of determining both the gravitational constant and Planck's constant twice.

Keynote Speakers (continued)

Oliver G. Schmidt
Chemnitz University of Technology, Chemnitz, Germany
Research Center for Materials, Architectures and Integration of Nanomembranes (MAIN)

Micro-origami robots: From single agents to microelectronic morphogenesis

Abstract: Analogous to nature with its biological cells as basic building blocks for myriads of different lifeforms, tiny modular microrobots show great potential for creating artificial life based on microelectronic morphogenesis of non-biological material modules [1]. The talk will show how self-folded micro-origami robots make large leaps forward in self-assembling electronic nanomembrane materials into finely grained artificial units, that are solar powered, motile, and self-aware with on-board electronic control. They are made of soft material scaffolds with tiny Si CMOS chiplets sitting between the folds, for a massive increase in information processing capabilities. They can communicate, dock together and configure into larger entities like simple forms of artificial organisms [2]. This talk reports on our previous work on self-folding [3] and self-locomoting [4] thin film electronic modules and addresses key challenges in the field of microrobotics such as micromanipulation and force sensing well beyond state of the art [5] as well as energy storage with tiny on-board integrated batteries and biosupercapacitors [6-8]. The impact of these disruptive developments will be addressed for various application scenarios. References at https://i2mtc2025.ieee-ims.org/program/plenary-presentation-oliver-g-schmidt

Biography: Oliver G. Schmidt is the Scientific Director of the Research Center for Materials, Architectures and Integration of Nanomembranes (MAIN) and holds the Chair of Material Systems for Nanoelectronics at the Chemnitz University of Technology, Germany. He is an elected member of the German Academy of Science and Engineering and has received numerous international prizes and awards: Among them the Otto-Hahn Medal from the Max-Planck-Society in 2000, the Philip-Morris Research Award in 2002, the Carus-Medal from the German Academy of Natural Scientists Leopoldina in 2005, the International Dresden Barkhausen Award in 2013, the Gottfried Wilhelm Leibniz-Prize of the German Research Foundation in 2018, and an Advanced Grant of the European Research Council (ERC) in 2019. He is a pioneer in micromachining microrobotics and has made major scientific contributions to small scale energy storage devices, flexible electronics and integrated microsystems for biomedical applications.

2025 Joseph F Keithley Award in Instrumentation and Measurement

Alexander Bergmann
Graz University of Technology

Sponsored by Keithley Instruments, a Tektronix company, and the IEEE Instrumentation & Measurement Society

Citation: "For contributions to the field of pollution measurement and leadership in environmental sensing and emissions abatement."

Biography: Alexander Bergmann is a distinguished academic and innovator in the field of emission measurement and sensor technology. His work has had far-reaching commercial and societal impacts, particularly in vehicle emissions standards. As a key expert of the UN-ECE particle measurement program, Bergmann has been instrumental in developing cleaner emission technologies for Europe. His contributions include creating one of the first non-volatile particle number measurement devices and a portable emission measurement system, both of which have been incorporated into legislation. Bergmann's expertise in metrology has led to the development of crucial standards for emission measurement devices, with many countries adopting the standards he helped develop.

An IEEE Member, Bergmann is Head of Institute of Electrical Measurement and Sensor Systems, Graz University of Technology, Graz, Austria.

Diversity, Equity, and Inclusion Session

Massimo Giordani
Expert in Strategic Marketing and Innovation

The Power of Personal Branding in the AI Era: Inclusivity and Human-Centric Marketing

In an increasingly AI-driven context, personal branding plays a crucial role in building authentic and meaningful connections. This presentation explores how AI can support the development of our digital identity in a way that is inclusive, accessible, and retains a genuine human touch.

The focus will be on how artificial intelligence can help each of us personalize the messages we wish to share, representing ourselves authentically and reaching a wider audience.

Our objective is to show how technology and humanity can unite to build a personal brand that resonates with audience values, inspires active engagement, and fosters genuine inclusivity.

To create an engaging and productive experience, we will soon organize pre-conference activities that allow participants to connect and share perspectives in advance.

The opportunity for some participants to analyze their digital identity will be offered. Specifically, the first 10 individuals who respond to the survey declaring their interest in analyzing their digital presence will be selected for a personalized analysis.

Additionally, the chance for 4 participants, who request it via the survey, to create their own personal avatar after the conference will be offered.

Biography: Massimo Giordani is an expert in strategic marketing and innovation with a career spanning over three decades. He currently serves as President of the Italian Association for Marketing Development (www.aism.org) and is the founder of Time & Mind, an agency specializing in digital strategies. He also teaches as an adjunct professor at the University of Turin, sharing his expertise with the next generation. His passion for the socio-economic implications of technological innovation drives him to foster a digital culture enriched by humanistic elements, emphasizing the importance of an interdisciplinary approach in today's digital world.

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I²MTC Tradition

The first IEEE Instrumentation and Measurement Technology Conference was held in 1984 aboard the Queen Mary in Long Beach, California. But its origins stretch back nearly 20 years earlier to the Electrical and Electronic Measurement and Test Instrument Conference held each year from 1966 until 1981 in Ottawa, Canada. The latter was revived by the IEEE Instrumentation and Measurement Society with a new focus on all aspects of instrumentation and measurement. The following list contains locations and themes of the I²MTC conferences:

1984 – Long Beach, CA, USA, Automation-Quality-Productivity
1985 – Tampa, FL, USA, Measurement Science
1986 – Boulder, CO, USA, Standards of Excellence
1987 – Boston, MA, USA, The Changing Face of I&M Technologies
1988 – San Diego, CA, USA, Intelligence in Instrumentation
1989 – Washington, DC, USA, Persuasive I&M Technology – A Resource
1990 – San Jose, CA, USA, Emerging Measurement Technologies
1991 – Atlanta, GA, USA, Enhancing Productivity with Instrumentation and Measurement Technologies
1992 – Meadowlands, NJ, USA, Smart People, Smart Instruments, Smart Measurements
1993 – Irvine, CA, USA, Innovative Ideas for Industry
1994 – Hamamatsu, Japan, Advanced Technologies in Instrumentation and Measurement
1995 – Waltham, MA, USA, I3C – Integrating Intelligent Instrumentation and Control
1996 – Brussels, Belgium, Quality Measurements – The Indispensable Bridge between Theory and Reality (No Measurements? No Science!)
1997 – Ottawa, Canada, Sensing, Processing, Networking
1998 – St. Paul, MN, USA, Where Instrumentation is Going
1999 – Venice, Italy, Measurements for the New Millennium
2000 – Baltimore, MD USA, Smart Connectivity: Integrating Measurement and Control
2001 – Budapest, Hungary, Rediscovering Measurement in the Age of Informatics
2002 – Anchorage, AK, USA, The Frontier of Instrumentation and Measurement
2003 – Vail, CO, USA, Instrumentation and Measurement at the Summit
2004 – Lake Como, Italy, From the Electrometer to the Networked Instruments: A Giant Step toward a Deeper Knowledge
2005 – Ottawa, Canada, The 22nd Reunion
2006 – Sorrento, Italy, A View on the New Technologies for Instrumentation and Measurement
2007 – Warsaw, Poland, Synergy of Science and Technology in Instrumentation and Measurement
2008 – Victoria, British Columbia, Canada, Advances in the Science of Measurement Technology
2009 – Singapore, Always On: Instrumentation and Measurement in the Networked World
2010 – Austin, TX, USA, Innovative and Integrated Applications of I&M
2011 – Binjiang, Hangzhou, China, Instrumentation and Measurement for Improving Quality of Life
2012 – Graz, Austria, Smart Measurements for a Sustainable Environment
2013 – Minneapolis, MN, USA, Instrumentation and Measurement for Life
2014 – Montevideo, Uruguay, Instrumentation and Measurement for Sustainable Development
2015 – Pisa, Italy, The "Measurable" of Tomorrow: Providing a Better Perspective on Complex Systems
2016 – Taipei, Taiwan, Measuring the Pulse of Industries, Nature and Humans
2017 – Torino, Italy, “Man is the measure of all things” - Protagoras
2018 – Houston, TX, USA, Discovering New Horizons in Instrumentation and Measurement
2019 – Auckland, New Zealand, The Lords of the IMS: Expanding the Frontiers of Metrology Innovations
2020 – Dubrovnik, Croatia (Moved Fully Virtual), Technology Advancement Through Strong Foundation and Persistent Innovation
2021 – Glasgow, Scotland (Moved Fully Virtual), To Measure Is To Know
2022 – Ottawa, Canada, Instrumentation & Measurement Under Pandemic Constraints
2023 - Kuala Lumpur, Malaysia, Instrumentation and Measurement: Rising Above Covid-19
2024 – Glasgow, Scotland, Instrumentation and Measurement for a Sustainable Future
2025 – Chemnitz, Germany, Boosting Digital Transformation by Modern Instrumentation

Awards and Distinctions

2024 IEEE Transactions on I&M Outstanding Associate Editors

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2024 IEEE Open Journal of I&M Outstanding Associate Editors

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Mohammad Tayeb Al Qaseer

2024 I&M Society Awards

IEEE Instrumentation and Measurement Society Career Excellence Award
George Xiao, National Research Council Canada, Canada

"For 40 years outstanding contributions to the advancement and implementation of instrumentation and measurement technologies, and for distinguished service to I&M society's publications, conferences and technical committee."

IEEE Instrumentation and Measurement Society Best Application Award
Lijun Xu, Beihang University, China

"For the Complex flow metering technologies for multi-layer oil field well logging."

IEEE Instrumentation and Measurement Society
Outstanding Young Engineer Award
Min Xia, The University of Western Ontario, Canada

"*For expertise in AI and digital technologies has fostered extensive collaborations with academic and industrial partners, addressing global challenges in the digital transformation of various sectors."*

IEEE Instrumentation and Measurement Society Technical Award
Pawel Niewczas, University of Strathclyde, Canada

"For outstanding contributions to the advancement and field deployment of photonic instrumentation and measurement techniques in the power and energy sectors."

IEEE J. Barry Oakes Advancement Award
Yunjie Yang, The University of Edinburgh, United Kingdom

"For demonstrated exceptional expertise, innovation and leadership in the field of Instrumentation and Measurement."

2024 Instrumentation and Measurement Society Fellows Elevated by IMS:

Daniele Fontanelli
"For contributions to measurement and real-time estimation algorithms in robotics."

Dean Jarrett
"For contributions to high resistance metrology and measurement standards and techniques."

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General Conference Information

Venue:

Carlowitz Congress Center Chemnitz
Theaterstraße 3, 09111 Chemnitz, Germany

Registration & Information Desk:

The Registration & Information desk is located outside of the Aqua Room. Name Badges can be picked up at registration and are required for access to all conference events.

Registration Hours:

Monday, May 19	8:00 – 16:00
Tuesday, May 20	8:00 – 16:00
Wednesday, May 21	8:00 – 16:00
Thursday, May 22	8:00 – 16:00

Electronic Proceedings:

A download link for the conference proceedings will be emailed to registered attendees within 48 hours of the start of the conference. The proceedings download link will be available from May 19 – June 19, 2025.

Conference Attire:

Attire during the duration of the conference is business casual.

Cellular Phones:

As a courtesy to fellow attendees, please silence electronic devices.

Conference App:

Instructions to download and access the conference app will be emailed to registered attendees within 48 hours of the start of the conference.

Exhibit Hall:

Refer to the program grid for scheduled Exhibit Hall setup and cleanup times. Setup or cleanup outside of these designated hours is not permitted.

I²MTC 2025 Program Grid – Tutorials – Monday, May 19th

Registration: 8:00 – 16:00 (Aqua Foyer)
Exhibitor Set-Up: 15:30 – 17:00 (Silva-Foyer + Stadthallen-Foyer)

	Terra & Radixor	Lichtenwalde	Augustusburg 1-3	Rabenstein
8:30 – 10:00		Developing data-driven soft sensors: 10 good practices for reliable, safer, and more efficient models		High Voltage Circuit Breaker Condition Assessment - Where the instrumentation, measurement and human expertise meet
10:00 – 10:30	Coffee Break *(Silva-Foyer + Stadthallen-Foyer)*			
10:30 – 12:00	Impedance Spectroscopy: From Fundamentals to Advanced Applications and Signal Processing	Measurement Fundamentals	Smart Sensing Systems and AI for Precision Agriculture	Effective Technical Paper Publishing & Review Process Guidelines: Tips for Authors, Editors, and Reviewers
12:00 – 13:30	Lunch *(Silva-Foyer + Stadthallen-Foyer)*			
13:30 – 15:00	Electrical Resistance Tomography for 2D and thin-film materials: from measurements to image reconstruction	Measurement Validation in Automated Compound Oriented Measurements	Measurements Applications in Autonomous Systems	Mastering Electrical Impedance Spectroscopy: From Basics to Advanced Measurement Setups
15:00 – 15:30	Coffee Break *(Silva-Foyer + Stadthallen-Foyer)*			
15:30 – 17:00	Development of Non-Contact Microwave Cavity Technique for Assessing Environmental Impact on the Dielectric Properties of Nano-Scale Moisture Barriers and Electronic Materials	Low Power IoT and Edge AI	Measurement of the Beam-Pattern of the Antenna System as a Large Structure By Using the Flying Drone Equipped with RF Probes	Real-time Condition Monitoring and Fault Diagnosis of Rolling Element Bearings
17:00 – 18:30	Tutorial / Young Professional Reception *Hosted by the City Mayor of Chemnitz (Markt 1, 09111 Chemnitz)*			

I²MTC 2025 Program Grid – Tuesday, May 20th

Registration: 8:00 – 16:00 (Aqua Foyer)
Exhibit Hall Open: 10:30 - 19:00 (Silva-Foyer + Stadthallen-Foyer)

	Terra & Radixor	Lichtenwalde	Augustusburg 1-3	Rabenstein	Carlowtiz-Saal
8:30 – 9:00	Opening Session *(Carlowtiz-Saal)*				
9:00 – 10:00	Plenary Speaker and I&M A Family Announcement *(Carlowtiz-Saal)*				
10:00 – 10:30	Coffee Break *(Silva-Foyer + Stadthallen-Foyer)*				
10:30 – 12:30	Session 1A: Signal Processing for I&M (I)	Session 1B: Sensors and Transducers	Session 1C: SPS: I&M for reliable and safe applications to support Digital Transformation	Session 1D: I&M for the Energy and Power Industry	Session 1E: I&M in Medical, Biomedical and Healthcare Systems (I)
12:30 – 13:30	Redefining Feminism: Women's Perspectives in Engineering and Science	Lunch *(Silva-Foyer + Stadthallen-Foyer)*			
13:30 – 14:30	Plenary Speaker and Chapters Announcement *(Carlowtiz-Saal)*				
14:30 – 15:30	Coffee Break Poster Session TIM Poster Session *(Silva-Foyer + Stadthallen-Foyer)*				
15:30 – 17:30	Session 2A: SPS: Ultra-low power and energy-autonomous wireless sensor systems	Session 2B: SPS: Inertial Measurement Units: From Testing and Characterization of MEMS Sensors to Advanced Position and Orientation Estimation Algorithms	Session 2C: Advances in Gas Sensing and Environmental Monitoring: Technologies and Challenges	Session 2D: Circuits and Embedded Systems for I&M	Session 2E: Digitalization, Machine Learning and Big Data for I&M (I)

I²MTC 2025 Program Grid – Wednesday, May 21st

Registration: 8:00 – 16:00 (Aqua Foyer)
Exhibit Hall Open: 11:00 – 17:00 (Silva-Foyer + Stadthallen-Foyer)

	Terra & Radixor	Lichtenwalde	Augustusburg 1-3	Rabenstein	Carlowtiz-Saal	
8:30 – 10:30	Session 3A: Signal Processing for I&M (II)	Session 3B: SPS: Sensors Related Technologies for AIoT Applications	Session 3C: I&M Systems for Robotics	Session 3D: I&M for Renewable Energy Systems	Session 3E: I&M in Medical, Biomedical and Healthcare Systems (II)	IMS Student Contest *(Silva-Foyer + Stadthallen-Foyer)*
10:30 – 11:00	Coffee Break *(Silva-Foyer + Stadthallen-Foyer)*					
11:00 – 12:00	2025 Joseph F Keithley Award in Instrumentation and Measurement Presentation *(Carlowtiz-Saal)*					
12:00 – 13:00	I&M and I2MTC Award Ceremony and YP/Student Activities Announcement *(Carlowtiz-Saal)*					
13:00 – 14:00	Lunch *(Silva-Foyer + Stadthallen-Foyer)*					
14:00 – 15:00	The Power of Personal Branding in the AI Era: Inclusivitiy and Human-centric Marketing *(Carlowtiz-Saal)*					
15:00 – 16:00	Coffee Break Poster Session *(Silva-Foyer + Stadthallen-Foyer)*					IMS Student Contest Award Ceremony *(Carlowtiz-Saal)*
16:00 – 18:00	Session 4A: I&M for Non-Destructive Testing and Evaluation (IMNDE)	Session 4B: SPS: TC-37 SS on Measure. Methods & Metrological Characterization for Time-Sensitive Networking (TSN) Systems and App./I&M for Commun. & IoT	Session 4C: SPS: Sensors, Instrumentation, and Networks Technologies for Environmental Measurement and Intelligent Forecasting	Session 4D: I&M for Physical and Electromagnetic Quantities	Session 4E: SPS: Artificial Intelligence in I&M: theoretical fundamentals and applications	
18:00 – 19:00	I&M Past President Panel *(Carlowtiz-Saal)*					
19:00 – 22:00	Gala Dinner *(Stadthallen-Saal)*					

I²MTC 2025 Program Grid – Thursday, May 22nd

Registration: 8:00 – 16:00 (Aqua Foyer)
Exhibit Hall Open: 11:00 – 14:30 (Silva-Foyer + Stadthallen-Foyer)
Exhibitor Clean-Up: 14:30 – 16:00 (Silva-Foyer + Stadthallen-Foyer)

	Terra & Radixor	Lichtenwalde	Augustusburg 1-3	Rabenstein	Carlowtiz-Saal
8:30 – 10:30	*Session 5A: I&M for Industry 4.0*	*Session 5B: SPS: From Rigid to Flexible: Advances in Flexible Conformal Sensing*	*Session 5C: SPS: Sensing and Measure. for Smart Transportation Systems/I&M for the Automotive and Transportation Industry*	*Session 5D: I&M for the Oil and Gas Industry*	*Session 5E: SPS: Applications of Time-Frequency Analysis for I&M*
10:30 – 11:00	Coffee Break *(Silva-Foyer + Stadthallen-Foyer)*				
11:00 – 12:00	Advancing Instrumentation by AI for Overcoming Complexity in Semiconductor Testing *(Carlowtiz-Saal)*				
12:00 – 13:00	Lunch *(Silva-Foyer + Stadthallen-Foyer)*				
13:00 – 14:00	Coffee Break *(Silva-Foyer + Stadthallen-Foyer)*	Poster Session Later Result Poster Session Demo Session *(Silva-Foyer + Stadthallen-Foyer)*			
14:00 – 16:00	Session 6A: Image Processing and Vision Based Measurement	Session 6B: Data Acquisition Systems	Session 6C: SPS: Impedance Bridges/Circuits and Embedded Systems for I&M	Session 6D: Optical and Fiber Optic Instrumentation and Measurement	Session 6E: Digitalization, Machine Learning and Big Data for I&M (II)
16:00 – 17:00	Closing Ceremony & 2026 Announcement *(Carlowtiz-Saal)*				

8:30 - 10:00
Developing data-driven soft sensors: 10 good practices for reliable, safer, and more efficient models
Room: Lichtenwalde

Prof. Gustavo Pessin

Soft sensors are models that allow estimating the values of a variable based on other process information, without having to measure this variable directly. The main benefits of soft sensors are (1) they represent a low-cost alternative when compared to physical sensors, (2) they can work together with physical sensors, including identifying when they fail, (3) they allow implementation on existing devices, and (4) they provide real-time estimates, being an option for measurements where physical sensors depend on time-consuming analysis. In this tutorial, we are going to learn how to develop a data-driven soft sensor using Python taking into account data-driven techniques such as neural networks, decision trees, and other regression techniques. Besides the soft sensor development, we will discuss 10 good practices to develop safer, more reliable and more efficient models. The good practices involves the understanding of the risk of not taking care of models extrapolation, the effect of data quality and data quantity while building the models, and the importance of error distribution besides general metrics. After building the models, we will discuss good practices to improve efficiency, how to monitor performance and how to perform models calibration.

8:30 - 10:00
High Voltage Circuit Breaker Condition Assessment - Where the instrumentation, measurement and human expertise meet
Room: Rabenstein

Kerim Obarcanin

The increasing energy consumption demand urges to level up the power grid's reliability in every aspect. The high-voltage circuit breaker (HVCB) is one of the most important elements of the power grid responsible for the protection and control of the power system. The life expectancy of a newly installed CB is approximately 40 years. Through its lifetime, under normal conditions. CB will operate (make or break) for less than ten minutes while during abnormal conditions it will operate for less than one minute. To prevent potential issues that might arise during operating and specifically during its long idling time, the HVCBs are inspected and maintained regularly. The presentation will cover the invasive as well as noninvasive measurement methods, signal processing and result interpretation used for assessing the condition of the HVCB. It covers approaches to assessing conditions of the main and arcing contact, operating mechanism as well as the actuating coil focusing on the measurement and acquired signals interpretation.

The first portion of the presentation is devoted to the anatomy of the measurement approaches for performing well-established tests in industrial applications such as timing test, static resistance measurement, and dynamic resistance measurement as well as assessing the condition of the actuating coil and operating mechanism in the form of minimum trip voltage test and motor test. Additionally, the mechanical integrity will be discussed based on vibration fingerprint-based assessment.

The second portion of the presentation is oriented toward signal processing, analysis and algorithms utilized to quantify the measurement described in the first portion of the presentation. Thus, the denoising, processing and feature extraction for each stated test will be covered. Furthermore, the extracted features and indices interpretation will be supported by real-life measurements of different HVCB types.

10:00 - 10:30
Coffee Break
Room: Silva-Foyer + Stadthallen-Foyer

10:30 - 12:00
Impedance Spectroscopy: From Fundamentals to Advanced Applications and Signal Processing
Room: Terra & Radixor

Prof. Dr-Ing. Olfa Kanoun & Dr. Ahmed Yahia Kallel

Impedance spectroscopy has become an indispensable tool in modern measurement science, offering unique insights into material and system properties through frequency-dependent electrical measurements. This method is particularly valuable because it is non-invasive and can reveal information about physical and chemical processes that remain hidden to conventional measurement techniques. This tutorial aims to bridge the gap between theoretical understanding and practical implementation of impedance spectroscopy for different classes of application requirements.

We will begin with the fundamentals of impedance measurements and progressively explore real-world applications across various domains. Through practical examples, we will examine how impedance spectroscopy is implemented in laboratory environments with big devices and in-field implemented in embedded systems. The tutorial will address key applications, including material testing, battery characterization, biomedical measurements, and sensor development. Special attention will be given to common challenges encountered in practice, such as dealing with measurement uncertainties, choosing appropriate measurement parameters, and optimizing system performance.

Beyond the basics, we will explore recent developments in advances in measurement hardware and new approaches for data analysis. We will discuss practical strategies for interpreting measurement results, from traditional equivalent circuit modeling to modern analysis methods. The tutorial concludes with a look at current trends and future possibilities in the field.

10:30 - 12:00
Measurement Fundamentals
Room: Lichtenwalde

Dario Petri

The acquisition of information about physical quantities by means of sensors historically fostered the interpretation of measurement as a merely experimental activity. Conversely, measurement is a complex activity, far more complex than suitably connecting and reading an instrument. Indeed, prior of the execution of empirical activities, measurement always requires descriptive activities to be performed to ensure both the correct implementation of the experiments and the interpretation of the obtained information.

In this tutorial, the basic concepts involved in any measurement are presented and discussed. The tutorial contents support a methodologically correct development required by any measurement, regardless the kind of involved quantities (either physical or non-physical) or the field of application.

At the end of this tutorial the attendee will be able to answer such questions as: Which characteristics need to be fulfilled to ensure that an informative empirical process is a measurement? How an adequate model for a given measurement can be identified? How the quantity of information obtained through measurement can be evaluated and expressed?

10:30 - 12:00
Smart Sensing Systems and AI for Precision Agriculture
Room: Augustusburg 1-3

Dr. Octavian Postolache

The precision agriculture (PA) combines technologies and practices that assure the optimization of the operations associated agricultural production through specific farm management.

Regarding the used technologies distributed smart sensing systems characterized by fixed and mobile nodes (based on remote sensing and Unnamed Aerial Vehicle (UAV))) are used to turn the farming operations into data, and to optimize the future operation based on data driven models that can be part of digital twins applied in precision agriculture. Edge and cloud computing platforms that are capable to run AI/ML algorithms may contribute to help on human decisions.

The tutorial focusses on digital transformation of the agriculture in the context of heavily uncertainty associated with climate change. The IoT ecosystem technologies for precision agriculture will be discussed including multimodal sensing and artificial intelligence. In-situ and remote sensing are considered special attention being granted to the soil characteristics monitoring (moisture and macronutrients concentration).

The agriculture UAV imagery and satellite imagery solutions as so as the relation between the data coming from the in-situ distributed smart sensors and acquired images using multispectral and thermographic camera and imagery techniques will be part of the presentation as so as elements of virtualization in the case of digital twins implementation. AI multiple sources data driven models for an increased crops quality through the optimization of farming operations as so as examples of data driven models for smart irrigation and nutrients will be discussed.

10:30 - 12:00
Effective Technical Paper Publishing & Review Process Guidelines: Tips for Authors, Editors, and Reviewers
Room: Rabenstein

Reza Zoughi

There has been an astronomical increase in the number of technical paper submissions in the past decade. Some of the reasons include:

- pressure to publish, as the success indicator, for promotion and professional advancement,
- universities moving away from the traditional Theses and Dissertations compilations and instead use peer-reviewed journal papers,
- creation of new journals, and
- the open-access publishing “economy”.

Effective journal paper writing requires many implicit and explicit issues to consider. This involves deciding on the proper, most effective and relevant publications venue; having the knowledge of (and experience) how to compile the content that goes into the paper; having a clear knowledge of the publications’ guidelines and rules for the chosen venue; etc.

The review process is the most crucial aspect of a proper publishing process. It involves the authors, the editors, and the reviewers, and how each performs detrimentally impacts the outcome and the Quality”.

Inclusion of AI-assisted and AI-generated content has become an important issue. To this end, IEEE has specific guidelines with to authors and reviewers must adhere and ignoring them could have significant implications for authors and reviewers.

This tutorial will specifically discuss issues and guidelines relevant to: Technical Paper Writing; Publication Process; Review Requirements; and Use and Implications of AI Content for authors and reviewers.

12:00 - 13:30
Lunch
Room: Silva-Foyer + Stadthallen-Foyer

13:30 - 15:00
Electrical Resistance Tomography for 2D and thin-film materials: from measurements to image reconstruction
Room: Terra & Radixor

Alessandro Arduino & Alessandro Cultrera

Join us in this comprehensive tutorial to explore the Electrical Resistance Tomography (ERT) — a valuable technique for non-invasive conductivity mapping of 2D and thin-film materials. This tutorial will give you an overview of both experimental practices and advanced mathematical methods, providing a foundation for professionals and researchers interested in exploiting ERT in material science. The first part of the tutorial will focus on practical challenges and solutions in experimental ERT setups. Learn how to implement in-contact electrical measurements on thin films, using suitable custom fixtures; unravel the pros and cons of different measurement protocols; understand how to optimize instrumentation for speed and accuracy. In the second part, the focus will move on the mathematical framework behind ERT. From deriving forward models with partial differential equations to solving non-linear inverse problems with advanced numerical methods, this section will provide hands-on insights into the computational tools needed for an effective conductivity mapping with real-world examples. The tutorial will also introduce Open Science practices, including the development of FAIR-compliant datasets, promoting collaboration between experimental and computational research communities. This tutorial will be an opportunity for professionals and researchers seeking to deepen their understanding of ERT and its applications in material science.

13:30 - 15:00
Measurement Validation in Automated Compound Oriented Measurements
Room: Lichtenwalde

Heidi Fleischer

Compound-Oriented Measurement Technology is a specialized area within measurement technology that requires a more comprehensive approach than standard measurement techniques. These methods can be complex and involve several stages, including sampling, sample preparation, transportation, reformatting, measurement, and data processing. The intricate nature of these procedures requires a validation, which consideres all subprocesses within the overall workflow for accurate measurement results. In contrast to most physical measurements, compound-oriented measurements qualify (identify) and quantify the measurand of interest. Often, the measurand must be selected from multi-component mixtures of different compounds embedded in biological, chemical, medical, industrial, or environmental matrices. Compound-oriented measurements can be improved using robotic systems to increase sample throughput, ensure the safety of personnel, and enhance measurement accuracy. This tutorial will provide an in-depth exploration of the theoretical and practical aspects of compound-oriented measurements, the validation strategies required for both manual and automated methods, and the key parameters for evaluating measurement systems. Real-world examples, such as detecting heavy metals and pharmaceutical residues in environmental and biological samples, will demonstrate the validation results for both manual and automated measurement processes. The tutorial will also highlight how robotic systems can streamline workflows and reduce the influence of variables, leading to more accurate and reliable results. By the end of this tutorial, you will gain a comprehensive understanding of the complexities of compound-oriented measurements and the potential of automation solutions through robotic systems.

13:30 - 15:00
Measurements Applications in Autonomous Systems
Room: Augustusburg 1-3

Daniele Fontanelli

Autonomous systems are nowadays having an undisputed pervasiveness in the modern society. Autonomous driving cars as well as applications of service robots (e.g. cleaning robots, companion robots, intelligent healthcare solutions, tour guided systems) are becoming more and more popular and a general acceptance is now developing around such systems in the modern societies. Nonetheless, one of the major problems in building such applications relies on the capability of autonomous systems to understand their surroundings and then plan proper counteractions. The most popular solutions, which are gaining more and more attention, rely on artificial intelligence and deep learning as a means to perceive the structured and complex natural environment. Nonetheless, besides the importance of such complex tools, classical concept of metrology, such as standard uncertainty, accuracy and precision, are still unavoidable for a clear and effective understanding of modern autonomous systems applications.

At the end of this tutorial the attendee will be able to answer such questions as: what are the tools and the methods of major relevance for autonomous systems applications? How do concepts as uncertainty map in the autonomous systems realm?

13:30 - 15:00
Mastering Electrical Impedance Spectroscopy: From Basics to Advanced Measurement Setups
Room: Rabenstein

Martin Bulst

Electrical impedance spectroscopy (EIS) is a powerful technique, but performing accurate measurements can be challenging. Selecting the right equipment, sensors and configurations requires a deep understanding of specifications, parameters, and options—decisions that even experienced engineers and scientists may find complex. The interdependencies of components, practical constraints, and the prevalence of imprecise or overly simplified assumptions further complicate the process.

This tutorial addresses the critical technical aspects of EIS measurement setups, providing participants with both foundational knowledge and actionable insights. Topics covered include:

- A concise review of EIS fundamentals
- Exploration of common and unconventional EIS applications
- Overview of available instrument classes and their specific strengths
- In-depth analysis of key specifications and their practical implications
- Multichannel systems and their advantages
- Addressing parasitic influences
- Selection and use of electrodes and sensors

The tutorial combines lectures with hands-on sessions to solidify understanding through practical examples. Real-life case studies from academic research and industrial applications will illustrate the discussed concepts, highlighting their relevance and significance. By the end, participants will be equipped to navigate the complexities of EIS measurements, make informed decisions about setups, and avoid common pitfalls caused by oversimplifications or misconceptions.

15:00 - 15:30
Coffee Break
Room: Silva-Foyer + Stadthallen-Foyer

15:30 – 17:00
Development of Non-Contact Microwave Cavity Technique for Assessing Environmental Impact on the Dielectric Properties of Nano-Scale Moisture Barriers and Electronic Materials
Room: Terra & Radixor

Jan Obrzut

We present a novel non-contact microwave cavity method and instrumentation to evaluate the environmental effects on the dielectric permittivity of electronic materials. This approach addresses the challenge of field perturbation caused by non-uniform depolarization field distribution when a partially inserted dielectric sample interacts with the cavity, which can otherwise skew resonant frequency measurements. Our method enables precise analysis of strongly perturbing, partially inserted specimens, which are inaccessible to conventional techniques. By demonstrating a linear relationship between the natural resonant frequency shift and the damping ratio with the volume fraction of the specimen, we improve measurement uncertainty. Incremental sample insertion enhances data resolution, increasing data points from 1 to 20 for a single specimen and significantly improving accuracy for complex permittivity evaluations under environmental exposure. Example applications include the measurement of water vapor transmission rates for thin-film protective coatings on epitaxial monolayer graphene, the impact of environmental moisture and UV radiation on insulating dielectrics in solar installations, and the CO_2 capture efficiency of polyethylenimine thin films.

15:30 - 17:00
Low Power IoT and Edge AI
Room: Lichtenwalde

Prof. Henry Leung & Dr. Nan Xie

The Internet of Things (IoT) paradigm enables smart objects to communicate, this allows us to interact with our environment in a smart way. It is predicted that low power and ultra-low power sensors will make up the majority of IoT devices by 2030. To leverage the full potential of IoT applications, machine learning (ML) techniques are required to analyze sensor measurements on the edge for real-time analytics, lower latency, and less privacy concern. In this tutorial, we will first give a comprehensive overview of low power sensors and compare various IoT communication protocols. We will cover the end-to-end data integration steps from sensors to the loud data platform using real life award-winning smart cities examples. This tutorial will review various methods for applying ML and deep learning to resource-limited low power sensors. Different hardware and software options will be discussed including bio-inspired chipsets, traditional centralized learning, federated ML, pruning and TinyML for edge computing. We will demonstrate the latest design of our acoustic sensor with edge ML capability for real time sound classification. Development trend and future research opportunities for edge AI and IoT will also be presented.

15:30 - 17:00
Real-time Condition Monitoring and Fault Diagnosis of Rolling Element Bearings
Room: Rabenstein

Wilson Wang

Rolling element bearings are commonly used in rotating machines such as vehicles, aircraft, and motors. As a matter of fact, most machinery imperfections, especially for small- and medium-size machines, are related to bearing defects. However, reliable fault detection in rolling element bearings remains a challenging task in this research and development field, due to reasons such as system dynamics complexity and feature modulations. This tutorial will address recent development and the related challenges in bearing fault detection and real-time health condition monitoring. The covered research aspects include smart sensor-based data acquisition, signal denoising to improve signal-to-noise ratio, signal processing for bearing representative feature extraction, and AI-based real-time machine condition monitoring and fault diagnostics. This tutorial will discuss recent research progress in related fields, the challenges encountered, and possible solutions. It will also provide examples and strategies on how to implement the related technologies for machine health condition monitoring and fault diagnostics in real-world industrial applications.

15:30 - 17:00
Measurement of the Beam-Pattern of the Antenna System as a Large Structure By Using the Flying Drone Equipped with RF Probes
Room: Augustusburg 1-3

Prof. Dr. Sungtek Kahng & Dr. Changhyeong Lee

Antennas are seen everywhere connectivity is required. Along with cellular phones and IoT devices, vehicles in the land or the sea need channels of communication via relays in the sky or the peak of a hill to send and receive information in a mobile network indebted to functions of the antennas. The quality of the communication is determined by that of an antenna whether it goes with the analogue or digital mobile framework, for it allows an RF signal from the transmitter to reach the receiver. Before the antenna is deployed for the ultimate configuration of wireless communication, its characteristics of electromagnetic radiation are assessed with the far-field test equipment at an anechoic chamber. It is normal of the Zigbee, Bluetooth, WiFi, 5G mobile, metasurface lens, RIS reflectors, SAR antennas, etc. to undergo the conventional test method. Meanwhile, it runs across technical limits and shortcomings when the radiation aperture or structure holding the antenna is very large such as access point antennas mounted on a building or high directivity ones having large apertures adopted for hyper connectivity and target detection. In case the space for a wireless link such as the localizer in the instrument landing system as well as the mountain-top television relay station should be too large to be put into the anechoic chamber, an alternative method had to be come up with. The drone is adopted to the in-flight observation of the electromagnetic properties of the antenna huge or positioned very high. Step 1 is to equip the drone with the probe antenna, GPS antenna, spectrum analyzer, data storage and controller. Step 2 is to define the shape and size of the field scanning surface comprising observation positions with the distance and angular range from the antenna under test (AUT). Step 3 is to calibrate the AUT with the reference antenna like the log-periodic or horn antenna. Step 4 is to conduct the field scanning with the drone and record the observed field at every observation position on the scanning surface. Step 5 is to make the field plot and analyze it. In this talk, the general idea is mentioned and followed by elaborating on a real example of a UHF broadcasting antenna.

15:30 - 17:00
Exhibitor Set-Up
Room: Silva-Foyer + Stadthallen-Foyer

17:00 - 18:30
Tutorial/Young Professional Reception
Location: City Hall (Markt 1, 09111 Chemnitz)

Reception Hosted by the City Mayor of Chemnitz

The New Town Hall was built at the beginning of the 20th century according to plans by city architect Richard Möbius. The interior of the building is predominantly in Art Nouveau style. The famous mural ‘Labour - Prosperity - Beauty' by Max Klinger (1918) can be seen in the town council chamber.

8:30 - 9:00
Opening Session
Room: Carlowitz-Saal

9:00 - 9:55
Plenary Presentation #1
Room: Carlowitz-Saal

Chasing Precision: How Fundamental Constants Are Determined

An adage among scientists and engineers says that before you conclude nothing happened, make sure it was plugged in, turned on, and calibrated. This seems especially important when measuring fundamental constants of nature. These constants are built into the fabric of our universe and are, as the name implies, constant in space and time. It is in our human desire to find estimates of the numerical values as close as possible to the true but hidden value of these beautiful and eternal constants.

While the fundamental constants are perfect, they are measured by humans. Naturally, the human condition, imperfect apparatus, and general messiness of life get in between the shining fundamental constants and our assessment of their values. In this talk, I'll take you on a journey from Olaf Roemer's first measurement of the speed of light in 1676 to all the measurements required to revise the definition of the international system of units, the SI, in 2019 on defining constants.

At its heart, this is a human story about setbacks, ingenuity, and relentless pursuit. But it is also a story about instruments and measurements.

Stephan Schlamminger
National Institute of Standards and Technology (NIST)

Biography: Stephan Schlamminger earned his diploma in physics from the University of Regensburg, Germany, in 1998, followed by a Ph.D. in experimental physics from the University of Zurich, Switzerland, in 2002, where his thesis focused on determining the gravitational constant. From 2002 to 2010, he worked at the University of Washington, conducting experimental tests of the equivalence principle.

In 2010, Stephan joined the National Institute of Standards and Technology (NIST), where his research centered on the watt balance, a key tool in redefining the kilogram. He became the group leader of NIST's Fundamental Electrical Measurement Group in 2016. He also taught physics at the Regensburg University of Applied Sciences from 2017 to 2018.

Since the Fall of 2018, Stephan has continued his work as a physicist at NIST, focusing on the realization of the unit of mass and impedance measurements. Throughout his career, he has achieved the rare feat of determining both the gravitational constant and Planck's constant twice.

9:55 - 10:00
IMS A Family Announcement by Shervin Shirmohammadi
Room: Carlowitz-Saal

10:00 - 10:30
Coffee Break
Room: Silva-Foyer + Stadthallen-Foyer

10:30 - 12:30
Sensors and Transducers
Room: Lichtenwalde
Session Chairs: Daniel Otto and Alessandro Mingotti

Active ultrasonic measurements for machine condition monitoring
Marcel Jongmanns (Fraunhofer IPMS, Germany)

Comparative Analysis of Acceleration Sensors for Precision Measurement Applications
Daniel Otto, Michael Eiserbeck and Daniel Käßler (Leipzig University of Applied Sciences, Germany); Gerold Bausch (HTWK Leipzig, University of Applied Sciences, Germany)

An Improved Thin-film Multijunction Thermocouple for the Application in a Calorimetric Thermal Voltage Converter
Krzysztof Kubiczek and Michał Pecyna (Silesian University of Technology, Poland); Marian Kampik (Politechnika Slaska / Silesian University of Technology, Poland); Kordian Dudzik (Silesian University of Technology, Poland)

AT-Cut Quartz Piezoelectric Resonant Hydrogen Sensor Based on Palladium-Hydrogen Adsorption Effect
Haidong Jia (Network Group (Xinjiang) United Pipeline Co., Ltd., China); Hai Xiang (University of Electronic Science and Technology of China, China); Hui Ma (Network Group (Xinjiang) United Pipeline Co., Ltd, China); Jie Zhang (Network Group (Xinjiang) United Pipeline Co., Ltd., China); Libing Bai and Cong Chen (University of Electronic Science and Technology of China, China)

Individual or Group Error Compensation: An Experimental Demonstration on the Frequency Response of Rogowski Coils
Christian Betti, Alessandro Mingotti, Roberto Tinarelli and Lorenzo Peretto (University of Bologna, Italy); Jan Meyer (TUD Dresden University of Technology, Germany)

Temperature Dependence Analysis of the Electrokinetic Process in Liquid Circular Angular Accelerometers
Simai Wang, Meiling Wang and Zitian Xiong (Beijing Institute of Technology, China)

10:30 - 12:30
SPS: I&M for reliable and safe applications to support Digital Transformation
Room: Augustusburg 1-3
Session Chairs: Lorenzo Ciani and Loredana Cristaldi

A single-point EIS measurement for SOC estimation of supercapacitor
Valentina Bianchi (University of Parma, Italy); Fabio Canzanella (University of Florence, Italy); Sadia Ali (University of Parma, Italy & University of Bologna, Italy); Ilaria De Munari (University of Parma, Italy); Lorenzo Ciani and Gabriele Patrizi (University of Florence, Italy)

Influence of relaxation time on Electrochemical Impedance Spectroscopy measurements in Electric Vehicle charger
Gabriele Patrizi, Fabio Canzanella, Alessandro Bartolini and Lorenzo Ciani (University of Florence, Italy)

T2Net: An Attention-Enhanced Network for Trustworthy Thermal Imaging-Based Lubrication System Condition Assessment
Tianlei Wang, Jiaxin Ren, Ke Feng and Chenye Hu (Xi'an Jiaotong University, China); Zhibin Zhao (The State Key Laboratory for Manufacturing Systems Engineering, China); Ruqiang Yan (Xi'an Jiaotong University, China)

A Data Pipeline to Classify PCB Welding Defects on Noisy Data
Luca Martiri, Andrea Moschetti, Emilia Lenzi, Marco Zanoni, Loredana Cristaldi, Letizia Tanca and Davide Martinenghi (Politecnico di Milano, Italy)

A compound fault diagnosis method based on health state feature decoupling
Hong Xu (Xi an Jiaotong University, China); Chenye Hu, Yasong Li, Yuangui Yang, Jiaxin Ren and Ruqiang Yan (Xi'an Jiaotong University, China)

Resilient RuralAI using Hierarchical Federated Learning to Forecast Soil Water Levels
Shaleeza Sohail (The University of Newcastle, Australia); Gabriel Mercier (Ecole Polytechnique, Palaiseau, France); Melanie Ooi (University of Waikato, New Zealand); Kelvin Law (Kacific Broadband Satellites Ltd, Australia); Boyang Li (The University of Newcastle, Australia); Harish Devaraj (University of Waikato, New Zealand)

10:30 – 12:30
I&M for the Energy and Power Industry
Room: Rabenstein
Session Chairs: Ferdinanda Ponci and Jan-Philipp Kitzig

Dual Battery Control for In-Situ Impedance Spectroscopy during Variable Load Demand
Roberto Ferrero and Milosz Wolos (University of Liverpool, United Kingdom (Great Britain))

Embedding PMU Algorithms in Grid-Following Converters: a Feasibility Study
David Macii, Atul Singh and Dario Petri (University of Trento, Italy)

Inference of the Lithium-ion Battery internal structure from ultrasonic impulse response
Shihao Liu, Chao Tan, Yong Bao and Feng Dong (Tianjin University, China)

Characterizing the Harmonic Measurement Accuracy of Voltage Transformers: The Role of the Number of Test Waveforms
Adriano Demetrio, Marco Faifer, Christian Laurano, Roberto Ottoboni and Sergio Toscani (Politecnico di Milano, Italy)

On the Variability of Random Errors Distribution in PMUs: An Experimental Characterization
Paolo Castello, Carlo Muscas, Paolo Attilio Pegoraro, Davide Sitzia and Sara Sulis (University of Cagliari, Italy)

An Encoder-Decoder LSTM Network for Load Forecasting in Building Power Systems
Simone Mari (University of L'Aquila, Italy); Patricio Donato (CONICET & National University of Mar del Plata, Argentina); Álvaro Hernández Alonso (University of Alcala, Spain); Edoardo Fiorucci (University of L'Aquila, Italy)

10:30 - 19:00
Exhibit Hall Open
Room: Silva-Foyer + Stadthallen-Foyer

10:30 - 12:30
Signal Processing for I&M (I)
Room: Terra & Radixor
Session Chairs: Grazia Iadarola and Antonio Moschitta

Unsupervised Learning of Physical Effort: proposal of a simple metric for wearable devices
Grazia Iadarola (Polytechnic University of Marche, Italy); Gloria Cosoli (Università eCampus, Italy); Lorenzo Scalise (Università Politecnica delle Marche, Italy); Susanna Spinsante (Università Politecnica Delle Marche, Italy)

A time-delay unsaturated bistable stochastic resonance system and its application in weak signal detection
Yifan Wang, Li Wang, Fan Wu and Bo Xu (University of Electronic Science and Technology of China, China)

A Closed-form Eigenmode-based DoA Estimation using Uniform Circular Array
Meng Jiang and Chibuzo J Nnonyelu (Mid Sweden University, Sweden); Marco Carratù (University of Salerno, Italy); Marianthi Adamopoulou, Goran Thungstrom and Jan Lundgren (Mid Sweden University, Sweden)

Improving Reliability in Additive Manufacturing through Imputation
Steven W Thompson and Maciej Zawodniok (Missouri University of Science and Technology, USA); Michkath Omanda Bouraima (Missouri University of Science & Technology, USA)

Gravity-Based Calibration for In-Situ Acceleration Sensors
Robert Thiel (HTWK Leipzig University of Applied Sciences, Germany); Robert Fromm and Florian Strakosch (Leipzig University of Applied Sciences, Germany); Jens Jäkel (HTWK Leipzig University of Applied Sciences, Germany); Faouzi Derbel (Leipzig University of Applied Sciences, Germany)

Compressive Sensing-based Pruning of Frequency-Domain Volterra Models
Christian Laurano and Sergio Toscani (Politecnico di Milano, Italy); Paolo Attilio Pegoraro and Antonio Vincenzo Solinas (University of Cagliari, Italy)

10:30 – 12:30
I&M in Medical, Biomedical and Healthcare Systems (I)
Room: Carlowitz-Saal
Session Chairs: Gianfranco Miele and Bruce Wallace

Multi-element and Multi-organ Heavy Metal Measurements Using ICP-MS - A Contribution to Reference Value Generation in Human Tissues
Heidi Fleischer and Sybille Horn (University of Rostock, Germany); Jan Jordan Bruckhaus, Annett Klinder and Christoph Lutter (University Medical Center Rostock, Germany); Wolfram Mittelmeier (Universität Rostock, Germany); Andreas Büttner (University Medical Center Rostock, Germany); Kerstin Thurow (Center for Life Science Automation - CELISCA, Germany)

Photoplethysmography Signal Quality Assessment Using Instantaneous Harmonic Analysis via Taylor-Fourier Method
Sahar Rahbar and Roberto Ferrero (University of Liverpool, United Kingdom (Great Britain)); Sergio Toscani and Sina Ronaghi (Politecnico di Milano, Italy); Paolo Attilio Pegoraro (University of Cagliari, Italy)

Enhancing QCM-D Sensitivity for Biosensing Applications through Novel Transient Signal Processing
Elia Landi, Ada Fort, Marco Mugnaini and Valerio Vignoli (University of Siena, Italy); Vincenzo Paciello (University of Salerno, Italy); Salvatore Dello Iacono (University of Brescia, Italy)

NFS2ECG: Estimation of Electrocardiogram Signal Waveforms from Near-Field Sensing on Chest Wall
Shun Hinatsu (Mitsubishi Electric Corporation, Japan); Saki Wada (MitsubishiElectric corp., Japan)

Method for the Measurement of the Dicrotic Notch in the Photoplethysmogram Signal
Phillippe Forster, Brady Laska and Rafik Goubran (Carleton University, Canada); Bruce Wallace (AGE-WELL NIH SAM3, Canada & Carleton University, Canada); Peter Liu and Heidi Sveistrup (University of Ottawa, Canada)

An Inertial Multi-Joint Approach for Arm Gesture Recognition
Bruno Ando, Mattia Manenti and Salvatore Baglio (University of Catania, Italy)

12:30 - 13:30
Lunch
Room: Silva-Foyer + Stadthallen-Foyer

The Nondestructive Evaluation and Industrial Inspection (NDE&II) technical committee (TC-01) would like to invite all interested conference attendees to joins us for a lunch meeting. We will socialize and discuss what activities we would like to pursue to advance advantageous NDE&II technology. Several tables will be reserved for NDE&II in the luncheon area. Please look for us.

12:30 - 13:30
Redefining Feminism: Women's Perspectives in Engineering and Science
Room: Terra & Radixor

Professor Karin Leistner

This session begins with a short talk from a speaker who shares her personal perspective as a woman in engineering, including real experiences, common misconceptions, and what feminism means within the context of science and engineering. Her story sets the tone for an open and thoughtful conversation. After the talk, participants will take part in a light icebreaker and small-group discussions to unpack common myths about feminism in STEM. The conversation continues with a panel that includes both women and men, offering different viewpoints on workplace realities and the meaning of inclusion. The presence of men in this discussion brings valuable perspective and helps open up new ways of thinking about equity and progress. The session wraps up with shared insights, reflections, and time for informal networking.

13:30 - 14:25
Plenary Presentation #2
Room: Carlowitz-Saal

Micro-origami robots: From single agents to microelectronic morphogenesis

Analogous to nature with its biological cells as basic building blocks for myriads of different lifeforms, tiny modular microrobots show great potential for creating artificial life based on microelectronic morphogenesis of non-biological material modules [1]. The talk will show how self-folded micro-origami robots make large leaps forward in self-assembling electronic nanomembrane materials into finely grained artificial units, that are solar powered, motile, and self-aware with on-board electronic control. They are made of soft material scaffolds with tiny Si CMOS chiplets sitting between the folds, for a massive increase in information processing capabilities. They can communicate, dock together and configure into larger entities like simple forms of artificial organisms [2]. This talk reports on our previous work on self-folding [3] and self-locomoting [4] thin film electronic modules and addresses key challenges in the field of microrobotics such as micromanipulation and force sensing well beyond state of the art [5] as well as energy storage with tiny on-board integrated batteries and biosupercapacitors [6-8]. The impact of these disruptive developments will be addressed for various application scenarios.

Oliver G. Schmidt
Chemnitz University of Technology, Chemnitz, Germany
Research Center for Materials, Architectures and Integration of Nanomembranes (MAIN)

Biography: Oliver G. Schmidt is the Scientific Director of the Research Center for Materials, Architectures and Integration of Nanomembranes (MAIN) and holds the Chair of Material Systems for Nanoelectronics at the Chemnitz University of Technology, Germany. He is an elected member of the German Academy of Science and Engineering and has received numerous international prizes and awards: Among them the Otto-Hahn Medal from the Max-Planck-Society in 2000, the Philip-Morris Research

Award in 2002, the Carus-Medal from the German Academy of Natural Scientists Leopoldina in 2005, the International Dresden Barkhausen Award in 2013, the Gottfried Wilhelm Leibniz-Prize of the German Research Foundation in 2018, and an Advanced Grant of the European Research Council (ERC) in 2019. He is a pioneer in micromachining microrobotics and has made major scientific contributions to small scale energy storage devices, flexible electronics and integrated microsystems for biomedical applications.

14:25 - 14:30
I&M Chapters Announcements by Octavian Postolache
Room: Carlowitz-Saal

14:30 - 15:30
Coffee Break and Poster Session
Room: Silva-Foyer + Stadthallen-Foyer
Session Chairs: Chun-Jen Weng and Trent Moritz

1: A Non-Intrusive AC Series Arc Fault Detection Embedded System Based on TMR Sensor
Jiang Shuai, Hongshuo Fu, Bing Liu, Hongtao Yin, Qiao Jiaqing and Feng Lei (Harbin Institute of Technology, China)

2: SUBVO Dataset: Analyzing Feature Extraction for Underwater Monocular Visual Odometry
Arman Neyestani and Francesco Picariello (University of Sannio, Italy); Daniel M Toma (Technical University of Catalonia, Spain); Ahmad Falahzadeh (Universitat Politecnica de Catalunya (UPC), Spain); Pasquale Daponte (University of Sannio, Italy); Joaquin del Rio (Universitat Politecnica de Catalunya, Spain); Luca De Vito (University of Sannio, Italy)

3: A Mass Sensor Utilizing Dissolvable Piezo-Ionic Pullulan Compound
Carlo Trigona and Andrea D'Amico (University of Catania, Italy); Giovanna Di Pasquale (Università degli Studi di Catania, Italy); Salvatore Graziani (University of Catania, Italy); Antonino Pollicino (Univesrità di Catania, Italy)

4: Deep Learning Solution For Point Source Holographic Cloud Droplet Imaging
Eero O. Molkoselkä, Ville Kaikkonen and Anssi Mäkynen (University of Oulu, Finland)

5: Measurement System for Wetsuits Thermal Characterization
Gianluca Crotti and Roberto Cantù (Politecnico di Milano, Italy); Gianluca Gatti and Hossein Shabanalinezhad (University of Calabria, Italy); Minh Long Hoang and Giovanni Chiorboli (University of Parma, Italy); Christian Laurano, Francesco Casella and Cesare Svelto (Politecnico di Milano, Italy)

6: Deep Residual Reconstruction Network for Electromagnetic Tomography
Qingli Zhu (Fujian Agriculture and Forestry University, China); Yong Li (Fujian Police College, China)

7: Microcrack Detection in Nickel-based Superalloy GH4169 Using Eddy Current-TMR Testing
Zhaoyuan Xu, Jianbo Wu and Erlong Li (Sichuan University, China); Zhe Wang, Jian Tang and Yuanhong Tao (Hefei General Machinery Research Institute Co., Ltd., China)

8: Tool Condition Monitoring of Turning Inserts Using an Eddy Current Sensor
Kalle Kinnunen and Raine Viitala (Aalto University, Finland)

9: Analysis of the Motion-induced Eddy Current Effect in High-speed EMAT Testing
Yiru Xiao, Yini Song and Kai Wang (Huazhong University of Science and Technology, China); Jun Tu (Hubei University of Technology, China); Yihua Kang and Bo Feng (Huazhong University of Science and Technology, China)

10: Active Microwave-Thermographic Signal Reconstruction
Logan M Wilcox, Emma T Bohannon and Kristen M Donnell (Missouri University of Science and Technology, USA)

11: Performance assessment of grid frequency measurements in a smart power quality meter
Lorenzo Ciani, Alessandro Bartolini, Fabio Canzanella, Leandro Calandroni, Francesco Grasso and Gabriele Patrizi (University of Florence, Italy)

12: Reference-free damage imaging for quasi-isotropic structures using Lamb wave based on path matching
Muchao Zhang (Instituto de Telecomunicações & Instituto Superior Técnico, University of Lisbon, Portugal); Mohsen Barzegar (Instituto de Telecomunicações, Portugal); Dario J. Pasadas (Instituto Telecomunicações & Instituto Superior Técnico, Portugal); Artur L. Ribeiro (Instituto de Telecomunicações & Instituto Superior Técnico, University of Lisbon, Portugal); Helena G. Ramos (Instituto de Telecomunicacoes, Instituto Superior Tecnico, Portugal)

13: Fabrication of Linear Dense Array Sensors and Impact Localization
Liuyang Zhang (Xi'an Jiaotong University, China); Wenkang Li (Xi'an Jiaotong University); Xingyu Wang (Xi'an Jiaotong University, China)

14: A Data-driven Accuracy Estimation Method for Calibration Devices on an Automatic Verification Assembly Line for Smart Meters
Zemin Qu, Yang Jiao and Hongbin Li (Huazhong University of Science and Technology, China); Gai Jiang (Huazhong University of Science and Technology & School of Electrical and Electronic Engineering, China); Hang Yang (Huazhong University of Science and Technology, China); Ziqin Gao (The Chinese University of Hong Kong, Shenzhen, China)

15: Quantitative Nondestructive Evaluation of Defects by Double D-shaped Probes in Eddy Current System
Lei Zhang (Xi'an Jiaotong University, China & Newcastle University, United Kingdom (Great Britain)); Bing Li (Xi'an Jiaotong University, China); Changrong Yang and Peilin Hui (Newcastle University, United Kingdom (Great Britain)); Lei Chen (Xi'an Jiaotong University, China); Guiyun Tian (Newcastle University & University of Electronic Science and Technology of China, United Kingdom (Great Britain))

16: Principal Component Analysis based Corrosion Characterization under Coating Using Pulse Thermography
Peilin Hui (Newcastle University, United Kingdom (Great Britain)); Qiuji Yi (Northumbria University, United Kingdom (Great Britain)); Changrong Yang (Newcastle University, United Kingdom (Great Britain)); Lei Zhang (Xi'an Jiaotong University, China & Newcastle University, United Kingdom (Great Britain)); Wenjie Li (Newcastle University, United Kingdom (Great Britain)); Guiyun Tian (Newcastle University & University of Electronic Science and Technology of China, United Kingdom (Great Britain))

17: Harmonic Measurement in DC: a Case for Synchrophasors
Cesar Andres Cazal (RWTH Aachen University & Institute for Automation of Complex Power Systems, Germany); Yoga Kannan (Institute for Automation of Complex Power Systems, RWTH Aachen University, Germany); Davide Sitzia (University of Cagliari, Italy); Guglielmo Frigo (Swiss Federal Institute of Metrology METAS, Switzerland); Paolo Attilio Pegoraro (University of Cagliari, Italy); Ferdinanda Ponci (RWTH Aachen University, Germany); Antonello Monti (RWTH Aachen University & Institute for Automation of Complex Power Systems, Germany)

18: Accelerated Fault Detection in HVDC Networks using Cable Joints Instrumented with Photonic Current Sensors
Alfred Amiolemen (University of Strathclyde, United Kingdom (Great Britain) & Ambrose Alli University, Nigeria); Grzegorz Fusiek (University of Strathclyde, United Kingdom (Great Britain)); Pawel Niewczas (University of Strathclyde & Synaptec Ltd, United Kingdom (Great Britain)); Adam Dysko (University of Strathclyde, United Kingdom (Great Britain))

19: Design and Implementation of a Wireless Sensor Network for Water Resource Management
Vasco Luz (Instituto Superior Técnico, Portugal); Pedro Faria (Instituto de Telecomunicações, Portugal); Luís Soldado Rosado (Instituto Superior Técnico, Portugal & Instituto de Telecomunicações, Portugal); Fernando M Janeiro (Instituto de Telecomunicações, Portugal & Universidade de Évora, Portugal); Pedro M Ramos (Instituto de Telecomunicações, Portugal & Instituto Superior Técnico, Universidade de Lisboa, Portugal); Alessio De Angelis, Antonio Moschitta, Paolo Carbone, Silvia Meniconi, Caterina Capponi, Bruno Brunone and Paolina Bongioannini Cerlini (University of Perugia, Italy)

20: Tilt Effects in Pulsed Eddy Current Measurements
Kuohai Yu and Rui Guo (University of Manchester, United Kingdom (Great Britain)); Saibo She (The University of Manchester, United Kingdom (Great Britain)); Lei Xiong, Xinnan Zheng and Xun Zou (University of Manchester, United Kingdom (Great Britain)); Wuliang Yin (The University of Manchester, United Kingdom (Great Britain))

21: ECG and EEG Analysis of Brain-Heart Interactions During Seizure Episodes
Yasir Hussain (Brno University of Technology, Czech Republic)

22: 3D On-chip Network Structure and Routing Algorithm for Large-scale Neuromorphic System
Kuanchuan Wang, Jiang Wang, Xinyu Hao and Chen Liu (Tianjin University, China)

23: Enhancing Generalization in PPG-Based Emotion Measurement with a CNN-TCN-LSTM Model
Karim Alghoul (University of Ottawa, Canada); Hussein Al Osman (University of Ottawa, USA); Abdulmotaleb El Saddik (University of Ottawa, Canada)

24: Real-time estimation of space magnetic field for magnetocardiographic devices
Shengjie Qiu, Jiqiang Tang and Kun Liu (Beihang University, China); Lu Zhang (Hangzhou Institute of National Extremely-Weak Magnetic Field Infrastructure, China)

25: A novel instrument for characterising the electrical properties of dry granular-porous materials
Nicola Papini (University of Perugia, Italy); Carmine Villani Delle Vergini (Sapienza University of Rome, Italy); Pisana Placidi, Andrea Scorzoni and Manuela Cecconi (University of Perugia, Italy); Alessandro Tarantino (University of Strathclyde, United Kingdom (Great Britain))

26: Magnetic Field Adjustment Method for Magnetic Shielding Room Based on Demagnetization
Kun Liu, Haitao Li, Shengjie Qiu, Moyu Li, Haifeng Zhang and Shiqiang Zheng (Beihang University, China); Fengwen Zhao (Hangzhou Institute of Extremely-Weak Magnetic Field National Infrastructure, China); Xiangyang Ye (Beihang University, China)

27: DSP-based Electrical Impedance Tomography Device: Implementation and Experiments
Anar Abdullayev, Marek Rist, Margus Metshein and Olev Martens (Tallinn University of Technology, Estonia)

28: MDAE-GraphSage Network-based Intelligent Fault Diagnosis for Harmonic Drive under Multiple Unknown Working Conditions
Xu Tan, Jiaxian Chen and Guolin He (South China University of Technology, China); Shupeng Tan (Midea Group Industrial Technology Research Institute, China); Yan Shao and Weihua Li (South China University of Technology, China)

29: Sleep Position Classification using Transfer Learning for Bed-based Pressure Sensors
Olivier Papillon (University of Carleton, Canada); James R Green and Rafik Goubran (Carleton University, Canada); Julien Larivière-Chartier (Bruyère Research Institute, Canada); Caitlin Higginson (University of Ottawa, Canada); Frank Knoefel (Bruyere Continuing Care, Canada); Rebecca Robillard (University of Ottawa, Canada)

30: Exploiting Hyperspectral Imaging for Spatial-Spectral Characterization of Advanced Display Elements
Guo-Hao Lu (Taiwan Instrument Research Institute, Taiwan & National Applied Research Laboratories, Taiwan); Yu-Hsing Lin (Taiwan Instrument Research Institute, Taiwan); Teng-I Yang (Taiwan Instrument Research Institute and National Applied Research Laboratories, Taiwan); Chi-Hung Hwang (Taiwan Instrument Research Institute, NARLabs, Taiwan); Cheng-Tang Pan (National Sun Yat-sen University, Taiwan); Yung-Fu Chen (National Yang Ming Chiao Tung University, Taiwan); Chun-Jen Weng (Taiwan Instrument Research Institute & National Applied Research Laboratories, Taiwan)

31: Noise-assisted Nonlinear Squeezing Transform for Rotating Machinery Fault Diagnosis
Yiming Zheng (Xi'an Jiaotong University, China); Shibin Wang (The State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, China); Baoqing Ding (Xian Jiaotong University China, China); Xuefeng Chen (Xian Jiaotong University, China); Robert Gao (Case Western Reserve University, USA); Ruqiang Yan (Xi'an Jiaotong University, China)

32: Design of an Adaptive Electrochromic Measurement and Control System
Zixiang Zheng, Wenbin Zheng, Ping Fu, Qiao Jiaqing and Li Wang (Harbin Institute of Technology, China)

33: High-Precision Portable Microcontroller-Based Voltammetry Potentiostat with Noise Reduction for Electrochemical Sensors
Ammar Al-Hamry, Salem Nasraoui, Ahmed Yahia Kallel and Olfa Kanoun (Chemnitz University of Technology, Germany)

34: Two New Detection Field Partitioning Methods for Electrical Impedance Tomography Based on Intersection Line Model
Honghao Qu and Yue (Tianjin University, China); Yuwei Zhao (Tianjin University Tianjin, China)

35: ECTAR: An Integrated Augmented Reality and Eddy Current Array System for Non-destructive Testing of Metallic Plate
Ruoxuan Zhu (University of Manchester, United Kingdom (Great Britain)); Saibo She (The University of Manchester, United Kingdom (Great Britain)); Tian Meng, Xinnan Zheng and Anthony Peyton (University of Manchester, United Kingdom (Great Britain)); Wuliang Yin (The University of Manchester, United Kingdom (Great Britain))

36: Linearization of Magnetic Shielding Room Model based on Second-order Variable Phaser
Zhouqiang Yang (BEIHANG University, China & The School of Instrumentation and Optoelectronic Engineering, China); Peiling Cui and Yanbin Li (Beihang University, China)

37: Design of a Microcontroller-Based Low-Power Bioimpedance Spectroscopy Measurement System
Cherif Ouni (Technische Universität Chemnitz, Germany); Nour Ammar (Control and Energy Management Laboratory & Measurement and Sensor Technology, Germany); Xing Duoxiao (Technische Universität Chemnitz, Germany); Ahmed Yahia Kallel (Chemnitz University of Technology, Germany); Ahmed Fakhfakh (Laboratory of Technologies for Smart Systems, Digital Research Center of Sfax, Tunisia); Nabil Derbel (Sfax University, Tunisia); John T Horstmann and Olfa Kanoun (Chemnitz University of Technology, Germany)

38: Ray Tracing Modelling Using LiDAR 3D Scans for Rapid Acoustical Measurement and Simulation
Amir Laghai and Brady Laska (Carleton University, Canada); Bruce Wallace (AGE-WELL NIH SAM3, Canada & Carleton University, Canada); Rafik Goubran (Carleton University, Canada)

14:30 - 15:30
TIM/OJIM Poster Session
Room: Silva-Foyer + Stadthallen-Foyer
Session Chairs: Roberto Ferrero and Reza Zhoughi

39: W6DNet: Weakly Supervised Domain Adaptation for Monocular Vehicle 6-D Pose Estimation With 3-D Priors and Synthetic Data
Yangxintong Lyu, Remco Royen and Adrian Munteanu (Vrije Universiteit Brussel, Belgium)

40: Multiloop Feedback Compensation-Based Photometer Circuit
Wilmar Hernandez (Universidad de Las Americas, Ecuador); Francisco Jose Arques-Orobon (Universidad Politecnica de Madrid, Spain); Vicente González Posadas (Polytechnic University of Madrid, Spain); Jose Luis Jimenez-Martin (Universidad Politecnica de Madrid, Spain)

41: A Time-Series Data-Driven Method for Milling Force Prediction of Robotic Machining
Kai Wu and Ruyi Huang (South China University of Technology, China); Bernd Kuhlenkötter (Ruhr-Universität Bochum, Lehrstuhl für Produktionssysteme (LPS), Germany); Weihua Li (South China University of Technology, China)

42: Optical Parameter Decoupling and Optimization for Elliptically Polarized Atomic Magnetometer
Yifan Yan (Beihang University & Hefei National Laboratory, China); Zehua Liu (Beihang University, China); Ying Zhou (Hangzhou Innovation Institute, Beihang University, China); Jixi Lu (Beihang University, China)

43: Femtotesla Spin-Exchange Relaxation-Free Atomic Magnetometer With a Multipass Cell
Yibo Qi (Beihang University, China & Hefei National Laboratory, China); Jixi Lu and Shuying Wang (Beihang University, China)

44: A Structure Modality Enhanced Multimodal Imaging Method for Electrical Impedance Tomography Pressure Distribution Measurement
Huaijin Chen (Vrije Universiteit Brussel, Belgium)

45: Linearization of Intermodulation Distortion Using a Derivative Extended Model and Three-Tone Signal Identification
Stanislas Dubois, Bruno Lelong and Jean-Michel Hodé (Thales DMS, France); Guillaume Ferré (University of Bordeaux, France); Dominique Dallet (IMS Laboratory - Bordeaux INP - University Bordeaux, France)

46: Hardware Prototype of a Time-Encoding Sub-Nyquist ADC
Hila Naaman (Weizmann Institute of Science, Israel)

47: A Gaussian process regression-based multi-target orientation compensation algorithm for distance measurement
Junxi Tian (Harbin Institute of Technology, China & Control and Simulation Center, China); Ming Yang (Control and Simulation Center, Harbin Institute of Technology (HIT), China); Ping Ma and Tao Chao (Control and Simulation Center, Harbin Institute of Technology, China)

48: Visual-Inertial Fusion With Depth Measuring for Hyper-Redundant Robot's End Under Constrained Environment
Haoyi Song, Jiangqin Deng, Weichao Guo and Xinjun Sheng (Shanghai Jiao Tong University, China)

49: Study of CCD Mosaicking Technique Based on Error Accumulation Model for WFST
Jun Zhang, Feng Zeng, Jian Wang, Hongfei Zhang, Yihao Zhang and Jinting Chen (University of Science and Technology of China, China)

50: Image-based visual servoing with collision-free path planning for monocular vision-guided assembly
Zhiyuan Chen, Tiemin Li and Yao Jiang (Tsinghua University, China)

51: Discrete Interval Binary Sequence for Stable and Stationary Impedance Spectroscopy of Li-Ion Batteries
Ahmed Yahia Kallel (Chemnitz University of Technology, Germany); Amin Fischer (TU Chemnitz, Germany); Olfa Kanoun (Chemnitz University of Technology, Germany)

52: Enhancing Shear Horizontal Wave Generation With a Multilayer Coil Electromagnetic Acoustic Transducer
Ambuj Kumar Gautam (Osaka University, Japan); Ching-Chung Yin (National Yang Ming Chiao Tung University Taiwan, Taiwan); Bishakh Bhattacharya (IIT Kanpur, India)

15:30 - 17:30
SPS: Inertial Measurement Units: From Testing and Characterization of MEMS Sensors to Advanced Position and Orientation Estimation Algorithms
Room: Lichtenwalde
Session Chairs: Gabriele Patrizi and Marco Carratù

[INVITED] On the use of robotic arms for performance assessment of inertial sensors for detection of neurodegenerative diseases
Giorgio de Alteriis

Compensation of thermal drifts on MEMS Inertial Measurement Unit using package underfilling
Gabriele Patrizi (University of Florence, Italy); Marco Carratù (University of Salerno, Italy); Karsten Meier (Technische Universität Dresden, Germany); Paolo Sommella (University of Salerno, Italy); Antonio Pietrosanto (University of Salerno & CEO of Metering Research srl, Italy); Karlheinz Bock (Technische Universität Dresden, Germany); Lorenzo Ciani (University of Florence, Italy)

A study on a wireless and low power implementation of a new approach for structural Health Monitoring
Valentina Bianchi (University of Parma, Italy); Edoardo Graiani (University of Parma & UNIPR, Italy); Carlotta Rossi, Stefano Pavoni and Michele Caselli (University of Parma, Italy); Andrea Boni (Università di Parma, Italy); Ilaria De Munari and Marcello Vanali (University of Parma, Italy)

Impact of Accelerated Life Testing on the Metrological Performance of Commercial MEMS Accelerometers
Vincenzo Gallo, Marco Carratù and Valter Laino (University of Salerno, Italy); Roberto Singuaroli, Lorenzo Ciani and Gabriele Patrizi (University of Florence, Italy); Paolo Sommella (University of Salerno, Italy); Antonio Pietrosanto (University of Salerno & CEO of Metering Research srl, Italy)

Design of an IMU Based Wearable Measurement System for Rapid Events
Diego Valdés Tirado and Gonzalo García Carro (Universidad de Oviedo, Spain); Juan Carlos Álvarez, Alejandro Castellanos Alonso, Diego Álvarez and Antonio Miguel López (University of Oviedo, Spain)

Evaluation of Magnetometer-Less Inertial Sensors for Static Spatial Orientation Estimation
Alejandro Castellanos Alonso (University of Oviedo, Spain); Gonzalo García Carro (Universidad de Oviedo, Spain); Juan Carlos Álvarez, Diego Álvarez and Antonio Miguel López (University of Oviedo, Spain)

15:30 – 17:30
Advances in Gas Sensing and Environmental Monitoring: Technologies and Challenges
Room: Augustusburg 1-3
Session Chairs: Giovanni Gugliandolo and Wilmar Hernandez

Pulsed excitation of eigenmode in photoacoustic resonators for gas sensing
Enza Panzardi, Ada Fort, Marco Mugnaini, Valerio Vignoli, Tunahan Vatansever and Alberto Pompanin (University of Siena, Italy)

On the sensing properties of Nb2O5 films prepared by pulsed laser deposition
Leonardo Iannucci (Politecnico di Torino, Italy); Mariangela Latino (Institute for Chemical and Physical Processes - IPCF CNR, Italy); Giovanni Gugliandolo (University of Messina, Italy); Premysl Fitl and Martin Vrnata (Institute of Chemical Technology in Prague, Czech Republic); Sabrina Grassini (Politecnico di Torino, Italy); Nicola Donato and Laura Arruzzoli (University of Messina, Italy); Marco Parvis and Luca Lombardo (Politecnico di Torino, Italy)

Sensor for Acoustic Emission Sensing on High Voltage Lines
Nadja Hölzl, Markus Neumayer and Thomas Bretterklieber (Graz University of Technology, Austria); Oliver Pischler (Technische Universität Graz, Austria)

Deep learning supported length measurement algorithm of seals from drone images
Stephan Hussmann, Michael Harslem, Leif Ole Harders and Felix Zilske (West Coast University of Applied Sciences, Germany); Marc Schnurawa and Anna Kersten (BioConsult SH GmbH & Co. KG, Germany)

Forecasting CO2 concentration in a classroom
Wilmar Hernandez (Universidad de Las Americas, Ecuador); Norberto Cañas (Universidad Politecnica de Madrid, Spain)

Contrastive Learning-based Domain Adaptive Adversarial Autoencoder for Solid-Phase Fraction in Pipe
Zifan Zhao and Yue (Tianjin University, China); Yuwei Zhao (Tianjin University Tianjin, China)

15:30 – 17:30
Circuits and Embedded Systems for I&M
Room: Rabenstein
Session Chairs: Wuliang Yin and Theodore Antonakopoulos

An Low-Power Embedded System for Long Term Measurements of Compressive Stresses in Solids
Vincent Gunnar Weiß (Hochschule für Technik, Wirtschaft und Kultur, Leipzig, Germany); Michael Eiserbeck (Leipzig University of Applied Sciences, Germany); Eric Fischer (Research- and Transfer Centre Leipzig e.V., Germany); René Sallier (Leipzig University of Applied Sciences, Germany); Gerold Bausch (HTWK Leipzig, University of Applied Sciences, Germany)

A Distributed Emulation Environment for In-Memory Computing Systems
Eleni Bougioukou, Anastasios Petropoulos, Nikolaos Toulgaridis, Theodoros Chatzimichail and Theodore A. Antonakopoulos (University of Patras, Greece)

FPGA Implementation of IEC61000-4-30 Quasi-Peak meter with CORDIC Algorithm
Philippe Blanchard (Université du Québec à Trois-Rivières, Canada); Manouane Caza-Szoka (Universite du Quebec a Trois-Rivieres, Canada & UQTR, Canada); Roger Bergeron (Les Services Électrigenies, Canada); Daniel Massicotte (Universite du Quebec a Trois-Rivieres, Canada)

Real-Time FPGA Estimation of Eddy Currents and Hysteresis in Axisymmetric Inductors
Oliver Donald Munroe and Michel Lemaire (Université du Québec à Trois-Rivières, Canada); Daniel Massicotte (Universite du Quebec a Trois-Rivieres, Canada)

Linearity Testing of Precision Analog-to-digital Converters using Low-precision Stimulus Generators
Aswin Raj (Texas Instruments, India)

Ultra Low Noise, High Bandwidth Capacitive Transimpedance Amplifier for Scanning Tunneling Microscopy
Julian Gustav Jasper Kulenkampff (Technische Universität Darmstadt, Germany); Andreas Kramer and Klaus Hofmann (TU Darmstadt, Germany)

15:30 – 17:30
SPS: Ultra-low power and energy-autonomous wireless sensor systems
Room: Terra & Radixor
Session Chairs: Alessandro Pozzebon and Sebastian Bader

[INVITED] Energy-aware and Collision-avoidance LoRaWAN Communication for Intermittent Sensor Systems
Domenico Balsamo

Fitting Wake-Up Radio Communication in ISM Bands by Employing Signal Shaping
Robert Fromm (Leipzig University of Applied Sciences, Germany); Olfa Kanoun (Chemnitz University of Technology, Germany); Faouzi Derbel (Leipzig University of Applied Sciences, Germany)

A Novel AC-AC Converter for Inductive Power Transfer Applications
Abdallah Adawy (Technische Universität Chemnitz, Germany & Jordan University of Science and Technology, Jordan); Ghada Bouattour (Leuphana University Lueneburg, Germany); Mohammed Ibbini (Jordan University of Science and Technology, Jordan); Olfa Kanoun (Chemnitz University of Technology, Germany)

Thermoelectric Generators (TEGs) for Smart Waste Management: an Energy Self-Sufficient Wireless Monitoring Platform for Smart Trash Bins
Irene Cappelli and Stefano Parrino (University of Siena, Italy); Alessandro Pozzebon (University of Padova, Italy)

Ultra-Low Power Architecture for Offline and Online Inertial Measurements
Marco Migliorini (University of Siena, Italy); Alessandro Pozzebon (University of Padova, Italy)

Development of an Ultra-Low-Power Bidirectional LoRa Backscatter Tag
Till Steinmann (University of Freiburg, Germany)

15:30 – 17:30
Digitalization, Machine Learning and Big Data for I&M (I)
Room: Carlowitz-Saal
Session Chairs: Dario Petri and Emma Angelini

Efficient Distribution-Aware Ensemble Learning for Multi-Sensor Systems
Payman Goodarzi, Julian Schauer and Andreas Schütze (Saarland University, Germany)

A comparative analysis of real-time detection algorithms for UAV-assisted maritime rescue
Felix Zilske, Leif Ole Harders and Stephan Hussmann (West Coast University of Applied Sciences, Germany)

Black-box conformity tests on regulated measuring instruments: A machine learning approach
Levin C. X. Ho (Physikalisch-Technische Bundesanstalt, Germany & Technical University Berlin, Germany); Marko Esche and Martin Nischwitz (Physikalisch-Technische Bundesanstalt, Germany); Sabine Glesner (TU-Berlin, Germany)

Lossless Compression of Supraharmonic Assessment Data through Lossy Periodic Component plus Lossless Residual Coding
Manouane Caza-Szoka (Universite du Quebec a Trois-Rivieres, Canada & UQTR, Canada); Philippe Blanchard (Université du Québec à Trois-Rivières, Canada); Roger Bergeron (Les Services Électrigenies, Canada); Daniel Massicotte (Universite du Quebec a Trois-Rivieres, Canada)

Signal First-Difference as Augmentation Method for CNN-Based Heart Sound Classification
Chibuzo J Nnonyelu and Meng Jiang (Mid Sweden University, Sweden); Vincenzo Gallo, Valter Laino and Marco Carratù (University of Salerno, Italy); Jan Lundgren (Mid Sweden University, Sweden)

Uncertainty-Driven Data Augmentation for Improved Load Time Series Forecasting
Virginia Negri (University of Bologna, Italy); Simone Mari (University of L'Aquila, Italy); Alessandro Mingotti (University of Bologna, Italy); Fabrizio Ciancetta (University of L'Aquila, Italy); Roberto Tinarelli and Lorenzo Peretto (University of Bologna, Italy)

8:30 - 10:30
SPS: Sensors Related Technologies for AIoT Applications
Room: Lichtenwalde
Session Chairs: Cheng-Tang Pan, Wen-Tse Hsiao, and Chi-Hung Hwang

Statistic Method to Optimize Artificial Intelligence for Temporalis Muscle Volumetry to Establish Taiwanese Normative Data Across Lifespan
Yao-Chung Yang (National Sun Yat-Sen University, Taiwan); Hua-Yi Tseng, Chen-Han Lin, Yow-Ling Shiue and Cheng-Tang Pan (National Sun Yat-sen University, Taiwan)

Development of Optimized Variational Quantum Circuits for Quantum Long Short-Term Memory Models Applied to Temperature Measurement Compensation for Thermal Errors in Machine Tools
Chien-Chang Chen (National Kaohsiung University of Science and Technology, Taiwan); Cheng-Tang Pan (National Sun Yat-sen University, Taiwan)

Using a Three-Dimensional Oximeter to Evaluate the Enhancement and Retention Effects of Oxygen Saturation at Different Skin Layers Under Near-Infrared Irradiation
Hsin-Yi Tsai and Jia-Wei Xu (Taiwan Instrument Research Institute National Applied Research Laboratories, Taiwan); Yu-Hsuan Lin (Taiwan Instrument Research Institute, National Applied Research Laboratories, Taiwan); Kuo-Cheng Huang (Taiwan Instrument Research Institute National Applied Research Laboratories, Taiwan); Chen-Ju Lee and Yen-Pei Lu (National Applied Research Laboratories, Taiwan)

Detecting Package Drops in Shipments with an Embedded ML-Enabled Measurement System
Matteo Bertocco, Giacomo Peruzzi, Alessandro Pozzebon and Salvatore Vallone (University of Padova, Italy)

Design of Readout Circuit and System for Miniaturizated Gas Sensor Applications
Yi-Cheng Lin and Shu-Ju Tsai (Taiwan Instrument Research Institute, Taiwan); Rou-Jhen Chen (Instrument Technology Research Center National Applied Research Laboratories, Taiwan); Wen-Tse Hsiao (Taiwan Instrument Research Institute, Taiwan); Fong-Zhi Chen (Instrument Technology Research Center, National Applied Research Laboratories, Taiwan)

8:30 – 10:30
I&M Systems for Robotics
Room: Augustusburg 1-3
Session Chairs: Ruqiang Yan and Gustavo Pessin

Toward a predictive model for estimating time until thermal protection shutdown in a service robot
Leonardo S Kiepper (Instituto Tecnológico Vale, Brazil & Universidade Federal de Ouro Preto, Brazil); Gustavo Pessin (Vale Institute of Technology, Brazil); Gustavo M Freitas (Universidade Federal de Minas Gerais, Brazil); Paulo Magalhães (Universidade Federal de Ouro Preto, Brazil)

GVIR: A GNSS-Visual-Inertial-Range Sensor Fusion Approach for Seamless Indoor-Outdoor Robot Localization
Mingyang Qi and Ping Huang (Harbin Engineering University, China); Chao Hu (Nanjing Yinwang Intelligent Technology Co., Ltd, China); Zeng Fansong (Harbin Engineering University & College of Intelligent Science and Engineering, China); Wei Wang (Harbin Engineering University, China)

Vision-based Task Learning and Manipulation for Humanoid Muscle-skeleton Robotic Arm
Yan Wang, Jianyin Fan and Qiang Wang (Harbin Institute of Technology, China)

Material Recognition with Capacitive Tactile Sensor and Robotic Arm
Ruixiang Deng, Yang Hu, Haozheng Bai and Wuqiang Yang (The University of Manchester, United Kingdom (Great Britain))

Dual-Step Calibration of MEMS Mirrors for High Resolution Beam Steering Applications
David Boulos (Université de technologie de Compiègne, France & IMT Atlantique, France); Hani Al Hajjar (Roberval Laboratory University of Technology Compiegne France, France); Erwan Dupont (Université de technologie de Compiègne, France); Bruno Fracasso (IMT Atlantique, France)

Advanced Tactile Sensor Solution with Spline Surface Interpolation for Robotics
Thomas Kammerhofer (Montanuniversität Leoben, Austria); Dimitar Ninevski and Thomas Thurner (University of Leoben, Austria)

8:30 – 10:30
I&M for Renewable Energy Systems
Room: Rabenstein
Session Chairs: Mathias Bonmarin and Sergio Toscani

Enhancing Efficiency Prediction Accuracy in PEM Fuel Cell Hybrid Systems Using AI
Virginia Negri (University of Bologna, Italy); Livio D'Alvia (Sapienza University of Rome, Italy); Alessandro Mingotti (University of Bologna, Italy)

Numerical modeling for lithium iron phosphate batteries
Barbara Palmieri (Italian Research Council (CNR), Italy); Alfonso Martone (Consiglio Nazionale delle Ricerche (CNR), Italy & CNR-IPCB, Italy); Alessio Miele, Filippo Milano and Mario Molinara (University of Cassino and Southern Lazio, Italy); Luigi Ferrigno (University of Cassino, Italy); Gianni Cerro (University of Molise, Italy); Marco Laracca (Sapienza University of Rome, Italy)

Lock-in Thermography Characterization of Photothermal Transparent Thin Films
Gabriella Butler, Hannah Carter and Dardan Bajrami (Zurich University of Applied Sciences, Switzerland); Sagar Shrestha and Donglu Shi (University of Cincinnati, USA); Mathias Bonmarin (Zurich University of Applied Sciences, Switzerland)

Kalman filter algorithm for embedded systems for Li-Ion battery state of health estimation
Efstathios Fiorentis (Polytechnic University of Bucharest Romania, Romania)

Infrasound microphone network to monitor wind farm emissions
Kourosh Tatar and Per Ängskog (University of Gävle, Sweden); Ken Mattsson and Leif Persson (Uppsala University, Sweden); Jose Chilo (University of Gavle, Sweden)

Digital magnetic encoder hardware and software integration for bearing fault detection in a modular condition monitoring system
Jens Matthys, Cédric Peeters, Jonathan Sterckx and Jan Helsen (Vrije Universiteit Brussel, Belgium)

8:30 – 10:30
Signal Processing for I&M (II)
Room: Terra & Radixor
Session Chairs: Grazia Iadarola and Antonio Moschitta

Estimation of DOA of Low-altitude Moving Source Using 1D-CNN Based on a Single 3-axis Geophone
Xin Wang (Chinese Academy of Sciences & Institute of Acoustics, China); Pengxiao Teng (Chinese Academy of Sciences, China); Tao Jiang (Jilin University, China); Jun Lv and Wei Cheng (Chinese Academy of Sciences, China)

Reducing the variability of higher-degree nonlinear cross-correlation measurements using orthogonal multisines
Lars Denayer and Dries Peumans (Vrije Universiteit Brussel, Belgium); Gerd Vandersteen (Vrije Universiteit Brussel (VUB), Belgium)

Aliasing Pattern Study for Single Sensor Blade Tip Timing
Zengkun Wang (Chang'an University, China); Jiahui Cao, Chengwenbo Gao, Zhibo Yang and Baijie Qiao (Xi'an Jiaotong University, China); Xiaohua Xia, Hao Zuo and Min Ye (Chang'an University, China)

Low-frequency acoustic time-of-flight estimation algorithm in noisy environment
Jingyu Gao, Yong Bao, Chao Tan and Feng Dong (Tianjin University, China)

Gridless co-evolutionary algorithm for single snapshot DOA estimation with unknown number of sources
Meiyu Fan, Jingchao Zhang, MuHeng Li and Liyan Qiao (Harbin Institute of Technology, China)

Digital Defect Oriented Test Method for Phase Locked Loops with High Coverage
Michael Sekyere (Iowa State University, USA); Marampally Saikiran (TBD, USA); Godfred Bonsu and Kelvin Worlanyo Tamakloe (Iowa State University, USA); Rob Butler and Reed Adams (Texas Instrument, USA); Degang Chen (Iowa State University, USA)

8:30 – 10:30
I&M in Medical, Biomedical and Healthcare Systems (II)
Room: Carlowitz-Saal
Session Chairs: Gianfranco Miele and Bruce Wallace

Cross-Body Transfer Learning for Human Activity Recognition
Will Sloan (Carleton University, Canada); Bruce Wallace (AGE-WELL NIH SAM3, Canada & Carleton University, Canada); Rafik Goubran (Carleton University, Canada); Heidi Sveistrup (University of Ottawa, Canada)

Metrological Characterization of a Jump Height Measurement Procedure Based on Inertial Sensors
Luna Panni (Università Politecnica Delle Marche, Italy); Gloria Cosoli and Marco Arnesano (Università eCampus, Italy); Lorenzo Scalise (Università Politecnica delle Marche, Italy)

Uncertainty Analysis for Deep Learning Prediction in Human Activity Recognition based on Monte Carlo Approach
Minh Long Hoang (University of Parma, Italy); Cesare Svelto (Politecnico di Milano, Italy); Paolo Ciampolini, Guido Matrella and Giovanni Chiorboli (University of Parma, Italy)

Vision-aided Inertial-Based Simultaneous Indoor Fall Prediction and Localization
Jingjing Yan (Ningbo University of Technology, China); Craig Hancock (Loughborough University, United Kingdom (Great Britain)); Ana Basiri (University of Glasgow, Glasgow & The Alan Turing Institute, United Kingdom (Great Britain))

Nanoindentation and Raman Spectroscopy Measurements on Root Canal Treatment
Isabella Sannino (Polytechnic of Turin, Italy); Leila Es Sebar (Politecnico di Torino, Italy); Pietro Palopoli (Università degli Studi di Torino, Italy); Andrea Baldi (University of Turin, Italy); Gianpaolo Serino (Politecnico di Torino, Italy); Damiano Pasqualini and Mario Alovisi (University of Turin, Italy); Emma Paola Angelini (Politecnico di Torino, Italy); Nicola Scotti (University of Turin, Italy); Sabrina Grassini (Politecnico di Torino, Italy)

Feasibility Study for Fatigue Detection by Electrical Impedance Tomography
Bilel Ghoul (Chemnitz University of Technology, Germany & National School of Electronics and Telecommunications of Sfax, Tunisia); Mariem Hafsa (TU Chemnitz & National Engineering School of Sousse, Germany); Oumaima Bader (MST and LATIS, Germany); Salwa Sahnoun (Laboratory of Technologies for smart Systems, Tunisia); Ahmed Fakhfakh (Laboratory SMARTS, Tunisia & CRNS, Tunisia); Olfa Kanoun (Chemnitz University of Technology, Germany)

8:30 – 11:00
IMS Student Contest
Room: Silva-Foyer + Stadthallen-Foyer

10:30 - 11:00
Coffee Break
Room: Silva-Foyer + Stadthallen-Foyer

11:00 - 17:00
Exhibit Hall Open
Room: Silva-Foyer + Stadthallen-Foyer

11:00 - 11:05
YP/Students Activities Announcement by Judy AB
Room: Carlowitz-Saal

11:05 - 12:00
2025 Joseph F Keithley Award in Instrumentation and Measurement
Room: Carlowitz-Saal

Sponsored by Keithley Instruments, a Tektronix company, and the IEEE Instrumentation & Measurement Society

For contributions to the field of pollution measurement and leadership in environmental sensing and emissions abatement

Alexander Bergmann
Graz University of Technology

Biography: Alexander Bergmann is a distinguished academic and innovator in the field of emission measurement and sensor technology. His work has had far-reaching commercial and societal impacts, particularly in vehicle emissions standards. As a key expert of the UN-ECE particle measurement program, Bergmann has been instrumental in developing cleaner emission technologies for Europe. His contributions include creating one of the first non-volatile particle number measurement devices and a portable emission measurement system, both of which have been incorporated into legislation. Bergmann's expertise in metrology has led to the development of crucial standards for emission measurement devices, with many countries adopting the standards he helped develop.

An IEEE Member, Bergmann is Head of Institute of Electrical Measurement and Sensor Systems, Graz University of Technology, Graz, Austria.

12:00 - 22:00
I&M and I2MTC Award Ceremony
Room: Carlowitz-Saal

13:00 - 14:00
Lunch
Room: Silva-Foyer + Stadthallen-Foyer

14:00 - 15:00
The Power of Personal Branding in the AI Era: Inclusivitiy and Human-centric Marketing
Room: Carlowitz-Saal

In an increasingly AI-driven context, personal branding plays a crucial role in building authentic and meaningful connections. This presentation explores how AI can support the development of our digital identity in a way that is inclusive, accessible, and retains a genuine human touch.

The focus will be on how artificial intelligence can help each of us personalize the messages we wish to share, representing ourselves authentically and reaching a wider audience.

Our objective is to show how technology and humanity can unite to build a personal brand that resonates with audience values, inspires active engagement, and fosters genuine inclusivity.

To create an engaging and productive experience, we will soon organize pre-conference activities that allow participants to connect and share perspectives in advance.

The opportunity for some participants to analyze their digital identity will be offered. Specifically, the first 10 individuals who respond to the survey declaring their interest in analyzing their digital presence will be selected for a personalized analysis.

Additionally, the chance for 4 participants, who request it via the survey, to create their own personal avatar after the conference will be offered.

Massimo Giordani
Expert in Strategic Marketing and Innovation

Biography: Massimo Giordani is an expert in strategic marketing and innovation with a career spanning over three decades. He currently serves as President of the Italian Association for Marketing Development (www.aism.org) and is the founder of Time & Mind, an agency specializing in digital strategies. He also teaches as an adjunct professor at the University of Turin, sharing his expertise with the next generation. His passion for the socio-economic implications of technological innovation drives him to foster a digital culture enriched by humanistic elements, emphasizing the importance of an interdisciplinary approach in today's digital world.

15:00 - 16:00
Coffee Break and Poster Session
Room: Silva-Foyer + Stadthallen-Foyer
Session Chairs: Logan Wilcox and Dario Petri

1: Design and investigation of a Remote Interrogation System for capacitive measurement, exploiting Inkjet Printed techniques
Danilo Greco, Bruno Ando, Salvatore Baglio and Aruna Seegobind (University of Catania, Italy)

2: Analytical Modeling of Eddy Current Testing for Asymmetric Cylinders and Radius and Electromagnetic Properties Estimation
Saibo She (The University of Manchester, United Kingdom (Great Britain)); Xun Zou, Kuohai Yu and Xinnan Zheng (University of Manchester, United Kingdom (Great Britain)); Wuliang Yin (The University of Manchester, United Kingdom (Great Britain))

3: A New Implementation of Tapped-Delay-Line Based High-Performance Time-to-Digital Converter on Xilinx Kintex-7 FPGA
Dianhang Sun and Yonggang Wang (University of Science and Technology of China, China)

4: A Convolutional Neural Network and Feature Selection-Based Method for Arc Fault Location in Household Appliances
Fan Wu, Songting Zou, Kai Chen and Yifan Wang (University of Electronic Science and Technology of China, China)

5: FT-DropBlock: A Novel Approach for Spatiotemporal Regularization in EEG-based Convolutional Neural Networks
Pierre Sedi Nzakuna, Vincenzo Paciello and Vincenzo Gallo (University of Salerno, Italy); Aime' Lay-Ekuakille (University of Salento, Italy); Vital Angelo Kuti Lusala (Université de Kinshasa, Democratic Republic of the Congo)

6: A Class-Enhanced Multi-Source Domain Adaptation Method for Rotary Machinery Fault Diagnosis
Ye Li (Harbin Institute of Technology, China); Tianyu Gao (China); Jingli Yang (Harbin Institute of Technology, China); Zheng Cui (China Unicom Smart City Research Institute, China); Shuangyan Yin (Harbin Institute of Technology, China)

7: A Multi-sensor Fusion Approach Based on Deep Neural Networks for Thermal Sensation Prediction
Tong Li, Jiang Wang, Jishen Tang and Bin Deng (Tianjin University, China)

8: A Semi-supervised Convolutional Autoencoder for Multiple Physical Parameters Measurement in Laser Absorption Tomography
Anyang Liang, Yi Jin and Chao Zhai (University of Science and Technology of China, China); Xinguo Sha and Huazhen Song (China Academy of Aerospace Aerodynamic, China)

9: Attention-Enhanced YOLO Model for High-Precision Detection of Internal Chip Defects in Ultrasonic Imagery
Wenxin Niu and Jianqiang Mei (Tianjin University of Technology and Education, China)

10: Marine Radar CFAR Target Detection in Sea Clutter Dynamic Distribution Based on Superpixel Segmentation
Bowen Zhou and Zhizhong Lu (Harbin Engineering University, China); Yongfeng Mao (Dalian Institute of Measurement and Control Technology, China); Baotian Wen (Harbin Engineering University, China)

11: A novel laser interferometry method for measuring slug frequency of intermittent flow
Yan Wu, Ting Xue and Songlin Li (Tianjin University, China)

12: Assessing the Size-of-Source Effect in Thermography by Measuring the MTF with Consideration of Scattering Effects
Jannik Ebert, Miguel Mendez, Robert Schmoll and Andreas Kroll (University of Kassel, Germany)

13: Extending Self-Mix Interferometer Measurements to the Range of Several Tens to Hundred Meters
Silvano Donati (University of Pavia, Italy)

14: Optimisation of Camera Layout for Computed Tomography of Chemiluminescence under Limited Projection Angles
Chengsheng Ren (University of Science and Technology of China, China & Institute of Advanced Technology, China); Yi Jin (University of Science and Technology of China, China)

15: Vision Transformer for Estimating Respiration Rate from Thermal Video
Mohsen Mozafari (Carleton University, Canada); Andrew Law (National Research Council, Canada); Rafik Goubran and James R Green (Carleton University, Canada)

16: Multitask Learning for Estimating Primary Forest Characteristics Using Sentinel-2 Data
Elisey Plotnikov and Konstantin Rudkevich (Saint-Petersburg State University, Russia); Svetlana Illarionova and Polina Tregubova (Skolkovo Institute of Science and Technology, Russia); Dmitrii Shadrin (Irkutsk National Research Technical University, Russia); Evgeny Burnaev (Skoltech, Russia)

17: Electrical Evaluation of an Omnidirectional Vibration Energy Harvester
Hossein Shabanalinezhad (University of Calabria, Italy); Cesare Svelto and Christian Laurano (Politecnico di Milano, Italy); Piero Malcovati (University of Pavia, Italy); Gianluca Gatti (University of Calabria, Italy)

18: State of Charge Estimation of an Electric Battery using the Theory of Evidence
Harsha Vardhana Jetti, Paolo Carbone and Alessio De Angelis (University of Perugia, Italy); Alessandro M Ferrero, Sina Ronaghi and Simona Salicone (Politecnico di Milano, Italy)

19: A Novel Simulation Method of the Zero-flux Current Transformer in the HVDC Systems Based on Magnetic Path and Circuit
Haohan Zhen and Haibin Chen (State Grid Shanghai Municipal Electric Power Company, China); Changxi Yue and Kui Xiong (China Electric Power Research Institute, China); Shaozhe Zhang (Huazhong University of Science and Technology, China); He Li (China Electric Power Research Institute, China)

20: Aperture-Based FSS for Dielectric Thickness Sensing
Alexander Hook, Kristen M Donnell and Gage Donahue (Missouri University of Science and Technology, USA)

21: Performance and Measurement Characteristics Analysis of Fin Resonant Cavity Sensor
Yiguang Yang, Chenlong Wang, Lijun Chen, Lianyong Zhang, Zhongzheng Wu and Kai Yang (Northeast Electric Power University, China)

22: Decomposing Apparent Power
Harold Kirkham (Pacific Northwest National Laboratory, USA); Jan-Philipp Kitzig (EA Elektro Automatik GmbH, Germany); Mihaela Albu (Politehnica University of Bucharest, Romania); David Laverty (Queen's University Belfast, United Kingdom (Great Britain)); Artis Riepnieks (Pacific Northwest National Laboratory, USA)

23: Artifact removal in LAS-based combustion parameter tomography with flame distribution estimation and robust iterative algorithm
Fanghao Lu, Zhang Cao, Liuyong Chang, Peng Suo and Lijun Xu (Beihang University, China); Yong Yan (Beihang University & University of Kent, China)

24: Metrics for Conducted Emissions Assessment up to 150 kHz in Grid-connected Systems with Power Electronic Converters
Giovanni Artale (University of Palermo, Italy); Antonio Cataliotti (Università degli Studi di Palermo, Italy); Valentina Cosentino (University of Palermo, Italy); Dario Di Cara (National Research Council, Italy); Vito Ditta (Università degli Studi di Palermo, Italy); Salvatore Guaiana and Nicola Panzavecchia (National Research Council, Italy); Giovanni Tinè (Italian National Research Council, Italy & Institute of Marine Engineering - PALERMO UNIT, Italy)

25: Reference Field Reconstruction in Absolute Electrical Impedance Tomography Based on Fuzzy Inverse Membership Function
Honghao Qu and Yue (Tianjin University, China); Yuwei Zhao (Tianjin University Tianjin, China)

26: An Extended Undifferenced and Uncombined PPP Model to Explain the Impact of Receiver Code Biases on Ionospheric Delay Measurements
Lin Zhao, Chuanfeng Zhu, Hui Li, Xue Liu and Shaohan Ren (Harbin Engineering University, China)

27: Accurate Measurements of Methane, Carbon Dioxide for Arctic and Wetland Conditions using NDIR Technology and AI-based Calibration
Huy Gia Duong (The Climate and Environmental Research Institute NILU, Norway & University of Oslo, Norway); Amir Taherkordi (University of Oslo, Norway); Phuong Hoai Ha (UiT The Arctic University of Norway, Norway); Benoit Wastine and Bakhram Gaynullin (Senseair AB, Sweden); Federico Dallo (National Research Council of Italy, Italy); Tuan-Vu Cao (The Climate and Environmental Research Institute NILU, Norway)

28: Comparative Analysis of Sub-6 GHz Microwave Sensors Suitable for Low-Cost In-Situ Microplastic Detection
Miguel Cezar Vieira, Glenerson Vieira Da Silva Santos, Antonio Souza and Carlos Alberto De Souza Filho (Federal University of Paraiba, Brazil); Antonio Marcus Nogueira Lima (Universidade Federal de Campina Grande & Departamento de Engenharia Elétrica, Brazil)

29: Gas Component Strategy and Signal Graph Attention Network for Enhanced Gas Concentration Estimation
Ding Wang (Tongji University, China); Xin Huang (University of Tongji, China & Technical University of Munich, Germany); Haiyan Wang (University of Tongji, China); Huilin Yin (Tongji University, China); Lei Wang (TongJi University, Shanghai, China); Yuan Gao (University of Tongji, China)

30: How Machine Learning can contribute to evaluate stress level
Adrien Thirion (LAAS-CNRS Institut National Polytechnique de Toulouse & Nanomade Lab, France); Nicolas Dufour (Nanomade Concept, France); Blaise Mulliez (LAAS-CNRS, France); Hélène Tap (LAAS-CNRS, Université de Toulouse, France)

31: Study on the acoustic field directivity of PPM-EMAT by FE simulation and theoretical calculation
Xiaofei Huang, Yuedong Xie, Fulu Liu, Jiyao Li, Huiyuan Kong and Lijun Xu (Beihang University, China)

32: A state space model for sensor response mechanism of mixed gases
Peiwen Wu (University of Electronic Science and Technology of China, China)

33: Design and Validation of a Non-Invasive Thermal Flowmeter for Industrial Applications
Albert Mlčoch (Brno University of Technology, Czech Republic); Stanislav Pikula and Petr Beneš (Brno University of Technology & FEEC, Czech Republic)

34: Exploring the Effect of Probe Size and Lift-off on Footprint
Xinnan Zheng and Kuohai Yu (University of Manchester, United Kingdom (Great Britain)); Saibo She (The University of Manchester, United Kingdom (Great Britain)); Ruoxuan Zhu, Lei Xiong and Xun Zou (University of Manchester, United Kingdom (Great Britain)); Wuliang Yin (The University of Manchester, United Kingdom (Great Britain))

35: A Two-Layer Medium Total Focusing Method for Gas-Liquid Stratified Flow Measurement
Dandan Zheng and Peiwei Yang (Tianjin University, China); Yongtao Chen (School of Electrical and Information Engineering, China & Tianjin University, China); Jilin Ye (School of Electrical and Information Engineering & Tianjin University, China)

36: Preliminary Evaluation of Machine Learning Approaches for PANTONE Color Classification with the SENSIPATCH wearable system
Hamza Mustafa (University of Cassino and Southern Lazio, Italy & Sesnsichips Srl, Italy); Michele Vitelli (University of Cassino and Southern Lazio & Sensichips Srl, Italy); Filippo Milano, Mario Molinara and Luigi Ferrigno (University of Cassino and Southern Lazio, Italy); Andrea Ria (University of Pisa, Italy); Federico Fina (Roma Tre University, Italy); Fabio Leccese ("Roma Tre" University, Italy)

37: Recursive Gaussian Process Regression Based Status Predicting for Gas-liquid Two-phase Flow
Lijie Jiang, Wentao Wu and Feng Dong (Tianjin University, China)

38: Zero-shot Learning Model with Dynamic and Static Feature Fusion for Industrial Gas-liquid Two-phase Flow State Identification
Xinyi Han, Linghan Li, Shumei Zhang and Feng Dong (Tianjin University, China)

39: Series Arc Fault Detection Based on the Asymmetry of the Arc Current Signal
Kai Zhou, Xin Liu, Yang Jiao, Hongbin Li and Qing Chen (Huazhong University of Science and Technology, China); Ziqin Gao (The Chinese University of Hong Kong, Shenzhen, China)

40: Spatial-Temporal Modeling Based Data Recovery Method For Gas-Liquid Two-Phase Flow
Liyuan Zhang, Wentao Wu and Feng Dong (Tianjin University, China)

41: Within and Among Wavelet-subband Sparse Decomposition For Bearing Fault Diagnosis
Haiwei Ren (Xian Jiaotong University, China); Baoqing Ding (Xian Jiaotong University China, China); Lei Jin (Xi'an Jiaotong University, China); Zhibin Zhao (The State Key Laboratory for Manufacturing Systems Engineering, China); Chuang Sun (Xi'an Jiaotong University, China); Xingwu Zhang (Xian Jiaotong University, China); Ruqiang Yan (Xi'an Jiaotong University, China); Xuefeng Chen (Xian Jiaotong University, China)

42: Hydraulic Valve Core Fault Diagnosis Applied with a Data-driven Approach
Zicheng Wang, Weidong Li, Chunhua Feng and Binbin Qiu (University of Shanghai for Science and Technology, China); Xin Lu (Leeds Trinity University, United Kingdom (Great Britain))

43: An Entropy-Bounded, General, Model-Based Framework for Lossy Compression of Sensor Data
Steven W Thompson and Maciej Zawodniok (Missouri University of Science and Technology, USA)

44: Retrieving Wind Direction from Marine Radar Images Based on One-Dimensional Discrete Wavelet Transform
Jie Xiao (Harbin Engineering University, China)

45: A Novel and Innovative Approach for Capacitive Sensoring of Spherical Joint Coordinates
Andi Schnebel (Offenburg University of Applied Sciences, Germany); Alexander Dierle (Hochschule Offenburg, Germany); Thomas M. Wendt (University of Applied Sciences Offenburg & Work-Life Robotics Institute, Germany)

46: TMIQ: Quantifying Test and Measurement Domain Intelligence in Large Language Models
Emmanuel A Olowe and Danial Chitnis (The University of Edinburgh, United Kingdom (Great Britain))

47: BodySense: An Expandable and Wearable-Sized Wireless Evaluation Platform for Human Body Communication
Lukas Schulthess, Philipp Mayer and Christian Vogt (ETH Zurich, Switzerland); Luca Benini (Swiss Federal Institute of Technology (ETH), Switzerland); Michele Magno (ETH Zurich, Switzerland)

48: AIN MEMS Transducer Interface Enabled by LoPy 4 Wireless Module
Carlo Trigona, Suhail Ahmed, SA, Anna M Gueli and Salvatore Baglio (University of Catania, Italy); Giuseppe Campobello, Filippo Battaglia, Giovanni Gugliandolo and Nicola Donato (University of Messina, Italy); Giacomo Navarra (Kore University of Enna, Italy); Francesco Lo Iacono and Mariangela Liuzzo (University of Enna Kore, Italy)

49: Deep machine learning for identifying time-series functions of regulated measuring instruments
Levin C. X. Ho (Physikalisch-Technische Bundesanstalt, Germany & Technical University Berlin, Germany); Marko Esche, Martin Nischwitz and Manuel Maue (Physikalisch-Technische Bundesanstalt, Germany); Sabine Glesner (TU-Berlin, Germany)

50: Modeling and Control of an Integrated Energy based water-heating System
Shumaila Mushtaq and Giorgio Baldinelli (Università degli Studi di Perugia, Italy); Tommaso Scorteccia (Tiemmeelettronica SrL, Italy); Antonio Moschitta (University of Perugia, Italy)

51: A Robust Multi-Output Soft Sensor Model Based on Adversarial Learning under Sensor Faults
Wenlong Hu, Hongshuo Fu, Wenbin Zheng, Qiao Jiaqing, Feng Lei and Bing Liu (Harbin Institute of Technology, China)

52: Influence of latent space dimension on flow field reconstruction from limited number of sensors
Charly Witmeur, Mark Runacres and Jan Decuyper (Vrije Universiteit Brussel, Belgium)

15:00 – 16:00
IMS Student Contest Award Ceremony
Room: Carlowtiz-Saal

16:00 - 18:00
SPS: TC-37 SS on Measure. Methods & Metrological Characterization for Time-Sensitive Networking (TSN) Systems and App./I&M for Commun. & IoT
Room: Lichtenwalde
Session Chairs: Alberto Morato and Domenico Capriglione

A statistical pre-processing method for computationally efficient cyber-attack identification based on electromagnetic measurements
Andrea Amodei and Domenico Capriglione (University of Cassino and Southern Lazio, Italy); Gianni Cerro (University of Molise, Italy); Luigi Ferrigno (University of Cassino, Italy); Gianfranco Miele (University of Cassino and Southern Lazio, Italy)

Accuracy Evaluation in VNA-Based EVM Measurements of Unmatched SOI Cells for Wi-Fi
Alberto Maria Angelotti (University of Bologna, Italy); Youngseo Ko, Nijita Kesavan Namboothiri, Andrés Zárate-de Landa and Panglijen Candra (pSemi Corporation, USA); Gian Piero Gibiino (University of Bologna, Italy)

A low-cost TSN-based embedded measurement system: synchronization accuracy assessment
Alberto Morato (IEIIT-CNR, Italy); Elena Ferrari (University of Padova, Italy); Stefano Vitturi (CNR, Italy); Federico Tramarin (University of Modena and Reggio Emilia, Italy); Claudio Zunino (CNR IEIIT, Italy)

Experimental Analysis of QoS Parameters Decay in Small IoT Networks Under SYN Flood Attacks
Andrea Amodei and Domenico Capriglione (University of Cassino and Southern Lazio, Italy); Gianni Cerro (University of Molise, Italy); Gianfranco Miele (University of Cassino and Southern Lazio, Italy); Luigi Ferrigno (University of Cassino, Italy)

LoRaWAN "Breadcrumbs": Location-Aware Multi-Hop for the Monitoring of Workers in Underground Environments
Irene Cappelli, Ada Fort and Lorenzo Parri (University of Siena, Italy); Alessandro Pozzebon (University of Padova, Italy); Marco Tani (University of Siena, Italy)

Ambient magnetic field-based positioning with smartphones: a comparison of different fingerprinting methods
Fernando J. Álvarez (University of Extremadura, Spain); Fernando J. Aranda (Universidad de Extremadura & Sensory Systems Research Group, Spain); Felipe Parralejo (University of Extremadura & Sensory Systems Research Group, Spain); José Moreno (University of Extremadura, Spain); Juan Espinosa Valenzuela and Rodrigo Gallardo (Universidad de Extremadura, Spain)

16:00 – 18:00
SPS: Sensors, Instrumentation, and Networks Technologies for Environmental Measurement and Intelligent Forecasting
Room: Augustusburg 1-3
Session Chairs: Chi-Hung Hwang and Yunjie Yang

A Sensor Fusion Paradigm for Particulate Matter Monitoring Exploiting an Embedded Sound Level Meter for Virtual Sensing Techniques
Matteo Bertocco, Giorgio Magalini, Giacomo Peruzzi and Alessandro Pozzebon (University of Padova, Italy)

AI-Driven Estimation of Soil Moisture and Density Using Antenna-Based Scattering Parameters
Lukas Wasner, Robert Fromm, Alexander Knut, Faouzi Derbel and Ralf Thiele (Leipzig University of Applied Sciences, Germany)

Development of a methodology for monitoring of key parameters for the early assessment of water quality in reservoirs
Stefanie Penzel (University of Applied Sciences Leipzig Germany, Germany); Mathias Rudolph (HTWK Leipzig, Germany); Helko Borsdorf (Helmholtz Centre for Environmental Research - UFZ, Germany); Olfa Kanoun (Chemnitz University of Technology, Germany)

Design and Characterization of a Ground Penetrating Magnetic Ranging System
Cecilia Provenzale (University of Cassino and Southern Lazio, Italy); Valerio Brunacci (University of Perugia, Italy); Chiara Carissimo (University of Molise, Italy); Francesco Santoni (University of Perugia, Italy); Filippo Milano (University of Cassino and Southern Lazio, Italy); Antonio Moschitta (University of Perugia, Italy); Domenico Capriglione (University of Cassino and Southern Lazio, Italy)

Laser-Based Raindrop Analyzer for Accurate Size and Distribution to Enhance Rainfall Wind Correction
Mark Dutton (Newcastle University, United Kingdom (Great Britain))

Study of Energy Consumption and Performance in an Autonomous Sensor Node with On-Demand Communication and Wake-Up Receiver as a Function of Computational Complexity
Carlo Trigona and Giuliano A. Salerno (University of Catania, Italy); Robert Fromm (Leipzig University of Applied Sciences, Germany); Lydia Schott (University of Applied Science Leipzig, Germany); Olfa Kanoun (Chemnitz University of Technology, Germany); Faouzi Derbel (Leipzig University of Applied Sciences, Germany)

16:00 – 18:00
I&M for Physical and Electromagnetic Quantities
Room: Rabenstein
Session Chairs: Kamel Haddadi and Paolo Durandetto

Electrical Resistance Tomography for the investigation of memristive nanowire networks
Alessandro Cultrera (INRIM - Istituto Nazionale di Ricerca Metrologica, Italy); Gianluca Milano (Istituto Nazionale di Ricerca Metrologica (INRiM), Italy); Carlo Ricciardi (Politecnico di Torino, Italy); Luca Callegaro (INRIM - Istituto Nazionale di Ricerca Metrologica, Italy)

Capture of Dynamic Propagation of Switching Mechanical Waves in IGBT Modules Using Laser Interferometric Vibrometer
Jiahao Wang, Cong Chen, Libing Bai, Chaoyue Song and Yuxin Luo (University of Electronic Science and Technology of China, China); Yuhua Cheng (University of Electronic Science and Technology of China & School of Automation Engineering, China)

Traceable characterization and simulation of charge injection in CMOS electronic switches
Bruno Trinchera, Sr and Paolo Durandetto (INRiM - Istituto Nazionale di Ricerca Metrologica, Italy); Ricardo Iuzzolino (INTI - Instituto Nacional de Tecnologia Industrial, Argentina)

Reflectarray Aperture Phase Distribution Measurement using Imaging Approach
Mohamed A Abou-Khousa (Khalifa University of Science and Technology, United Arab Emirates); Omar S. Hassan (Khalifa University, United Arab Emirates)

Contactless magnetoresistance sensor for industrial applications
Larissa Q Huston (Commonwealth Scientific and Industrial Research Organisation, Australia); Richard Yong, Sy Nguyen, Peter Coghill and David Miljak (Commonwealth Scientific and Industrial Research Organsiation, Australia)

Impact of Flange Offsets in Clamped Rectangular and Clamped Circular Waveguide Measurement Methods
Trent D Moritz, Matthew Dvorsky and Mohammad Tayeb Al Qaseer (Iowa State University, USA)

16:00 – 18:00
I&M for Non-Destructive Testing and Evaluation (IMNDE)
Room: Terra & Radixor
Session Chairs: Bo Feng and Jim Smith

High Sensitive ECT Probe for Detection of Deeply Buried Defects
Lian Xie (Universidade de Lisboa, Portugal); Prashanth Baskaran (Instituto de Telecomunicações, Portugal); Artur L. Ribeiro (Instituto de Telecomunicações & Instituto Superior Técnico, University of Lisbon, Portugal); Francisco Alegria (Technical University of Lisbon (IST), Portugal); Bo Feng (Huazhong University of Science and Technology, China); Helena G. Ramos (Instituto de Telecomunicacoes, Instituto Superior Tecnico, Portugal)

Feature Extraction Based On Signal Similarity for Damage Detection with Ultrasonic Guided Waves
Houssam El Moutaouakil (Universität des Saarlandes & Lab for Meassurement Technology, Germany); Vittorio Memmolo (Goethe University Frankfurt, Germany & University of Naples Federico II, Italy); Julian Schauer and Payman Goodarzi (Saarland University, Germany); Tizian Schneider (Saarland University & Center for Mechatronics and Automation Technology (ZeMA), Germany); Andreas Schütze (Saarland University, Germany)

Enhanced Disbond Detection in CFRP Joints Using Autoencoders for Guided Wave Signal
Mohsen Barzegar (Instituto de Telecomunicações, Portugal); Sahar Moradi Cherati (INESC-ID, Instituto Superior Técnico, University of Lisbon, Portugal); Muchao Zhang (Instituto Superior Técnico, Portugal); Dario J. Pasadas (Instituto Telecomunicações & Instituto Superior Técnico, Portugal); Artur L. Ribeiro (Instituto de Telecomunicações & Instituto Superior Técnico, University of Lisbon, Portugal); Helena G. Ramos (Instituto de Telecomunicacoes, Instituto Superior Tecnico, Portugal)

Enhanced High-Sensitivity Eddy Current Technology for In-Line Pipeline Inspection and Imaging with Superior Resolution
Qiuping Ma, Jiaqu Zhou, Xumei Yang, Chao Chang, Rui Chen, Qin Tang and Zhaohu Yu (University of Electronic Science and Technology of China, China); Bin Gao (University of Electronic Science and Technology, China); Guiyun Tian (Newcastle University & University of Electronic Science and Technology of China, United Kingdom (Great Britain))

An improvement in defect detection through integration of Rotating Eddy Currents and multi-tone excitation
Alessandro Sardellitti (Universitas Mercatorum, Italy); Marco Laracca and Silvia Sangiovanni (Sapienza University of Rome, Italy); Andrea Bernieri (University of Cassino, Italy); Federico Carere (Telematic University Pegaso, Italy)

A New Index for Hyperparameters Selection in ERT Reconstruction Algorithms
Fanpeng Dong and Yue (Tianjin University, China); Yuwei Zhao (Tianjin University Tianjin, China)

16:00 – 18:00
SPS: Artificial Intelligence in I&M: theoretical fundamentals and applications
Room: Carlowitz-Saal
Session Chairs: Antonio Pietrosanto and Marco Carratù

On the False Notion of Misclassification Probability as Uncertainty in Machine Learning-Assisted Measurements
Fan Wang (National Tsing Hua University, Taiwan); Shervin Shirmohammadi (University of Ottawa, Canada); Cheng-Hsin Hsu (National Tsing Hua University, Taiwan)

Test-set generation for AI-augmented measurement systems
Giada Giorgi (University of Padova, Italy); Lorenzo Michelotti (University of Padua, Italy); Claudio Narduzzi (Universita' di Padova, Italy); Matteo Bertocco (University of Padova, Italy)

Uncertainty-Aware Data Reconstruction in Autoencoders
Valter Laino, Vincenzo Gallo and Marco Carratù (University of Salerno, Italy); Jan Lundgren (Mid Sweden University, Sweden); Antonio Pietrosanto (University of Salerno & CEO of Metering Research srl, Italy); Consolatina Liguori (University of Salerno, Italy)

Addressing Contextual Factors in ArUco Marker-Based Distance Estimation: A Machine Learning Approach
Seyed Jalaleddin Mousavirad (Mid Sweden University, Sweden); Vincenzo Gallo (University of Salerno, Italy); Irida Shallari and Mattias O'Nils (Mid Sweden University, Sweden)

From mAP to Statistical Metrics: A New Paradigm for Evaluating Model Accuracy in Metrology
Astile Peter (Mid Sweden University, Sweden & University of Salerno, Italy); Irida Shallari (Mid Sweden University, Sweden); Marco Carratù (University of Salerno, Italy); Jan Lundgren (Mid Sweden University, Sweden)

LABIIUM: AI-Enhanced Zero-configuration Measurement Automation System
Emmanuel A Olowe and Danial Chitnis (The University of Edinburgh, United Kingdom (Great Britain))

18:00 - 19:00
I&M Past-President Panel
Room: Carlowitz-Saal

Abstract: Our Society's Celebration of 75 Years brings together most of I&M's past presidents from 2000 to date. Following brief remarks by current Jr. Past President Juan Manuel Ramirez, the available past presidents will have the chance to introduce themselves. Two of those past presidents—Kim Fowler and Steve Dyer—will share a quick history of our Society, reflections on its maturation, and some personal memories. Members of the audience will then have approximately 25 minutes to interact as they please with the panel of past presidents.

Biography for Stephen A. Dyer
Stephen A. "Jack" Dyer is Professor Emeritus of Electrical and Computer Engineering, Kansas State University. He holds degrees in physics, electrical engineering, and engineering, and he spent most of his career as a faculty member, having taught over 80 different courses in mathematics, physics, electrical and computer engineering, entrepreneurship, and music. His research was broadly in digital signal processing, instrumentation and measurement, spectrometry, digital communication systems, and numerical methods, but his fun has been in analog electronics. His consulting practice centered largely on engineering forensics and assistance in product design. A Life Fellow of the IEEE, Dyer served three terms as President of the IEEE Instrumentation and Measurement Society. Before that, he served three stints as editor-in-chief of the IEEE Transactions on Instrumentation and Measurement and was the founding Editor-in-Chief of the IEEE Instrumentation & Measurement Magazine. He recently completed a term as President of the IEEE Systems Council.

Biography for Kim Fowler
Kim Fowler has spent over 40 years in the design, development, and project management of medical, military, and satellite equipment. His interest is the rigorous development of diverse, mission-critical, embedded systems. Kim has worked for several companies designing embedded systems and consulted with commercial companies and government agencies. He co-founded Stimsoft, a medical products company, in 1998 and sold it in 2003. Kim is a Life Fellow of the IEEE and was President of the IEEE Instrumentation & Measurement Society for 2010 and 2011, Editor-in-Chief of the IEEE I&M Magazine, and an adjunct professor for the Johns Hopkins University Engineering Professional Program. He was secretary for the IEEE System Council in 2022 and is part of the administration committee. He has published widely and has written four textbooks. He has 20 patents - granted, pending, or disclosed. Kim received his Ph.D. from Kansas State University in December 2018 and is an Associate Professor of Engineering at Campbell University in North Carolina.

19:00 - 22:00
Gala Dinner
Room: Stadthallen-Saal

Access to the gala dinner is exclusively for full conference attendees. Please present your name badge at the entrance for verification. Entry will be denied to participants who do not have their name badge.

8:30 - 10:30
SPS: From Rigid to Flexible: Advances in Flexible Conformal Sensing
Room: Lichtenwalde
Session Chairs: Nan Li and Yunjie Yang

[INVITED] Harnessing nonlinear observability of soft robots with flexible e-skins
Francesco Giorgio-Serchi

[INVITED] Direct-write Flexible Ultrasonic Transducers and Sensors for NDE and SHM Applications
Shifeng Guo

Flexible electrical impedance tomography for tactile interfaces
Huazhi Dong (University of Edinburgh, United Kingdom (Great Britain)); Sihao Teng, Xiaopeng Wu, Xu Han and Francesco Giorgio-Serchi (The University of Edinburgh, United Kingdom (Great Britain)); Yunjie Yang (University of Edinburgh, United Kingdom (Great Britain))

Functional composite fiber sensors: Integrating communication and pressure sensing
Chenlong Liu, Lin Li and Nan Li (Northwestern Polytechnical University, China)

The Role of Length Shift in Assessing Force and Resistivity for Optimized e-Textile Sensors
Gianmarco Gola (Politecnico di Torino, Italy); Matteo Menolotto (Tyndall National Institute, Ireland & University College Cork, Ireland); Danilo Demarchi (Politecnico di Torino, Italy); Brendan O'Flynn (Tyndall National Institude, Ireland)

Sensorizing Flexible Joints for Soft Robots: a Feasibility Study
Elia Landi and Tommaso Lisini Baldi (University of Siena, Italy); Jonas Papenbrock (University of Pisa, Italy); Domenico Prattichizzo and Ada Fort (University of Siena, Italy); Alessio Facello, Andrea Prato and Alessandro Schiavi (INRiM - National Institute of Metrological Research, Italy)

8:30 – 10:30
SPS: Sensing and Measure. for Smart Transportation Systems/I&M for the Automotive and Transportation Industry
Room: Augustusburg 1-3
Session Chairs: Hongrui Wang and Anna Glaser

Challenges in Smartphone-Based Crowdsensing for Railway Condition Monitoring: Insights into Variability and Track Quality Assessment
Wessel Roodenburg, Yuanchen Zeng and Siwarak Unsiwilai (Delft University of Technology, The Netherlands); Arjen Zoeteman (ProRail B.V., The Netherlands); Alfredo Núñez (Delft University of Technology, The Netherlands)

Laser-based classification of bituminous potting compound for fugues of tram rails
Maik Wolf (Leipzig University of Applied Sciences, Germany); Lucas Nierobisch and Elena Richter (Leipzig University of Applied Sciences (HTWK), Germany); Mathias Rudolph (HTWK Leipzig, Germany)

Beyond RGB: Evaluating Event-Based and Light-Field Sensors for Perception in Highly Automated Vehicles
Anna Glaser (AVL List GmbH, Austria & Graz University of Technology, Austria)

Design of a Simulation Platform for Visual Measurement of Port Automation Equipment Based on Digital Twin Technology
Yujie Zhang (ISCTE-IUL, Portugal); Kai Luo (China Academy of Transportation Sciences, MOT, China); Octavian Adrian Postolache (ISCTE. Instituto Universitario de Lisboa, ISCTE-IUL & IT-Instituto de Telecomunicacoes, Portugal); Chao Mi (Shanghai Maritime University, China)

Sensitivity Analysis of a Visual Inertial Odometry-based Navigation System for UAV
Luca De Vito, Arman Neyestani, Francesco Picariello, Ioan Tudosa and Sergio Rapuano (University of Sannio, Italy)

MGCCDCNet: A Multisensor Fusion Network with Delay Compensation for Component-Level Fault Diagnosis
Yuhan Huang (Harbin Institute of Technology, China); Xiaoxi Hu and Jingming Cao (Beijing Jiaotong University, China); Chen Fei (Wuhan University, China)

8:30 – 10:30
I&M for the Oil and Gas Industry
Room: Rabenstein
Session Chairs: Chao Tan and Feng Dong

Attribute Causality-Guided State Monitoring Model for Oil-gas-water Three-phase Flow Processes
Xinyi Wang, Linghan Li and Feng Dong (Tianjin University, China)

Machine Learning Method for Slug Flowrate Prediction Based on Ultrasonic Sensor
Dandan Zheng (Tianjin University, China); Yongtao Chen (School of Electrical and Information Engineering, China & Tianjin University, China); Jilin Ye (School of Electrical and Information Engineering & Tianjin University, China); Maosen Wang (School of Electrical and Information Engineering, Tianjin University, China); Tao Li (Tianjin University, China)

Electrical impedance characteristics of gas-liquid two-phase flow from the tomographic perspective
Yimin Wu (Zhejiang University, China); Maomao Zhang (University of Electronic Science and Technology of China, China); Yandan Jiang, Haifeng Ji and Baoliang Wang (Zhejiang University, China)

Frequency Modulated Ultrasonic Doppler Method for Velocity and Position Measurement of Bubbles
Yijiang Dong, Xuewei Shi, Chao Tan and Feng Dong (Tianjin University, China)

A mircowave-based method for water fraction measurement in downhole annulus
Shilong Li, Xuewei Shi and Feng Dong (Tianjin University, China); Liangjie Wang and Kai Zuo (China National Offshore Oil Corporation, China); Chao Tan (Tianjin University, China)

Flowrate Measurement of Gas-Liquid Two-Phase Flow Using a Throat-Extended Venturi Meter and Data-driven Models
Peng Suo, Jiangtao Sun, Shijie Sun, Fanghao Lu and Lijun Xu (Beihang University, China); Yong Yan (Beihang University & University of Kent, China)

8:30 – 10:30
I&M for Industry 4.0
Room: Terra & Radixor
Session Chairs: Daniele Fontanelli and Salvatore Graziani

Impulsive Vibrations Detection for Manufacturing Machines Using Machine Learning
Boon Yaik Ooi (Universiti Teknologi PETRONAS, Malaysia); Woan Lin Beh and Xin Yi Kh'ng (Universiti Tunku Abdul Rahman, Malaysia); Shervin Shirmohammadi (University of Ottawa, Canada)

Universal Calibration Framework for Localization Infrastructures Using Distance-Only Measurements
Luca Santoro (IMDEA NETWORKS, Spain); Davide Brunelli and Daniele Fontanelli (University of Trento, Italy)

Finite-time delay estimators for soft sensors of nonlinear processes
Salvatore Graziani (University of Catania, Italy); Maria Gabriella Xibilia (University of Messina, Italy)

An On-Device Hybrid Machine Learning Approach for Anomaly Detection in Conveyor Belt Operations
Luciano Sebastian Martinez Rau, Yuxuan Zhang, Quynh Nguyen Phuong Vu, Bengt Oelmann and Sebastian Bader (Mid Sweden University, Sweden)

Uncertainty Quantification in Measuring Ore Mass Flow Rate with Data-Driven Soft Sensors
Francisco José dos Santos Diniz (Universidade Federal de Ouro Preto - UFOP, Brazil & Instituto Tecnológico Vale - ITV, Brazil); Saulo Neves Matos (University of São Paulo, Brazil); Leandro Soriano Marcolino (Lancaster University, United Kingdom (Great Britain)); Jo Ueyama (University of São Paulo (USP) & Institute of Mathematics and Computer Science, Brazil); Eduardo José da Silva Luz (Universidade Federal de Ouro Preto, Brazil); Gustavo Pessin (Vale Institute of Technology, Brazil)

CNN-based Solid-phase Fraction Calculation in Two-Phase Flow
Yuwei Zhao (Tianjin University Tianjin, China); Yibo Wang and Yue (Tianjin University, China)

8:30 – 10:30
SPS: Applications of Time-Frequency Analysis for I&M
Room: Carlowitz-Saal
Session Chairs: Gu-Young Kwon and June Shin

Anomaly Detection of Shielded Cable via Time-Frequency-based Greedy Search Algorithm
Hobin Lim and Jaeyong Ahn (Yonsei University, Korea (South)); Kyungyoon Jo (Republic of Korea Navy, Korea (South)); Yong-June Shin (Yonsei University, Korea (South))

Resource Optimization of an FFT-based Short-time Fourier Transform for Real-time Spectrum Analysis
Hao Sun and Liansheng Liu (Harbin Institute of Technology, China); Xin Ma (RIGOL Technologies Co. LTD, China)

Development of AI-based Reflectometry for Multiple Series Arc Faults Localization in PV Systems
Jae-Hyun Ryu and Hyun-Mo Seong (Chung-Ang University, Korea (South)); Chun-Kwon Lee (Pukyong National University, Korea (South)); Gu-Young Kwon (Kongju National University, Korea (South)); Seung Jin Chang (Chung-Ang University, Korea (South))

Costas Array Reflectometry: A Novel Approach for Fault Localization in Cables Under Attenuation and Dispersion
Gu-Young Kwon (Kongju National University, Korea (South)); Seung Jin Chang (Hanbat National University, Korea (South)); Seon Hyeog Kim (Kongju National University, Korea (South))

Artifact Filtering and FPC-Based Piezoelectric Transducer Module for Pipeline Defect Detection
Young Eun Choi and Gibum Joung (Tech University of Korea, Korea (South)); Yoonmee Doh (ETRI, Korea (South)); Seon Hyeog Kim (Kongju National University, Korea (South)); Su Sik Bang (Tech University of Korea, Korea (South))

10:30 - 11:00
Coffee Break
Room: Silva-Foyer + Stadthallen-Foyer

11:00 - 14:30
Exhibit Hall Open
Room: Silva-Foyer + Stadthallen-Foyer

11:00 - 12:00
Advancing Instrumentation by AI for Overcoming Complexity in Semiconductor Testing
Room: Carlowitz-Saal
Chaired by Prof. Harald Kuhn, Fraunhofer ENAS

12:00 - 13:00
Lunch
Room: Silva-Foyer + Stadthallen-Foyer

13:00 - 14:00
Coffee Break and Poster Session
Room: Silva-Foyer + Stadthallen-Foyer
Session Chairs: Luca Lombardo and Salvatore Graziani

1: Hybrid Harvester-Based Measurement System for Microclimatic Monitoring of Cultural Heritage
Carlo Trigona, Giuliano A. Salerno, Domenico Cavallaro, Alessio Centamore, Giuseppe Politi and Anna M Gueli (University of Catania, Italy)

2: Hybrid Domain Adaptation with Deep Adversarial Network Architecture for State of Health Evaluation of Lithium-ion Power Battery
Junyang Chen, Wenbin Zheng and Ping Fu (Harbin Institute of Technology, China)

3: Optomechatronic tool wear sensor positioning with increased repeatability
Jiuzhou Xiang, Dirk Stöbener, Andreas Fischer (University of Bremen & BIMAQ, Germany); Sabrina Stemmer, Jens Sölter, Bernhard Karpuschewski (Leibniz-Institute for Materials, Germany)

4: A Novel SVR-LWL Based Precalibrator for Peak-Shaped Nonlinear Amplitude Frequency Errors in the FI-DAC
Shengjian Liu (Harbin Institute of Technology, China); Yang Luo (Ceyear Technologies Co., Ltd, China); Liansheng Liu (Harbin Institute of Technology, China); Yu Peng (Harbin Institute of Technology, HIT, China)

5: Porosity Identification in Laser Powder Bed Fusion Through Feature-based Multi-Observation Hidden Markov Model
Dongqing Yan and Xianzhe Fu (Oregon State University, USA); Robert X. Gao (Case Western Reserve University, USA); Zhaoyan Fan (Oregon State University, USA)

6: Adaptive-Hierarchical-Mechanism-based Grinding Planning with Experience Reuse
Ningyuan Wang, Yuemeng Ma and Qiang Wang (Harbin Institute of Technology, China)

7: Investigation of Coupling Inductance for the Feasibility of Directional Characterisation of Magnetic Permeability using Inductive Spectroscopy
Frank Wendler, Jeannette Boll, Birgit Awiszus and Till Clausmeyer (Chemnitz University of Technology, Germany); Sebastian Härtel (Brandenburg University of Technology, Germany); Olfa Kanoun (Chemnitz University of Technology, Germany)

8: On a direct method to estimate cannabidiolic acid content of Cannabis sativa L. from near-infrared hyperspectral images
Wayne Holmes (Unitec Institute of Technology, New Zealand); Melanie Ooi and Sanush Abeysekera (University of Waikato, New Zealand); Ye Chow Kuang (University of Waikato & Monash University, New Zealand); Serge Demidenko (Sunway University, Malaysia); Deepinder Sidhu (UNITEC Institute of Technology, New Zealand)

9: Methods for Detection and Identification of Chemical Compounds Using GC-IMS
Oscar Olarte (Royal Military Academy (RMA), Belgium); Stefanie Schroeder (Bundeswehr Research Institute for Protective Technologies and NBC Protection, Germany); Darius Couchard (Royal Military Academy (RMA), Belgium); Maria Allers (Bundeswehr Research Institute for Protective Technologies and NBC Protection, Germany); Rob Haelterman and Leticia Fernandez Velasco (Royal Military Academy (RMA), Belgium)

10: Oscillator With Love Wave Sensor for Biosensors
Dailan de Jesus Pereira Bernardes, Sr (Universidade Federal do Maranhão, Brazil & Instituto Federal do Maranhão, Brazil); Ewaldo Santana (University of State of Maranhao, Brazil); Raimundo Freire (Universidade Federal de Campina Grande - PB, Brazil); Paulo Fernandes da Silva Júnior (Universidade Estadual do Maranhão, Brazil)

11: Multi-Objective Optimization of Graphene-Based Plasmonic Sensors Using Genetic Algorithms
Arthur Aprígio de Melo (Federal University of Campina Grande, Brazil); Antonio Marcus Nogueira Lima (Universidade Federal de Campina Grande & Departamento de Engenharia Elétrica, Brazil)

12: Frequency-Based Decoupling and Modeling of BLE RSS Measurements for Indoor Positioning
Fernando J. Aranda (Universidad de Extremadura & Sensory Systems Research Group, Spain); Paula Rangel (University of Extremadura, Spain); África Vicario Millán (Universidad de Extremadura, Spain); Jorge Morera, Fernando J. Álvarez and Teodoro Aguilera (University of Extremadura, Spain)

13: Data Consistency Determination with Multi-Event Detection for Heterogeneous Sensors
Tim Ruhland (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany & Siemens, Germany); Maximilian Lübke (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany); Andreas Tobola (Siemens, Germany); Norman Franchi (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

14: Flexible Ultra-Low Power Strain Gauge Readout Platform for Sensor-Integrating Bolts
David Riehl (TU Darmstadt, Germany); Felix Herbst (Technical University of Darmstadt, Germany); Julian Peters (Karlsruher Institute of Technology, Germany); Dirk Leiacker (TU Darmstadt, Germany); Sven Matthiesen (Karlsruher Institut für Technologie, Germany); Mario Kupnik and Klaus Hofmann (TU Darmstadt, Germany)

15: Evaluating Three Eddy Current Sensor Coils for Reduced Temperature and Humidity Effects
Gabriel Gruber, Markus Neumayer and Bernhard Schweighofer (Graz University of Technology, Austria); Thomas Leitner, Matthias Berger and Gerald Klösch (Voestalpine, Austria); Hannes Wegleiter (Graz University of Technology, Austria)

16: Effect of diamond burnishing treatment parameters on eddy current displacement measurement
Veeti Karhu, Kalle Kinnunen and Raine Viitala (Aalto University, Finland)

17: Estimators of Frequency Variability in Low Inertia Systems
Anca Petruta Brincoveanu (University Politehnica of Bucharest, Romania); Radu Cristian Opreanu, Radu Plamanescu and Ana Maria Dumitrescu (National University of Science and Technology Politehnica Bucharest, Romania); Mihaela Albu (Politehnica University of Bucharest, Romania); Harold Kirkham (Pacific Northwest National Laboratory, USA)

18: A novel parameter estimation method of BTT data without gridding error
Ruochen Jin, Laihao Yang, Zhibo Yang and Huahui Hu (Xi'an Jiaotong University, China); Xuefeng Chen (Xian Jiaotong University, China)

19: Design of a low-cost oscillator-based conditioning method for a graphene film-based capacitive sensor in aerospace de-icing applications
Luca Tari (University of Cassino and Southern Lazio, Italy); Gabriele Cavaliere (University of Salerno, Italy); Sarah Sibilia (University of Cassino and Southern Lazio, Italy); Sergio Chiodini (Nanesa srl Italy, Italy); Luigi Ferrigno (University of Cassino, Italy); Antonio Maffucci (University of Cassino and Southern Lazio & National Institute of Nuclear Physics, INFN-LNF, Italy)

20: CNN-based Deep Auto-Encoders for Limited Gas Chromatography - Ion Mobility Spectrometry data
Georgios Kirtsanis (Centre for Research and Technology Hellas, Greece); Georgios Dolias and Spyridon Kintzios (Centre for Research and Technology Hellas (CERTH), Greece); Konstantinos Ioannidis (Information Technologies Institute-CERTH, Greece); Stefanos Vrochidis (Information Technologies Institute (ITI), Greece); Ioannis Kompatsiaris (Centre for Research and Technology Hellas, Greece)

21: Uncertainty Assessment of NDVI Measurement with Radiometric Compensation by means of Monte Carlo Analysis
Fatemeh Khalesi, Pasquale Daponte, Luca De Vito and Francesco Picariello (University of Sannio, Italy)

22: A low cost sensor system for determining emissions in open stable systems
Michael Kazda, Julian Hartje and Marcus Clauß (Thünen Institute of Agricultural Technology, Germany)

23: Data-Driven Dynamics Modeling of a 9-Degree-of-Freedom Rehabilitation Robot Based on the Koopman Operator
Junyu Wu, Yubin Liu, Zhuoqi Man, Zeyu Sun, Xiaofan Yang and Xuanming Cao (Harbin Institute of Technology, China)

24: ECT Sensor with Unique Structure for Robot Gripper Application
Yang Hu, Ruixiang Deng, Haozheng Bai and Wuqiang Yang (The University of Manchester, United Kingdom (Great Britain))

25: Investigation of Capacitive Micromachined Ultrasound Transducer for NDT and material inspection in metals and alloys
Karman Selvam, Nooshin Saeidi, Yves Schwarzmann, Maik Wiemer and Harald Kuhn (Fraunhofer ENAS, Germany)

26: PVDF as Dielectric Material for Capacitance Enhancement of IDTs Structure Based PCB
Fatma Khayat (CRMN, Centre for Research on Microelectronics and Nanotechnology of Sousse, Tunisia & University of Sciences of Monastir, Tunisia); Salma Bizid and Mohamed Hadj Said (CRMN, Centre for Research on Microelectronics and Nanotechnology of Sousse, Tunisia); Mounir Mansour (University of Sousse & University of Sciences of Monastir, Tunisia); Fares Tounsi (National Engineering School of Sfax, Tunisia); Ayoub Hadj Said (CRMN, Centre for Research on Microelectronics and Nanotechnology of Sousse, Tunisia); Olfa Kanoun (Chemnitz University of Technology, Germany)

27: Research on dip frequency tracking demodulation method for optical carrier based microwave interferometry
Songlin Li, Ting Xue and Yan Wu (Tianjin University, China)

28: A Fast and Real-Time Digital Method To Sense Fault Conditions in Resonant-Based MEMS Systems
Raffaele Enrico Furceri and Marco Zamprogno (STMicroelectronics, Italy)

29: Establishment point-of-care device for real-time detection creatinine of acute ischemic stroke patients
Rui-Cian Weng (National Center for Instrumentation Research, Taiwan); Chi-Hung Hwang (Taiwan Instrument Research Institute, NARLabs, Taiwan)

30: EIT Reconstruction Based on Pareto Multi-Objective Optimization
Xiangxu Meng and Yue (Tianjin University, China); Yuwei Zhao (Tianjin University Tianjin, China)

31: Plastic Identification Using NIR Spectral Analysis and KNN Model with Correlation Feature Selection
Lijuan Wang, Uche Ejiofor and Dayang Wang (University of Kent, United Kingdom (Great Britain))

32: A Generalize Mechanical Fault Diagnosis Method Based on Enhanced Meta Learning
Jingli Yang, Changdong Wang, Shuangyan Yin, Yu ang Li and Siyuan Liu (Harbin Institute of Technology, China); Tianyu Gao (China)

33: Novel Lower Limb Exoskeleton Rehabilitation System Based on Tactile Sensors and Digital Twin
Ming-Chan Lee (National Kaohsiung University of Science and Technology, Taiwan); Cheng-Tang Pan (National Sun Yat-sen University, Taiwan)

34: Development of a MEMS-Based VOCs Gas Sensor and Monitoring System for Environmental Detection
Yu-Jen Hsiao (Department of Vehicle Engineering, National Kaohsiung University of Science and Technology, Kaohsiung City 807, Taiwan.)

35: Cellular Signals-of-Opportunity for RF Propagation Measurements with SDRs
Max Hollingsworth (University of Colorado, USA); Prasanth Prahladan (University of Colorado Boulder, USA); Michael Cotton (National Telecommunications and Information Administration, USA); Dirk Grunwald (University of Colorado, USA)

36: Leveraging Ubiquitous LTE Signals for Non-Intrusive Wheelchair Detection
Sandip Jana (IIT Hyderabad, India); Amit Kumar Mishra (Aberystwyth University, United Kingdom (Great Britain)); Mohammed Zafar Ali Khan (Indian Institute of Technology Hyderabad, India)

37: Preliminary Study on the Quality of Distributed Calibration Procedures for WSN
Vincenzo Gallo, Daniele Buonocore and Vincenzo Paciello (University of Salerno, Italy); Antonio Pietrosanto (University of Salerno & CEO of Metering Research srl, Italy)

38: Onboard Approximation of Dynamic Load-response Relationship of Track Structure Using Laser Doppler Vibrometer and Axle Box Accelerometer
Yuanchen Zeng, Alfredo Núñez and Zili Li (Delft University of Technology, The Netherlands)

39: Optimizing Sensor Selection in Laparoscopic Surgical Simulators: Lessons Learned in a Robotic Platform
Kade Macwilliams and James R Green (Carleton University, Canada); Ahmed Nasr (Children's Hospital of Eastern Ontario, Canada); Georges Azzie (Hospital for Sick Children, Canada); Carlos Rossa (Carleton University, Canada)

40: Robust Heart Rate Estimation based on rPPG Signal from Subsurface Scattering
Chen Zhang, Wang Liao and Gunther Notni (Ilmenau University of Technology, Germany)

41: Predicting Pulmonary Function from Chest X-Rays Using Deep Learning: A DenseNet Approach to Estimating FEV1/FVC Z-Scores
Somin Lee (University of Toronto, Canada); Mohamed Abdalla (University of Alberta, Canada); Bita Behrouzi (Beth Israel Deaconess Medical Center, USA); Po-Chih Kuo (National Tsing Hua University, Taiwan); Soyoon Lee (University of Waterloo, Canada); Han-Jay Shu (Massachusetts Institute of Technology, USA); Kenneth Patrick Seastedt (Roswell Park Comprehensive Cancer Center, USA); Leo Celi (Beth Israel Deaconess Medical Center, USA)

42: Score-based diffusion model for three- dimensional electrical impedance tomography
Xiaomin Hu, Yijia Wang, Yanbin Xu, Feng Dong and Shuaifu Zhang (Tianjin University, China)

43: Recognition of Three Fine-Grades of Ancient Roman Coins Through Transfer Learning
Melaku Getahun and Mohammed Hammoud (Skolkovo Institute of Science and Technology, Russia); Roberto Passerone (University of Trento, Italy); Andrey Somov (Skolkovo Institute of Science and Technology, Russia)

13:00 – 14:00
Late Result Poster Session
Room: Silva-Foyer + Stadthallen-Foyer
Session Chairs:

44: Computational Analysis of Optical Sensors Based on Localized Surface Plasmon Resonance Using Gold Nanoparticles
Bruna Carvalho (Federal Institute of Paraiba, Brazil); Arthur Aprígio de Melo (Federal University of Campina Grande, Brazil); Antonio Marcus Nogueira Lima (Universidade Federal de Campina Grande & Departamento de Engenharia Elétrica, Brazil); Rossana Moreno Santa Cruz (Instituto Federal da Paraíba, Brazil); Cleumar da Silva Moreira (Instituto Federal Da Paraíba - João Pessoa & VIRTUS-UFCG, Brazil)

45: Precision non-invasive high DC current sensor
Ladislav Grno (Applied Precision Ltd., Slovakia)

46: Early tooth demineralization assessment by impedance spectroscopy
Isabella Sannino (Polytechnic of Turin, Italy); Luca Lombardo, Leila Es Sebar, Marco Parvis, Leonardo Iannucci and Emma Paola Angelini (Politecnico di Torino, Italy); Tolou Shokuhfar (University of Illinois at Chicago, USA); Nicola Scotti (University of Turin, Italy); Sabrina Grassini (Politecnico di Torino, Italy)

47: Compressive Power Spectrum Estimation Using Delay Coprime Sampling
Jiahui Cao (Xi'an Jiaotong University, China); Zengkun Wang (Chang'an University, China); Zhibo Yang (Xi'an Jiaotong University, China); Shuming Wu (Xi an Jiaotong University, China); Feng Tian (Xi'an Jiaotong University, China); Asoke K Nandi (Brunel University London, United Kingdom (Great Britain)); Ruqiang Yan and Xuefeng Chen (Xi'an Jiaotong University, China)

48: Deep Learning-based Iterative Dynamic Error Compensation for Vibration Sensors
Dmitrij Filenko, Alexander Hetznecker and Thomas Greiner (Pforzheim University, Germany)

49: Additively Manufactured Position Detection for a Translationally Movable Robot Flange
Robin Waltersbacher (Offenburg University of Applied Sciences, Germany); Lukas Stiglmeier (University of Applied Sciences Offenburg, Germany); Thomas M. Wendt (University of Applied Sciences Offenburg & Work-Life Robotics Institute, Germany)

50: Monitoring Climate Impact on Forests using a Wireless Sensor Network
Manuel Alvarez-Herrera and Jose A. Garcia-Souto (Universidad Carlos III de Madrid, Spain)

51: Automatic Module Based on Full-Field Stress and Tensile/Compressive State Measurement Methods
Po-Chi Sung, Hsu-Chung Chen, Ching-Hsin Hsu, Yun-Chi Huang and Wei-Chung Wang (National Tsing Hua University, Taiwan)

52: Towards Sustainable Indoor Farming: an IoT-based Prototype for Crop Cultivation
Nicolò Grasso, Benedetta Fasciolo, Giulia Bruno, Paolo Chiabert, Sabrina Grassini and Luca Lombardo (Politecnico di Torino, Italy)

53: A dielectric-based method for rapid detection of woody breast in chicken breast meat
Samir Trabelsi (US National Poultry Research Center, USDA-ARS, USA & USDA-ARS, USA)

54: Acetone detection at aqueous solutions using a prism-based SPR sensor: simulations and experiments
Pedro Antonio Andrade Silva (Federal Institute of Paraiba & Virtus-UFCG, Brazil); Arthur Aprígio de Melo (Federal University of Campina Grande, Brazil); Gabriel Bruno Fernandes (Universidade Federal de Santa Catarina (UFSC) & Instituto de Engenharia Biomédica, Brazil); Antonio Marcus Nogueira Lima (Universidade Federal de Campina Grande & Departamento de Engenharia Elétrica, Brazil); Jefferson Marques (Federal University of Santa Catarina, Brazil); Cleumar da Silva Moreira (Instituto Federal Da Paraíba - João Pessoa & VIRTUS-UFCG, Brazil)

13:00 – 14:00
Demo Session
Room: Silva Foyer/Lounge/Lux
Session Chairs: Enza Panzardi and Chi Hung Hwang

Live Demonstration: Low-Conductivity Liquid Measurement through High-Frequency Electromagnetic Tomography
Xun Zou and Shu Lin (University of Manchester, United Kingdom (Great Britain)); Hongwei Song and Wei Xu (Yangtze University, China); Ziqi Chen (University of Manchester, United Kingdom (Great Britain)); Jorge R. Salas Avila (The University of Manchester, United Kingdom (Great Britain)); Xinnan Zheng and Kuohai Yu (University of Manchester, United Kingdom (Great Britain)); Saibo She and Wuliang Yin (The University of Manchester, United Kingdom (Great Britain))

Live-Demonstration: Synchronized Harmonic Measurement in DC Grids Using the TrueDC Algorithm
Cesar Andres Cazal (RWTH Aachen University & Institute for Automation of Complex Power Systems, Germany); Ferdinanda Ponci (RWTH Aachen University, Germany); Antonello Monti (RWTH Aachen University & Institute for Automation of Complex Power Systems, Germany)

Smart Nitric Oxide Gas Sensor system of High-Temperature Resistance
Ray Hua Horng (National Yang Ming Chiao Tung University, Taiwan)

Live Demonstration: General Two-Finger Tactile Sensor for Robotic Hand
Ruixiang Deng, Yang Hu, Haozheng Bai and Wuqiang Yang (The University of Manchester, United Kingdom (Great Britain))

Live Supraharmonic Analyzer Demonstration
Philippe Blanchard (Université du Québec à Trois-Rivières, Canada); Roger Bergeron (Les Services Électrigenies, Canada); Manouane Caza-Szoka (Universite du Quebec a Trois-Rivieres, Canada & UQTR, Canada); Daniel Massicotte (Universite du Quebec a Trois-Rivieres, Canada)

Live Demonstration: LABIIUM - AI Measurement Automation
Emmanuel A Olowe and Danial Chitnis (The University of Edinburgh, United Kingdom (Great Britain))

14:00 - 16:00
Data Acquisition Systems
Room: Lichtenwalde
Session Chairs: Michal Janosek and Renczes Balázs

Beyond histogram testing: a new method to estimate a comparator threshold level
Paolo Carbone (University of Perugia, Italy); Balázs Renczes (Budapest University of Technology and Economics, Hungary)

Smart Feeding Station: Non-Invasive, Automated IoT Monitoring of Goodman's Mouse Lemurs in a Semi-Natural Rain Forest Habitat
Jonas Peter (ETH Zürich, Switzerland); Victor Luder and Lukas Schulthess (ETH Zurich, Switzerland); Leyla Rivero Davis (Zoo Zürich, Switzerland); Michele Magno (ETH Zurich, Switzerland)

Study on the Asymmetry of G.655 Optical Fiber for DWDM-based Clock Distribution and Synchronization Systems
Yingjian Zhang, Lingyun Li and Yonggang Wang (University of Science and Technology of China, China)

A Novel Feedforward Digital Background Calibration Technique for Time-Interleaved ADCs
Yu Bai and Datong Liu (Harbin Institute of Technology, China); Yu Peng (Harbin Institute of Technology, HIT, China)

Reliability Evaluation in Operational Amplifier at Cryogenic Temperature
Minh Long Hoang, Danilo Santoro, Giovanni Chiorboli and Marco Bassani (University of Parma, Italy); Alessandro Andreani (Università degli Studi di Milano, Italy); Paolo Cova (University of Parma, Italy); Massimo Lazzaroni (Università degli Studi di Milano, Italy); Valeria Trabattoni (University of Milan, Italy); Andrea Zani (INFN Milano, Italy); Nicola Delmonte (Università di Parma, Italy)

Ultralow-Frequency Noise in High-Bias Precision DC-Coupled Voltage Measurements
David Novotny and Michal Janosek (Czech Technical University in Prague, Czech Republic); Vojtech Petrucha (Czech Technical University in Prague & Faculty of Electrical Engineering, Czech Republic)

14:00 – 16:00
SPS: Impedance Bridges/Circuits and Embedded Systems for I&M
Room: Augustusburg 1-3
Session Chairs: Stephan Schlamminger and Daniel Massicotte

[INVITED] How to compare a resistor with a capacitor?
Yicheng Wang

A New Measurement Procedure for Digital Sampling-Based Impedance Bridges
Krzysztof Musiol (Silesian University of Technology, Poland); Ryszard Rybski (University of Zielona Gora, Poland); Marian Kampik (Politechnika Slaska / Silesian University of Technology, Poland); Janusz Kaczmarek and Miroslaw Koziol (University of Zielona Gora, Poland); Adam Ziółek, Maciej Koszarny, Jolanta Jursza and Paweł Zawadzki (GUM, Poland)

Output Buffers in Precision Generators for Impedance Bridges: A Primary Impedance Metrology Perspective
Janusz Kaczmarek, Miroslaw Koziol and Ryszard Rybski (University of Zielona Gora, Poland); Marian Kampik (Politechnika Slaska / Silesian University of Technology, Poland); Krzysztof Musiol (Silesian University of Technology, Poland)

Calibration of mutual inductance standards with a fully-digital impedance bridge
Juan Medved (Istituto Nazionale di Ricerca Metrologica (INRIM), Italy & Politecnico di Torino, Italy); Alessandro Cultrera, Martina Marzano and Vincenzo D'Elia (Istituto Nazionale di Ricerca Metrologica (INRIM), Italy); Massimo Ortolano (Politecnico di Torino, Italy); Luca Callegaro (Istituto Nazionale di Ricerca Metrologica (INRIM), Italy)

Simple Electronic Frontend for Telemetric Sensors in a Smart Object Paradigm
Tiziano Fapanni, Roberto Cannone and Emilio Sardini (University of Brescia, Italy)

Efficient Hybrid Resistor-String and Capacitor DAC with Area Efficient Redundancy-Based Digital Calibration for High-Performance Applications
Ekaniyere Oko-Odion (Iowa State University, USA & Iowa State, USA); Emmanuel Nti Darko, Isaac Bruce, Degang Chen and Matthew Crabb (Iowa State University, USA)

14:00 – 16:00
Optical and Fiber Optic Instrumentation and Measurement
Room: Rabenstein
Session Chairs: Thomas Kissinger and Jose Garcia-Souto

Experimental Evaluation of FSO Link: Impact of Pointing Error on OFDM System Performance
Guilherme D. Ébias (Universidade Federal Fluminense, Brazil); Marcio Alexandre Dias Garrido (Universidade Federal Fluminense, Brazil & Universidade de Vassouras, Brazil); Andrés Pablo López Barbero (UFF, Brazil); Gustavo Bastos Lyra (Universidade Federal Rural do Rio de Janeiro, Brazil); Thiago Coelho (University of Juiz de Fora, Brazil); Vinicius Nunes Henrique Silva (Universidade Federal Fluminense, Brazil)

Dual Optical Frequency Comb Interrogation of Long Period Grating Sensors
Olaoluwa S. Olayemi and Jose A. Garcia-Souto (Universidad Carlos III de Madrid, Spain)

Gas temperature and concentration detection via using a high-coherence dual comb laser
Xiaoqian Zhang, Lijun Xu and Zhang Cao (Beihang University, China)

Wavelength Measurement Base on Optical Fiber Chromatic Dispersion and Microwave Photonics
Yongji Wu, Jing Guo, Xinyu Jiao, Ningxuan Wen and Ruan Li (Clemson University, USA); Jason Shaw (Christ Church Episcopal School, USA); Fei Peng and Hai Xiao (Clemson University, USA)

Multiple harmonics extraction of wavelength modulated laser spectrum by single step empirical mode decomposition
Hongyao Li, Lijun Xu and Zhang Cao (Beihang University, China)

Eco-friendly, High-Resolution Fluorescence Diamond-Based Broadband EUV and X-Ray Beam Profiler System
Yu-Hsin Yang (National Taiwan University, Taiwan); Ya-Ting Kang (National Chung Cheng University, Taiwan); Tzu-Ping Huang and Yin-Yu Lee (National Synchrotron Radiation Research Center, Taiwan); Yu-Chan Lin (Institute of Atomic Molecular Sciences Academia Sinica, Taiwan); Pei-Jie Wu (National Taiwan Normal University, Taiwan); Guo-Hao Lu (Taiwan Instrument Research Institute, Taiwan & National Applied Research Laboratories, Taiwan); Chun-Jen Weng (Taiwan Instrument Research Institute & National Applied Research Laboratories, Taiwan); Chi-Hung Hwang (Taiwan Instrument Research Institute, NARLabs, Taiwan); Wen-Tse Hsiao and Chi-Chung Kei (Taiwan Instrument Research Institute, NarLabs, Taiwan); Wen-Hao Cho (National Applied Research Laboratories, Taiwan); Chan-Yuen Chang (Taiwan Instrument Research Institute, NarLabs, Taiwan); Huan-Cheng Chang (Institute of Atomic Molecular Sciences Academia Sinica, Taiwan); Teng-I Yang (Taiwan Instrument Research Institute and National Applied Research Laboratories, Taiwan)

14:00 – 16:00
Image Processing and Vision Based Measurement
Room: Terra & Radixor
Session Chairs: Chi Hung Hwang and Luca Lombardo

Real-Time Joint Gap Estimation in Laser Welding Using Computer Vision and Model-Based Techniques for Adaptive Control
Fredrik Sikström (Högskolan Väst, University West, Sweden)

Super Resolution Reconstruction of Temperature Field of Falling Film Based on PLIF40
Ting Xue, Haopeng Wu, Jinshun Liu and Yan Wu (Tianjin University, China)

Real-time Appearance-based Gaze Estimation via Web-Camera
Nikita Ligostaev (Skolkovo Institute of Science and Technology, Russia); Nicola Conci and Roberto Passerone (University of Trento, Italy); Andrey Somov (Skolkovo Institute of Science and Technology, Russia)

System for Drone Based Indoor Mapping for Augmented Reality
Tom Sloan (Carleton University, Canada); Bruce Wallace (AGE-WELL NIH SAM3, Canada & Carleton University, Canada); Rafik Goubran (Carleton University, Canada)

Identifying Biological Fluids using Hyperspectral Near-infrared Imaging and Machine Learning for Forensics Analysis
Shah Faisal, Melanie Ooi, Ye Chow Kuang, Yaminn Thawdar, Sanush Abeysekera, Peter Reutemann and Dale Fletcher (University of Waikato, New Zealand); Rachel Fleming and Heather McClelland (Institute of Environmental Science & Research, New Zealand)

Comprehensive Modeling of Camera Spectral and Color Behavior
Sanush Abeysekera (University of Waikato, New Zealand); Ye Chow Kuang (University of Waikato & Monash University, New Zealand); Melanie Ooi (University of Waikato, New Zealand)

14:00 – 16:00
Digitalization, Machine Learning and Big Data for I&M (II)
Room: Carlowitz-Saal
Session Chairs: Emma Angelini and Fernando Álvarez

Indirect measurements with a portable computational NIR spectroscopy - the sources of uncertainty and challenges in a multi-use scenario
Maedeh Nobari (Brandenburg University of Technology Cottbus-Senftenberg & Researcher Fraunhofer IPMS, Germany); Nihed Belkacem Bouzida (Fraunhofer Institute for Photonic Microsystems, Germany); Heinrich Grüger (Fraunhofer IPMS, Germany); Ireneusz Jablonski (Brandenburg University of Technology, Germany)

Variational Autoencoder for Calibration: A New Approach
Travis Barrett (University of Cape Town, South Africa); Amit Kumar Mishra (Aberystwyth University, United Kingdom (Great Britain)); Joyce Mwangama (University of Cape Town, South Africa)

Survey of Quantization Techniques for On-Device Vision-based Crack Detection
Yuxuan Zhang, Luciano Sebastian Martinez Rau, Quynh Nguyen Phuong Vu, Bengt Oelmann and Sebastian Bader (Mid Sweden University, Sweden)

Lithium Battery SOH Estimation under Operating Conditions Based on Improved Ant Lion Algorithm and XGBoost
Wenbin Zheng, Chenyu Bai, Ping Fu, Bing Liu and Li Wang (Harbin Institute of Technology, China)

Single-Particle Mass Spectrometry coupled with Deep Learning Approaches for automatic on-site Classification of Aerosol Particles
Heinrich Ruser, Guanzhong Wang and Julian Schade (University of the Bundeswehr Munich, Germany); Johannes Passig and Ralf Zimmermann (University of Rostock, Germany); Thomas Adam (University of the Bundeswehr Munich, Germany)

Two-Phase Flow Measurement Model Of Coriolis Mass Flowmeter Based On Online Active Learning
Jiawei Zhang, Lijun Sun, Haiming Wang and Xuan Zhuang (Tianjin University, China)

14:30 - 16:00
Exhibitor Clean-Up
Room: Silva-Foyer + Stadthallen-Foyer

16:00 - 16:30
Closing Ceremony & 2026 Announcement
Room: Carlowitz-Saal