

# FULL PROGRAM

## INTERNATIONAL METROLOGY CONGRESS

# CIM 2025

11 - 14 MARCH LYON FRANCE

# ONLINE REGISTRATION



a new metrology for a sustainable industry and society

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## QI-Digital WORKSHOP (limited seats)

09:00 AM - 12:30 PM

Metrology in the Digital Transformation of the international Quality Infrastructure

The green and digital transition challenge metrology and the quality infrastructure (QI). The QI-Digital initiative develops smart tools for a data-based QI, enabling new types of quality assurance, easing bureaucracy and unlocking billions in savings. The workshop focuses on digital certificates in metrology, their provisioning via data spaces and interoperability with the larger QI. We invite the international metrology community and industry to provide feedback and team up for joint activities.

### 9.00 - 10.30 - PART ONE

“QI-Digital” – idea, initiative and agenda of the workshop

- Dorothea Knopf – PTB / GERMANY
- Jens Niederhausen – PTB / GERMANY

M4AIM – Metrology for AI in Medicine

- Hans Rabus – PTB / GERMANY

TraCIM-AI – Platform for AI testing

- Maik Liebl – PTB / GERMANY

Digital Calibration Certificate and Digital Accreditation Symbol

- Shanna Schönhals – PTB / GERMANY
- Michael Melzer – BAM / GERMANY

QI Big Data Architectures and Data Spaces in Cities of the Future

- Barbara Jung – PTB / GERMANY
- Daniel Hutzschenreuter – PTB / GERMANY

### 10.30 - 11.00 - COFFEE BREAK

### 11.00 - 12.30 - PART TWO

Digital Certificate of Conformity (D-CoC)

- Dorothea Knopf – PTB / GERMANY

Digital Product Passport

- Jens Niederhausen – PTB / GERMANY
- Jens Gayko - DKE / GERMANY

Panel Discussion “Current challenges in the transfer of QI-Digital results to practise”

- Sami Koskinen – Beamex / FINLAND
- Michael Mende – SPEKTRA Schwingungstechnik und Akustik GmbH / GERMANY
- Thomas Engel – Siemens / GERMANY
- QI-Digital representatives

### 12.30 – 1.30 Lunch for workshop participants ONLY



## Kickoff of the 22nd edition of the Congress

01:30 PM - 02:00 PM

Pioneering precision in a digital world: Metrology's role in sustainability and industrial innovation. This year's the International Metrology Congress will explore how metrology plays a key role in advancing industrial innovation while driving sustainability efforts in a digital age.

Speakers:

- Thomas COURBE - DIRECTION GÉNÉRALE DES ENTREPRISES / FRANCE
- Martin MILTON - BIPM / INTERNATIONAL
- Cosimi CORLETO - CFM president / FRANCE
- Laurent LABATUT - TRESCAL / FRANCE
- GL Events representative (TBA) / FRANCE

## ROUND TABLE | IoT and metrology: toward an internet of metrology?

02:00 PM - 03:30 PM

The Internet of Measurement (IoM) is emerging as a crucial field in the era of IoT, focusing on accurate and synchronized measurements across connected devices. IoM ensures calibration, data collection, and analysis from sensors, guaranteeing precision through centralized management. By leveraging IoT technology, IoM supports real-time synchronization, ensuring measurements follow industry norms and remain reliable over time.

IoM enables centralized calibration management, using AI to monitor variations and manage device performance. Predictive maintenance becomes possible by tracking sensor data, calibration cycles, and detecting anomalies early. Additionally, IoM allows remote calibration updates, reducing manual interventions and enhancing the efficiency of devices in various environments.

The collaboration between IoT and metrology is essential, but the real challenge for IoM lies in creating global standards for measurement accuracy. As IoM evolves, it will define how industries trust and manage precise measurements, shaping the future of data integrity and operational reliability across all sectors.

### Moderator:

- Olivier Moinecourt & David Riallant - OMWAVE by Groupe TERA / FRANCE

### Speakers:

- Malek Abdi - Advarna / FRANCE
- Michael Mende - Spektra / GERMANY
- Shanna Schönhals - Physikalisch-Technische Bundesanstalt / GERMANY
- Tony Wattrelot - HEX GROUP / BELGIUM
- Maxence Bureau - ENGIE / FRANCE

**12.30 - 1.30 Lunch for workshop participants ONLY**

## S1 - Metrology for sustainability and health

02:00 PM - 03:30 PM | Session Chair: Hugo Lehmann - METAS / SWITZERLAND

- 02:00 PM - 02:15 PM | KEYNOTE

Metrological characterisation of low-cost and wearable sensors for research on healthy buildings in a novel living laboratory

*Francesca Rolle - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 02:15 PM - 02:30 PM

The new EMN Clean Energy

*Fabian Plag - Physikalisch-Technische Bundesanstalt / GERMANY*

- 02:30 PM - 02:45 PM

Sensor data analysis for air quality estimation at the urban scale

*Laurent Spinelle - Ineris-LCSQA / FRANCE*

- 02:45 PM - 03:00 PM

Metrology for improving well-being and participation of society

*Mona Wehming - Physikalisch-Technische Bundesanstalt / GERMANY*

- 03:00 PM - 03:15 PM

Introducing systems metrology: applications and future directions

*Barbara Jung - Physikalisch-Technische Bundesanstalt / GERMANY*

- 03:15 PM - 03:30 PM

EMN Food: priorities and strategies for driving metrology in support of food safety and sustainability

*Chiara Portesi - Istituto Nazionale di Ricerca Metrologica / ITALY*



## S2 - Improving mechanical measurement

02:00 PM - 03:30 PM | Session Chair: Fredrik Arrhen - RISE / SWEDEN

- 02:00 PM - 02:15 PM | KEYNOTE

Technological development in coordinate measuring machines: from the first patents to future developments

*Thierry Coorevits - École Nationale Supérieure des Arts et Métiers / FRANCE*

- 02:15 PM - 02:30 PM

Optimization of the self-balancing of an AACMM to improve its ergonomic and measurement performance

*Salomé Provost-Mattmann - DRIVE Laboratory / FRANCE*

- 02:30 PM - 02:45 PM

Status and future of metrology for dynamic measurement in Nordic and Baltic countries

*Martti Heinonen - VTT Mikes / FINLAND*

- 02:45 PM - 03:00 PM

NDE developments to support additive manufacturing

*Peter Loftus - UK Research Centre in Nondestructive Evaluation / UNITED KINGDOM*

- 03:00 PM - 03:15 PM

Improving and optimizing robotized non-destructive examination by means of 3D data acquisition and processing

*Yannick Caulier - Intercontrôle / FRANCE*

- 03:15 PM - 03:30 PM

Environmental noise pollution: a portable dosimeter for measuring low-frequency noise exposure

*Olav Werhahn - Physikalisch-Technische Bundesanstalt / GERMANY*



## P1 - POSTERS

04:00 PM - 05:30 PM

### MECHANICS:

- Improving efficiency determination of electric machines by better obtaining details on mechanical and electrical power  
André Schäfer - Hottinger Brüel & Kjaer / GERMANY
- Calibration of shock accelerometers by a primary method at amplitudes up to 100 000 m/s<sup>2</sup>  
Michael Mende - Spektra / GERMANY

### DIMENSIONAL

- CMM measurement of injection-moulded plastic lenses and steel moulds: strategies for the determination of the reference system  
Andrea Egidi - Istituto Nazionale di Ricerca Metrologica / ITALY
- Algorithms for surface texture characterization of freeform surfaces and components produced by additive manufacturing  
Ahmed Bachir - Laboratoire National de Métrologie et d'Essais / FRANCE
- Crane runway check with a robot  
Florian Lenormand - CML Métrologie / FRANCE

### ROBOTISATION, AUTOMATION

- Robotization system for pipette calibration  
Or Shoal - QCC Hazorea Calibration Technologies / ISRAEL
- Accurate automation of deadweight force standard machine at NMCC-SASO-KSA  
Hamad ALGamdi - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA
- Gauging error of pose acquired by vision systems in bin picking applications  
Kamel Saidi - National Institute of Standards and Technology / USA
- Calibration method for driving robots and geolocated inertial measurement units  
Laurent Pingot - UTAC / FRANCE
- DMM robot modification for automated accredited calibration of clamp meters  
Matthew Gypps - Trescal / UNITED KINGDOM
- Robotic automation at micron-level precision ensures workforce health and scalability at cretex medical  
Louis Lapierre - Mecademic Robotics / CANADA
- System for the automated calibration/adjustment of EXFO OTDRs  
Dylan Cupedo - Trescal / THE NETHERLANDS
- Automation and monitoring of lab- and industrial-scale food processing facilities for quality project management  
Pierre Casaubieilh - AgroParisTech-INRAE / FRANCE

### QUALITY INFRASTRUCTURE

- Establishment of sustainability through open access to research infrastructure in a calibration laboratory for extreme electrical metrology  
Marija Cundeva-Blajer - Ss.Cyril and Methodius University of Skopje-FEEIT / MACEDONIA
- Software in metrology for the digital age: addressing compliance challenges with MID, NAWID and MDR  
Martin Koval - Czech Metrology Institute / CZECH REPUBLIC
- How can the CMC of a laboratory be evaluated in the field of NAWI calibration?  
Adriana Vâlcu - Romanian Accreditation Association-RENAR / ROMANIA
- Implementing a risk based approach when determining the periodicity of Inter and Intra laboratory comparisons  
Paul Charman - Trescal / UNITED KINGDOM

### DIGITALIZATION

- Digitalizing metrology: the quality infrastructure services portal of IPEM-SP  
Marcos Heleno Gerson De Oliveira Júnior - IPEM-SP-Instituto de Pesos e Medidas do Estado de São Paulo / BRAZIL
- Error-free mass calibration guided by embedded software applications  
Martin Ross - Sartorius / GERMANY
- The digital thread for dimensional inspection  
Loïc Marquet - PolyWorks Europa / FRANCE
- Semantic data spaces for selective disclosure of DCoC in digital quality infrastructure  
Tomasz Sołtysiński - Physikalisch-Technische Bundesanstalt / GERMANY
- Calibration and traceability of weather stations in a highly modern calibration facility  
Martin Østerlund - Danish Technological Institute / DENMARK
- Integration of data quality information with metrology in real-world sensor networks  
Anupam Prasad Vedurmudi - Physikalisch-Technische Bundesanstalt / GERMANY
- Digitalization of the tensile test audit procedure in accordance with the ISO 6892-1 standard  
Olfa Dhrioua - ISETSO-Higher Institute of Technological Studies of Sousse / TUNISIA
- Recent advancements in sensor network metrology for a sustainable industry and society  
Shahin Tabandeh - VTT Mikes / FINLAND
- National Quality Infrastructure (NQI) and National Quality Strategy (NQS) in Saudi Arabia  
Khaled Ahmed - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA



## P1 - POSTERS

04:00 PM - 05:30 PM

### METROLOGY FOR SUSTAINABILITY

- Evaluation of temporal depreciation in the energy consumption of refrigerators and its impact on energy efficiency tests  
*Carlos José Rupp Bindé Junior - CRB Strategic QI / BRAZIL*

### MATERIALS

Metrological characterization of standards – plastic films, which are used for calibration of nanodrop spectrophotometers

- *Veljko Zarubica - Analysis D.O.O / SERBIA*
- Enovasense Field Sensor HR: a breakthrough in high-resolution under surface analysis
- *Geoffrey Bruno - Precitec / FRANCE*

Electrical resistance as a tool for evaluating filler dispersion in polymer composites

- *Pier Paolo Capra - Istituto Nazionale di Ricerca Metrologica / ITALY*

Emissivity and reflectivity measurements for passive radiative cooling technologies

- *Albert Adibekyan - Physikalisch-Technische Bundesanstalt / GERMANY*



### PHOTONICS

Extension from 250 nm to 200 nm for measuring the spectral irradiance of a source at LNE-Cnam

- *Mai Huong Valin - Laboratoire National de Métrologie et d'Essais - CNAM / FRANCE*

New calibration standards and methods for radiometry and photometry after phaseout of incandescent lamps

- *Thierry Valin - Laboratoire National de Métrologie et d'Essais / FRANCE*

European EPM Project - 22NRM05 MeLiDos

- *Fabien Eloi - Laboratoire National de Métrologie et d'Essais / FRANCE*

Metrology as an important tool to ophthalmic laser therapy

- *Carlos Simoes - Trescal / SPAIN*



### BIOLOGY

The effects of accreditation on microbiology laboratories performance in proficiency testing programs

- *Amar Alomair - SAAC-Saudi Accreditation Center / SAUDI ARABIA*

Characterization of a sonication system for blood-brain barrier opening using OLYMPUS V301 focalized transducers

- *Giovanni Durando - Istituto Nazionale di Ricerca Metrologica / ITALY*

## WELCOME APERITIVE

05:30 PM - 07:00 PM

*Cheers to the first day!*

To wrap up the first day of the CIM, all participants are invited to gather at the Metrology Village within the exhibition hall. It's the perfect opportunity to relax, share a drink together and enjoy a cheerful and informal moment of connection!

## ROUND TABLE | Quality infrastructure in a digital world

09:00 AM - 10:30 AM

We live in an era where face-to-face interactions are no longer the norm, and the products, services, and systems we depend on are becoming increasingly complex and digitalized. This transformation, in both scale and complexity, is unprecedented.

Technology is now deeply embedded in industrial processes and business models, transforming supply chains and integrating across all levels. With this digital evolution, ensuring quality and safety is more critical than ever.

Quality Infrastructure (QI) forms the foundation for development and safety assurance. It connects metrology, standardization, accreditation, conformity assessment, and market surveillance. For example, standardization enables economic efficiency and access to global markets by ensuring precise measurements and product verification. Accreditation adds another layer of confidence.

While industries have quickly adapted to the digital age, has QI evolved fast enough to stay relevant to markets, consumers, and regulators? Failing to bridge these gaps could risk QI becoming a barrier to innovation. We'll explore how QI is adapting, and look ahead to the future challenges and opportunities in maintaining trust and confidence in this digital landscape.

### Moderator:

- Cristina Draghici - ISO / INTERNATIONAL

### Speakers:

- Sascha Eichstädt - Physikalisch-Technische Bundesanstalt / GERMANY
- Hadi Hussain - ISO / INTERNATIONAL
- Pierre Girault - France Qualité / FRANCE
- Maureen Logghe - European Accreditation / INTERNATIONAL
- Martin Michelot - TIC Council / INTERNATIONAL

## S3 - Metrology to tackle greenhouse effects

09:00 AM - 10:30 AM | Session Chair: Michela Segal - Istituto Nazionale di Ricerca Metrologica / ITALY

- 09:00 AM - 09:15 AM | KEYNOTE

Comparison of cavity ring-down spectroscopy and Fourier transform infrared spectroscopy for the isotopic composition determination of CRMs of CO<sub>2</sub> in air

*Michela Segal - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 09:15 AM - 09:30 AM

Quantification of trace NH<sub>3</sub> as an impurity in emerging applications: CCUS, biomethane and hydrogen

*Zhechao Qu - Physikalisch-Technische Bundesanstalt / GERMANY*

- 09:30 AM - 09:45 AM

Quality assurance for CO<sub>2</sub> purity – Role of metrology in underpinning the safe, sustainable and cost effective CCUS at scale

*Nityashree Nagesh - National Physical Laboratory / UNITED KINGDOM*

- 09:45 AM - 10:00 AM

Stability study of multicomponent mixtures to support carbon metrology

*Florbela Dias - Instituto Português da Qualidade / PORTUGAL*

- 10:00 AM - 10:15 AM

Instrumented platform on sensor systems evaluation in a controlled environment

*Tatiana Macé - Laboratoire National de Métrologie et d'Essais / FRANCE*

- 10:15 AM - 10:30 AM

Towards innovative optical gas standards for N<sub>2</sub>O – advancing metrological traceability for greenhouse gas quantification and control

*Olav Werhahn - Physikalisch-Technisch Bundesanstalt / GERMANY*



## S4 - Dimensional

09:00 AM - 10:30 AM | Session Chair: David Vasty - Trescal / FRANCE

- 09:00 AM - 09:15 AM | KEYNOTE

On the way to a choice support tool for surface characterization and development

*Kevin Chauveau - CETIM / FRANCE*

- 09:15 AM - 09:30 AM

Assessing rechargeable batteries with 3D X-ray microscopy, computed tomography and nanotomography

*Adrien Chandat - ZEISS / FRANCE*

- 09:30 AM - 09:45 AM

Micro-geometric measurements of plastic lenses and metallic inserts by optical profilometry

*Luigi Ribotta - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 09:45 AM - 10:00 AM

Accuracy and reproducibility of ambient topographies at the nanoscale by AFM: several months of metrological monitoring

*Ziad Gharibeh - UNICAEN CNRS / FRANCE*

- 10:00 AM - 10:15 AM

Robot qualification and calibration

*Florian Lenormand - CML Métrologie / FRANCE*

- 10:15 AM - 10:30 AM

A virtual metrology frame test setup using fiber interferometric sensors

*Davi Anders Brasil - Institut für Mikroelektronik und Mechatronik-Systeme / GERMANY*



## PLENARY SESSION - A NEW METROLOGY FOR A SUSTAINABLE INDUSTRY AND SOCIETY

11:00 AM - 12:30 PM

WIn this plenary session, we will hear from international experts representing diverse fields. They will showcase international perspectives on how metrology is evolving to support sustainability in industry. Experts will highlight collaborative efforts between industry and government, the role of measurement science in driving innovation, reducing environmental impact and contributing to a greener, more responsible future.

### Chairman and introduction:

- Thomas Grenon - Laboratoire National de Métrologie et d'Essais / FRANCE

### Speakers:

- Celebrating 150 years of the Metre Convention - providing measurements for all time for all people

*Martin Milton - BIPM / INTERNATIONAL*

- Smart measurements for a greener tomorrow: metrology meets sustainability

*Dolores Del Campo - EURAMET / INTERNATIONAL*

- Manufacturing architecture for resilience and sustainability

*Cosimi Corleto - Horizon Europe Project Mars / INTERNATIONAL*

## S5 - Photonics

01:30 PM - 03:00 PM | Session Chair: Ivo Degiovanni - Istituto Nazionale di Ricerca Metrologica / ITALY

- 01:30 PM - 01:45 PM | KEYNOTE

Integrated light for distributed sensing and new metrology solutions

Olav Werhahn - Physikalisch-Technisch Bundesanstalt / GERMANY

- 01:45 PM - 02:00 PM

A primary irradiance standard based on a predictable quantum efficient detector coupled with an ultra-Stable, homogeneous laser beam

Salim Ferhat - Physikalisch-Meteorologisches Observatorium Davos, World Radiation Center / SWITZERLAND

- 02:00 PM - 02:15 PM

Figures of merit and practices for constructive passive daytime radiative cooling measurements comparison

David Tichy - Czech Metrology Institute / CZECH REPUBLIC

- 02:15 PM - 02:30 PM

Uncertainty of evaluation of spectral mismatch factor in solar cell calibration

Khaled Ahmed - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA

- 02:30 PM - 02:45 PM

Advanced non-destructive nanometrology using confocal optical imaging with photon reassignment

Alberto Aguilar - IotaMetrix / FRANCE



## S6 - Implementing the new mass unit

01:30 PM - 03:00 PM | Session Chair: Thierry Coorevits - École Nationale Supérieure des Arts et Métiers / FRANCE

- 01:30 PM - 01:45 PM | KEYNOTE

First weighings with the LNE electrostatic balance

Matthieu Thomas - Laboratoire National de Métrologie et d'Essais / FRANCE

- 01:45 PM - 02:00 PM

Improvement of the mass measurement noise of the LNE Kibble balance

Matthieu Thomas - Laboratoire National de Métrologie et d'Essais / FRANCE

- 02:00 PM - 02:15 PM

Implementation of the new SI definition of the mass in the milligram range at INRIM

Milena Astrua - Istituto Nazionale di Ricerca Metrologica / ITALY

- 02:15 PM - 02:30 PM

Gravimetric standard leak artefact calibration

Bartholomé Blanc - Laboratoire National de Métrologie et d'Essais / FRANCE

- 02:30 PM - 02:45 PM

The dissemination of the mass unit in France...towards the end of standards?

Florian Beaudoux - Laboratoire National de Métrologie et d'Essais / FRANCE

## ROUND TABLE | Tackling pollutants of emerging concern for a healthier tomorrow

01:30 PM - 03:00 PM

We are facing an increasing number of pollutants. Pharmaceuticals, pesticides or microplastics, pose significant threats to both the environment and human health and metrology can play a critical role in addressing them. Yet, our ability to detect, quantify and assess their impact is still limited. Accurate and reliable measurement techniques are essential to fully understand the scale of these risks. This round table aims to explore the current gaps in our measurement capabilities, the development of new metrological methods and the standards needed to ensure robust, reproducible data. By fostering collaboration between scientists, policymakers and industry, we can create solutions that will help protect our planet and ensure a healthier future for all.

### Moderator:

- Robert Wielgosz - BIPM / INTERNATIONAL

### Speakers:

- Nina Huynh - INERIS / FRANCE
- Flavia Nagy - Nestlé / SWITZERLAND
- Andrea Mario Giovannozzi - Istituto Nazionale di Ricerca Metrologica / ITALY
- Nathalie Guigues - Laboratoire National de Métrologie et d'Essais / FRANCE
- Toni Laurila - Sensmet / FINLAND



## S7 - Biomedical applications

03:30 PM - 05:00 PM | Session Chair: Florbela Dias - Instituto Português da Qualidade / PORTUGAL

- 03:30 PM - 03:45 PM | KEYNOTE

Metrology for microfluidics and organ-on-chip technology

*Vania Silverio - INESC MN Microsistemas e Nanotecnologias / PORTUGAL*

- 03:45 PM - 04:00 PM

Low background facility design and traceability at LNE LNHB for ionizing radiation

*Jean-Marc Bordy - LNE LNHB (CEA-List) / FRANCE*

- 04:00 PM - 04:15 PM

Federated semantic data space for networks in biomedical engineering and medical diagnostics

*Tomasz Sołtysiński - Physikalisch-Technische Bundesanstalt / GERMANY*

- 04:15 PM - 04:30 PM

Evaluating the uncertainty of virtual experiments for MR safety assessments via Polynomial Chaos Expansion

*Oriano Bottauscio - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 04:30 PM - 04:45 PM

Towards reference standards for gene delivery

*James Noble - National Physical Laboratory / UNITED KINGDOM*



## S8 - Digital transformation

03:30 PM - 05:00 PM | Session Chair: Sascha Eichstädt - Physikalisch-Technische Bundesanstalt / GERMANY

- 03:30 PM - 03:45 PM | KEYNOTE

An overview of the digital transformation at NRC Metrology

*Georgette Macdonald - National Research Council / CANADA*

- 03:45 PM - 04:00 PM

Digital Calibration Certificates (DCC): benefits and challenges to overcome for implementation

*Martin Koval - Czech Metrology Institute / CZECH REPUBLIC*

- 04:00 PM - 04:15 PM

Digitalization in the metrology quality infrastructure – perspectives from Novo Nordisk

*Heidi Foldal - Novo Nordisk / DENMARK*

- 04:15 PM - 04:30 PM

From a digital calibration certificate to a digital quality infrastructure

*Thomas Engel - Siemens / GERMANY*

- 04:30 PM - 04:45 PM

Are we really prepared for the calibration of measuring devices with a purely digital output?

*Michael Mende - Spektra / GERMANY*

## ROUND TABLE | Quantum sensing: the next industrial revolution

09:00 AM - 10:30 AM

The second quantum revolution will lead to unprecedented technological capabilities opening up important scientific and business opportunities. The worldwide investments in quantum technologies are important in the academic as well as in the industrial sector to accelerate progress.

However, for these investments to be effective the new technologies must be properly characterized and calibrated with measurements traceable to the International System of Units, which is the universal standard for all technologies. Thus, an accessible and fit for purpose testing and validation infrastructure for quantum technology is clearly needed.

What are the needs of the nascent quantum industry? How can metrology help a faster adoption of quantum technologies? What can be done to bridge the gap between fundamental research and industry uptake? Is there sufficient funding for the needs of the community and to reach the high expectations? Which skills are relevant and are they on hand?

This round table will tackle these questions, share some insights and try to give clues how to adapt to these new trends.

### Moderator:

- Hugo Lehmann - METAS / SWITZERLAND

### Speakers:

- Thierry Botter - EUROQUIC / THE NETHERLANDS
- Daniel Dolfi - Thales / FRANCE
- Rémi Geiger - Kwan-Tek / FRANCE
- Barbara Goldstein - National Institute of Standards and Technology / USA
- Sylwia Kostka - Quantera / POLAND
- Wolfgang Tittel - University of Geneva / SWITZERLAND

## S9 - New challenges in chemical metrology

09:00 AM - 10:30 AM | Session Chair: Nathalie Guigues - Laboratoire National de Métrologie et d'Essais / FRANCE

- 09:00 AM - 09:15 AM | KEYNOTE

Metrological progress on hydrogen gas quality: new analytical methods, proficiency testing and validation of sampling system  
Thomas Bacquart - National Physical Laboratory / UNITED KINGDOM

- 09:15 AM - 09:30 AM

Microplastics released during the recurrent use of plastic objects, biases induced by spectroscopy quantification techniques  
Lucas Aine - Centre Technique Industriel de la Plasturgie et des Composites / FRANCE

- 09:30 AM - 09:45 AM

Impact of fog generation on PM sensors' measurement

Laurent Spinelle - Ineris-LCSQA / FRANCE

- 09:45 AM - 10:00 AM

Standardization and harmonization effort on microplastics analysis by spectroscopic methods

Andrea Mario Giovannozzi - Istituto Nazionale di Ricerca Metrologica / ITALY

- 10:00 AM - 10:15 AM

Recycling critical and strategic materials from the urban mine: first accurately estimate the content

Fisicaro Paola - Laboratoire National de Métrologie et d'Essais / FRANCE

- 10:15 AM - 10:30 AM

Improving access to traceability: novel reference standards for biomethane analyser performance evaluation

Nur Ain Nazirah Najurudeen - National Physical Laboratory / UNITED KINGDOM



## S10 - Metrology for machine learning and machine learning for metrology

09:00 AM - 10:30 AM | Session Chair: Alex Dexter - National Physical Laboratory / UNITED KINGDOM

- 09:00 AM - 09:15 AM | KEYNOTE

Proposal for an interlaboratory comparison of data for artificial intelligence

Maik Liebl - Physikalisch-Technische Bundesanstalt / GERMANY

- 09:15 AM - 09:30 AM

Bayesian analysis of combustion kinetic models for ammonia-based fuel blends using Artificial Neural Networks

Guanyu Wang - Physikalisch-Technische Bundesanstalt / GERMANY

- 09:30 AM - 09:45 AM

Digitalised energy transition: determination of thermodynamic properties of hydrogen containing streams using machine learned boosting algorithms

Elahe Rostaminikoo - University of Central Lancashire / UNITED KINGDOM

- 09:45 AM - 10:00 AM

Possibilities of using AI-based soft sensors in the field of process analysis technology

Piotr Strauch - Siemens / GERMANY

- 10:00 AM - 10:15 AM

Estimating the repeatability and reproducibility of an AI-embedded measuring device: application to road marking detection

Térence Bordet - Colas / FRANCE

## P2 - POSTERS

11:00 AM - 12:30 PM

### ELECTROMAGNETISM

Scattering parameters in coaxial line measurements

- *Ahmed ALJawan - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA*

Extension and upgrade of calibrations in electricity using a new quantum standard: a traceability scheme suitable for small laboratories

- *Quentin Baire - FPS Economy / BELGIUM*

Modeling of high voltage sections to design a reference universal voltage divider at LNE

- *Hanane Saadeddine - Laboratoire National de Métrologie et d'Essais / FRANCE*

Linearity verification of a reference system for short-circuit current calibration

- *Paolo Roccato - Istituto Nazionale di Ricerca Metrologica / ITALY*

Improvement of the INRIM calibration capabilities for lightning impulse voltages higher than 200 kV

- *Stefano Caria - Istituto Nazionale di Ricerca Metrologica / ITALY*

New structure for high-sensitivity coaxial thermal power sensor in the frequency range from DC to 50 GHz

- *Doudou Ba - Laboratoire National de Métrologie et d'Essais / FRANCE*

Enhancement of reference power standard at SASO NMCC on extend AC power capability and reevaluation of measurement uncertainty

- *Saleh Almojaewel - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA*

An overview of the different sources of uncertainty affecting the measurement of electrochemical elements

- *Houda Yahyaoui - Laboratoire National de Métrologie et d'Essais / FRANCE*

Design of S-parameter standards for high-frequency nano-devices characterization

- *Daouda Seck - Laboratoire National de Métrologie et d'Essais / FRANCE*

Traceability of the WBCO standard attenuator by comparing with an inductive voltage dividers

- *Houssemeddine Krraoui - Laboratoire National de Métrologie et d'Essais / FRANCE*

Electric field probe calibration method by using a TEM cell for reference field generation

- *Seif Ben Hassine - Laboratoire National de Métrologie et d'Essais / FRANCE*

Characterisation of thermal and climatic chambers: project for an internationally recognised standard

- *Didier Bozonnet - Boozconsult / FRANCE*

Establishment of AC-DC transfer standard at SASO-NMCC

- *Ahmed Aljomaie - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA*



### QUANTUM TECHNOLOGY

Operation of the quantum Hall resistance standard in a closed-cycle cryogen-free cryostat at LNE

- *Mathieu Taupin - Laboratoire National de Métrologie et d'Essais - DMSI / FRANCE*

### NANOTECHNOLOGY

Towards standardization of field-flow fractionation for better characterization of innovative nanotherapeutics

- *Thierry Caeberts - FPS Economy / BELGIUM*



### FLOW

Testing of smart meters under various water flow conditions

- *Rached Ben-Mansour - King Fahd University of Petroleum and Minerals / SAUDI ARABIA*

Metrology for hydrogen: flow measurement, intercomparison with blends of hydrogen and natural gas, and domestic gas meter accuracy

- *Maxime Mussard - Justervesenet / NORWAY*

Improvements of the national standard for flows below 0.2 mg·s<sup>-1</sup> nitrogen or dry air (10 sccm)

- *Deborah Segall - Laboratoire National de Métrologie et d'Essais / FRANCE*

Calibration and testing of leak detectors for halogenated gases

- *Carlos Simoes - Trescal / SPAIN*

A denoising algorithm for phase difference determination of a Coriolis Flow Meter

- *David Wee Yang Khoo - National Metrology Centre, Agency for Science and Technology Research (A\*STAR) / SINGAPOUR*



### THERMOMETRY, HYGROMETRY

Development of non-contact thermometry capabilities within Europe by the construction and characterisation of eutectic fixed points above 1000°C

- *Peter Pavlasek - Slovak Institute of Metrology / SLOVAK REPUBLIC*

Study of the representativeness of temperature profiles obtained in oceanography

- *Marc Le Menn - Shom / FRANCE*

Fiber-optic temperature sensing: investigating cross-sensitivities and ageing effects in Fiber Bragg Grating based sensors

- *Henrik Kjeldsen - Danish Technological Institute / DENMARK*

Dew point temperature and relative humidity measurements: primary and secondary calibration methods

- *Andreia Furtado - Process Insights / GERMANY*

Organisation of a proficiency test on the characterisation of thermostatic chambers

- *Boris Geynet - CT2M / FRANCE*

Characterisation of liquid temperature calibration baths for the estimation of measurement uncertainty

- *Jack Nolan - NSAI National Metrology Laboratory & Dublin City University / IRELAND*

Uncertainty analysis for calibration of radiation thermometers based on single fixed point

- *Khaled Ahmed - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA*

Guide to Thermal Characterization of Temperature Comparison Media

- *Jacques-Olivier FAVREAU - CETIAT / FRANCE*



## P2 - POSTERS

11:00 AM - 12:30 PM

### CHEMISTRY

Calibration of CO and CO<sub>2</sub> monitors used in periodic inspection of vehicles at fixed station for environmental control

- *Abdullah Al Owaysi - Saudi Standards, Metrology and Quality Organization / SAUDI ARABIA*

Low-concentration HCl gas mixtures in H<sub>2</sub>: preparation and analysis

- *Daniel García Nieto - Centro Español de Metrología / SPAIN*

Progress and achievements of EURAMET project 21GRD09 MetroPOEM

- *Dirk Arnold - Physikalisch-Technische Bundesanstalt / GERMANY*

ScreenFood project - metrology for food safety in the circular economy:

targeted and screening methods for contaminants in food and recycled packaging

- *Chiara Portesi - Istituto Nazionale di Ricerca Metrologica / ITALY*

ChemisTwin Portal for Automated Structure Verification and Quantification of Organic Compounds by NMR Using Digital Reference Materials (DRMs)

- *Coralie Leonard - MERCK KGAA / FRANCE*



### UNCERTAINTIES

Case study of genetic algorithms in metrology: assessment of inter-laboratory comparisons

- *Romain Coulon - BIPM / INTERNATIONAL*

Risk-aware decisions: taking into account admissible risk and measurement uncertainty in setting the acceptance limits

- *Sina Ronaghi - Politecnico di Milano / ITALY*

Measuring the impact of heat waves on underground medium voltage cables: a field measurement campaign for cable behavior assessment

- *Andrea Mazza - Politecnico di Torino / ITALY*

Design and validation of a calibration method for patient simulators

- *Miguel Castro - Universidad ECCI & Biosancta / COLOMBIA*

Bayesian inversion of nanoparticles size distribution obtained by light scattering

- *Youri Noville - FPS Economy / BELGIUM*

For a more satisfactory approach to measurement results

- *Mickael Rodier - Deltamu / FRANCE*



### MACHINE LEARNING

Artificial Intelligence in metrology: opportunity or threat?

- *Sami Koskinen - Beamex / FINLAND*

Metrology and Artificial Intelligence: measure to understand, decide and (now) optimize

- *Seyfeddine Cheour - Deltamu / FRANCE*

Checking the reliability of an artificial intelligence system using a single-blind sampling: application to the road markings inspection

- *Maxime Redondin - Colas / FRANCE*

## SHORT COURSE | Ensuring measurement traceability in ISO/IEC 17 025 laboratories

01:30 PM - 03:00 PM

### NEW PRESENTATION FORMAT

The aim of the short course is to describe and illustrate the different routes opened by ISO/IEC 17025 to ensure the traceability of measurement. The speakers will first recall the definition of traceability and the general requirements to be fulfilled. Then the course will develop these concepts and requirements on different examples: for calibration laboratories, in the field of testing and more generally in measurement. Practical cases coming from the audience will be welcome and, as far as possible, addressed.

This presentation will be led by the following expert speakers:

- *Laurent Vinson - COFRAC / FRANCE*
- *Marc Himbert - LE CNAM / FRANCE*

### S11 - Advanced methods for uncertainty evaluation

01:30 PM - 03:00 PM | Session Chair: Francesca Pennechi - Istituto Nazionale di Ricerca Metrologica / ITALY

- 01:30 PM - 01:45 PM | KEYNOTE

A Laplace domain tool for in-situ calibration of sensors in a sensor network

*Henrik Söderblom - VTT Mikes / FINLAND*

- 01:45 PM - 02:00 PM

On the autocorrelation of measurement results for gas volume and calorific value in fiscal metering in gas grids

*Federica Gugole - VSL / THE NETHERLANDS*

- 02:00 PM - 02:15 PM

A case study of data fusion in autonomous driving for sensor assurance

*Yuhui Luo - National Physical Laboratory / UNITED KINGDOM*

- 02:15 PM - 02:30 PM

Advancing calibration techniques for dynamic measurements

*Bayan Tallawi - CETIAT / FRANCE*

- 02:30 PM - 02:45 PM

Platform and tools for assessing the consequences of an industrial fire in the context of a more sustainable society

*Brice Berthelot - Ineris / FRANCE*

- 02:45 PM - 03:00 PM

Universal structure of participant deviations from key comparison reference values

*Erkki Ikonen - Aalto University / FINLAND*



### S12 - Electromagnetism

01:30 PM - 03:00 PM | Session Chair: Jan-Theodoor Janssen - National Physical Laboratory / UNITED KINGDOM

- 01:30 PM - 01:45 PM | KEYNOTE

Rydberg atoms for microwave field metrology

*Matt Simons - National Institute of Standards and Technology / USA*

- 01:45 PM - 02:00 PM

Exploring DC power quality measurement and characterization techniques

*Yara Daaboul - EDF R&D / FRANCE*

- 02:00 PM - 02:15 PM

Metrology in very high magnetic fields: challenges and opportunities for science and industry

*Steffen Krämer - European Magnetic Field Laboratory AISBL / BELGIUM*

- 02:15 PM - 02:30 PM

Low voltage tower crane testing procedure

*Paolo Roccatto - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 02:30 PM - 02:45 PM

Direct traceability of the impedance units to the quantum Hall effect: The new project "ImpACQ" at LNE

*Olivier Thevenot - Laboratoire National de Métrologie et d'Essais / FRANCE*

- 02:45 PM - 03:00 PM

Towards a traceable calibration of medium voltage instrument transformers up to 150 kHz

*Mohamed Agazar - Laboratoire National de Métrologie et d'Essais / FRANCE*



## S13 - Nanotechnology

03:30 PM - 05:00 PM | Session Chair: François Piquemal - Laboratoire National de Métrologie et d'Essais / France

- 03:30 PM - 03:45 PM | KEYNOTE

Development of reference samples for calibrating resistance and current measurements in Conductive probe Atomic Force Microscopy

*José Moran - Laboratoire National de Métrologie et d'Essais / FRANCE*

- 03:45 PM - 04:00 PM

Tandem DMA analysis of silver particle sintering and its effect on CPC counting efficiency

*Vinicius Berger - Catalytic Instruments / GERMANY*

- 04:00 PM - 04:15 PM

Electrical resistance tomography in actively controlled ambient conditions for conductivity mapping of large specific area materials

*Alessandro Cultrera - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 04:15 PM - 04:30 PM

Magneto-opto-rheology

*Alain Ponton - Université Paris Cité & CNRS / FRANCE*

- 04:30 PM - 04:45 PM

Metrology and traceability at the nanoscale using AFM

*Luigi Ribotta - Istituto Nazionale di Ricerca Metrologica / ITALY*



## S14 - Mind the gap: challenges for the quality infrastructure

01:30 PM - 03:00 PM | Session Chair: Miruna Dobré - SPF Economy / BELGIUM

- 03:30 PM - 03:45 PM | KEYNOTE

Quality Infrastructure for trust even in a digital world

*Dorothea Knopf - Physikalisch-Technische Bundesanstalt / GERMANY*

- 03:45 PM - 04:00 PM

Integration of metrological information in digital product passports and the digital quality infrastructure

*Jens Niederhausen - Physikalisch-Technische Bundesanstalt / GERMANY*

- 04:00 PM - 04:15 PM

Accreditation to ISO/IEC 17043 of an ILC in mass calibration: the challenges to be met

*David Benhamou - CT2M / FRANCE*

- 04:15 PM - 04:30 PM

Quality infrastructure for sustainable hydrogen solutions

*Helga Hansen - Physikalisch-Technische Bundesanstalt / GERMANY*

- 04:30 PM - 04:45 PM

ISO 10012 Quality Management – requirements for measurement management systems. What is its place in regards to ISO 17025?

*Christophe Dubois - Deltamu / FRANCE*

## GALA EVENT - BURLESQUE & WONDERS NIGHTS

07:30 PM - 11:30 PM | @CIRQUE IMAGINE

Get ready for an unforgettable Gala Night at Cirque Imagine. With a dazzling burlesque atmosphere, magical performances and aerial stunts, this is the perfect time to relax and have fun with fellow participants. Expect a truly unique evening that will leave a lasting impression!

## S15 - Quantum technology

09:00 AM - 10:30 AM | Session Chair: Barbara Goldstein - National Institute of Standards and Technology / USA

- 09:00 AM - 09:15 AM | KEYNOTE

NIST and Quantum Information Science: Fundamental Research to Ecosystem Support

*James Kushmerick - National Institute of Standards and Technology / USA*

- 09:15 AM - 09:30 AM

NV quantum sensors for non-destructive testing

*Thomas Hingant - Kwan-tek / FRANCE*

- 09:30 AM - 09:45 AM

Long-term stability investigation of QKD devices in operation

*Egon Astra - Metroserf / ESTONIA*

- 09:45 AM - 10:00 AM

Quantum entanglement and discord characterisation facility at INRiM

*Enrico Rebufello - Istituto Nazionale di Ricerca Metrologica / ITALY*

- 10:00 AM - 10:15 AM

Molecular doping of epitaxial graphene on SiC for the quantum Hall resistance standard at low magnetic field

*François Couëdo - Laboratoire National de Métrologie et d'Essais / FRANCE*

- 10:15 AM - 10:30 AM

European effort towards a novel quantum anomalous Hall effect-based primary resistance standard: INRiM first results

*Martina Marzano - Istituto Nazionale di Ricerca Metrologica / ITALY*



## S16 - Digitalisation for metrology

09:00 AM - 10:30 AM | Session Chair: Stéphane Gueu - Essilor / FRANCE

- 09:00 AM - 09:15 AM | KEYNOTE

Fully automated generation of digital calibration certificates and calibration of blackbodies for tympanic thermometers using an industrial robot

*Ingmar Mueller - Physikalisch-Technische Bundesanstalt / GERMANY*

- 09:15 AM - 09:30 AM

On the interoperability of the D-SI and SI Reference Point measurement unit representation schemes

*Maximilian Gruber - Physikalisch-Technische Bundesanstalt / GERMANY*

- 09:30 AM - 09:45 AM

A digital measurement approach for structural condition assessment of sewers

*Álvaro Ribeiro - Laboratório Nacional de Engenharia Civil / PORTUGAL*

- 09:45 AM - 10:00 AM

Reconfigurable key comparisons for multipurpose challenges in a metrological semantic data space

*Tomasz Sołtysiński - Physikalisch-Technische Bundesanstalt / GERMANY*

- 10:00 AM - 10:15 AM

Building a radionuclide metrology software comparison platform: insights from rapid integration with Microsoft PowerApps

*Eric Macedo - BIPM / INTERNATIONAL*

- 10:15 AM - 10:30 AM

Digitalizing the evaluation of interlaboratory comparison – a Digital Metrological Expert software tool

*Daniel Hutzschenreuter - Physikalisch-Technische-Bundesanstalt / GERMANY*

## S17 - Flow

09:00 AM - 10:30 AM | Session Chair: Oliver Büker - RISE / SWEDEN

- 09:00 AM - 09:15 AM | KEYNOTE

The Digital Calibration Certificate (DCC) in flow metrology enhances the reliability of calibration results

*Christian Sander - Testo Industrial Services / GERMANY*

- 09:15 AM - 09:30 AM

Characterisation of microfluidic transfer standards: results and challenges

*Kevin Romieu - CETIAT / FRANCE*

- 09:30 AM - 09:45 AM

Assessment of alternative fluid calibration to estimate traceable liquefied hydrogen flow measurement uncertainty

*Federica Gugole - VSL / THE NETHERLANDS*

- 09:45 AM - 10:00 AM

Uncertainty evaluation methods applied to a virtual ultrasonic flow meter

*Nursen Bayazit - Physikalisch-Technische Bundesanstalt / GERMANY*

- 10:00 AM - 10:15 AM

Uncertainty assessment using GUM and MC-SIM methods. Calibration of mass flow and correction of totalized time and mass under ISO 4185

*Ammar Grous - Polycontrols / CANADA*

- 10:15 AM - 10:30 AM

Improving the volumetric flow rate measurement of disturbed pipe flows using neural networks

*Sonja Schmelter - Physikalisch-Technische Bundesanstalt / GERMANY*



## ROUND TABLE | Metrologist: an endangered species?

11:00 AM - 12:30 PM

Metrology 4.0 is transforming industrial measurement by integrating cutting-edge technologies like Artificial Intelligence, Big Data, and 3D mapping into the science of measurement. This shift presents both challenges and opportunities for current and future metrologists, requiring them to expand beyond traditional skills. The role of metrologists now involves deeper interaction with digitalized processes and smart systems, transitioning from passive monitoring to becoming key players in intelligent measurement systems.

Metrologists must now blend core skills with new technological expertise, collaborating with smart machinery and digital systems. This calls for continuous adaptation, combining human ingenuity with the precision of advanced tools. However, this shift is also contributing to a decline in interest among younger generations to pursue careers in metrology, creating a significant labor shortage in the field.

The upcoming roundtable will address these challenges and opportunities, focusing on:

- Metrology and Calibration Lab Experts' profiles in the digital age
- Transitioning today's metrologists to meet future demands
- The impact of digitalization on metrologists' work
- Training and skills required for future metrologists
- Addressing labor shortages and bridging the skills gap
- Adapting to rapid technological changes through continuous learning
- Sharing successful stories and best practices within the field

### Moderator:

- Laura Martin - EUROLAB / BELGIUM

### Speakers:

- Jean-Clair Ballot - IUT Paris-Saclay / FRANCE
- Sébastien Denaës - Colas / FRANCE
- Alvaro Ribeiro - Laboratório Nacional de Engenharia Civil / PORTUGAL
- Louise Wright - National Physical Laboratory / UNITED KINGDOM

## S18 - Advances in thermometry and hygrometry: SI Traceability for industry

11:00 AM - 12:30 AM | Eric Georgin - CETIAT / FRANCE

- 11:00 AM - 11:15 AM | KEYNOTE

A transportable precision humidity generator for operation with hydrogen

*Rezvaneh Nobakht - Istituto Nazionale di Ricerca Metrologica - Politecnico di Torino / ITALY*

- 11:15 AM - 11:30 AM

Analysis of district heating sensor data for uncertainty-aware, network-wide sensor-correction

*Peter Østergaard - Danish Technological Institute / DENMARK*

- 11:30 AM - 11:45 AM

Thermometry with embedded SI traceability for industrial applications (ThermoSI): a new European Partnership on Metrology project

*Jonathan Pearce - National Physical Laboratory / UNITED KINGDOM*

- 11:45 AM - 12:00 PM

The INFOTherm project – Integrated European research, calibration and testing infrastructure for fibre-optic thermometry

*Stephan Krenek - Physikalisch-Technische Bundesanstalt / GERMANY*

- 12:00 PM - 12:15 PM

Advanced techniques for moisture and water content analysis in solids: enhancing industrial process control and product quality

*Bayan Tallawi - CETIAT / FRANCE*

- 12:15 PM - 12:30 PM

State-of-the-art in the realization of the redefined kelvin: latest project DireK-T achievements

*Miruna Dobre - FPS Economy / BELGIUM*



## CLOSING & AWARDS CEREMONY

12:30 PM - 01:00 PM

Time for the grand finale of the event where we celebrate outstanding contributions and achievements. It's a moment to recognize excellence across various categories, applaud the innovative work presented and reflect on the success of this year's congress.