I’m delighted that our latest exhibition, Measurement World, has been organised in collaboration with the CFM. This partnership has allowed us to combine both the International Metrology Congress 2019, and a Metrology Village in this new event reuniting the major players in the sector.

We worked in close collaboration with the grass roots of the profession, to create a biennial event for all the community.

Measurement forms the backbone of the exhibition, being its primary focus, but Measurement World is also aimed at professionals in the optics, vision, testing and analysis sectors.

We also decided, right from the first event, to register this exhibition on the international events calendar so that it very quickly becomes an unmissable get-together. By creating Measurement World we have attracted attention from numerous national and international corporate partners.

I’m convinced that the partnership between the exhibition and the International Metrology Congress will allow us to present a comprehensive technology offer and provide our visitors with very high-level conferences and workshops, all in a high-quality environment that is conducive to discussions, networking and business.

Welcome, and enjoy your visit!

Jérôme LETU-MONTOIS
Director of the Measurement World exhibition

The CIM is the only event of its kind in Europe, and has proven to be a tremendous hit with the entire profession. It incorporates:

- a conference on the latest developments in technology and measurement processes, where 900 participants come together from 45 countries, now organised in partnership with the new Measurement World exhibition,
- a meeting place for manufacturers, experts and scientists, where the whole European metrology research community gets together every other year
- a networking space for everyone involved: manufacturers and service providers, official bodies, end-users from all kind of industry, university staff, researchers, etc
- a showcase for the technological skills and opportunities available to industry through expertise in measurements and industrial processes.

Metrology and measurement are two sectors with dynamic evolutions due to the developments associated with Industry 4.0: intelligent instrumentation and sensors, data use and security, collaborative robotics, AI, etc.

Come along to learn about and “Share Measurement Intelligence” relating to industrial metrology at CIM 2019!
### ORGANISING COMMITTEE

**CHAIRMAN**
Jenny HULLY - NPL (United Kingdom), Daniel JULLIEN - DigiPlant (France)

**MEMBERS**

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<tr>
<th>Name</th>
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<td>Vincent BARBIER</td>
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### SCIENTIFIC AND TECHNICAL COMMITTEE

**CHAIRMAN**
Mrs DOBRE - SPF ECONOMIE (Belgium), Jean-Rémy FILTZ - LNE (France), JT JANSSEN - NPL (United Kingdom)

**MEMBERS**

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### CONTACT

Collège Français de Métrologie
© 33 (0) 4 67 06 20 36 - info@cfmetrologie.com - www.cim2019.com
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<th>Time</th>
<th>Tuesday 24</th>
<th>Wednesday 25</th>
<th>Thursday 26</th>
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<tr>
<td>8:00</td>
<td>TUESDAY 24 WELCOME</td>
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<tr>
<td>9:00</td>
<td>S1 Processing Metrological data</td>
<td>S9 Mechanical Quantities</td>
<td>S14 Thermal Measurements in Industry</td>
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<tr>
<td>11:00</td>
<td>S2 Innovative Electrical Instrumentation</td>
<td>S10 SI, what’s next?</td>
<td>S15 IOT and Calibration challenges</td>
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<td>11:30</td>
<td>S3 Dimensional metrology</td>
<td>SHARE MEASUREMENT INTELLIGENCE</td>
<td>S16 Nanometrology</td>
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<td>13:00</td>
<td>POSTER</td>
<td>S17 Standards in Thermal Measurements</td>
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<td>13:45</td>
<td>• Dimensional</td>
<td>• Industry 4.0</td>
<td>• Training</td>
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<td>15:30</td>
<td>• Traceability / Quality</td>
<td>• Mechanical Quantities</td>
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<td>S8 Energy mix</td>
<td>S18 Photonics</td>
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<td>S5 Sustainable Environment</td>
<td>S12 Uncertainties: toolbox</td>
<td>Additive Manufacturing: measure and control challenges</td>
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<td>S6 Chemical Analysis</td>
<td>S13 Innovations in flow</td>
<td>S18 Photonics</td>
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<td>Smart sensors for production optimisation</td>
<td>S11 Science with impact</td>
<td>S18 Photonics</td>
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<td>S7 Metrology for Health Care</td>
<td>Measurement chain Security and Traceability</td>
<td>S18 Photonics</td>
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**Notes:**
- **Processing Metrological data**
- **Innovative Electrical Instrumentation**
- **Dimensional metrology**
- **Quality and Accreditation**
- **Sustainable Environment**
- **Metrology for Health Care**
- **Energy mix**
- **Chemical Analysis**
- **SI, what’s next?**
- **SHARE MEASUREMENT INTELLIGENCE**
- **Uncertainties: toolbox**
- **Innovations in flow**
- **Science with impact**
- **Thermal Measurements in Industry**
- **IOT and Calibration challenges**
- **Nanometrology**
- **SI, what’s next?**
- **New ISO/CEI 17025: first feedbacks**
- **Measurement for climate change**
- **Nanometrology**
- **Additive Manufacturing: measure and control challenges**
CONGRESS OPENING

**S1 PROCESSING METROLOGICAL DATA**
Chairman: Sascha EICHSTADT - PTB (Germany)

**9:30**
**KEYNOTE TALK**
Future metrology: are you ready for the digital age?
Mr. EICHSTADT - PTB / Germany

**9:55**
The European metrology cloud: impact of data protection and free flow of data regulation
Mr. THIEME - PTB / Germany

**10:20**
A new approach to software requirements
Mr. TURNER - CECIP / Belgium

**10:45**
Calibration 4.0 - Information system for use of digital calibration certificates
Mr. SOUSA, Mr. RIBEIRO - IPQ / Portugal

**11:15**

**S2 INNOVATIVE ELECTRICAL INSTRUMENTATION**
Chairwoman: Maguelonne CHAMBON - LNE (France)

**9:30**
Practical precision electrical impedance measurement for the 21st Century
Mr. POWER - NSAI / Ireland & All

**9:35**
Study of non-invasive instruments for the measurement of pulsed X-Ray tube high voltage
Mr. AGAZAR - LNE / France & All

**10:20**
A universal compact ultra-stable sine-wave generator for metrology purposes
Mr. RUCERA, Mr. KOVAC - CMI / Czech Republic

**10:45**
EMPIR European project for validation of vector array SAR measurement systems
Mr. ALLAL - LNE / France

**11:15**

**MEASUREMENT FOR CLIMATE CHANGE**

Measuring climate change with great accuracy is mandatory to understand where we stand and where we go. Metrologists working with climatologists and meteorologists can play a key role in improving the monitoring capabilities of the essential climate variables.

- How do we measure climate change?
- Why metrologists can help in understanding climate change?

Presenter: Mr. MERLONE - INRIM / Italy
With: Mr. BRUNET - Rovira University / Spain, Mr. ERIKSSON - Vaisala / France, Mrs. FISICARO - LNE / France, Mrs. JOUSSAUME - CNRS / France, Mrs. WOOLIAMS - NPL / United Kingdom

**9:30**

**9:55**

**10:20**

**10:45**

**11:15**
TUESDAY 24 SEPTEMBER

S3 DIMENSIONAL METROLOGY
Chairman: François HENNEBELLE - University of Burgundy (France)

11:45 CERN dimensional metrology service activity in the field of particle physics research
Mr CHERIF - CERN / Switzerland

12:05 Deep learning and 3D optical metrology improve complex feature detection and ranking
Mrs CALVEZ - Alicona / France

12:25 Computed tomography metrology: an accuracy contemplation
Mr ZEPP - Yxlon International / Germany

12:45 Investigation of non-linearities of capacitive displacement sensors for industrial application
Mr DAUL - PTB / Germany & All

13:15 14:00

S4 QUALITY AND ACCREDITATION
Chairman: Alain GUERDAT - Rolex (Switzerland)

11:45 ISO/IEC 17025:2017 considers reference data as equipment: so what?
Mr PIERSON - LABOPERE / France

12:05 Calibration and measurement capability (CMC) and customer technical qualification
Mrs FISCHER BECKERT - Universidade de Santa Catarina / Brazil

12:25 How to optimise your calibration-setup with a technology refresh
Mr ELBERT, Mrs PIC - WIKA / Germany

12:45 A case study on the establishment of a national quality infrastructure in South Korea
Mr YOO - KRISS / South Korea

13:15 14:00

S5 SUSTAINABLE ENVIRONMENT
Chairman: Teemu NAYKKI - Finnish Environment Institute (Finland), David BENHAMOU - CT2M (France)

11:45 KEYNOTE TALK
The European metrology network for climate and ocean observation
Mrs WOOLLIAMS - NPL / United Kingdom

12:05 Metrological needs for natural steroids and xenobiotics measurements in water and blood
Mrs HIRAMOTO - LNE / France & All

12:25 Use of FTIR spectroscopy for the measurement of CO2 carbon stable isootope ratios
Mr SEGA - INRIM / Italy

12:45 It started to rain - INCIPIT a new project on non-catching rain instruments calibration
Mrs DOBRE - SMD / Belgium

13:15 14:00

S6 CHEMICAL ANALYSIS
Chairman: Bernd GUETTLER - PTB (Germany)

14:00 Hydrogen quality for transport revision of ISO14687 and gas analysis according to ISO21087
Mr BACQUART - NPL / United Kingdom & All

14:15 Standardised methods for the analysis of amines, terpenes and ammonia in biomethane
Mrs CUCCIA - RICE GRTgaz / France & All

14:30 Metrology for biomethane conformity assessment: measure trace gas impurities in biomethane
Mrs LI, Mr PERSJAM, Mr YAN DER YEEEN, Mrs DE BROM, Mrs MEUZELAAR - VSL / THE NETHERLANDS

14:45 Problems of metrological assurance of gas analysis using IR spectroscopy
Mr KONOPELKO, Mr BELOBORODOV, Mr RUMIANTSEV, Mr CHUBCHENKO - VNIIM / Russia

15:00 Dynamic calibration method for reactive gases
Mr RAJAMAKI - MIKES / Finland
S7 **METROLOGY FOR HEALTH CARE**

**Chairwomen:** Michela SEGA - INRIM (Italy), Sophie VASLIN-REIMANN - LNE (France)

**KEYNOTE TALK**

Advances in imaging supporting drug discovery  
Mr WEST - GSK / United Kingdom

Metrological references for health care based on entropy  
Mr PENDRILL - RISE / Sweden, Mrs QUAGLIA - LGC / United Kingdom,  
Mr CANO - Modus Outcomes / United Kingdom, Mrs MELIN - RISE / Sweden

Standardisation of clinically relevant biomarkers  
Mrs BŒUF, Mr DELATOUR - LNE / France, Mr HUGGETT, Mrs QUAGLIA - LGC / United Kingdom,  
Mrs SWART - PTB / Germany

Unravelling the contribution of biological variability vs measurement uncertainty in MSI  
Mr DEXTER - NPL / United Kingdom & All

Metrological characterisation of a device dedicated to inhalation study  
Mr HAMDAOUI, Mr GAIE-LEVREL, Mrs MACE, Mrs VASLIN-REIMANN - LNE / France

Traceability in laboratory medicine: a european metrology network  
Mr AUERBACH, Mr STOSCH, Mr GUETTLER - PTB / Germany

**SMART SENSORS FOR PRODUCTION OPTIMISATION**

A new generation of sensors is emerging in readiness for the factory of the future. They are faster, more precise and capable of communicating and interacting directly with the machines. Some are installed directly inside the machines or onboard vehicles, while others remain independent of the machines. As a new world of measurement emerges, just how smart are these new sensors?

- What kind of measurements for smart sensors?
- What are the impacts of last technology evolution and the normative point of view?
- How to calibrate a smart sensor?

**Presenter:** Mr CORLETO - STIL / France  
**With:** Mr AVRIN - LNE / France,  
Mr BUKKAPATNAM - University of Texas / USA,  
Mr CARTALAS - JRI / France,  
Mr LUBCKE - Endress & Hauser / Switzerland,  
Mr ZIPRANI - Marposs / Italy

**ENERGY MIX**

**Chairman:** Marco Carlo MASOERO - Politecnico di Torino (Italy)

Measurement uncertainties of electrochemical impedance spectra of Li-ion battery cells  
Mrs HEINE, Mr EBERHARDT, Mr FUNCK, Mr SEITZ - PTB / Germany

Fictive power source for calibrations in railway systems  
Mrs ISTRATE, Mr FORTUNE - LNE / France

Uncertainties in PV modules performance measurements in indoor and outdoor conditions  
Mrs PERRIN - CEA-LITEN / France

New photovoltaic technologies: metrology for PV energy rating  
Mr DUBARD - LNE / France

Improved method for hi-resolution night aerial lighting maps production and analysis  
Mr CHASEIGNE, Mr DUBARD, Mr PIERRARD, Mr HAY - LNE / France

**COCKTAIL**
POSTERS - 13:45 to 15:15

DIMENSIONAL

- Method for controlling complex surfaces and associated uncertainties
  Mr HABIBI - ENSAM, Mr ABDELOUAHAB, Mr JALID - ENSET / Morocco

- Comparison of thread effective diameter measurement by using conventional methods and CMMs
  Mr YUKSEL, Mr KILINC, Mr SONMEZ, Mrs ON AKTAN - Roketsan / Turkey

- Position calibration of turn tables by using laser interferometers
  Mr YUKSEL, Mr KILINC, Mr SONMEZ, Mrs ON AKTAN - Roketsan / Turkey

- 3D scanning to offload the traditional CMM, an ROI analysis
  Mr LONGUEMARE - Ametek - Creaform / France

- 360° scanning of vegetable fibers with focus variation microscope
  Mr VARGAS CEPEDA, Mr CORTES RODRIGUEZ, Mrs ARAQUE SALAZAR - University of Colombia / Colombia

- Investigation in optimisation of accuracy with non-contact systems by influencing factors
  Mr MATHARU, Mr SADLER, Mr GASHI, Mr TOMAN - Coventry University / United Kingdom

- 3D measurement as an integral part of manufacturing processes
  Mr LEMOINE - Metrologic Group / France

- Calibration of Articulating Arms per ASME B89.4.22
  Mr JOHNSON - TROSCAL / USA

- Investigation of non-linearities of capacitive displacement sensors for industrial applications
  Mr DAUL - PTB / Germany & All

- Task-specific uncertainties budget of curvic using analytical methods
  Mr GASHI, Mr TOMAN, Mr MATHARU - Coventry University / United Kingdom

- Diameter measurement and uncertainty evaluation using three-spheres reciprocity method
  Mr CHEN - ITRI / Taiwan

- Interferometric calibration bench for lengths up to 60 m
  Mr SOKOLOV - VNIIFTRI / Russia

TRACEABILITY / QUALITY

- European Interlaboratory comparison in mass calibration
  Mrs HEGRON - CT2M / France

- Challenges of achieving accreditation to ISO 6789-2:2017
  Mr GYPPS - TROSCAL / United Kingdom

- Understand how calibration can minimise business risk whilst improving yield and quality
  Mr FORSIN - KEYSIGHT TECHNOLOGIES / United Kingdom

- Risk and opportunity management: an approach for the mechanical testing field
  Mr JAMAL-EDDINE - L2EC / France

- Inter-laboratory comparison on the calibration of photometric and radiometric measurements
  Mr SONMEZ, Mr KILINC, Mr YUKSEL, Mrs ON AKTAN - Roketsan / Turkey
**ELECTRICITY**

- Automated multiple decade ratios precision divider for generation of low DC voltages
  - Mr. Galliana, Mr. Cerrai, Mr. Corona - INRIM / Italy
- A versatile electrical impedance calibration laboratory based on digital impedance bridges
  - Mr. Elmholdt Christensen - TRESCAL / Denmark
- Measurement setup to characterize electrical standards
  - Mr. Cappa - INRIM / Italy & All
- New reference systems for the calibration of high voltage impulses at LNE
  - Mr. Agazar, Mrs. Saaedidine - LNE / France
- Influence of crimped connections in temperature rise verification
  - Mr. Roccato - INRIM / Italy & All
- Piezoelectricity measurements of hybrid films functionalised with ZnO nanostructures
  - Mrs. Duraccio, Mrs. Fioravanti - CNR, M. Cappa, M. Filippo - INRIM, Mr. Maluccelli - University of Turin / Italy
- Traceability features of the electric power unit in Ukraine
  - Mr. Velichko, Mr. Karpenko - Ukrmetrteststandard / Ukraine
- Inter-laboratory comparison on the calibration of a multimeter
  - Mr. Benhamou - CT2M / France
- Exploration of a special alternative generator for small power wind turbines
  - Mr. Bouzas - Badj Mokhtar-Annaba University / Algeria

**UNCERTAINTIES**

- Choosing parameters for R&R and their impacts on measurement capability
  - Mrs. Courtois - DELTAMU / France
- Inter-laboratory comparison on tensile testing of solid composite rocket propellants
  - Mr. Gurel, Mr. Yucel - ROKETSAN / Turkey
- Uncertainty calculations and calibration of metal hardness testing equipment
  - Mr. Gurel, Mr. Yucel - ROKETSAN / Turkey
- The drift in the estimation of the measurement uncertainty
  - Mr. Coquet - ACEI / France
**NEW ISO/CEI 17025: FIRST FEEDBACKS**

9:00  
In November 2017, ISO and the IEC published a comprehensive revision of the accreditation standard 17025 “General requirements for the competence of testing and calibration laboratories”.

Now that we have passed the halfway mark of this period, the time has come to review the first feedback on the practical application of this standard.

- What have we learned from the launch of the new 17025?
- The transition to the new 17025 - an easy task?
- What are the first feedbacks?

Presenter: Mrs COMBE - EA, Mr LABORDE - COFRAC / France  
With: Mr ESPANOL - QTI / Spain, Mr LAUNEY - LNE / France,  
Mr MAMODALY - COFRAC / France, Mr OSBORNE - A2LA / USA,  
Mr PECCHIOLI - Police Technique et Scientifique / France,

**SI, WHAT'S NEXT?**

Chairmen: Pierre GOURNAY - BIPM, JT JANSSEN - NPL (United Kingdom)

9:00  
**KEYNOTE TALK**

Light and photon: quantum technology and applications for the future  
Mrs RASTELLO - INRIM / Italy

9:20  
On Supporting Capacitance Measurements by the BIPM  
Mr MORENO, Mr GOURNAY - BIPM / France

9:40  
The mise-en-pratique of the new definition of the kelvin: what happens next?  
Mr SADLI, Mr SPARASCI, Mr PITRE - LNE-LCM-CNAM / France

10:00  
A µKibble balance for direct realisation of small-scale masses and forces  
Mr ROBINSON, Mr DAVIDSON, Mrs WEBSTER - NPL / United Kingdom

10:20  
Superconducting microwave cavity quantum pressure standard in the range 200 Pa to 20 kPa  
Mr GAMBETTE, Mr PITRE, Mr PEINHER - LNE-LCM-CNAM / France, Mr RIPE, Mr GAVIOSO - INRIM / Italy

10:40  
Progress towards SPRIGT from 5 K to 25 K with pressures up to 60 kPa  
Mrs GAO - Chinese Academy of Sciences / China & All

11:00  

**WEDNESDAY 25 SEPTEMBER**

**MECHANICAL QUANTITIES**  
Chairmen: Nabil ANWER - ENS Cachan, Thierry COOREVITS - Arts et Métiers Paris Tech (France)

9:00  
Dynamic calibration of a secondary reference pressure transducers in gaz  
Mr SARRAF - ARTS ET METIERS PARIS TECH / France

9:20  
Traceable calibration of dynamic pressure transducers for motor pressure range  
Mr SALMINEN - MIKES, Mr HOGSTROM, Mr HAMALAINEN, Mrs SAXHOLM - VTT / Finland

9:40  
Reinventing airborne sound detection  
Mr SOMMERHUBER - XARION LASER ACOUSTICS / Austria

10:00  
Robustness studies of viscoelastic fluids with oscillation-type density meters  
Mr PEREIRA - IPQ / Portugal & All

10:20  
Quantitative fractography for failure analysis and material characterization  
Mr PONSON - TORDISE / France
SHARE MEASUREMENT INTELLIGENCE

Chairman: Thomas GRENON - LNE (France)

11:35 - 12:50

Data, representation, models and knowledge: augmenting measurements
Mr CHINESTA - Arts et Métiers ParisTech (France)

From smart measurements to intelligent assets management for the intelligent enterprise
Mr GEOFFROY - SAP (France)

Regulatory issues raised by emerging technologies like artificial intelligence
Mr FRUGIER - French Federation of Mechanical Engineering Industries (France)

S11 SCIENCE WITH IMPACT

Chairwoman: Maria-Luisa RASTELLO - INRIM (Italy), Maguelonne CHAMBON - LNE (France)

13:45 The TiFOON project: time and frequency over optical networks
Mr KRONJAEGER - NPL / United Kingdom

14:00 Representation of the quantity radon activity concentration for traceable calibrations
Mr BECK - BFS / Germany

14:15 Certified reference materials for breath alcohol control - the ALCOREF project
Mrs LALERE, Mrs VASLIN-REIMANN - LNE / France

14:30 Primary reference in terms of air kerma for ionizing radiation fields produced by a LINAC
Mr BORDY - CEA-LNHB / France

14:45 Metrology for drug delivery 2: a new joint research project for metrology in healthcare
Mr OGHEARD - CETIAT / France

The EUAMET logo indicates that the work described in the paper is linked to an EMRP or EMPIR project.
A traceability chain based on data-driven approaches cannot exist without cryptographic solutions for storage and communication of data, so that the information being shared with partners and customers is not misused or manipulated. Recent advances in cryptography, public key infrastructures and distributed ledger technologies, such as blockchain, may provide possible solutions.

- Why traceability of data is so important?
- Which solutions for ensuring traceability of data?

Presenter: Mr. EICHSTADT - PTB / Germany
Wish: Mr. ABAZ - Thales / France, Mr. AHLE - FIWARE / Germany, Mr. BENOIST - ARXUM / France, Mr. JAEGER - Rohde & Schwarz / Germany, Mr. MOREL - Akeo Plus / France, Mr. WIEDENHOEFER - PTB / Germany
POSTERS - 13:45 to 15:15

TEMPERATURE
- Overview of measurements capabilities in radiation thermometry at CEM
  Mrs. MARTIN-HENRANDEZ - CEM / Spain

- Improvement of emissivity measurements on low emissivity insulation materials
  Mr. HAMEURY - LNE / France & All

- Calibration of radiation thermometers and infrared cameras in real measurement conditions
  Mrs. HOIT - Lviv Polytechnic National University / Ukraine & All

- A new set-up for the calibration of wood moisture meters
  Mr. FESTER, Mr. NIELSEN - Danish Technological Institute / Denmark

- Humidity calibration automation
  Mr. FENOTTI, Mr. VASTY - TRESCAL / Italy

- New calibration facility developed at LNE-CETIAT
  Mr. GEORGIN, Mr. BERNARD, Mr. BERAUD, Mr. SALEY - CETIAT / France

- Interlaboratory comparison on thermal conductivity measurements by GHP at LNE and VINCA
  Mr. HAY - LNE-LCTM-CNAM / France & All

- Wall radiation quantification on temperature measurements in climatic chambers
  Mr. FAVREAU - CETIAT / France

- A new EMPIR Project “Met For TC” for developing traceable measurement capabilities for monitoring thermocouple performance
  Mrs. ARIEVOC - TUBITAK UME / Turkey & All

- A data processing software tool for double-wavelength thermometry
  Mr. BILIC - TUBITAK UME / Turkey

- Results of intercomparison of radiation temperature scales between UME and SASO
  Mr. NASIBLI, Mrs. PEHLIVAN - TUBITAK UME / Turkey, Mr. ALDAWOOD, Mr. ALFALEH - SASO / Saudi Arabia

- Influence of low temperature annealing on Nickel RTDs designed for heat flux sensing
  Mrs. BEGOT - University of Franche-Comté / France

- Improvement of thermal enclosures for pressure measurements in primary thermometers
  Mr. COPPA - INRIM / Italy

ENVIRONMENT
- Quantify sediment plumes generated by dredging operations at sea: metrological approach
  Mr. ROCHET, Mr. DEGENELE, Mrs. DOURNE - IFS Economy / Belgium

- Verification of Sr-90 determination in marine animals
  Mr. VISESPOTJANAKIT, Mr. NAKKOEY - Office of Atoms for Peace / Thailand

BIO / HEALTH
- Optical Phantom Development for Skin Measurement
  Mrs. ZHANG - NATIONAL METROLOGY CENTRE - A**STAR / Singapore & All

- Uncertainty and limit of detection in biosensors from immunoassays
  Mr. LAVIN - Polytechnical University of Madrid / Spain & All

- Reference materials to address metrological challenges in life sciences and diagnostics
  Mrs. KEPIRO - NPL / United Kingdom

- The contribution of metrological management in Moroccan institutions of blood donation
  Mr. EL BEKKAYE - Centre Régional de Transfusion Sanguine / Morocco

- Comparison of temperature dynamics of various thermal cycler calibration methods
  Mrs. SPAN, Mr. HENDRICKX, Mr. VERBLAKT - Geno-tronics / The Netherlands

- Metrological performance of thermal cyclers: characterisation
  Mrs. FERNANDES - LNE / France

- Understand and monitor the scope of accreditation thanks to ISO 9001
  Mr. BOZONNET - IP / France

- Use of fuzzy logic in estimating and controlling the parameters of a system
  Mr. HASSINI - University of Mostaganem, Mrs. HAMZAOUI - DSP Mostaganem / Algeria

- Development of a new ‘6 axis’ force connected sensor
  Mr. BUSSON - RB CONSULTANT, Mr. DECATOIRE, Mr. LACOUTURE, Mr. LEFORT - University of Poitiers, Mr. ABDI - W Technologies / France

CHEMISTRY
- Evaluation of homogeneity in certified reference materials (CRM)
  Mr. COSTA - IPQ / Portugal

- Preparation of hydrogen chloride in hydrogen standard gas mixtures for hydrogen purity requirements
  Mr. ROJO, Mr. SANTAMARIA - CEM / Spain

- Influence of storage time of pulp and paper industry wastewaters in AOX determination
  Mrs. SOARES, Mrs. MARQUES, Mrs. RODRIGUES - Forest and Paper Research Institute / Portugal

- Recent progress in chemical capabilities in INM determined by European metrology programs
  Mrs. BUZOIANU - NMI, Mr. RADU, Mr. IONESCU - NMI / Romania
FLOW

Installation for the high accuracy flow meter calibration with the weighting method
Mr RADANOV, Mr ILIC, Mr JANKOVIC - University of Belgrade - Directorate of Measures and Precious Metals / Serbia

Calibration of flowmeters using gauging method and comparison to Coriolis flowmeters
Mr MOUCHEL, Mrs ABBAS - TRESAL / France

NANOMETROLOGY

nPSize: a project to improve the traceability chain of nanoparticle size measurements
Mr FELTIN - LNE / France, Mr HODOROABA - BAM / Germany

Robust accurate and traceable determination of number concentration of Au nanoparticles by UV-Vis spectroscopy
Mr SCHOFIELD - NPL / United Kingdom & All

Implementation of a metrological UHV-STM
Mr OSTERMANN, Mr BUSCH, Mr FLUGGE, Mr KOENDES, Mr POPADIC - PTB / Germany

Advanced material metrology: scanning atomic force and electron microscopy
Mr GRANT - Hitachi High Technologies / United Kingdom
Today, companies are finding it difficult to meet their needs in terms of technical skills on the labour market or amongst their existing personnel. What is generally true about technical subjects is particularly true about metrology, as activities change very quickly and it hard to keep pace with technological developments. Machines are changing at a faster pace than people.

- How to form future technologists?
- Which kind of skills for metrologists?
- How to keep up with the evolution of technologies?

Presenter: Mr. LARQUIER - BEA Métrologie / France
With: Mr. BARBIER - CETIM / France, Mrs. BEAUGRAND - Trescal / France, Mr. COOREVITS - Arts et Métiers Paris Tech / France, Mrs. ESCOFFIER - Ariane Group / France, Mr. GULKA - NCSLi / USA, Mrs. LOFTUS - NPL / United Kingdom, Mr. MARCONNET - IUT Saint-Etienne / France
**THURSDAY 26 SEPTEMBER**

**S16 NANOMETROLOGY**
Chairman: Emeric FREJAFON - INERIS (France)

- **11:30**
  French traceability chain for dimensional measurements at nanometre scale
  Mr DUCOURTIEUX - LNE / France & All

- **11:50**
  Hybrid metrology combining AFM and SEM for measuring nanoparticle dimensions
  Mr CROUZIER - LNE / France & All

- **12:10**
  Characterisation by SEM of the nano fraction of additives in commercial products
  Mr DEVOILLE, Mr FELTIN - LNE / France

- **12:30**
  Asymmetric flow field-flow fractionation: study of the parameters governing particle retention behavior
  Mr DE CARSALADE DU PONT – LNE / France & All

**THURSDAY 26 SEPTEMBER**

**S17 STANDARDS IN THERMAL MEASUREMENTS**
Chairman: Pete LOFTUS – NCSLi (United-Kingdom)

- **13:45**
  Toward a metrological reference facility for specific heat measurements
  Mr RAZOUK, Mr HAY, Mr BEAUMONT - LNE / France

- **14:05**
  Response time measurement of chilled mirror hygrometers at LNE-CETIAT
  Mr GEORGIN - CETIAT / France

- **14:35**
  Realization of ITS90 temperatures with small batches of fixed point cells
  Mrs DOBRE, Mr DE BOECK - FPS Economy / Belgium

- **15:00**
  Improving fixed-point cells by modifying furnace heater shape
  Mr LOWE, Mrs WRIGHT - NPL / United Kingdom, Mr LILLER - Thermo Gauge Instruments / USA

**THURSDAY 26 SEPTEMBER**

**S18 PHOTONICS**
Chairman: Stefan KUECK - PTB (Germany)

- **13:45**
  Calibration of near infrared photovoltaic detectors using wavelength tunable light source
  Mrs MAMM - Aalto University / Finland

- **14:05**
  Development of an optical power meter using radiation pressure measurements
  Mr SILVESTRI, Mr PINOT - LNE-LCM-CNAM / France

- **14:25**
  Rapid photoresponse imaging of optoelectronic devices using compressed sensing
  Mr KOUTSOURAKIS, Mr THOMPSON, Mr BLAKESLEY - NPL / United Kingdom

- **14:45**
  Selforganisation of surfaces and the new SI: on the way to make calibration of microscopes
  Mr BUSCH, Mr DAUL, Mr KOENDERS, Mrs WEINERT, Mrs XU - PTB / Germany

- **15:05**
  Determining the shape of curved reflective surfaces using Monte-Carlo simulations
  Mr LANEVSKI - University of Aalto / Finland & All
ADDITIVE MANUFACTURING: MEASUREMENT AND CONTROL CHALLENGES

Additive manufacturing is playing an increasing role in many industries, allowing to design very complex shapes, not accessible by conventional means. But the complexity raises the question of the control of these shapes. Computerised tomography appears to be the most suitable solution, but is it really the case? Metrologists may have a word to say...

- Additive manufacturing everywhere, everytime?
- Computed tomography, the only way to measure 3D printed objects?
- What metrologists do have to say about computerised tomography?

Presenter: Mr BARBIER - CETIM / France
With: Mr GOSTIAUX - Vallourec / France, Mrs LEBORGNE - CETIM / France, Mr LE GOUPIL - CEA Tech / France, M. THIBAULT - Carl Zeiss / France, Mr WILLIAMS - Cranfield University / United Kingdom

CLOSING SESSION

15:50 – 16:45

Talk of Mrs Sabrina KRIEF
National Museum of Natural History (France)
Professor of the Museum / Primatologist and Director of Sebitoli Chimpanzee Project

Prospects and slideshow of best moments.

Mrs DOBRE - SPF Economie (Belgium), Mr FILTZ - LNE (France), Mr JANSSEN - NPL (United Kingdom)

CLOSING DRINK
THURSDAY 26 SEPTEMBER

POSTERS - 11:15 to 12:45

INDUSTRY 4.0

- Autonomous vehicle for remote rensing
  Mr. LAURONT - INNOVIDEA / France
- Semantic web and ontologies for data provenance and curation
  Mr. BROWN - NPL / United Kingdom
- Determination of the coefficient of expansion of a carbon tube and its assembly
  Mrs. EL ASMAI, Mr. HENNEBELLE, Mr. FONTAINE - University of Burgundy, Mr. COOREVITS - Arts Et Metiers Paris Tech / France
- Improving reliability of power plant equipment due to measurement information redundancy
  Mrs. SAPOZHNIKOVA - VNIIM, Mrs. BAKSHEYEVA - University of Aerospace Instrumentation, Mr. TAYMANOV - VNIIM / Russia
- Close loop control machining systems needs accurate in-line dimensional metrology
  Mr. SCIASCIA - CETIM / France
- Achieving precision measurements under non-standard environmental conditions
  Mr. TUTSCH - TU Braunschweig / Germany, Mr. SUMIN - TU Braunschweig / Ukraine
- How do we ensure the robustness of the links between specification and evaluation
  Mr. GIRAUD - GEODESIGN, Mr. AUGER - CA-Consulting / France
- An online platform for sociocognitive metrology: the BEAR assessment system software
  Mr. FISHER, Mr. WILSON - University of Berkeley / USA
- The role of magnetic sensors in the hybridisation and electrification of vehicles
  Mr. KRAMB, Mr. SLATTER - SENTINEL / Germany
- Metrological maintenance of measuring systems in the Industry 4.0 era
  Mr. TAYMANOV, Mrs. SAPOZHNIKOVA - VNIIM / Russia

MECHANICS QUANTITIES

- Precision of the residual stress determined by x-ray diffraction: summary and limits
  Mr. MUELLER - Bochum University of applied sciences / Germany
- News on the calibration of non automatic weighing instruments
  Mrs. MEDINA - CEM / Spain
- Comparison by primary means on seismometer sensitivity following ISO 16063-11 standard
  Mrs. BARTOLI - LNE, Mr. LARSONNIER - CEA / France, Mr. BRUNS, Mr. ICLAUS - PTB / Germany
- Method for the realisation of small differential pressures between 1 Pa and 1 kPa
  Mr. SANDER - TESTO INDUSTRIAL SERVICES / Germany
- Establishing new types of LS2P microphones as reference standards
  Mr. MENDE - SPEKTRA / Germany
- Development of a primary dynamic calibration method for pressure sensors
  Mr. MENDE - SPEKTRA / Germany
- Recent improvements of INRIM static system for pressures generation from 2 mPa to 1 kPa
  Mrs. ASTRIJA, Mr. MARL, Mr. PASQUALIN - INRIM / Italy
- The minimum weight according to regulation
  Mr. GIRAULT - METTLER TOLEDO / France
- Development of a generator of periodic pressure disturbances
  Mr. DIAZ TET, Mr. PADILLA VIQUEZ, Mr. GONZALEZ VICARIOLI - University of Costa Rica / Costa Rica
- Calibration of pressure balances and modelling piston-cylinders effective areas
  Mr. UTAL, Mrs. TARDIN - LNE / France
- Calibrations techniques for differential pressure measurement
  Mr. TUTSCH - TU Braunschweig / Germany
- Shape and size corrections in magnetic susceptibility measurements of weights
  Mr. SUMIN - TU Braunschweig / Ukraine
- Improvement of dynamic pressure standard for calibration of dynamic pressure transducers
  Mr. DURGUT, Mr. TUKL, Mr. YILMAZ, Mr. HAMARAT - TUBITAK UME, Mr. BAGCI - TUBITAK UME / Turkey
- On the calibration procedure in the mass-volume in microfluidics
  Mrs. ROSENDAHL-AVELINO - National Institute of Metrology, Quality and Technology / Brazil
- New design of automat mass comparator with d=1mg to calibrate the masse below 1mg
  Mr. SOLECKI - RADWAG BALANCES & SCALES / Poland
- Metrology as support for predictive maintenance in concrete industry
  Mrs. BAVELARD - CERIB / France
- Micro structural and spectrophotometric analysis system for metal welding processes
  Mrs. FAGA - CNR, Mr. CAPRA, Mr. FILIPPO - INRIM, Mr. LAI - IRIS / Italy
THURSDAY 26 SEPTEMBER

POSTERS - 11:15 to 12:45

TRAINING FORMATION
- Distance learning system in the field of gas analysis
  Mr. BELOBORODOV, Mr. KONOPELKO - VNIM / Russia
- Laboratory measurement activities in a first-year engineering technology class
  Mr. FULHINE - Purdue Polytechnic Columbus / USA

RADIATION/PHOTONICS
- Influences of sensor protective coating on laser energy calibration results
  Mr. KILINC, Mr. SONMEZ, Mr. YUKSEL, Mrs. ON AKTAN - Roketsan / Turkey
- New neutron source calibration service at the Laboratoire National Henri Becquerel
  Mr. THIAM - CEA-LNHB / France
- New approach to application of the spectrophotometric system for determining the optical properties of turbid liquids
  Mr. ZARUBICA - Analysis / Serbia

TIME/FREQUENCY
- Use of a standard microwave satellite simulator for TWSTFT earth station characterization
  Mr. AKHRAR - LNE-SYRTE, Mr. HUANG - Paris Observatory, Telecommunication Laboratories / France & Taiwan
- CLONETS: pan-european ultra-precise time and frequency dissemination over optical fibre
  Mrs. BOODJANS, Mr. POTTIE, Mr. TUCKET - LNE-SYRTE / France

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**HOTELS**
SESSIONS

TUESDAY 24 SEPTEMBER
K1 K2
K3 K4 K5 K6 K7 K8
ROUNDTABLE

WEDNESDAY 25 SEPTEMBER
K9 K10 K11 K12 K13 K14 K15 K16 K17 K18
ROUNDTABLE

THURSDAY 26 SEPTEMBER
K19 K20 K21 K22 K23 K24 K25 K26
ROUNDTABLE

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