CIM 2015
17th INTERNATIONAL CONGRESS OF METROLOGY

measure
analyse
innovate

SEPT. 21 TO 24
PARIS • FRANCE

info@cfmetrologie.com - www.metrologie2015.com
In Paris, in September we will be back together for this unique event in Europe.

Its objectives are innovative but also very practical:
• explore developments in measurement techniques, R&D advances and their implications for industry,
• demonstrate how measurement improves industrial processes and risk management.

Its content is large: 180 presentations, 6 round-tables, an exhibition of technological innovations.

We expect 1000 participants from fifty countries:
• measurement equipments end-users,
• reliability and quality managers, decision-makers,
• manufacturers and service providers,
• academics and researchers.

A French / English simultaneous translation is provided.
A three-day conference to understand the extent of the metrology world and a maximum of networking!

The Collège Français de Métrologie generates exchanges for measurement processes to be better understood, for measuring instrument to be more than a machine that «knows» while its user does not «really know», for innovation to be transferred to industry.

The concept of ENOVA Show is to be the meeting point for industrial, scientific or academic innovation. It is a platform for exchanges between manufacturers, engineers and researchers: the best place for electronics, measurement, vision and optics, bringing together industry professionals.

It is natural that CFM and ENOVA offer a complete package for those few days. Welcome in Paris.
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Mr MATAMOROS - CENAM (Mexico)
Mr MILOSEVIC - VINCA (Serbia)
Mr PENIN - Norma System (France)
Mr PETERSEN - DFM (Denmark)
Mr PRIEL - ip (France)
Mr RIETVELD - VSL (The Netherlands)
Mrs SALVETAT - Ifremer (France)
Mr TWERENBOLD - METAS (Switzerland)
Mr VAN DER HAM - NMI (Australia)
Mr VILLAMANAN - University of Valladolid (Spain)

GENERAL SECRETARIAT

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CIM 2015 and enova PARIS, same place, same dates, same objectives: to encourage meetings.

Create your future

The exhibition for technologies in ELECTRONICS | MEASUREMENT | VISION | OPTICS
### POSTER p.14 to 17

- Health
- Mechanical quantities
- Legal metrology
- Statistics / uncertainty
- Environment
- Flow

### COCKTAIL

**S6** Metrology of medical laboratories p.12

**S7** Environment and climate p.12

**Energy transition: metrology meets challenges** p.13

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### POSTER p.22 to 24

- Soft metrology
- Energy
- General
- SI
- Health
- Optics

### GALA

**S10** Challenges in electricity p.20

**S11** Photonics in the year of light p.20

**Outsourcing the metrology: dream or reality?** p.21

**WORKSHOP: Industry and Materials** p.21

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### POSTER

**S14** Nanotechnology: measurement and characterisation p.28

**S15** Thermal show p.28

**Risk management and control: new approach for ISO 9001** p.29

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### OBSERVATOIRE de Paris visit
- Microwave frequencies and optical laboratories

### SOPEMEA visit
- Mechanical, climatic and EMC testing

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### SEPTEMBER 21 TO 24
PARIS • FRANCE

www.metrologie2015.com
MONDAY 21 SEPTEMBER

CIM2015
17th INTERNATIONAL CONGRESS OF METROLOGY

CONGRESS OPENING SPEECHES

17:00 – 18:30

Metrology in services providing
Mme KERLEGUER - Groupe la Poste / France

Metrology and forensics
M. VANDEN-BERGHE - Judicial Division of the National Gendarmerie / France

Congress opening speeches
Mr LARQUIER - BEA Métrologie / France, Chairman of the Collège Français de Métrologie
Mr CLAUDEL - CETIAT / France and Mrs HULLY - NPL / United Kingdom, Co-chairmen of CIM 2015

Congress opening by the Ministry in charge of Industry

DRINK
9:00  Strategic research agenda for energy metrology research up to 2025  
Mr RIETVELD - VSL / The Netherlands

9:20  PhotoClass: a new metrology for opto-electric performance of photovoltaic modules  
Mr DUBARD, Mr VALIN - LNE / France

9:40  Calibration of currentmeters in direction: results obtained on a stock of instruments with a new calibration platform  
Mr LE MENN - SHOM / France

10:00 Influence of gas and liquid viscosity on turbine and positive displacement meters calibration  
Mr PEDISIUS, Mr ZYGMANTAS, Mr MASLAUSKAS - Lithuanian Energy Institute / Lithuania

10:20 Advances in oil condition monitoring permits preventive maintenance before damage occurs assuring asset protection and achieving theoretical component lifetimes  
Mr MAUNTZ, Mr PEUSER - CMC Instruments, Mr KUIPERS - Fachhochschule Südwestfalen / Germany

10:40 Temperature and heat measurement using thin or thick films: benefits, fabrication and applications  
Mr GARNIER - POLYTECH' NANTES / France

11:05 Evaluation of vortex flowmeters by Exera  
Mrs CARE - CETIAT, M. VEAU - EDF / France

11:35 Discrete dynamic bell type instrument of combined work principle for the calibration of gas meters  
Mr RAK, Mr MAZUR, Mr SHCHUPAK - Ukrmetriesstandard / Ukraine

12:00 Determination of the blockage effect on a thermal anemometer using a small open jet wind tunnel  
Mr RICKABY - Trescal / United Kingdom
S2  UNCERTAINTY MANAGEMENT
Chairmen: Carol HOCKERT - NIST (USA) and Marc PRIEL (France)

9:00  Numerical simulation will be mandatory for a better management of measurement process?
Mr RAGEADE - Biomérieux / France

9:20  Multilevel Monte Carlo approach to evaluate the process closer to physics
Mr HENNEBELLE - University of Bourgogne, Mr COOREVITS - Arts et Métiers ParisTech, Mr VINCENT - CETIM / France

9:40  Comparison of different performances scoring strategies in proficiency testing by interlaboratory comparison
Mrs DESENFANT - LNE / France & all

10:00 Monte Carlo propagation: when increasing input variance decreases output variance
Mr PERNOT - CNRS, Mrs DESENFANT - LNE, Mr DIMARCQ - LNE-SYRTE, Mr HENNEBELLE - University of Bourgogne / France

10:20 Uncertainty in dynamic measurements, an overview
Mr ZAFAR - BAE SYSTEMS / Saudi Arabia

10:40 Possibility and probability: application examples and comparison of two different approaches to uncertainty evaluation
Mr FERRERO, Mr PRIOLI, Mrs SALICONE - Polytechnic of Milan / Italy, Mr POU - Delta Mu / France

11:05 11:35

S4  CHALLENGES IN MECHANICS
Chairmen: Thierry COOREVITS - Arts & Métiers Paris Tech (France) and Medina NIEVES - CEM (Spain)

11:35  PVDF sensors for dynamic pressure metrology in extreme environment
Mr FOURMANN - CEA / France & all

12:55  Additive manufacturing and control needs
Mrs OBATON, Mr MOSCHETTA - LNE, Mr BERNARD - Ecole Centrale de Nantes, Mr TAILLANDIER - AFPR / France

12:15  Elementary research on the effect of acceleration distribution of hammer in dynamic force calibration
Mr MENG - National Institute of Metrology / China

12:35  Diffuse field calibration of microphones by reciprocity
Mr BACELAR MILHOMEM, Mr MARTINS DEFIlliPPO SOARES - Inmetro, Mr MUSAFIR - UFRJ / Brazil

12:50 13:45
In a highly regulated context, the healthcare sector has a natural obligation to **control its risks**. Measurement will play a central role here as an **objective element in inspections**, **vital in decision-making**. It will be involved at several levels: during equipment approval processes, during the production and release of a batch of drugs, during storage, during biological analysis etc.

**Debates about key questions:**
- What is the contribution of metrology in healthcare?
- What role can the metrology function play in mastering this best practice?
- How to minimise risk with metrology?

**Animation:** Mr CLAUDEL - CETIAT / France

**With:** Mr BOUDY - AGEPS / France, Mr ERNY - COFRAC / France, Mr PEYRET - BIOMERIEUX / France, Mr VALENTIN - GSK / Belgium
S6  METROLOGY OF MEDICAL LABORATORIES
Chairman: Jean CHAVAUDRA - ip (France)

15:30  ■ Metrological requirements for accredited laboratories
Mr TSIMILLIS - Pancyprian Union of Chemists, Mrs MICHAEL - Ministère de la Santé / Cyprus

15:50  ■ Practical metrology in a medical laboratory
Mr BOZONNET - Dijon Center cancer control / France

16:10  ■ Metrology at the French agency for blood: periodicities, calibration, test, criticality, risk analyse
Mr REIFENBERG, Mr BEGUE - EFS Pyrénées-Méditerranée / France

16:30  ■ Management of the temperature metrology in a laboratory of medical assisted reproduction
Mrs LEMARQUIS - LBM BILLIEMAZ / France

16:50  ■ Nucleic acid analysis in new fields of metrology
Mrs CAMLOH - National Institute of Biology / Slovenia

17:10  ■ Metrological traceability of PCR to the SI system in the ISO15189 accreditation context
Mr LE TOUZÉ - A+ Métrologie / France

S7  ENVIRONMENT AND CLIMATE
Chairman: Richard BROWN - NPL (United Kingdom)

15:30  ■ Traceability for mercury measurements
Mrs FISICARO - LNE / France, Mr ENT - VSL / The Netherlands, Mrs SWART - PTB / Germany,
Mr GOENAGA-INFANTE - LGC / United Kingdom, Mrs HORVAT - IJS / Slovenia

15:55  ■ Development of a calibration method for on-line analyser of atmospheric particle mass concentrations
Mr GAIE-LEVREL - LNE / France

16:20  ■ European project: metrology for ammonia in ambient air (MetNH3)
Mr POGANY - PTB / Germany

16:45  ■ Metrology for remote sensing of the environment and climate
Mr FOX - NPL / United Kingdom

17:10  ■ Assessment of metrological performances of distributed temperature sensing techniques
Mr FAILLEAU - LNE / France & all
The revolution of energy transition aims to better manage the world’s energy resources for the benefit of present and future generations. The objective is to reduce the consumption of fossil fuels to support the development of renewable energy sources as an accepted energy mix. Metrology appeared as a useful tool to optimise the transition process.

**Debates about key questions:**
- Production and conversion
- Transport and storage
- The end use and applications
- Current research and industrial initiatives

Animation: Mr FILTZ - LNE / France
With: Mr BECCAVIN - CERTISOLIS / France, Mr CASSAGNE - TOTAL / France, Mr MASOERO - University of Turin / Italy,

Mr PETERSEN - DFM / Denmark, Mr RIETVELD - VSL / The Netherlands
HEALTH

- Temperature monitoring in thermostatic chambers: use(s) of the control thermometer
  Mr BLANQUART, Mr CRÉTINON, Mr BOREL / France

- Organisation of an interlaboratory comparison in the field of disinfectants and antiseptics
  Mr GEYNET - CT2M / France

- Calibration of $\text{H}_2\text{O}_2$ transmitter or portable probe through the use of physical and chemical properties of $\text{H}_2\text{O}_2$
  Mr BOREL, Mr SERRE - VIRBAC, Mr GUERRIN - ARECO / France

- Metrology serving the quality control of the equipment used in the biological and pharmaceutical analysis laboratory
  Mr EL BEKKAYE, Mr BOUCHAHRA, Mr ATTAR, Mr BENAJIBA - Regional Center for Blood Transfusion / Morocco
POSTER - 13:45 to 15:15

MECHANICAL QUANTITIES

- Comparison between a reference torque standard machine and a deadweight torque standard machine to be used in torque calibration
  Mr MENG - National Institute of Metrology / China

- Miniaturized Nd-YAG laser as photo-elastic transducer for small forces sensing
  Mr KHELIFA - LCM LNE-CNAM / France

- Interlaboratory comparisons in the field of Rockwell’s scales
  Mr SKLIAROV - National Scientific Centre / Ukraine

- Calibration of bridge standard for strain gauge bridge amplifier
  Mr CORMINBOEUF - METAS / Switzerland

- Very low frequency calibration of geophones
  Mr MENDE, Mr IWANZCIK - Spektra / Germany, Mr LARSONNIER - CEA / France

- Uncertainty determination of in situ airborne sound insulation measurements
  Mrs JOHANSSON - SM Quality / Sweden

- Calibration of force and displacement transducers for measurements in sodium from ambient temperature up to 350°C and examples of results
  Mr PORTIER - CEA, Mr SABATE - PRESCAMEX, Mr BUISSON - RBConsultant, Mr PERISSE - AREVA NP / France

- Investigation on the effects of loading pads hardness on the calibration results of force transducers
  M. GOUDA - National Institute for standard / Egypt

LEGAL METROLOGY

- Cloud computing in legal metrology
  Mr THIEL, Mr ESCHÉ, Mr PETERS, Mr GROTTKER - PTB / Germany

- Decision C-423/13: 1st decision of the European Court of Justice on MID and smart devices
  Mr BOCK - METAS / Switzerland

- Instructional repository of learning objects in metrology and conformity assessment
  Mr CARDOSO - Sociedade Brasileira de Metrologia / Brazil
POSTER - 13:45 to 15:15

STATISTICS / UNCERTAINTY

- Accuracy and statistical intervals in the field of method validation
  Mrs YARDIN - LNE / France

- Interlaboratory comparisons in calibration and testing. Experience feedback
  Mrs AMAROUCHE - LNE / France

- Comparison of methods for the uncertainty calculation of a calibration function
  Mrs SUGLIANO - CT2M / France

- Uncertainty chain for correct decision-making in vehicle testing
  Mr LAU, Mr KALLGREN - SM Quality / Sweden

- Inter-instruments comparisons
  Mr COQUET - L.A. Métrologie, Mr POU - Delta Mu / France

- Numerical evaluation of uncertainty of microwave holography using planar near-field scanner
  Mr CHARLES, Mr LE SAGE, Mrs VINCENT-DROUART, Mr LERAT - LNE / France

- Evolutionary method to adapt the measurement capability process to the industrial context
  Mr LELONG - PSA / France

- MCM: an interfaced software for a simple and validated implementation of GUM-S1
  Mrs EBRARD, Mr FISCHER, Mr ALLARD - LNE / France

- Control of quantity of prepackages: new statistical multistep sampling procedure
  Mr VATERLAUS, Mr LI - METAS / Switzerland

- Statistical study of the drift of calipers
  Mr DUBOIS - Delta Mu / France

- Building acoustics: uncertainty of the apparent sound insulation index R’w
  by Monte Carlo approach
  Mr REBOUL - Bureau Veritas, Mr POU - Delta Mu / France
POSTER - 13:45 to 15:15

ENVIRONMENT

- Measurements of traceable amount of substance fractions through infrared spectroscopy at PTB
  Mr. Ebert - PTB / Germany

- Perfecting methods of metrological traceability of priority air pollutants using UV absorption spectroscopy
  Mr. Konopelko, Mr. Beloborodov, Mr. Rumiantsev, Mr. Selukov - DI Mendeleyev Metrology Institute / Russia

- Spectrophotometric method for the determination of the pH of sea water
  Mrs. Lamanè, Mrs. Salvetat, Mrs. Le Bihan - Ifremer / France

- Environmental metrology enabling sustainable use of groundwater resources
  Mr. Depraz - Imageau / France

- Metrology to underpin future regulation of industrial emissions
  Mrs. Rausch - PTB / Germany

- Participation in IAEA-TEL-201304/28 ALMERA proficiency test exercise on determination of anthropogenic radionuclides in water and flour samples
  Mr. Visetpotjanakit - Office of Atoms for Peace / Thailand

- International cross-validation of a BOD5 surrogate
  Mr. Dudal - Envolure / France

- Reliability of organic compounds measurement in environmental monitoring. The key role of analytical standard substance
  Mrs. Lardy-Fontan, Mrs. Lalere - LNE, Mrs. Chatellier, Mr. Lestremau, Mrs. Strub - Ineris / France

- Establishing satellite-derived biophysical product traceability through characterisation of in situ sensors
  Mrs. Nightingale - NPL / United Kingdom

FLOW

- EMRP: sensor development and calibration method for inline detection of viscosity and solids content of non-Newtonian liquids
  Mr. Ballereau - LCM LNE-CNAM / France & all

- Discharge coefficient behaviour in presence of four perforated plates flow conditioners
  Mr. Laribi - University of Khemis-Miliana, Mr. Abdellah Hadj - University of Medea / Algeria

- The specification, selection and use of liquid flow rate measuring devices
  Mr. Fertell - Proteus Industries / USA

- The new method for calibration and testing of the bell type prover
  Mr. Tonkonogi - Lithuanian Energy Institute / Lithuania
S8  **AT THE HEART OF THE ENERGY MIX**

Chairmen: Jan Petersen - DFM (Denmark) and Marco Carlo MASOERO - University of Turin (Italy)

9:00  EMPRESS: a European project to enhance process efficiency through improved temperature measurement
Mr PEARCE - NPL / United Kingdom

9:20  Metrological traceability for moisture content analysis in wood pellets
Mrs SEGAL, Mr BELTRAMINO, Mr FERNICOLA, Mrs ROLLE, Mr VERDOJA - INRIM / Italy

9:40  EMRP JRP «Biogas»: development of sampling methods for calorimetric measurements of biomethane and biogas
Mrs HALOUA - LNE / France, Mrs ARRHENIUS - SP / Sweden

10:00 Innovative non-intrusive high temperature measurements system for internal fluid and pipe surface
Mr ARENAS, Mr BOLDO, Mr BLAIRON, Mr ULPAT - EDF R&D / France

10:20  Tests requirements for the qualification of nuclear safety-classified hardware
Mr BORDES - AREVA NP / France

10:40  Infrared thermography as tool to serve the societal stakes: measurement methods, traceability, pro and cons
Mr FILTZ - LNE / France & all

11:05 11:35

S9  **METROLOGY TO SUPPORT LIFE SCIENCES**

Chairmen: Damian TWERENBOLD - METAS (Switzerland) and Jean CHAVAUDRA - ip (France)

9:00  Characterisation of biological microvesicles from human body fluids with atomic force microscopy
Mrs PETRY - SPF Economie / Belgium

9:20  Metrology for MRI safety
Mr ITTERMANN - PTB / Germany

9:40  Development of pure human alpha-fetoprotein certified reference material value assay by two independent methods
Mr SONG - National Institute of Metrology / China

10:00  Comparison of the deformation of phantoms of the aorta measured from MRI and stereovision
Mr FONTAINE - University of Bourgogne / France & all

10:20  Metrology for radiotherapy using complex radiation fields (HLT09 EMRP project)
Mr BORDY - CEA / France

10:40  Metrological assessment of micro-flow meters and drug delivery devices in the scope of the EMRP project «MeDD»
Mr O'GHEARD - CETIAT / France & all

11:05 11:35
THE WORLD OF SOFT METROLOGY

9:00 While sensory metrology is a tool that has been used for decades in the food industry, its field of application has widened to include many other industrial sectors: cosmetics, textiles, the automotive industry, construction, domestic appliances... The sensory analysis combined with hedonic tests constitute the most appropriate tool for measuring perceived quality. The goal of sensory metrology is to obtain an objective evaluation of sensation. This recent form of metrology is gradually building the knowledge base that will allow for objective comparisons by establishing references, evaluation methods, expert panels etc.

Debates about key questions:
• What is sensory metrology?
• How is man, as a measurement tool, calibrated?
• How can we guarantee that a sensation is accurate?

11:00 Animation: Mrs COURAGE - IFTH / France

11:00 With: Mr BARHAM - NPL / UK, Mr DEBAR - ISOLAB / France, Mr GAUDEMER - LNE / France

SEASON METROLOGY 4.0
Chairwomen: Jenny HULLY - NPL (United Kingdom) and Maguelonne CHAMBON - LNE (France)

11:35 Additive manufacturing
Mr JURRENS - NIST (USA)

11:35 Metrology and Industrie 4.0
Mr STENGER - PTB (Germany)

11:35 Establishing a metrology laboratory in space to meet the demands of climate change
Mr FOX - NPL (United Kingdom)
S10 CHALLENGES IN ELECTRICITY
Chairmen: François PIQUEMAL - LNE (France) and Pierre GOURNAY - BIPM

15:30 ◆ Metrology for graphene and 2-D materials
Mr POLLARD - NPL / United Kingdom

15:55 ◆ An easy-to-handle quantum electrical resistance standard based on graphene
Mr POIRIER - LNE / France & all

16:20 ◆ A transportable selectable-value, high dc voltage standard
Mr CAPRA, Mr GALLIANA, Mr CERRI, Mr RONCAGLIONE - INRiM / Italy

16:45 ◆ High voltage measurements by sampling technique
Mr AGAZAR - LNE / France

17:10 ◆ A calibration system for electric power at frequencies up to 1 MHz
Mr BERGSTEN, Mr TARASSO, Mr RYDLER - SP / Sweden

S11 PHOTONICS IN THE YEAR OF LIGHT
Chairmen: Mr BUCOURT - AFOP (France), Mr FERDINAND - CEA (France)

15:30 ◆ Methods for decreasing uncertainties in LED photometry
Mr DONSBERG - MIKES / Finland

15:55 ◆ Development of a spectro-photo-goniometer for the characterisation of new solid state lighting products
Mr RENOUX, Mr DUBARD - LNE / France

16:20 ◆ Absorption of visible light in silicon at 77 K
Mr KÜBARSEPP, Mr SILDOJA, Mr TAMRE - Tallinn University of Technology / Estonia

16:45 ◆ A new «low cost» and ultra low uncertainty standard reference for the spectral responsivity of detectors
Mr ROUGIÉ, Mrs COUTIN - LCM LNE-CNAM, Mr RENOUX - LNE / France

17:10 ◆ Industrial implementation of the new NIR laser-based sensor for measuring surface moisture in polymers
Mr HUDOKLIN, Mr BEGUS, Mr BEGES, Mr MUNOZ, Mr DRNOVSEK - University of Ljubljana / Slovenia
The metrology function guarantees control of measuring processes. And its control requires a high level of expertise to ensure maximum performance. We may be tempted to compare the metrology function with accounting. This activity is obviously vital for the smooth operation of any organisation, but it now requires such a high level of ability that it has become natural to call on specialist firms.

Debates about key questions:

• Can this expertise, strategic for the life of a company, be outsourced?
• Could and should the metrology function take the same route than accounting department?
• How to do that? How far to go?

Energy transition, building energy efficiency, industrial processes, aerospace and automotive industry, health are some fields where the development of new innovative materials is crucial. The thermal metrology of materials is one of the key vectors for improving the industrial performance and competitiveness.

The objective of this workshop is to analyse and cross the current and future industrial needs with the metrology capabilities, available and future to be developed. The field of materials being very wide, the workshop will focus on a few examples only.

This interactive and opened workshop is organised within the framework of EURAMET. The European Association of National Metrology Institutes aims at promoting the exchange of experiences and developing a harmonised European metrology useful for industry and society.

Chairmen: Mr FILTZ - LNE-CNAM / France, Mrs DOBRE - SMD / Belgium

With the participation of: CEM-UVa / Spain, CMI / Czech Republic, INRIM / Italy, MKEH / Hungary, NPL / UK, PTB / Germany, VINCA / Republic of Serbia
POSTER - 13:45 to 15:15

SOFT METROLOGY

- Metrology of human-based measurements
  Mr PENDRILL - SP / Sweden

- Inspection system for benchmarking of perceived and technical characteristics of surfaces
  Mr FRANK - University of Aachen / Germany

- Correlation of the haptic perception and the technical parameter
  Mrs NEUMANN, M. SCHMITT - University of Aachen / Germany

ENERGY

- Dynamic properties during wood humidification
  Mrs RUDOLFOVA, Mrs NETOLICKA, Mr STRNAD - CMI / Czech Republic

- Measurement requirements for biogas specifications
  Mrs LI - VSL / The Netherlands

- The use of «smart sensor» at AREVA: skate, prospect and experience feedback
  Mr GAGNIÈRE, Mr MACÉ - AREVA / France

- Moisture measurement setup for wood based materials and biomasses
  Mrs OJANEN, Mr SAIRANEN, Mr SALMINEN, Mr KAJASTIE, Mr HEINONEN - MIKES / Finland

- Comparison of methods for moisture content determination in wood pellets
  Mr KARABOECE - Tübitak / Turkey

- Traceability and metrological assurance of the vibration and accelerometry measurement unity in Ukraine
  Mr SKLIAROV, Mrs KOLOZINSKA - National Scientific Centre / Ukraine

- Development of an alternative procedure to verify «in situ» volumetric diaphragm type gas meters for residential use
  Mr DIAZ TEY - University of Costa Rica / Costa Rica

- The calorific value measurement of methane using metal burner
  Mr LEE - KRISS / Korea

- Measurement uncertainty and product classification of water heaters within the framework of the new EU energy labeling and eco-design regulations
  Mr PANARAS - University of Macedonia, Mr MATHIOULAKIS, Mr BELESSIOTIS - NCSR DEMOKRITOS / Greece

- Simulation and control of gas metering system based on differential pressure sensor
  Mr HARROUZ - University of Adrar / Algeria
POSTER - 13:45 to 15:15

OPTICS

- High accuracy and high speed wavelength meter based on photonic integrated technologies
  Mr MINK, Mr LU, Mr LIU - VTEC Lasers & Sensors / The Netherlands

- Variance or Monte Carlo error propagation in the context of the emittance measurement of a relativistic electron beam
  Mrs BRUNI - University Paris Sud / France

- News about the metrological verifications of speedmeters at IPQ
  Mr PELLEGRINO, Mr PIRES, Mrs FILIPE - IPQ / Portugal

- Colorimetry and computer vision for color characterisation by image, applied to integrated fruit production
  Mrs GOMES, Mr BALDNER, Mr COSTA - Inmetro, Mrs LETA - University Fluminense / Brazil

- Development of a machine vision system for fluids metrology
  Mr BALDNER, Mrs GOMES, Mr COSTA, Mr SANTO FILHO - Inmetro, Mrs LETA - University Fluminense / Brazil

- Spectrophotometry in transmission at IPQ
  Mr PELLEGRINO, Mrs ALVES, Mrs FILIPE - IPQ / Portugal

- LEDs blue light temperature shift and the blue light hazard context
  Mrs COSTA - Inmetro / Brazil

- Precision inspection of defects on free form by optical way
  Mr MEGUELLATI - University Ferhat Abbas / Algeria

- Some considerations on the use of certified reference materials in the spectrochemical measuring instruments calibration
  Mrs DUTA - National Institute of Metrology / Romania

- Lighting: panorama of the capacities and impact of metrology on the development and improvement of LED technology
  Mr FILTZ, Mr DUBARD, Mrs TO VAN TRANG, Mr ENOUF, Mr RENOUX - LNE / France
SI
- French watt balance experiment: design of a single-piece balance beam and study of its mechanical behavior
  Mr PINOT - LCM LNE-CNAM / France
- French watt balance experiment: uncertainty components associated with the mass standard for the determination of the Planck constant
  Mr PINOT - LCM LNE-CNAM / France
- How to disseminate the mass unit for the new kilogram?
  Mr SILVESTRI - LCM LNE-CNAM / France, Mr DAVIDSON - NPL / United Kingdom

HEALTH
- Determination of total haemoglobin by isotope dilution ICP-MS to assess metrological traceability in clinical biochemistry
  Mrs PALOS - LNE / France & all
- Comparative analysis of standard deviations in radioiodine effective dose estimation in nuclear medicine
  Mrs ZDRAVESKA KOCOBSKA, Mr MAJSTOROV - University of Skopje / Republic of Macedonia, Mr SPASIC JOKIC - University of Novi Sad / Serbia
- Uncertainties related to the estimation of annual doses: role of input parameters
  Mrs CHAMPION, Mr ALBRECHT, Mrs GOURIOU - Andra / France
- Task-specific uncertainty estimation for medical applications
  Mrs BEYERMANN - University of Aachen / Germany
- Determination of $^{90}$Sr by measuring $^{90}$Y Cerenkov counting
  Mr VISETPOTJANAKIT - Office of Atoms for Peace / Thailand
- Testing wirelessly-monitored thermometers for improved patient safety
  Mrs VELITCHEVA, Mrs ALSTON - NPL, Mrs GALLEGU - Isansys Lifecare / United Kingdom

GENERAL
- Estimation of economic feasibility of development of national measurement standards
  Mr NEYEZHMakov, Mr PROKOPOV - National Scientific Center / Ukraine
- Delivering measurement skills
  Mr SILVA - NPL / United Kingdom
- The industrial company calibrates, but what for?
  Mr DIDELot - Delta Mu / France
- Measurements reliability label: an alternative to showcase skills of research laboratories
  Mrs HEGRON - CT2M / France
- Diagnosis metrology in the food-processing industry
  Mr LEBLOIS - COMMA Consulting / France
- Determining coagulation time of milk using an ultrasonic technique
  Mr DERRA - Laboratory of metrology and Information processing / Morocco
- EUROCAL – the European cooperation of accredited calibration labs
  Mr HONIG - Amtest-TM / Czech Republic, Mr ULBIG - PTB / Germany
The Collège Français de Métrologie and Hexagon Metrology are pleased to welcome you for the Evening dinner of the Congress. Wedneday 23 September, upon registration.
S12 IMPROVEMENT IN ELECTRICAL STANDARDS
Chairman: Luc ERARD - LNE (France)

9:00 ■ Progress on the Thompson-Lampard calculate capacitor project at BIPM
Mr GOURNAY, Mr FLETCHER, Mr ROBERTSSON, Mr STOCK - BIPM / France

9:25 ■ Evaluation of measurement uncertainty for measurement of piezoelectric properties using the resonance method
Mr WEAVER - NPL / United Kingdom

9:50 ■ Calibration of the static and dynamic performances of PMUs
Mr BRAUN - METAS / Switzerland

10:15 ■ Improvement of the measurement chain linking the Farad to the Ohm
Mr SINDJUI - LNE / France & all

10:40 ■ Efficient and effective configuration and calibration of smart instruments and management of smart instrument data
Mr MAXFIELD, Mr BOUBAY - Beamex / France

S13 TRENDS IN COORDINATE MEASUREMENT
Chairman: Alain GUERDAT - Montres Rolex (Switzerland)

9:00 ■ Application of lean manufacturing concepts in the metrology room of an engine manufacturing workshop
Mr BONZON - PSA / France

9:25 ■ Typology and design of coordinate measuring machines: updating the bibliography
Mr COOREVITS, Mr RYELANDT - Art et Métiers Paris Tech, Mr HENNEBELLE - University of Bourgogne / France

9:50 ■ Metrological characterisation of 3D imaging systems: progress report on standards developments
Mr BERALDIN - NRC / Canada

10:15 ■ Traceable profile and roughness measurements inside sonic nozzles with the Profilscanner
Mrs XU, Mr KIRCHHOFF, Mr BRAND, Mr MICKAN - PTB / Germany

10:40 ■ Characterisation and measurement to the sub-micron scale of a reference wire position
Mr SANZ - CERN / Switzerland
Metrology in agrifood industry is an essential winning tool for security, quality and profitability of the company. In complement to its regulatory requirements, the metrology function is proactive to prevent the products marketing unfit for consumption or harmful to the company’s image. The product quality is also optimised by an appropriate control of manufacturing process.

Debates about key questions:

- The improvement of manufacturing processes
- The packaging and product evolution
- The control of contaminations

Animation: Mrs BLUM - EA / France and Mr HENNEBELLE - University of Bourgogne / France

With: Mr DEVIN - CEMAFROID / France, Mr LEBLOIS - COMMA CONSULTING / France, Mr SITARAS - ESYD / Greece,

Mr VOGEL - LNE / France
**SI4  NANOTECHNOLOGY: MEASUREMENT AND CHARACTERISATION**

Chairmen: Emilie LANGLOIS-BERTRAND - AFNOR (France) and François PIQUEMAL - LNE (France)

13:45  Metrological characterisation of the size distribution of airborne nanoparticles generated from nanomaterials  
Mr MOTZKUS - LNE / France

14:05  Toward the harmonisation of physical-chemical protocols for nanomedicine characterisation: size measurements  
Mrs VARENNE, Mr BOTTON, Mrs MERLET, Mrs VAUTHIER - University Paris Sud / France

14:25  Towards the standardisation of fullerene nanofibers using Raman spectroscopy  
Mr FERREIRA - Inmetro / Brazil

14:45  Hybrid metrology of surface roughness combining SEM and AFM measurements  
Mr CONSTANToudis - Institute of Nanosciences and Nanotechnologies / Greece

15:05  Thermal conductivity measurements of candidate materials for the calibration of scanning thermal microscopes  
Mr HAY, Mr ALLARD, Mrs RAMIANDRISOA, Mr DAVEE - LNE, Mrs GOMES - University of Lyon / France

15:25  Advances in measurement of interfacial chemical activity  
Mr WAIN - NPL / United Kingdom

**SI5  THERMAL SHOW**

Chairwomen: Eduarda FILIPE - IPQ (Portugal) and Miruna DOBRE - SP ECONOMIE (Belgique)

13:45  HiTeMS: High Temperature Measurement Solutions for industry  
Mr MACHIN - NPL / United Kingdom

14:05  Experimental assessment of methods of dissemination of the thermodynamic temperature at the highest temperatures  
Mr SADLI - LCM LNE-CNAM / France & all

14:25  Testing the reliability of humidity sensors through prolonged measurements traceable to calibration standards  
Mrs NAIR - University of South Wales / United Kingdom

14:45  METeNet: developments in metrology for moisture in materials  
Mrs BELL - NPL / United Kingdom

15:05  Improve radiation thermometry measurement uncertainty through implementing a primary scale in an industrial laboratory  
Mr WILLMOTT - University of Sheffield, Mr LOWE - NPL, Mr BROUGHTON - Land Instruments International / United Kingdom

15:25  Performance tests of cold chain temperature indicators and time/temperature integrators: tests methodology of NF E 18-100 standard and results  
Mr DEVIN, Mr CAVALIER, Mrs LECOCQ - Cemafroid / France
RISK MANAGEMENT AND CONTROL: NEW APPROACH FOR ISO 9001

13:45

Measurements are vital to enable companies to take the right decisions. Consequently, the quality of these measurements has a direct impact on the decisions taken and the risks incurred. The new ISO 9001:2015 standard introduces the notion of risk in relation to the systems to be put in place, as well as the ISO/IEC Guide 98-4. How can the risk be placed at the heart of metrology while achieving a “lean metrology”? Will these standards open up new performance horizons for business?

Debates about key questions:

• How can corporate risks be expressed in terms of metrology?
• How can metrologists be actors in decision-making and metrology a profit centre?
• How can risks be quantified, and operations be reduced to the minimum necessary?

Animation: Mr DAUBENFELD - PSA Automobiles / France
With: Mrs AMAROUCHE - LNE / France, Mr IBANEZ - SYRAConseil / France, Mr LEBLOIS - COMMA CONSULTING / France, Mr LE BRIS - RENAULT / France

15:50

CLOSED SESSION

15:50  16:30

Talk of Mr COHEN TANNOUDJI, Nobel Prize in Physics

Synthesis, prospects and slideshow of best moments
Best oral and poster presentations prizegiving
Mr FILTZ - LNE (France) and Mrs FILIPE - IPQ (Portugal)

CLOSING DRINK ON THE EXHIBITION SPACE
DIMENSIONAL

- Reliability and measurement uncertainty estimation of CMM according to GUM approach and Monte Carlo simulation
  Mr GROUS - CECEP / Canada, Mr MIROUH, Mr KARAALI - University of Constantine / Algeria

- Behavior simulation of a deformable part during the measurement
  Mr RAYNAUD, Mr DINH - INSA, Mr WOLFF - University of Lyon, Mr PAREJA - Renault / France

- Error evaluation in reverse engineering of aspherical lenses
  Mr PIRATELLI-FILHO - University of Brazilia, Mrs VALDES ARENCIBIA - University of Uberlandia / Brazil, Mr ANWER, Mr SOUZANI - ENS Cachan / France, Mr DEVEDZIC - University of Kragujevac / Serbia

- Performance of articulated arm CMM using virtual spheres gauge and geometry deviation analysis
  Mr FERREIRA, Mr PIRATELLI-FILHO - University of Brazilia / Brazil

- Validation of an ultra-precision optical coordinate measuring machine for the measurement of free form objects in industrial processes
  Mr DUPLESSY - Syhate / France, Mr MAUL - REDLUX / United Kingdom

- Error mapping of a rotary table based on automated cross calibration technique
  Mrs CHAO, Mr KOWALSKI, Mr LENG TAN - National Metrology Centre / Singapore

- Measurement uncertainty evaluation of the null detector method using Monte Carlo
  Mr COSTA, Mrs GOMES, Mr BALDNER - Inmetro, Mrs LETA - University Fluminense / Brazil

- CHRocodile CLS: chromatic line sensor for high speed and high resolution metrology
  Mr DUPRAZ - Precitec / France

- Strategy to measure the cutting edge preparation of precision cutting tools by using a white light chromatic sensor
  Mr CORTES-RODRIGUEZ - National University of Colombia / Colombia

- Fast checking of CMM geometry with a new tool
  Mr MANLAY - CEA / France

- DMD-based calibration of flatness systematic errors of micro-translation stages for surface roughness metrology
  Mr LE GOIC, Mr HENNEBELLE - University of Bourgogne, Mr FAVRELIÈRE, Mr PILLET - University of Savoie, Mr SAMPER - University of Rennes / France

- Angle metrology at INRIM in the framework of the EMRP Project SIB58
  Mr PISANI, Mrs ASTRUA - INRIM / Italy

- Characterization of the effects of the turbulence on the propagation of a laser beam in air
  Mr ZUCCO, Mr PISANI, Mrs ASTRUA - INRIM / Italy

NANOTECHNOLOGY...

- Thermal characterisation of thin as a function of temperature by modulated photothermal radiometry
  Mrs FLEURENCE, Mr HAY, Mrs FOULON - LNE / France

- Toward the harmonisation of physical-chemical protocols for nanomedicine characterisation: Zeta potential measurements
  Mrs VARENNE, Mr BOTTON, Mrs MERLET, Mrs VAUTHIER - University Paris Sud / France
... NANOTECHNOLOGY

- Estimation of the measurement uncertainty of LNE’s metrological atomic force microscope using virtual instrument modeling and Monte Carlo method
  Mr CERIA - LNE / France
- Last advances in the development of the LNE metrological atomic force microscope
  Mr DUCOURTIEUX, Mr BOUKELLAL - LNE / France
- Integration of a new position sensor based on four quadrant fiber optic bundle to measure the cantilever deflections in atomic force microscopy head
  Mr BOUKELLAL - LNE / France

ELECTRICITY

- Traceable power measurement of LTE signals for the non-ionising radiation
  Mr SOUMYA, Mr PYTHOUD - METAS, Mr LEUCHTMANN, Mr LEUTHOLD - ETHZ / Switzerland
- Automatic uncertainty propagation: application to vector network analyser self-calibration techniques
  Mr ALLAL, Mrs VINCENT-DROUART, Mr LITWIN - LNE / France, Mr HALL - MSL / New-Zealand
- Evaluation of the measurement capabilities of high performance commercial resistance bridge by comparison with two validated measurement methods
  Mr GALLIANA, Mr CAPRA, Mr GASPAROTTO - INRiM / Italy
- Programmable source for DC voltage ratio calibration of DVMs
  Mr CERRI, Mr SOSSO, Mr CAPRA, Mr RONCA GLIONE - INRiM / Italy
- High level comparison on a high performance multifonction calibrator between INRiM and an accredited electrical calibration laboratory
  Mr CAPRA, Mr GALLIANA, Mr LANZILLOTTI, Mr LA PAGLIA - INRiM, Mr MOTTA - ARO FLUKE / Italy
- Measurement of antenna parameters under a controlled temperature
  Mr LE SAGE, Mr LERAT - LNE / France
- Traceability of line impedance stabilisation network
  Mr ZIADÉ, Mr POLÉTAEFF - LNE / France, Mr KOKALJ, Mr PINTER - SIQ / Slovenia

THERMAL...

- Moisture determination for food quality assessment
  Mrs ROLLE, Mr BELTRAMINO, Mr FERNICOLA, Mrs SEGA, Mr VERDOJA - INRiM / Italy
- Good practices for the implementation of surface temperature measurements
  Mr FAVREAU, Mr GEORGIN, Mr SAVANIER - CETIAT / France
POSTER - 11:15 to 12:45

... THERMAL

- First steps in development of a new transfer standard, for moisture measurement, based on radio-frequency wave and micro-wave
  Mr GEORGIN, Mr ROCHAS - CETIAT, Mr SABOUROUX - University Aix Marseille / France

- Implementation of qualification benches according to NFX 15-113
  Mr GEORGIN, Mr FAVREAU - CETIAT / France

- Emissivity and spectral band related errors in the calibration of industrial pyrometers using transfer blackbody sources
  Mrs KOZLOVA - LCM LNE-CNAM / France & all

- PID control parameters optimisation for temperature calibration laboratory
  Mr VOLDAN, Mr STRNAD - CMI / Czech Republic

- Traceable radiation thermometer calibration to ITS-90 above the silver point at the NPL
  Mr LOWE, Mr MACHIN - NPL / United Kingdom

- Reduction of uncertainties of calibration in the air using a case of thermal equalisation
  Mr REIFENBERG, Mr RIOUT, Mr LEROY - EFS Pyrénées-Méditerranée / France

- Aspects regarding the realisation of the triple point of Argon
  Mr DINU, Mr NEAGU - National Institute of Metrology / Romania

- Metrology for humidity at high temperatures and transient conditions
  Mr HEINONEN - MIKES / Finland & all

- Development of new traceable European capabilities in thermal metrology
  Mr FILTZ - LNE / France & all

TIME / FREQUENCY

- Precision quantum devices of generation, modulation and detection of the laser radiation
  Mr NEYEZHMAKOV, Mr KRAVCENKO - National Scientific Centre / Ukraine

- Link between local time scale UTC(OP) by GPS TAIP3 common-views
  Mr ROVERA, Mr CHUPIN, Mr ABGRALL, Mr UHRICH - LNE-SYRTE / France

- FIRST-TF: a cluster of excellence in Time & Frequency metrology
  Mr DIMARCQ - LNE-SYRTE / France & all

- Oscillator stability of an artifact applied to interlaboratory comparisons SIBRATEC-TIC
  Mrs FOIATTO, Mr PINTO, Mr AVILA, Mr MIANES - LABELO-PUCRS / Brazil
... The CFM is a major meeting place for technical exchanges in the field of Metrology.

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LOCATION OF THE CONGRESS

PARIS EXPO PORTE DE VERSAILLES - Pavillon 4
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LANGUAGES SEMINAR

All presentations will be held in French or English and will be simultaneously translated.

HOTELS

Information on www.metrologie2015.com, link « Accomodation ». 
FEES
Congress fees include:
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• seminar proceedings,
• access to the exhibition,
• catalogue of the exhibition,
• coffee breaks, cocktails and lunches on September 22, 23 and 24,
• one technical visit.

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CANCELLATIONS
Cancellations must be sent to the General Secretary before August 31, 2015. The seminar fee payment will then be returned by bank transfer after the congress with a deduction of 120€ for administration costs. Cancellations received after August 31, 2015 will not be refunded.

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**EVENTS EXHIBITIONS**

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**TECHNICAL VISIT**

- OBSERVATOIRE: Tuesday 22, afternoon
- SOPEMEA: Wednesday 23, afternoon
- LINE Photonics: Thursday 24, morning

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**SESSIONS**

I'm interested by the following sessions or Round tables:

- Observation
- Sopema
- Line Photonics

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**PRICES** (including TVA 20%)

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