

## 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 SEGA, 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 CHAUDAUDRA - 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 OGHEARD - 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  
 With: Mr BARHAM - NPL / UK, Mr DEBAR - ISOLAB / France, Mr GAUDEMER - LNE / France

11:05  11:35

## SESSION METROLOGY 4.0

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

11:35 ■ ..... ■ 12:50

Additive manufacturing  
 Mr JURRENS - NIST (USA)

Metrology and Industrie 4.0  
 Mr STENGER - PTB (Germany)

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 ■ Evaluation of the measurement capabilities of high performance commercial resistance bridge by comparison with two validated measurement methods  
Mr CAPRA, Mr GALLIANA, Mr GASPAROTTO - 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 KÜPARSEPP, 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





## OUTSOURCING THE METROLOGY: DREAM OR REALITY?

**15:30** ■ 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?

Animation: Mr LARQUIER - BEA Métrologie / France

**17:30** ■ With: Mr DAUBENFELD - PSA Automobiles / France, Mr KAYLOR - KEYSIGHT / USA, Mr LAURICHESSE - AQMO / France, Mr MARSDEN - ROLLS ROYCE / UK, Mr PLANCHON - ARM / France, Mr RICHARD - TRESICAL / France, Mr VASTY - A+ Métrologie / France

## INDUSTRIAL NEEDS ANALYSIS AND THERMAL METROLOGY OF MATERIALS

### WORKSHOP

**15:00** ■ ..... ■ **17:30**

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 KARADÖCE - 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 DRUNI - 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 MECHELLATI - 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



POSTER - 13:45 to 15:15

**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 radiiodine effective dose estimation in nuclear medicine  
Mrs ZBRAVESKA KOCODSKA, Mr MAJSTOROV - University of Skopje / Republic of Macedonia, Mr STASIC 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 BEVERMANN - University of Aachen / Germany
- Determination of  $^{90}\text{Sr}$  by measuring  $^{90}\text{Y}$  Cerenkov counting  
Mr VISETPOTJANAKIT - Office of Atoms for Peace / Thailand
- Testing wirelessly-monitored thermometers for improved patient safety  
Mrs VELTCEVA, Mrs ALSTON - NPL, Mrs GALLEGRO - Isansys Lifecare / United Kingdom

**GENERAL**

- Estimation of economic feasibility of development of national measurement standards  
Mr NEYZHMAKOV, 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 HÉGRON - CT2M / France
- Diagnosis metrology in the food-processing industry  
Mr LEBLOIS - COMMA Consulting / France
- Determining coagulation time of milk using an ultrasonic technique  
Mr BERRA - 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