

A celebration of 150 years of the Metre Convention

20-22 May 2025

Provisional Agenda



WORLD METROLOGY DAY SYMPOSIUM 150 YEARS OF THE METRE CONVENTION: SCIENCE, INNOVATION & GLOBAL IMPACT

Tuesday 20 May 2025, 10:00 to 17:15 (CEST/Paris time)
UNESCO Headquarters, Room I, Paris, France

Every year, World Metrology Day is celebrated in around 50 countries by national metrology institutes, legal metrology entities, regional metrology organizations, and other stakeholders who rely on accurate measurements to underpin business, global trade, and sustainable development. It commemorates the anniversary of the signing of the Metre Convention (Paris, 1875) and the creation of the International Bureau of Weights and Measures (BIPM).

Recognizing the significance of metrology, the 42nd Session of the UNESCO General Conference (42 C/Resolution 21) proclaimed 20 May of every year as World Metrology Day. In 2024, World Metrology Day was observed for the first time as an international day designated by UNESCO.

20 May 2025 will mark the **150th anniversary** of the Metre Convention—an especially notable World Metrology Day. To celebrate, an event hosted at UNESCO Headquarters will bring together Permanent Delegations to UNESCO, representatives of the BIPM's Member States and Associates, international organizations, scientists, students, and the general public, highlighting 150 years of metrology and the unique international collaboration under the Metre Convention.

Objectives

1. Celebrate 150 years of the Metre Convention and its impact on science and innovation.
 2. Highlight the importance of accurate measurement for global trade, sustainable development, and scientific collaboration.
 3. Explore emerging challenges and future directions in metrology and its role in addressing the Sustainable Development Goals (SDGs).
 4. Foster multilateral dialogue among policymakers, scientists, and international organizations on capacity building and innovation in metrology.
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Registration opens - 08:30
First session - 10:00 - 11:15

Opening Session

10:00 - 10:05 **Opening**

Video, 150 years of the Metre Convention

Welcome by the Master of Ceremonies

- **Ms Georja Calvin-Smith**, Journalist, France

10:05 - 10:30 **High-Level Opening Remarks**

- **Minister for Europe and Foreign Affairs or Economy**, France **TBC**
- **Ms Lidia Brito**, Assistant Director-General for Natural Sciences, UNESCO **TBC**
- **H.E. Mr Askar Abdrakhmanov**, Ambassador, Permanent Delegate of the Republic of Kazakhstan to UNESCO **TBC**
- **Dr Wynand Louw**, President, CIPM - International Committee for Weights and Measures, South Africa
- **Dr Bobjoseph Mathew**, President, CIML - International Committee for Legal Metrology, Switzerland

10:30 - 11:15

Keynote Address

The SI - a tool for all mankind

Prof. William D. Phillips, Nobel Prize laureate 1997
NIST - National Institute of Standards and Technology, USA

Second session - 11:15 - 12:45

Panel Discussion

Navigating the Future of Metrology: Addressing Scientific and Technical Multilateralism Challenges

Video, introducing the session

Opening remarks by Moderator

- **Dr Maguelonne Chambon**, Director R&D, LNE - Laboratoire national de métrologie et d'essais, France

Panel Discussion

- **Mr Shaofeng Hu**, Director, Division of Science Policy and Basic Sciences, Natural Sciences Sector, UNESCO
- **Prof. Alessandro de Angelis**, Scientific Attaché at the Permanent Delegation of Italy to the International Organisations in Paris
- **Mr Mario Maniewicz**, Director, Radiocommunication Bureau, ITU - International Telecommunication Union
- **Prof. Mustafa Çetintaş**, Director, TÜBİTAK UME - National Metrology Institute of Türkiye
- **Dr Sharonmae Smith-Walker**, CEO, CARICOM - Regional Organisation for Standards and Quality, Jamaica
- **Dr Victoria Coleman**, NMIA - National Measurement Institute, Australia

12:45 - 14:00 **Lunch**

Third session - 14:00 - 15:15

150 years of international use of the Metric System

Video, introducing the session

Opening remarks by Moderator

- **Dr Fabienne Casoli**, President, PSL - Paris Observatory, France

Keynote address

From the Metric System to the Metre Convention

Prof. Ken Alder, Professor of History and author of “The Measure of All Things”

Northwestern University, USA

Speech “The historic contribution of China to measurement science”

- **Dr Yuning Duan**, Former CIPM member, NIM - National Institute of Metrology, China

Speech “150 years in fifteen photographs”

- **Dr Martin Milton**, Director of the BIPM

15:15 - 15:45 **Coffee/Tea**

Fourth session - 15:45 - 17:15

Panel Discussion

Future challenges for global metrology

Video, introducing the session

Opening remarks by Moderator

- **Ms Georja Calvin-Smith**, Journalist, France

Scene setting address “Expanding the horizon of metrology to chemistry, biology and beyond”

- **Prof. Willie E. May**, Vice President, Research and Economic Development & Professor of Chemistry, Morgan State University, USA

Scene setting address “Metrology as a driver for the industrial revolution”

- **Dr Nathalie von Siemens**, Member of the Advisory Board, PTB - Physikalisch-Technische Bundesanstalt, Germany

Panel Discussion

including **Prof. May** and **Dr von Siemens** with:

- **Dr Pascale Defraigne**, Time and Frequency Service, Royal Observatory of Belgium
- **Prof. Venu Gopal Achanta**, NPLI - National Physical Laboratory of India
- **Dr Henry Rotich**, KEBS - Kenya Bureau of Standards

17:00 - 17:10

Closing Note

- **Dr Takashi Usuda**, CIPM Secretary, Japan

17:10 - 17:15

Closing Remarks

- **Mr Shaofeng Hu**, Director, Division of Science Policy and Basic Sciences, Natural Sciences Sector, UNESCO
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Session 1 - 09:00 - 10:45

Metrology in the quantum era

The revision of the SI in 2019 and the progress of quantum technologies are enabling the development and implementation of quantum standards for an ever-increasing range of metrological applications. Quantum metrology relies on quantum effects to enhance precision and resolution in measurement beyond what would be possible with classical physics. Quantum metrology also provides the means to create inherent quantum standards – that do not require calibration – and that can be direct realizations of the units of the SI, based on fundamental constants. Such standards may allow access to primary realizations to users outside the National Metrology Institutes.

Convenor: Dr Michael Stock, BIPM

09:10

Ms Barbara Goldstein, NIST - National Institute of Standards and Technology, USA
The interplay between quantum, metrology and technology

09:35

Prof. Lixing You, Shanghai Institute of Microsystem and Information Technology, China
Superconducting photon detector: from quantum information processing to metrology

10:00

Panel discussion

Moderator: **Prof. Jan-Theodoor Janssen**, CIPM member, UK

Panelists: **Ms Goldstein** and **Prof. You**

Dr Jifeng Qu, NIM - National Institute of Metrology, China

Dr Nicolas Spethmann, PTB - Physikalisch-Technische Bundesanstalt, Germany

10:45 - 11:15 **Coffee**

Session 2 - 11:15 - 13:00

Metrology for climate science

Accurate measurement is the basis for scientific knowledge on climate science, its impacts and future risks. This session is devoted to the application of metrology to global climate and environment challenges. It will focus on initiatives taken since the BIPM-WMO Workshop on “Metrology for Climate Action” developed a consensus on recommendations to increase the impact of metrology and metrology institutions on climate.

Convenor: Dr Robert Wielgosz, BIPM

11:20

Dr Oksana Tarasova, WMO - World Meteorological Organization
Development of a Global Observation System for GHG emissions

11:45

Mr Mahesh Kumar Sha, BIRA-ISAB - Royal Belgian Institute for Space Aeronomy
Fiducial Reference Measurement for GHG

12:10

Panel discussion

Moderator: Dr Dolores del Campo Maldonado, CIPM member, Spain

Panelists: Dr Tarasova and Mr Sha

Dr Leonard Rivier, ICOS - Integrated Carbon Observation System

Dr Sangil Lee, KRISS - Korea Research Institute of Standards and Science

13:00 - 14:15 **Lunch**

Session 3 - 14:15 - 16:00

The FAIR digital revolution

In its long-term strategy, the CIPM has highlighted “digital transformation” as one of the key challenges for the coming decades. Indeed, the world is becoming increasingly digital with the emergence of Industry 5.0 based on the *Internet of Things* involving the rapid exchange of data from machine to machine. This is creating a growing need for interoperability and traceability of measurement data, in line with the FAIR principles. This traceability will be based on the SI digital framework and will be disseminated to all applications via NMI data services.

Convenor: Dr Vincent Gressier, BIPM

14:20

Dr Barend Mons, Leiden University, the Netherlands
Stop Data Sharing...

14:45

Dr Mark Allen, Strasbourg Astronomical Data Centre, France
FAIR digital data in astrophysics

15:10

Panel discussion

Moderator: Prof. Cornelia Denz, CIPM member, Germany

Panelists: Dr Mons and Dr Allen

Dr Peter Thompson, NPL - National Physical Laboratory, UK

Prof. Venu Gopal Achanta, NPLI - National Physical Laboratory of India

16:00 - 16:30 Tea

Poster Session - 16:30 to 17:45

Convenor: Dr Edgar Flores Jardines, BIPM

1. *The 'light fingerprint' of rubidium for precise atomic clocks*
Ms Dorothy Mringie, State Department of Trade, Kenya
 2. *Isotopic measurements for energy transition to low-carbon fuels*
Dr Kai Fuu Ming, NMC, A*STAR - National Metrology Centre, Agency for Science, Technology and Research, Singapore
 3. *Standardisation of measurements of neurodegenerative disease biomarkers: the neurobiostand project*
Dr Chiara Giangrande, LNE - Laboratoire national de métrologie et d'essais, France
 4. *Transforming food and water safety with innovative nanoscale plastic reference materials*
Dr Adrian Pegoraro, NRC - National Research Council of Canada
 5. *Collaborative metrology efforts for sustainable energy solutions in the Asia-Pacific*
Dr Oijai Ongrai, NIMT - National Institute of Metrology (Thailand)
 6. *Enabling the recycling of technology critical elements from e-waste through metrology*
Dr Sarah Hill, LGC Limited, UK
 7. *On the path to quality assurance of trustworthy AI in medicine: the metric-framework for systematically assessing medical training and test data*
Dr Daniel Schwabe, PTB - Physikalisch-Technische Bundesanstalt, Germany
 8. *Towards an easier realisation of the ohm with the quantum anomalous Hall effect*
Dr Martina Marzano, INRIM - Istituto Nazionale di Ricerca Metrologica, Italy
 9. *Building the next generation of metrologists: opportunities to improve SI education and scientific literacy at 150 years and beyond*
Ms Elizabeth Benham, NIST - National Institute of Standards and Technology, USA
 10. *Perceptual Metrology: A Future Frontier in Human Well-Being*
Cristhian Alfredo Paredes Cardona, INM - Instituto Nacional de Metrología, Colombia
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17:45 Reception

Session 4 - 09:00 - 10:45

New science and the definition of the second

The field of time metrology has always advanced rapidly based on the outcomes of leading-edge research into the performance of atomic clocks. Since 1967, the definition of the SI second has relied on quantum physics and is based on the caesium atom resonance frequency in the microwave domain. The capabilities of optical clocks have now surpassed the current performance of caesium, leading to debates initiated by the CCTF on a new definition based on optical frequency standards. Researchers are also exploring clocks based on nuclear transitions. This session will feature some of the latest advances made in the precision of optical clocks and the techniques for their comparison that offer the possibility for a new definition for the second.

Convenor: Dr Patrizia Tavella, BIPM

09:05

Prof. Hidetoshi Katori, University of Tokyo, Japan

Optical lattice clocks: From curiosity-driven science to future applications

09:30

Dr Marina Gertszov, NRC - National Research Council of Canada

The CCTF roadmap to the redefinition of the second

10:00

Panel discussion

Moderator: Dr Noël Dimarcq, CIPM member, France

Panelists: Prof. Katori and Dr Gertszov

Prof. William D. Phillips, NIST - National Institute of Standards and Technology, USA

10:45 - 11:15 **Coffee**

Session 5 - 11:15 - 13:00

Future revolutions - measuring for the life sciences

The final two sessions will showcase several exceptional opportunities for new metrology and new applications for metrology. These are based on the outcomes of leading-edge research and will present many challenges to the way we think about metrology in the future.

Convenor: Dr Anna Cypionka, BIPM

11:20

TBC (TBC)

TBC

11:45

Dr Renee Ruhaak, Leiden University Medical Center, the Netherlands

Personalized medicine - for improved patient care

12:15

Panel discussion

Moderator: Ms Georgette Macdonald, CIPM member, Canada

Panelists: TBC and Dr Ruhaak

Prof. Willie E. May, Morgan State University, USA

TBC

13:00 - 14:15 **Lunch**

Session 6 - 14:15 - 16:00

Future revolutions - metrology in space

Convenor: Dr Anna Cypionka, BIPM

14:20

Dr Luca Stringhetti, SKA Observatory

Precision at Cosmic Scales: future Metrology through the Square Kilometre Array telescope

14:45

Ms Cheryl Gramling, NASA Goddard Space Flight Center, USA

The Moon and beyond: measurements to navigate the solar system

15:10

TBC, TBC

Closing speech

15:35

Questions from the floor

Moderator: Ms Georgette Macdonald, CIPM member, Canada

Closing remarks

15:50 - 16:00 **Close of the conference**