

A celebration of 150 years of the Metre Convention

20-22 May 2025

Provisional Agenda



Opening Session - 09:30 - 10:45

Opening Speeches

After some opening remarks from UNESCO, the session will start with speeches by the Permanent Delegations to UNESCO of a number of the Member States of the BIPM.

These speeches will welcome the recognition of World Metrology Day by the UNESCO General Conference in 2023.

- Video introduction to the event
- Introduction: Master of Ceremonies - **Georja Calvin-Smith**, Master of Ceremonies
- Opening Speech 1: Minister of Foreign Affairs, France
- Opening Speech 2: **TBC**, UNESCO Representative
- Speech by the Permanent Delegation
- *The Metre Convention of 1875 - an act of multilateral scientific collaboration -* **Wynand Louw** (South Africa), President of the International Committee for Weights and Measures (CIPM)
- *Reply -* **Bob Joseph Mathew** (Switzerland), President of the International Committee for Legal Metrology (CIML)
- *The SI - a tool for all mankind -* **William D. Phillips** (NIST, USA) Nobel Prize for Physics in 1997

The first session will close with a video of short tributes from the Heads of International Organizations (IOs) that work in liaison with the BIPM including:

- International Atomic Energy Agency (IAEA)
- International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)
- International Telecommunication Union (ITU)
- World Meteorological Organization (WMO)

10:45 Coffee break

Second session - 11:15 - 12:45

Panel Discussion: Future challenges for scientific and technical multilateralism, where next for the BIPM and world metrology?

This session will discuss future opportunities for the BIPM and world metrology in the context of the **UNESCO International Decade of Sciences for Sustainable Development, 2024–2033**.

There will be a series of 10-minute insight talks – then a moderated panel discussion

- Video introduction to the session
- Introduction of the panel - **Georja Calvin-Smith**, Master of Ceremonies

Moderator introduction of panel: **TBC**

Opening Statements

1. *International Decade for Science for Sustainable Development* - **TBC**
2. *Science diplomacy – a national case study* - **Alessandro de Angelis** (Scientific Counsellor, Permanent Representation of Italy to the International Organizations in Paris)
3. *Challenges and opportunities for scientific multilateralism* - **Mario Maniewicz** (Director of the Radiocommunication Bureau (BR) at the International Telecommunication Union (ITU))
4. *Building global capacity for a future metrology system* - **Mustafa Çetintaş** (Director, TÜBİTAK UME (Türkiye))
5. *Capacity building in metrology in small island developing states* - **Sharonmae Smith-Walker** (CEO of the CARICOM Regional Organisation for Standards and Quality)

Panel Discussion

Questions from the floor

12:45 Lunch

Third session - 14:00 - 15:15

150 years of international use of the Metric System

Chaired by TBC.

Today's event was triggered by the decision of 17 States in 1875 to sign the Metre Convention which established the BIPM, one of the world's first international organizations. Since that time, huge steps have been taken to develop the Metric System to address the challenges of today's technologies and citizens.

Video introduction to session

- *150 years in fifteen photographs* - **Martin Milton** (BIPM Director)
- *From the Metric System to the Metre Convention* - **Ken Alder** (Northwestern Univ., USA) Professor of History and author of "The Measure of All Things"
- *The historic contribution of China to measurement science* - **Yuning Duan**
- *The challenge of achieving global participation in the Metre Convention* - **Victoria Coleman** (Section Manager, Nanometrology National Measurement Institute, NMIA (Australia))

Questions from the floor

15:15 Tea break

Fourth session - 15:45 - 17:15

Speeches and Panel Discussion: Future challenges for global metrology

Chaired by **Takashi Usuda** (Japan), Secretary of the International Committee for Weights and Measures (CIPM).

The final session will open with a video of short tributes from former CIPM Presidents and Honorary BIPM Directors. These will be followed by invited talks from global experts on the status of the world measurement system.

- Video introduction to session
- *Expanding the horizon of metrology to chemistry, biology and beyond* - **Willie E. May** (AAAS, USA)

Panel Discussion

- Introduction by Moderator - **Georja Calvin-Smith**
- *UTC - a future timescale for all the world for all time* - **Pascale Defraigne** (Royal Observatory of Belgium)
- *Metrology as a driver for the industrial revolution* - **Nathalie von Siemens**
- *Future challenges for metrology in Asia* - **Venu Gopal Achanta** (Director, NPLI (India))
- *Future challenges for metrology in Africa* - **Henry Rotich** (Director, KEBS (Kenya))
- Wrap-up **Georja Calvin-Smith**, Master of Ceremonies

Closing remarks

- Speech by UNESCO Representative
- Speech by the CIPM Secretary - **Takashi Usuda**
- Closing video

21-22 May 2025
Palais des Congrès, Versailles



From units to the universe – future revolutions in metrology

This two-day conference is organized in Versailles in conjunction with other events in Paris to mark the 150th anniversary of the signing of the Metre Convention on 20 May 2025.

The conference includes presentations from key stakeholders for world metrology and round-table discussions to allow an open exchange of ideas on the topics chosen to relate to the main outcomes of the CIPM Strategy 2030+.

The conference will include an open poster session.

Each day will follow a different theme.

Day 1 theme

New opportunities from horizontal themes in metrology

The first day of the conference will include sessions covering the three areas identified by the CIPM as benefitting from new “horizontal” coordination.

Day 2 theme

Metrology for future science

The second day of the conference will start with an opportunity to explore the options for a future new definition of the second in greater detail and will then conclude with a session that highlights exceptional new opportunities and applications for metrology.

New opportunities from horizontal themes in metrology

Opening of the conference 09:00 - 09:05

Session 1 - 09:05 - 10:45

Metrology in the quantum era

Speakers

- **Lixing You** (Shanghai Institute of Microsystem and Information Technology) *Superconducting photon detector: from quantum information processing to metrology*
- **Barbara Goldstein** (NIST) *The interplay between quantum, metrology and technology*

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.

Questions for the round-table session will include:

- *What is the future role of NMIs in a world with widely distributed quantum standards (NMI on a chip)?*
- *What metrology capability will be needed to support the further development of quantum standards?*

10:45 - 11:15 Coffee

New opportunities from horizontal themes in metrology

Session 2 - 11:15 - 13:00

Metrology for climate action

Speakers

- **Gianpaolo Balsamo** (WMO) *Development of a Global Observation system for GHG Emissions*
- **Mahesh Kumar Sha** (Royal Belgian Institute for Space Aeronomy) *Fiducial Reference Measurement for GHG*

Accurate measurement is the basis for scientific knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place. 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.

Questions for the round-table session will include:

- *How can metrology support the actions at the UNFCCC Conference of Parties (COP)?*
- *How can a Global Greenhouse Gas measurement system support mitigation actions?*
- *How can accurate measurements from space increase our knowledge of climate change and options for adaptation?*

13:00 - 14:15 Lunch

New opportunities from horizontal themes in metrology

Session 3 - 14:15 - 16:00

The FAIR digital revolution

Speakers

- **Barend Mons** (Leiden University) *Stop Data Sharing...*
- **Mark Allen** (Strasbourg Astronomical Data Centre (CDS)) *FAIR digital data in Astrophysics*

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.

Questions for the round-table session will include:

- *What role will SI units (and the SI Digital Framework) play in the Internet of Things, and in the ongoing digital revolution?*
- *How can we move towards establishing a reliable digital traceability chain?*

16:00 - 16:30 Tea

Poster session - 16:30 - 17:45

Metrology for future science

Session 4 - 09:00 - 10:45

New science and the definition of the second

Speakers

- **Hidetoshi Katori** (University of Tokyo) *Optical lattice clocks: From curiosity-driven science to future applications*
- **Marina Gertszov** (NRC) *The CCTF roadmap to the redefinition 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, optical and now, nuclear, clocks. This session will feature some of the latest advances made in the precision of optical clocks and the techniques for their comparison that now offer the possibility to agree a new definition for the second.

The CCTF has initiated debate on a new definition for the second based on the frequency of more than one atom or ion.

The key question to be discussed in the round-table session will be:

- *When might a new definition for the second be agreed and what will be the preferred basis for it?*

Round table:

- **Christophe Salomon** (LKB and French Academy of Sciences)
- **William D. Phillips** (NIST)

10:45 - 11:15 Coffee

Metrology for future science

Session 5a - 11:15 - 12:45

Future revolutions - measuring for the life sciences

The final session 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.

The session will end with an open Q&A.

Speakers

- **Marco Durante** (GSI Helmholtzzentrum für Schwerionenforschung) *Range uncertainty in particle therapy*
- **Renee Ruhaak** (Associate Professor, Leiden University Medical Center) *Personalized medicine - for improved patient care*

Session 5b - 14:00 - 15:15

Future revolutions (continued)

Speakers

- **Luca Stringhetti** (SKA Observatory) *Precision at Cosmic Scales: future Metrology through the Square Kilometre Array telescope*
- **Second speaker to be confirmed**

12:45 - 14:00 Lunch

15:15 - 15:30 Close of the conference