The Metre Convention and the BIPM

Dr. Martin Milton, Director of the BIPM
The Metre Convention and its structure
The Metre Convention and the SI

- **20 May 1875** - The Metre Convention was signed in Paris by 17 nations. It established the BIPM which is a permanent organizational structure for member governments to act in common accord on all matters relating to units of measurement.

- **1889** - the international prototypes for the metre and the kilogram, together with the astronomical second as unit of time, create the first international system of units.

- **1954** - the ampere, kelvin and candela are added as base units.

- **1960** - the unit system is named as the International System of Units (SI)

- **1971** - the mole is added as the unit for amount of substance, bringing the total number of base units to seven.
BIPM

Headquartered in Paris, France and financed by supporting governments.

Maintains scientific laboratories in areas of: mass, time, electricity, ionizing radiation, and chemistry.

CIPM

Made up of eighteen individuals, different nationalities.

Meets annually to promote worldwide uniformity in units of measurement.

Is the management board for the BIPM

CGPM

Made up of representatives from Member States.

Meets in Paris typically every four years to discuss the status of international metrology.
The BIPM

It has **headquarters** near Paris, France. It is **financed** jointly by the Member States and Associates, and operates under the exclusive **supervision** of the CIPM.

Its **mandate** is to provide the basis for a single, coherent system of measurements throughout the world, traceable to the International System of Units (SI). This task takes many forms, from **direct dissemination** of units (as in the case of mass and time) to coordination through **international comparisons** of national measurement standards (as in length, electricity and ionizing radiation).

It maintains **laboratories** in areas of: mass, time, electricity, ionizing radiation, and chemistry.

It has an international **staff** of around 75.

Its **budget** for 2012 is around thirteen million euros.
The Pavillon de Breteuil when given to the BIPM in 1870
Bureau International Des Poids Et Mesures

The Pavillon de Breteuil today
The role of the BIPM scientific programme is:

- promote worldwide compatibility of measurements traceable to the SI by providing calibrations and facilitating comparisons of measurement standards
- perform measurement science research directed at updating the SI as per the needs of society.

Current BIPM scientific programmes:
- Mass
- Time
- Electricity
- Ionizing Radiation
- Chemistry
The CIPM Consultative Committees

**CCAUV**  Consultative Committee for *Acoustics, Ultrasound and Vibration*

**CCEM**  Consultative Committee for *Electricity and Magnetism*

**CCL**  Consultative Committee for *Length*

**CCM**  Consultative Committee for *Mass and Related Quantities*

**CCPR**  Consultative Committee for *Photometry and Radiometry*

**CCQM**  Consultative Committee for *Amount of Substance (Chemistry)*

**CCRI**  Consultative Committee for *Ionizing Radiation*

**CCT**  Consultative Committee for *Thermometry*

**CCTF**  Consultative Committee for *Time and Frequency*

**CCU**  Consultative Committee for *Units*
In 1999, and in support of world trade, the CIPM established a Mutual Recognition Arrangement (MRA) of national measurement standards and of calibration and measurement certificates issued by NMIs. The aim of the CIPM MRA is to provide the technical basis for the worldwide acceptance of national measurement standards and calibration and measurement certificates of NMIs.

Currently, CIPM MRA participants comprise of:

- 52 Member States of the BIPM,
- 4 International Organizations (IAEA, IRMM, WMO and ESA), and
- 36 States/Economies that are Associates of the CGPM.

Participating NMIs meeting this criteria:

- have implemented quality/management systems that govern their deliver of services (ISO/IEC 17025 or ISO Guide 34).
- have their calibration and measurement capabilities (CMCs) peer reviewed and publicly declared in the BIPM
- take part in key comparisons that validate their technical proficiency
The CIPM MRA has now been signed by the representatives of 92 institutes – from 52 Member States, 36 Associates of the CGPM, and 4 international organizations* – and covers a further 146 institutes designated by the signatory bodies.

### CIPM MRA Participation

**Member States**
- Argentina
- Australia
- Austria
- Belgium
- Brazil
- Bulgaria
- Canada
- Chile
- China
- Colombia
- Croatia
- Czech Republic
- Denmark
- Democratic Republic
- Egypt
- Finland
- France
- Germany
- Greece
- Hungary
- India
- Indonesia
- Iran (Islamic Republic of)
- Ireland
- Israel
- Italy
- Japan
- Kazakhstan
- Kenya
- Malaysia
- Mexico
- Netherlands
- New Zealand
- Norway
- Pakistan
- Poland
- Portugal
- Republic of Korea
- Romania
- Russian Federation
- Saudi Arabia
- Serbia
- Singapore
- Slovakia
- South Africa
- Spain
- Sweden
- Switzerland
- Thailand
- Tunisia
- Turkey
- United Kingdom of Great Britain and Northern Ireland
- United States of America
- Uruguay
- Venezuela (Bolivarian Republic of)

* IAEA, IRMM, WMO, ESA

**Associates of the CGPM**
- Albania
- Bangladesh
- Belarus
- Bolivia (Plurinational State of)
- Bosnia and Herzegovina
- Botswana
- CARICOM
- Chinese Taipei
- Costa Rica
- Cuba
- Ecuador
- Estonia
- Georgia
- Ghana
- Hong Kong (China)
- Jamaica
- Latvia
- Lithuania
- Malta
- Mauritius
- Mongolia
- Montenegro
- Namibia
- Panama
- Paraguay
- Peru
- Philippines
- Republic of Moldova
- Seychelles
- Slovenia
- Sri Lanka
- Syrian Arab Republic
- Ukraine
- Viet Nam
- Zambia
- Zimbabwe
Committees of the BIPM and other international organizations, created for particular tasks of common interest.

**JCTLM**  
Joint Committee for Traceability in Laboratory Medicine.

The goal of the JCTLM is to provide a worldwide platform to promote and give guidance on internationally recognized and accepted equivalence of measurements in laboratory medicine and traceability to appropriate measurement standards.

**JCGM**  
Joint Committee for Guides in Metrology.

**BIPM, IEC, IFCC, ILAC, ISO, IUPAC, IUPAP, OIML**

The tasks of the JCGM are to maintain and promote the use of the Guide to the Expression of Uncertainty in Measurement (known as the GUM) and the International Vocabulary of Basic and General Terms in Metrology (known as the VIM).

**DCMAS Network**  
Network on Metrology, Accreditation and Standardization for Developing Countries.