

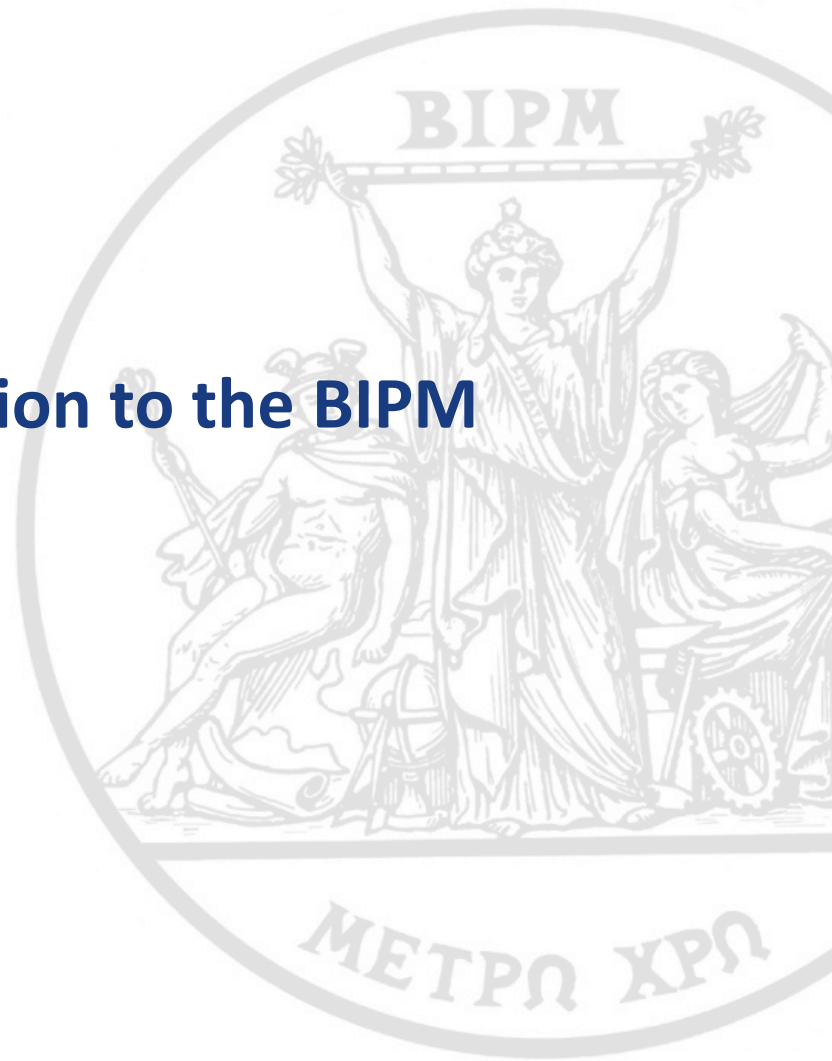
# Welcome and Introduction to the BIPM

Dr Jim McLaren

Secretary of the CIPM

4<sup>th</sup> December 2017

**Bureau**  
♦ **International des**  
♦ **Poids et**  
♦ **Mesures**



# The BIPM: An International Organization for Metrology

*“The BIPM is an intergovernmental organization established by the Metre Convention, through which Member States act together on matters related to measurement science and measurement standards”.*

- **Founded in Paris in 1875 by 17 Member States and based at the *Pavillon de Breteuil* in the Parc de Saint-Cloud Sèvres, France**
- **Now involving about 100 states and economies as Members or Associates.**



# The BIPM – an international organisation

Established in 1875 when 17 States signed the Metre Convention, now with 58 Member States.



## CGPM – Conférence Générale des Poids et Mesures

*Official representatives of Member States.*



## CIPM – Comité International des Poids et Mesures

*Eighteen individuals of different nationalities elected by the CGPM.*



## BIPM – Bureau International des Poids and Mesures

- *International coordination and liaison*
- *Technical coordination – laboratories*
- *Capacity building*

## Consultative Committees (CCs)

*CCAUV – Acoustics, US & Vibration*

*CCEM – Electricity & Magnetism*

*CCL – Length*

*CCM – Mass and related quantities*

*CCPR – Photometry & Radiometry*

*CCQM – Amount of substance*

*CCRI – Ionizing Radiation*

*CCT – Thermometry*

*CCTF – Time & Frequency*

*CCU - Units*

# Consultative Committee for Metrology in Chemistry and Biology (CCQM)

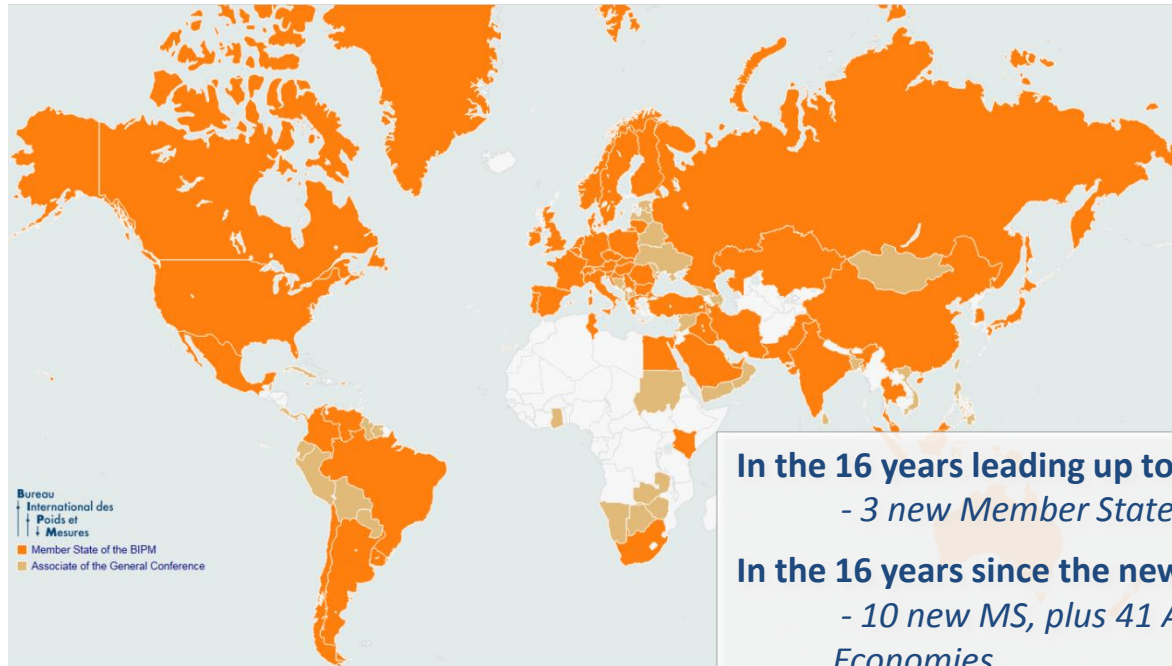
- Established by the CIPM in 1993
- President: W. E. May (CIPM)
- 40 Official member (28) and observer (12) organizations
- 10 Standing Working Groups and 2 *ad hoc* Working Groups
  - Attended by ~ 230+ experts from NMI's and other expert institutes
- Yearly meetings of CCQM plenary, attended by ~70 representatives from Member and Observer Institutes, stakeholder organizations and Guests

**Terms of Reference:** The CCQM is responsible for developing, improving and documenting the equivalence of national reference systems for chemical and biological measurements. It advises the CIPM on matters related to chemical and biological measurements including advice on the BIPM scientific program activities.

# Member States of the BIPM and Associates of the CGPM

- 58 Member States of the BIPM

- 41 Associates States (and Economies) of the CGPM



**In the 16 years leading up to the millennium**

- 3 new Member States

**In the 16 years since the new millennium**

- 10 new MS, plus 41 Associate States and Economies

# Mutual Recognition of Standards from National Metrology Institutes



## CIPM-MRA

### Technical basis for:

- Equivalence of national measurement standards
- Mutual recognition of calibration certificates and measurement results



**BAM** **ERM**

**CERTIFICATE OF ANALYSIS**  
**ERM®-CC014**  
**Polycyclic aromatic hydrocarbons in soil**

Compound	Certified Values	
	Certified value <sup>1</sup>	Uncertainty <sup>1</sup>
Mass fraction in mg/kg		
Naphthalene	1.9	± 0.3
Acenaphthene	0.92	± 0.18
Fluorene	1.23	± 0.14
Phenanthrene	1.5	± 0.3
Anthracene	2.15	± 0.21
Fluoranthene	0.1	± 0.01
Pyrene	1.5	± 0.4
Benzo[a]anthracene	4.15	± 0.4
Chrysene	3.92	± 0.22
Benzo[a]pyrene	0.9	± 0.1
Benzo[b]fluoranthene	2.25	± 0.18
Benzo[k]fluoranthene	4.35	± 0.21
Dibenz[a,h]anthracene	0.99	± 0.09
Benzo[ghi]perylene	3.5	± 0.3
Indeno[1,2,3-cd]pyrene	0.2	± 0.03
Sum of PAHs	30	± 5

<sup>1</sup> The certified values including the sum of PAHs are the means of 11 laboratory means using this certificate. The values are based on the 95 % confidence interval of the data used for calibration using sufficiently pure substances.  
<sup>2</sup> Expanded measured uncertainty is given as coverage factor of stated and, corresponding to a level of confidence of 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM 1995).

**itm** **ERM**

**CERTIFICATE OF ANALYSIS**  
**ERM®-CE278**

Parameter	MUSSEL TISSUE	
	Certified value <sup>1</sup>	Uncertainty <sup>1</sup>
Mass fraction (on dry mass basis)		
As	6.07	0.13
Cd	0.348	0.007
Cr	0.78	0.06
Cu	9.45	0.13
Hg	0.196	0.009
Mn	7.69	0.23
Pb	2.00	0.06
Se	1.04	0.10
Zn	83.1	1.7

<sup>1</sup> Certified values are the mean of 11 data sets (see certification report). Certified values represent total contents. Certified values are traceable to SI by the described method for dry mass correction is applied.  
<sup>2</sup> The certified uncertainty is the half-width of the 95 % confidence interval of the mean defined as 1 s. Factors were chosen according to the distribution depending on the number of accepted data sets and ranged from 2.3 to 3.2.  
 This certificate is valid until 4/2007; this validity may be extended as further evidence of stability becomes available.  
 The minimum sample intake is 400 mg.

# Participation in the CIPM MRA

Reconnaissance mutuelle  
des étalons nationaux de mesure  
et des certificats d'étalonnage et de mesurage  
émis par les laboratoires nationaux de métrologie  
Paris, le 14 octobre 1999  
[Supplément technique certifié en octobre 2003 \(pages 17-20\)](#)



Mutual recognition  
of national measurement standards  
and of calibration and measurement certificates  
issued by national metrology institutes  
Paris, 14 October 1999  
[Excerpt of Supplement certifié in October 2003 \(pages 18-19\)](#)

Comité international des poids et mesures

Bureau  
international  
des poids  
et mesures

Organisation  
internationale  
de la métrologie  
et de la mesure

## 98 National Metrology Institutes

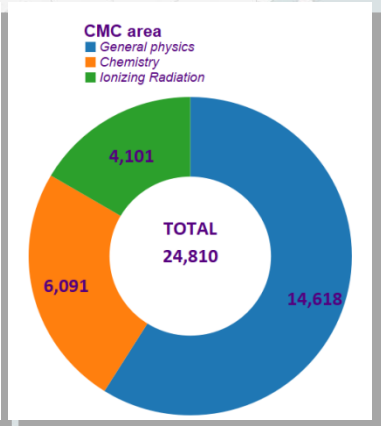
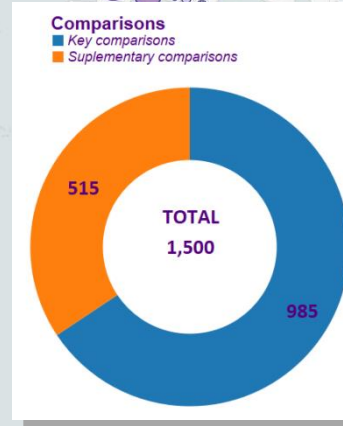
- 57 Member States
- 41 Associates

## 4 International organizations

(ESA, IAEA, JRC, WMO)

## plus 156 Designated Institutes

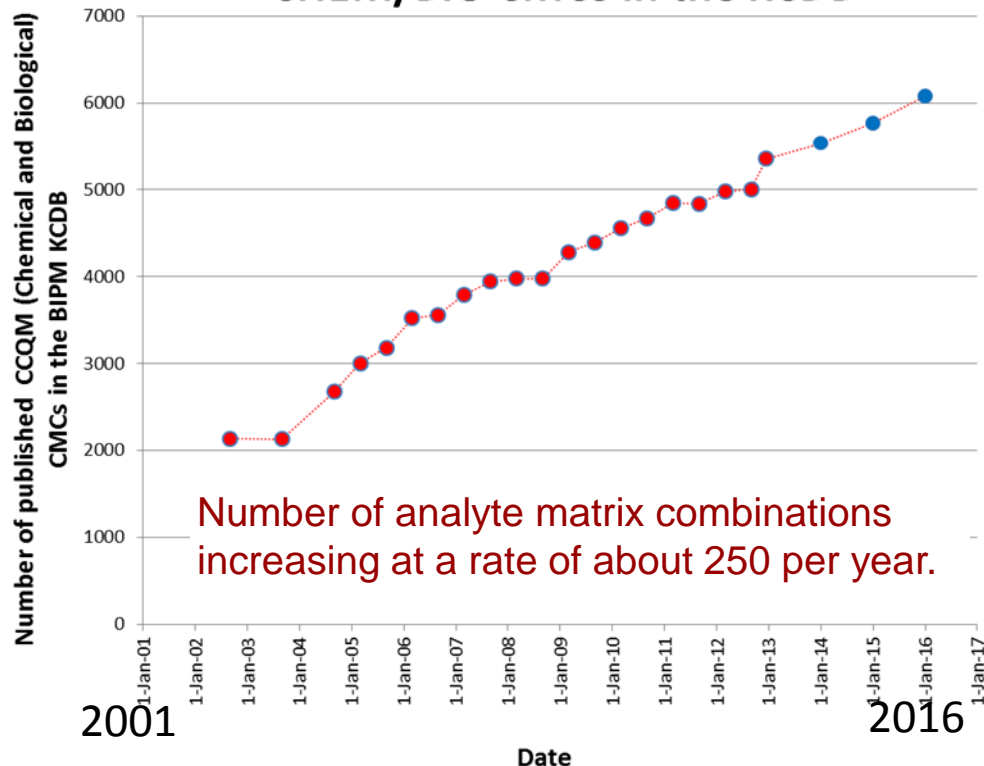
Total: 258 Institutes





# Evolution of Chemical and Biological CMCs

## CHEM/BIO CMCS in the KCDB

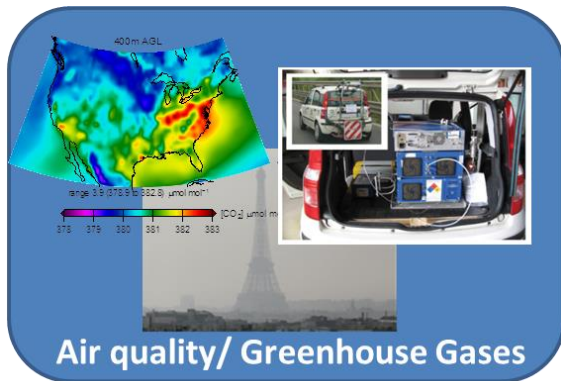


## CCQM Comparisons

- **225 CCQM Key Comparisons** registered in the KCDB database since 1999
- An additional **176 Pilot Studies**



# BIPM Chemical Metrology Department programmes



## International Equivalence of Measurement Standards



### Outreach:

CCQM, NMIs, JCTLM,  
IFCC, ILAC, WMO, WHO,  
IAEA, WADA, ISO, IUPAC,  
CODEX



# Metrology in Chemistry and Biology: International Liaisons 2016/2017



# Metrology for Healthcare: *In vitro* diagnostics, Reference Measurement Systems Database

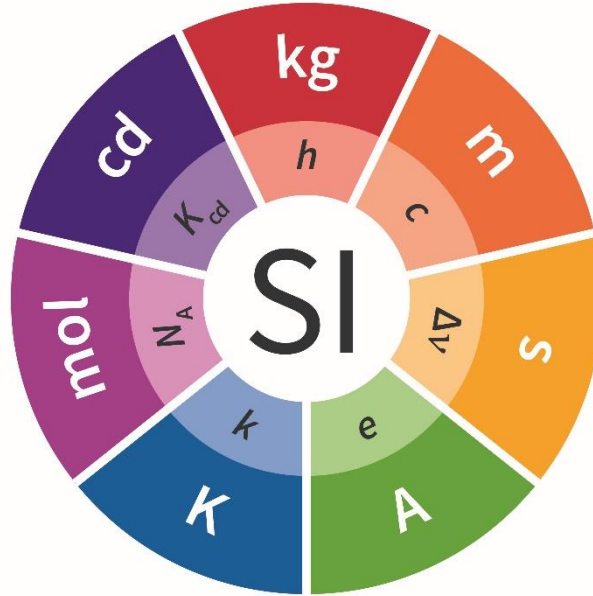


- BIPM is a sponsoring organization of the JCTLM (with IFCC and ILAC)
- BIPM provides the Secretariat for JCTLM
- Maintains the **JCTLM IVD Reference Measurement Systems Database**
- Coordinates the nomination and review process for database entries
- Hosts JCTLM Member and Stakeholder Meetings

## JCTLM Database Contains:

- **293 Certified Reference Materials**
- **184 Reference Methods**
- **161 Reference Measurement Services**

Thank you



**B**ureau  
International des  
Poids et  
Mesures

