

<b>CONTENTS</b>
-----------------

Introduction .....	2
Criteria for membership of the Consultative Committees of the CIPM.....	3
Meetings in 2003.....	4
Consultative Committee for Electricity and Magnetism (CEEM).....	5
Consultative Committee for Photometry and Radiometry (CCPR).....	15
Consultative Committee for Thermometry (CCT).....	19
Consultative Committee for Length (CCL).....	31
Consultative Committee for Time and Frequency (CCTF).....	36
Consultative Committee for Ionizing Radiation (CCRI).....	45
Consultative Committee for Units (CCU).....	53
Consultative Committee for Mass and Related Quantities (CCM).....	56
Consultative Committee for Amount of Substance: metrology in chemistry (CCQM).....	68
Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV).....	75
Acronyms and Addresses.....	79

## Introduction

The International Committee for Weights and Measures (CIPM) has ten Consultative Committees.

- Consultative Committee for Electricity and Magnetism (CCEM)\*
- Consultative Committee for Photometry and Radiometry (CCPR)
- Consultative Committee for Thermometry (CCT)
- Consultative Committee for Length (CCL)
- Consultative Committee for Time and Frequency (CCTF)
- Consultative Committee for Ionizing Radiation (CCRI)
- Consultative Committee for Units (CCU)
- Consultative Committee for Mass and Related Quantities (CCM)
- Consultative Committee for Amount of Substance: metrology in chemistry (CCQM)
- Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV)

The broad remit of each Committee is to advise the CIPM on matters related to its particular field of metrology.

This Directory gives a brief description of the current activities of each of these Committees, lists the members and the names and addresses of the participants, details the membership and tasks of working groups. The structure of the working groups differs from committee to committee depending on the nature of the work to be done. For example, in some working groups the members are laboratories while in others members are named individuals; some working groups are long standing and relatively formal, such as the CCEM Working Group on Radiofrequency Quantities. Others are set up for a particular task, such as running an international comparison or preparing a monograph, and are dissolved as soon as the work is completed. This is normal and no attempt is made to impose rules on how working groups should be established other than to require that the work be done in the simplest and most efficient way. At the end of this Directory is a list of the acronyms and full names and addresses of institutes and organizations around the world that participate in the work of the Consultative Committees.

A task now common to all the Consultative Committees, except the CCU, is that of identifying and carrying out the key comparisons of national measurement standards called for in the Mutual Recognition Arrangement (MRA) signed by directors of national metrology institutes in October 1999. This is a task the Consultative Committees carry out in collaboration with the BIPM. The CCU is different in that its main tasks are the surveillance of the SI and periodic revision of the SI brochure. More information on these comparisons can be obtained from the Executive Secretary of each Consultative Committee at the BIPM and a full list is maintained in the BIPM key comparison database.

The purpose of this Directory is to make available a concise list of contact points for each Consultative Committee over the whole range of its activities and to identify the BIPM contact in each field. The printed version of this Directory is revised at the beginning of each year and an up to date version is maintained on the BIPM home page: <http://www.bipm.org> which also contains the text of the MRA and the BIPM key comparison database.

A.J. WALLARD  
Director, BIPM

March 2003

---

\* Here and elsewhere in this document the acronyms come from the French names of the Committees.

## **Criteria for membership of the Consultative Committees of the CIPM\***

Membership of Consultative Committees is decided by the CIPM in consultation with the Presidents of the Consultative Committees and the Director of the BIPM.

Laboratories invited to be members of a Consultative Committee should be those already recognized internationally as most expert in the field. This normally requires that they:

- be national laboratories charged with establishing national standards in the field,
- be active in research and have a record of publications in research journals of international repute,
- have demonstrated competence by a record of participation on international comparisons organized either by the Consultative Committee, the BIPM or a regional metrology organization.

In addition to laboratory members, Consultative Committees may include as members:

- named individuals whose knowledge and competence in the field are such that they can provide valuable assistance to the Consultative Committee even though they do not come from a laboratory meeting the requirements for membership,
- international unions or other international organizations whose advice or expertise would be helpful to the Consultative Committee.

The Presidents of Consultative Committees may from time to time invite observers to meetings, including representatives of appropriate laboratories that are not yet members.

In general, the national metrology institute of each Member State of the Convention du Mètre wishing to participate might expect to be a member or an observer of at least one Consultative Committee.

---

\* Adopted by the CIPM at its 85th meeting in September 1996 (*BIPM Proc. Verb. Com. Int. Poids et Mesures*, 1996, **64**, 123-124).

**Meetings of the Consultative Committees in 2003  
(at the BIPM unless otherwise stated)**

CCQM-----	10 to 11 April 2003
CCU-----	17 to 18 April 2003
CCT-----	14 to 16 May 2003
CCRI Section I-----	21 to 23 May 2003
CCRI Section III-----	26 to 27 May 2003
CCRI Section II-----	28 to 30 May 2003
CCRI-----	30 May 2003
CCPR-----	17 to 19 June 2003
CCL-----	8 to 11 September 2003
CIPM-----	9 to 10 October 2003
CCEM Working Groups-----	3 to 7 November 2003

For the general diary of the BIPM, please see the BIPM web page at <http://www.bipm.org>.

**Consultative Committee for Electricity and Magnetism (CCEM)****Created in 1927**

*Present activities concern practical realizations of the SI volt, ohm, ampere and watt, laboratory reference standards of the volt and the ohm based upon the Josephson and quantum-Hall effects, capacitance standards and ac/dc measurements, RF and microwave standards and advice to the CIPM on matters related to electrical standards.*

**President: Dr Barry D. Inglis**  
 Director  
 National Measurement Laboratory CSIRO  
 Bradfield Road, West Lindfield  
 PO Box 218  
 NSW 2070 Lindfield  
 Australia  
 Tel: +61 2 9413 7460  
 Fax: +61 2 9413 7383  
 E-mail: [barry.inglis@csiro.au](mailto:barry.inglis@csiro.au)

**Executive Secretary: Dr Thomas J. Witt, BIPM**  
 Tel: + 33 1 45 07 70 97  
 Fax: + 33 1 45 34 20 21  
 E-mail: [tjwitt@bipm.org](mailto:tjwitt@bipm.org)

**Members:**

CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Danish Institute of Fundamental Metrology [DFM], Lyngby  
 Istituto Elettrotecnico Nazionale "Galileo Ferraris" [IEN], Torino  
 Justervesenet [JV], Kjeller  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 Laboratoire André Marie Ampère [BNM-LNE/LAMA], Fontenay-aux-Roses  
 Measurement Standards Laboratory of New Zealand [MSL], Lower Hutt  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL], Teddington  
 National Physical Laboratory of India [NPLI], New Delhi  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore  
 Swedish National Testing and Research Institute [SP], Borås  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 Prof. Heikki Seppä, VTT Information Technology, Espoo  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

Centre for Metrology and Accreditation [MIKES], Helsinki  
 Centro Español de Metrología [CEM], Madrid  
 Czech Metrology Institute [CMI], Praha  
 Instituto Nacional de Tecnología Industrial [INTI], Buenos Aires  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli

**Delegates and experts of member laboratories  
 at the last meeting (September 2002)**

**President at the time: Prof. Dr Ernst Otto Göbel**

**Members:**

**Dr William E. Anderson, NIST**  
 Tel: + 1 301 975 2220  
 Fax: + 1 301 975 4091  
 E-mail: william.anderson@nist.gov

**Dr Gérard Genevès, BNM-LNE/LAMA**  
 Tel: + 33 1 40 95 60 42  
 Fax: + 33 1 40 95 55 59  
 E-mail: gerard.geneves.@lne.fr

**Dr Hans Bachmair, PTB**  
 Tel: + 49 531 592 2010  
 Fax: + 49 531 592 2015  
 E-mail: hans.bachmair@ptb.de

**Dr Dave Inglis, NRC**  
 Tel: + 1 613 991 5650  
 Fax: + 1 613 952 1394  
 E-mail: dave.inglis@nrc.ca

**Dr Laurie Christian, MSL**  
 Tel: + 64 4 569 0110  
 Fax: + 64 4 569 0194  
 E-mail: l.christian@irl.cri.nz

**Dr Takeumi Inoue, NMIJ/AIST**  
 Tel: + 81 298 61 5631  
 Fax: + 81 298 61 4342  
 E-mail: t.inoue@aist.go.jp

**Dr Sze Wey Chua, SPRING Singapore**  
 Tel: + 65 6773 9819  
 Fax: + 65 6773 9804  
 E-mail: weychua@spring.gov.sg

**Dr Beat Jeckelmann, METAS**  
 Tel: + 41 31 323 3297  
 Fax: + 41 31 323 3210  
 E-mail: beat.jeckelmann@metas.ch

**Dr Jan P.M. de Vreede, NMI VSL**  
 Tel: + 31 15 269 1621  
 Fax: + 31 15 261 2971  
 E-mail: jdevreede@nmi.nl

**Dr Hans D. Jensen, DFM**  
 Tel: + 45 4525 5874  
 Fax: + 45 4593 1137  
 E-mail: hdj@dfm.dtu.dk

**Mr Erik Dressler, CSIR-NML**  
 Tel: + 27 12 841 4342  
 Fax: + 27 12 841 2131  
 E-mail: redressl@csir.co.za

**Dr Michael Kelley, NIST**  
 Tel: + 1 301 975 3722  
 Fax: + 1 301 975 2115  
 E-mail: mkelley@nist.gov

**Dr Luc Erard, BNM**  
 Tel: + 33 1 56 56 88 60  
 Fax: + 33 1 56 56 88 70  
 E-mail: luc.erard@bnm.fr

**Dr Jeong Hwan Kim, KRISS**  
 Tel: + 82 42 868 5170  
 Fax: + 82 42 868 5018  
 E-mail: kimjh@kriss.re.kr

**Dr Koji Komiyama**, NMIJ/AIST  
 Tel: + 81 298 61 5637  
 Fax: + 81 298 61 3492  
 E-mail: koji.komiyama@aist.go.jp

**Dr Zuliang Lu**, NIM  
 Tel: + 86 10 6421 1631-2401  
 Fax: + 86 10 6421 8629  
 E-mail: luzl@nim.ac.cn

**Dr Giancarlo Marullo Reedtz**, IEN  
 Tel: + 39 011 391 9421  
 Fax: + 39 011 346 384  
 E-mail: marullo@me.ien.it

**Dr Jürgen Melcher**, PTB  
 Tel: + 49 531 592 2116  
 Fax: + 49 531 592 2105  
 E-mail: juergen.melcher@ptb.de

**Mr M.K. Mittal**, NPLI  
 Tel: + 91 11 572 6959 (office), 587 2228  
 (residence)  
 Fax: + 91 11 572 6938 or 6952  
 E-mail: mkmittal@csnpl.ren.nic.in

**Mr Håkan Nilsson**, SP  
 Tel: + 46 33 16 50 00  
 Fax: + 46 33 16 56 20  
 E-mail: hakan.nilsson@sp.se

**Dr James K. Olthoff**, NIST  
 Tel: + 1 301 975 2431  
 Fax: + 1 301 926 3972  
 E-mail: james.olthoff@nist.gov

**Mr François Piquemal**, BNM-LNE/LAMA  
 Tel: + 33 1 40 95 60 37  
 Fax: + 33 1 40 95 55 59  
 E-mail: francois.piquemal@lne.fr

**Dr James Randa**, NIST  
 Tel: + 1 303 497 3150  
 Fax: + 1 303 497 3970  
 E-mail: randa@boulder.nist.gov

#### Observers:

**Mr Yakup Gülmez**, UME  
 Tel: + 90 262 679 5000  
 Fax: + 90 262 679 5001  
 E-mail: yakup.gulmez@ume.tubitak.gov.tr

**Dr Brian Ricketts**, NML CSIRO  
 Tel: + 61 2 9413 7730  
 Fax: + 61 2 9413 7202  
 E-mail: brian.ricketts@csiro.au

**Dr Ian A. Robinson**, NPL  
 Tel: + 44 208 943 7139  
 Fax: + 44 208 943 6341  
 E-mail: ian.robinson@npl.co.uk

**Mr Karl-Erik Rydler**, SP  
 Tel: + 46 33 16 50 00  
 Fax: + 46 33 12 50 38  
 E-mail: karlerik.rydler@sp.se

**Dr Yury P. Semenov**, VNIIM  
 Tel: + 7 812 323 9621  
 Fax: + 7 812 113 0114  
 E-mail: t.n.korzhakova@vniim.ru

**Prof. Heikki Seppä**, VTT Information Technology  
 Tel: + 358 9 456 6419  
 Fax: + 358 9 456 7029  
 E-mail: heikki.seppa@vtt.fi

**Dr Efim Z. Shapiro**, VNIIM  
 Tel: + 7 812 251 7444  
 Fax: + 7 812 251 7444  
 E-mail: ezshapiro@vniim.ru or  
 ezshapiro@peterlink.ru (private)

**Dr Eddy So**, NRC  
 Tel: + 1 613 990 5806  
 Fax: + 1 613 952 9366  
 E-mail: eddy.so@nrc.ca

**Dr Yang Sup Song**, KRISS  
 Tel: + 82 42 868 5015  
 Fax: + 82 42 868 5018  
 E-mail: yssong@kriss.re.kr

**Dr Haruo Yoshida**, NMIJ/AIST  
 Tel: + 81 298 61 5247  
 Fax: + 81 298 61 5126  
 E-mail: yoshida-h@aist.go.jp

**Ing. Frantisek Jelinek**, CMI  
 Tel: + 420 2 5732 3308  
 Fax: + 420 2 5732 4982  
 E-mail: fjelinek@cmi.cz

**Mr Miguel Neira, CEM**  
 Tel: + 34 91 807 4715  
 Fax: + 34 91 807 4807  
 E-mail: mneira@mform.es

**Dr Harald Slinde, JV**  
 Tel: + 47 64 84 84 84  
 Fax: + 47 64 84 84 85  
 E-mail: harald.slinde@justervesenet.no

### **CCEM Working Group on Radiofrequency Quantities (GT-RF)**

#### **Chairman:**

**Dr James Randa, NIST**  
 Tel: + 1 303 497 3150  
 Fax: + 1 303 497 3970  
 E-mail: randa@boulder.nist.gov

#### **Members:**

Institute for Physical-Technical and Radiotechnical Measurements, Gosstandart of Russia [VNIIFTRI], Moscow  
 International Union of Radio Science, [URSI]  
 Istituto Elettrotecnico Nazionale "Galileo Ferraris" [IEN], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 Laboratoire André Marie Ampère [BNM-LNE/LAMA], Fontenay-aux-Roses  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 Dr Luc Erard, BNM  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

#### **Delegates of member laboratories at the last meeting (September 2002)**

**Chairman: At the time Dr Luc Erard, BNM**

**Mr Djamel Allal, BNM-LNE/LAMA**  
 Tel: + 33 1 40 95 60 44  
 Fax: + 33 1 40 95 55 59  
 E-mail: djamel.allal@lne.fr

**Dr Luciano Brunetti, IEN**  
 Tel: + 39 011 391 9230  
 Fax: + 39 011 346 384  
 E-mail: brunetti@tf.ien.it

**Dr Hans Bachmair, PTB**  
 Tel: + 49 531 592 2010  
 Fax: + 49 531 592 2015  
 E-mail: hans.bachmair@ptb.de

**Mr Hock Ann Chua, SPRING Singapore**  
 Tel: + 65 772 9602  
 Fax: + 65 778 3798  
 E-mail: hachua@spring.gov.sg



**Mr Robert Clarke, NPL**  
 Tel: + 44 208 943 6156  
 Fax: + 44 208 943 7176  
 E-mail: robert.clarke@npl.co.uk

**Dr Jan P.M. de Vreede, NMI VSL**  
 Tel: + 31 15 269 1621  
 Fax: + 31 15 261 2971  
 E-mail: jdevreede@nmi.nl

**Mr Qiulai Gao, NIM**  
 Tel: + 86 10 6421 1631-2520  
 Fax: + 86 10 6429 2353  
 E-mail: gaoql@nim.ac.cn

**Mr Kurt Hilty, METAS**  
 Tel: + 41 31 323 3490/323 3111  
 Fax: + 41 31 323 3210  
 E-mail: kurt.hilty@metas.ch

**Dr Dave Inglis, NRC**  
 Tel: + 1 613 991 5650  
 Fax: + 1 613 952 1394  
 E-mail: dave.inglis@nrc.ca

**Dr Takeumi Inoue, NMIJ/AIST**  
 Tel: + 81 298 61 5631  
 Fax: + 81 298 61 4342  
 E-mail: t.inoue@aist.go.jp

**Dr Jeong Hwan Kim, KRISS**  
 Tel: + 82 42 868 5170  
 Fax: + 82 42 868 5018  
 E-mail: kimjh@kriss.re.kr

#### **Invited by the Chairman:**

**Dr Laurie Christian, MSL**  
 Tel: + 64 4 569 0110  
 Fax: + 64 4 569 0194  
 E-mail: l.christian@irl.cri.nz

**Mr Erik Dressler, CSIR-NML**  
 Tel: + 27 12 841 4342  
 Fax: + 27 12 841 2131  
 E-mail: redressl@csir.co.za

**Dr Koji Komiyama, NMIJ/AIST**  
 Tel: + 81 298 61 5637  
 Fax: + 81 298 61 3492  
 E-mail: koji.komiyama@aist.go.jp

**Dr James Randa, NIST**  
 Tel: + 1 303 497 3150  
 Fax: + 1 303 497 3970  
 E-mail: randa@boulder.nist.gov

**Dr Brian Ricketts, NML CSIRO**  
 Tel: + 61 2 9413 7730  
 Fax: + 61 2 9413 7202  
 E-mail: brian.ricketts@csiro.au

**Dr Yang Sup Song, KRISS**  
 Tel: + 82 42 868 5015  
 Fax: + 82 42 868 5018  
 E-mail: yssong@kriss.re.kr

**Dr Ulrich Stumper, PTB**  
 Tel: + 49 531 592 2220  
 Fax: + 49 531 592 2228  
 E-mail: ulrich.stumper@ptb.de

**Dr Dmitrij Vasiliev, VNIIFTRI**  
 Tel: + 7 095 535 2401 or 535 9210  
 Fax: + 7 095 535 9334  
 E-mail: vasiliev@vniiftri.ru

**Dr Giancarlo Marullo Reedtz, IEN**  
 Tel: + 39 011 391 9421  
 Fax: + 39 011 346 384  
 E-mail: marullo@me.ien.it

**Dr Harold Sánchez, Laboratorio Metrológico**  
 Tel: + 506 283 4622  
 Fax: + 506 234 8514  
 E-mail: hsanchez@ice.co.cr

## CCEM Working Group on low frequency quantities (WGLF)

**Chairman:****Dr Hans Bachmair, PTB**

Tel: + 49 531 592 2010

Fax: + 49 531 592 2015

E-mail: hans.bachmair@ptb.de

**Members:**

BNM-LNE/LAMA

IEN

KRISS

NIST

NMI VSL

NMIJ/AIST

NML CSIRO

NPL

NRC

PTB

SP

VNIIM

BIPM

**Delegates of member laboratories  
at the last meeting (September 2002)****Chairman: Dr Hans Bachmair****Dr William E. Anderson, NIST**

Tel: + 1 301 975 2220

Fax: + 1 301 975 4091

E-mail: william.anderson@nist.gov

**Dr Michael Kelley, NIST**

Tel: + 1 301 975 3722

Fax: + 1 301 975 2115

E-mail: mkelley@nist.gov

**Dr Jan P.M. de Vreede, NMI VSL**

Tel: + 31 15 269 1621

Fax: + 31 15 261 2971

E-mail: jdevreede@nmi.nl

**Dr Jeong Hwan Kim, KRISS**

Tel: + 82 42 868 5170

Fax: + 82 42 868 5018

E-mail: kimjh@kriss.re.kr

**Dr Luc Erard, BNM**

Tel: + 33 1 56 56 88 60

Fax: + 33 1 56 56 88 70

E-mail: luc.erard@bnm.fr

**Dr Koji Komiyama, NMIJ/AIST**

Tel: + 81 298 61 5637

Fax: + 81 298 61 3492

E-mail: koji.komiyama@aist.go.jp

**Dr Gérard Genevès, BNM-LNE/LAMA**

Tel: + 33 1 40 95 60 42

Fax: + 33 1 40 95 55 59

E-mail: gerard.geneves.@lne.fr

**Dr Giancarlo Marullo Reedtz, IEN**

Tel: + 39 011 391 9421

Fax: + 39 011 346 384

E-mail: marullo@me.ien.it

**Dr Dave Inglis, NRC**

Tel: + 1 613 991 5650

Fax: + 1 613 952 1394

E-mail: dave.inglis@nrc.ca

**Dr Jürgen Melcher, PTB**

Tel: + 49 531 592 2116

Fax: + 49 531 592 2105

E-mail: juergen.melcher@ptb.de

**Dr Takeumi Inoue, NMIJ/AIST**

Tel: + 81 298 61 5631

Fax: + 81 298 61 4342

E-mail: t.inoue@aist.go.jp

**Mr Håkan Nilsson, SP**

Tel: + 46 33 16 50 00

Fax: + 46 33 16 56 20

E-mail: hakan.nilsson@sp.se

**Dr James K. Olthoff**, NIST  
 Tel: + 1 301 975 2431  
 Fax: + 1 301 926 3972  
 E-mail: james.olthoff@nist.gov

**Dr James Randa**, NIST  
 Tel: + 1 303 497 3150  
 Fax: + 1 303 497 3970  
 E-mail: randa@boulder.nist.gov

**Dr Brian Ricketts**, NML CSIRO  
 Tel: + 61 2 9413 7730  
 Fax: + 61 2 9413 7202  
 E-mail: brian.ricketts@csiro.au

**Dr Ian A. Robinson**, NPL  
 Tel: + 44 208 943 7139  
 Fax: + 44 208 943 6341  
 E-mail: ian.robinson@npl.co.uk

**Mr Karl-Erik Rydler**, SP  
 Tel: + 46 33 16 50 00  
 Fax: + 46 33 12 50 38  
 E-mail: karlerik.rydler@sp.se

**Invited by the Chairman:**

**Dr Laurie Christian**, MSL  
 Tel: + 64 4 569 0110  
 Fax: + 64 4 569 0194  
 E-mail: l.christian@irl.cri.nz

**Dr Sze Wey Chua**, SPRING Singapore  
 Tel: + 65 6773 9819  
 Fax: + 65 6773 9804  
 E-mail: weychua@spring.gov.sg

**Mr Erik Dressler**, CSIR-NML  
 Tel: + 27 12 841 4342  
 Fax: + 27 12 841 2131  
 E-mail: redressl@csir.co.za

**Mr Yakup Gülmez**, UME  
 Tel: + 90 262 679 5000  
 Fax: + 90 262 679 5001  
 E-mail: yakup.gulmez@ume.tubitak.gov.tr

**Dr Beat Jeckelmann**, METAS  
 Tel: + 41 31 323 3297  
 Fax: + 41 31 323 3210  
 E-mail: beat.jeckelmann@metas.ch

**Dr Efim Z. Shapiro**, VNIIM  
 Tel: + 7 812 251 7444  
 Fax: + 7 812 251 7444  
 E-mail: ezshapiro@vniim.ru or  
 ezshapiro@peterlink.ru (private)

**Dr Eddy So**, NRC  
 Tel: + 1 613 990 5806  
 Fax: + 1 613 952 9366  
 E-mail: eddy.so@nrc.ca

**Dr Yang Sup Song**, KRISS  
 Tel: + 82 42 868 5015  
 Fax: + 82 42 868 5018  
 E-mail: yssong@kriss.re.kr

**Dr Haruo Yoshida**, NMIJ/AIST  
 Tel: + 81 298 61 5247  
 Fax: + 81 298 61 5126  
 E-mail: yoshida-h@aist.go.jp

**Ing. Frantisek Jelinek**, CMI  
 Tel: + 420 2 5732 3308  
 Fax: + 420 2 5732 4982  
 E-mail: fjelinek@cmi.cz

**Dr Hans D. Jensen**, DFM  
 Tel: + 45 4525 5874  
 Fax: + 45 4593 1137  
 E-mail: hdj@dfm.dtu.dk

**Dr Zuliang Lu**, NIM  
 Tel: + 86 10 6421 1631-2401  
 Fax: + 86 10 6421 8629  
 E-mail: luzl@nim.ac.cn

**Mr M.K. Mittal**, NPLI  
 Tel: + 91 11 572 6959 (office), 587 2228  
 (residence)  
 Fax: + 91 11 572 6938 or 6952  
 E-mail: mkmittal@csnpl.ren.nic.in

**Mr Miguel Neira**, CEM  
 Tel: + 34 91 807 4715  
 Fax: + 34 91 807 4807  
 E-mail: mneira@mfom.es

**Dr Harold Sánchez**, Laboratorio Metrológico  
 Tel: + 506 283 4622  
 Fax: + 506 234 8514  
 E-mail: hsanchez@ice.co.cr

**Dr Harald Slinde**, JV  
 Tel: + 47 64 84 84 84  
 Fax: + 47 64 84 84 85  
 E-mail: harald.slinde@justervesenet.no

**Prof. Heikki Seppä**, VTT Information Technology  
 Tel: + 358 9 456 6419  
 Fax: + 358 9 456 7029  
 E-mail: heikki.seppa@vtt.fi

### **CCEM Working Group on Electrical Methods to Monitor the Stability of the Kilogram**

#### **Chairman:**

**Dr Ian A. Robinson**, NPL  
 Tel: + 44 208 943 7139  
 Fax: + 44 208 943 6341  
 E-mail: ian.robinson@npl.co.uk

#### **Members:**

BNM-LNE/LAMA  
 METAS  
 NIST  
 NMIJ/AIST  
 NPL  
 PTB  
 BIPM

#### **Delegates:**

Dr Peter Becker, PTB (Braunschweig) (peter.becker@ptb.de)  
 Dr Richard Davis BIPM (Paris) (richard.davis@bipm.org)  
 Dr Kenichi Fujii, NMIJ/AIST (Tsukuba) (fujii.kenichi@aist.go.jp)  
 Dr Gérard Genevès, BNM-LNE/LAMA (Fontenay aux Roses) (gerard.geneves@lne.fr)  
 Dr Michael Gläser, PTB (Braunschweig) (michael.glaeser@ptb.de)  
 Mr David B. Newell, NIST (Gaithersburg) (david.newell@nist.gov)  
 Dr Alain Picard BIPM (Paris) (apicard@bipm.org)  
 Dr Terry Quinn BIPM (Paris) (terry.quinn@bipm.org)  
 Dr Philippe Richard, METAS (Bern-Wabern) (philippe.richard@metas.ch)  
 Dr Ian A. Robinson, NPL (Teddington) (ian.robinson@npl.co.uk)  
 Dr Richard L. Steiner, NIST (Gaithersburg) (richard.steiner@nist.gov)  
 Dr Mitsuru Tanaka, NMIJ/AIST (Tsukuba) (nmijtanaka@m.aist.go.jp)  
 Dr Edwin R. Williams, NIST (Gaithersburg) (edwin.williams@nist.gov)

#### **Parties involved**

##### **CCM Working Group on Mass Standards**

Dr George Chapman, NRC (Ottawa) (george.chapman@nrc.ca)  
 Mr André Gosset, BNM-LNE (Paris) (andre.gosset@lne.fr)  
 Dr Zeina J. Jabbour, NIST (Gaithersburg) (zeina.jabbour@nist.gov)  
 Dr Claude Jacques, NRC (Ottawa) (claud.jacques@nrc-cnrc.gc.ca)

Mr Michel Lecollinet, BNM-INM (Paris) (michel.lecollinet@cnam.fr)  
 Dr Woo Gab Lee, KRISS (Daejeon) (woogab@kriss.re.kr)

**CCM Working Group on the Avogadro Constant**

Prof. Dr Paul De Bièvre, (Kasterlee) (paul.de.bievre@skynet.be)  
 Dr Michael Kenny, CSIRO NML (Sydney) (michaelk@bigpond.net.au)  
 Dr Giovanni Mana, IMGC-CNR (Torino) (g.mana@imgc.cnr.it)  
 Dr Richard J. Matyi, NIST (Gaithersburg) (richard.matyi@nist.gov)  
 Dr Barry N. Taylor, NIST (Gaithersburg) (barry.taylor@nist.gov)

**BIPM :**

Dr Fang Hao BIPM (Paris) (fang@bipm.org)  
 Dr Harold Parks BIPM (Paris) (hparks@bipm.org)  
 Dr Stephane Solve BIPM (Paris) (stephane.solve@bipm.org)  
 Dr Michael Stock BIPM (Paris) (mstock@bipm.org)  
 Dr Leonid Vitushkin BIPM (Paris) (lvitushkin@bipm.org)  
 Dr Thomas Witt, BIPM (Paris) (tjwitt@bipm.org)

**Guests :**

Dr Edmund T. Frantsuz, VNIIM (St Petersburg) (e.t.frantsuz@vniim.ru)  
 Dr Carmen Matilla, CEM (Madrid) (cmatilla@cem.es)  
 Dr Peter Mohr, NIST (Gaithersburg) (mohr@nist.gov)

**CCEM Working Group on the Measurements of the Quantized Hall Resistance  
 with Alternating Current**

**Chairman:**

**Dr Jürgen Melcher, PTB**  
 Tel: + 49 531 592 2116  
 Fax: + 49 531 592 2105  
 E-mail: juergen.melcher@ptb.de

**Members:**

BNM-LNE/LAMA	NRC
NML CSIRO	PTB
IEN	VNIIM
METAS	VTT
NIST	BIPM
NPL	

**Delegates of member laboratories  
 at the last meeting (September 2002)**

**Chairman: at the time Dr Eric Braun, PTB**

**Dr Shakil Awan, NPL**  
 Tel: + 44 208 943 6890  
 Fax: + 44 208 943 7138  
 E-mail: shakil.awan@npl.co.uk

**Dr Franco Cabiati, IEN**  
 Tel: + 39 011 3919 435/429  
 Fax: + 39 011 346 384  
 E-mail: cabiati@me.ien.it

**Dr Dave Inglis, NRC**  
Tel: + 1 613 991 5650  
Fax: + 1 613 952 1394  
E-mail: dave.inglis@nrc.ca

**Dr Beat Jeckelmann, METAS**  
Tel: + 41 31 323 3297  
Fax: + 41 31 323 3210  
E-mail: beat.jeckelmann@metas.ch

**Dr Michael Kelley, NIST**  
Tel: + 1 301 975 3722  
Fax: + 1 301 975 2115  
E-mail: mkelley@nist.gov

**Dr Jürgen Melcher, PTB**  
Tel: + 49 531 592 2116  
Fax: + 49 531 592 2105  
E-mail: juergen.melcher@ptb.de

**Dr James K. Olthoff, NIST**  
Tel: + 1 301 975 2431  
Fax: + 1 301 926 3972  
E-mail: james.olthoff@nist.gov

**Dr Wilfrid Poirier, BNM-LNE/LAMA**  
Tel: + 33 1 40 95 60 63  
Fax: + 33 1 40 95 55 59  
E-mail: wilfrid.poirier@lne.fr

**Dr Brian Ricketts, NML CSIRO**  
Tel: + 61 2 9413 7730  
Fax: + 61 2 9413 7202  
E-mail: brian.ricketts@csiro.au

**Dr Yury P. Semenov, VNIIM**  
Tel: + 7 812 323 9621  
Fax: + 7 812 113 0114  
E-mail: t.n.korzhakova@vniim.ru

## Consultative Committee for Photometry and Radiometry (CCPR)

Created in 1933

*Present activities concern measurement standards for photometric and radiometric quantities,  
development of absolute radiometry  
and advice to the CIPM on matters concerned with radiometry and photometry*

**President:**     **Dr Franz Hengstberger**  
 Manager for the Regional and International Metrology  
 CSIR - National Metrology Laboratory  
 P.O. Box 395  
 0001 Pretoria  
 South Africa  
 Tel: + 27 12 841 4352  
 Fax: + 27 12 841 2131  
 E-mail: fhengstb@csir.co.za

**Executive Secretary:**   **Dr Michael Stock**, BIPM  
 Tel: + 33 1 45 07 70 24  
 Fax: +33 1 45 07 62 62  
 E-mail: mstock@bipm.org

### Members:

CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 Helsinki University of Technology [HUT], Espoo  
 Institut National de Métrologie [BNM-INM], Paris  
 Institute for Optico-Physical Measurements, Gosstandart of Russia [VNIIOFI], Moscow  
 Instituto de Física Aplicada [IFA-CSIC], Madrid  
 Istituto Elettrotecnico Nazionale "Galileo Ferraris" [IEN], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 Measurement Standards Laboratory of New Zealand [MSL], Lower Hutt  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Office of Measures/Országos Mérésügyi Hivatal [OMH], Budapest  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

### Observers:

Centro Nacional de Metrología [CENAM], Querétaro  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore

**Delegates and experts of member laboratories  
at the last meeting (June 2003)**

**President: Dr Franz Hengstberger**

**Members:**

**Mr György Andor, OMH**

Tel: + 36 1 4585 984

Fax: + 36 1 4585 927

E-mail: g.andor@omh.hu

**Dr Nigel Fox, NPL**

Tel: + 44 208 943 6825

Fax: + 44 208 943 6935

E-mail: nigel.fox@npl.co.uk

**Dr Mark Ballico, NML CSIRO**

Tel: + 61 2 9413 7767

Fax: + 61 2 9413 7202

E-mail: mark.ballico@csiro.au

**Prof. Erkki Ikonen, HUT**

Tel: + 358 9 451 2283

Fax: + 358 9 451 2222

E-mail: erkki.ikonen@hut.fi

**Dr Jean Bastie, BNM-INM**

Tel: + 33 1 40 27 20 25

Fax: + 33 1 42 71 37 36

E-mail: bastie@cnam.fr

**Dr In Won Lee, KRISS**

Tel: + 82 42 868 5003

Fax: + 82 42 868 5444

E-mail: optin@kriss.re.kr

**Dr Peter Blattner, METAS**

Tel: + 41 31 32 33 340

Fax: + 41 31 32 33 210

E-mail: peter.blattner@metas.ch

**Prof. Dr Jürgen Metzdorf, PTB**

Tel: + 49 531 592 4100

Fax: + 49 531 592 4105

E-mail: juergen.metzdorf@ptb.de

**Dr Louis-Philippe Boivin, NRC**

Tel: + 1 613 993 9354

Fax: + 1 613 952 1394

E-mail: phil.boivin@nrc.ca

**Dr Peter Nemecek, SMU**

Tel: + 421 2 6029 4278

Fax: + 421 2 6542 9592

E-mail: nemecek@smu.gov.sk

**Dr Giorgio Brida, IEN**

Tel: + 39 011 3919 222

Fax: + 39 011 346 384

E-mail: brida@ien.it

**Mr David Nettleton, NPL**

Tel: + 44 208 943 6804

Fax: + 44 208 943 6755

E-mail: david.nettleton@npl.co.uk

**Dr Joaquin Campos Acosta, IFA-CSIC**

Tel: + 34 91 561 8806

Fax: + 34 91 411 7651

E-mail: jcampos@ifa.cetef.csic.es

**Dr Yoshihiro Ohno, NIST**

Tel: + 1 301 975 2321

E-mail: ohno@nist.gov

**Dr John Clare, MSL**

Tel: + 64 4 569 0290

Fax: + 64 4 569 0003

E-mail: j.clare@irl.cri.nz

**Dr Kent Rochford, NIST**

Tel: + 1 303 497 5285

Fax: + 1 303 497 7671

E-mail: rochford@boulder.nist.gov

**Dr Jimmy Dubard, BNM-LNE**

Tel: + 33 1 30 69 12 37

Fax: + 33 1 30 69 10 82

E-mail: jimmy.dubard@lne.fr

**Dr Terubumi Saito, NMIJ/AIST**

Tel: + 81 29 861 5654

Fax: + 81 29 861 4860

E-mail: t.saito@aist.go.jp

**Prof. Victor I. Saprisky, VNIIOFI**

Tel: + 7 095 437 2992

Fax: + 7 095 437 3100



E-mail: vsapritsky@aol.com

**Prof. Dr Werner Schmutz, METAS**

Tel: + 41 81 417 51 45

Fax: + 41 81 417 51 00

E-mail: w.schmutz@pmodwrc.ch

**Dr Gerhard Ulm, PTB**

Tel: + 49 30 3481 312

Fax: + 49 30 3481 550

E-mail: gerhard.ulm@ptb.de

**Observers:**

**Mr Carlos Matamoros, CENAM**

Tel: + 52 442 211 0552

Fax: + 52 442 211 0553

E-mail: cmatamor@cenam.mx

**Dr Farhad Samedov, UME**

Tel: + 90 262 679 5000

Fax: + 90 262 679 5001

E-mail: farhad.samedov@ume.tubitak.gov.tr

**Dr Eric van der Ham, NMI VSL**

Tel: + 31 15 269 1586

Fax: + 31 15 261 2971

E-mail: evdham@nmi.nl

**Mrs Natasha van Tonder, CSIR-NML**

Tel: + 27 12 841 3618

Fax: + 27 12 841 2131

E-mail: nvtonder@csir.co.za

**Dr Gan Xu, SPRING Singapore**

Tel: + 65 6773 9789

Fax: + 65 6773 9804

E-mail: xugan@spring.gov.sg

**Working Group on UV Radiometry**

**Chairman:**

**Prof. Erkki Ikonen, HUT**

Tel: + 358 9 451 2283

Fax: + 358 9 451 2222

E-mail: erkki.ikonen@hut.fi

**Secretary:**

**Dr Hans Rabus, PTB**

Tel: + 49 30 3481 406

Fax: + 49 30 3481 490

E-mail: hans.rabus@ptb.de

**Members**

NIST

NMIJ/AIST

NPL

PTB

VNIIOFI

### **Working Group on Key Comparisons**

**Chairman:**

**Dr Al Parr**, NIST

Tel: + 1 301 975 2316

Fax: + 1 301 869 5700

E-mail: [albert.parr@nist.gov](mailto:albert.parr@nist.gov)

**Secretary:**

**Dr Michael Stock**, BIPM

Tel: + 33 1 45 07 70 24

Fax: +33 1 45 07 62 62

E-mail: [mstock@bipm.org](mailto:mstock@bipm.org)

**Members:**

KRISS

NIM

NIST

NMIJ/AIST

NML CSIRO

NPL

PTB

### **Working Group on Calibration and Measurement Capabilities**

**Chairman:**

**Dr Franz Hengstberger**, CSIR-NML

Tel: + 27 12 841 4352

Fax: + 27 12 841 2131

E-mail: [fhengstb@csir.co.za](mailto:fhengstb@csir.co.za)

**Members:**

Chairs of the Technical Committees of Regional Metrology Organizations (RMOs) dealing with Photometry and Radiometry.

**Consultative Committee for Thermometry (CCT)****Created in 1937**

*Present activities concern matters related to the establishment and realization of the International Temperature Scale of 1990 (ITS-90) and thermodynamic temperature, extension and improvement of the ITS-90, secondary reference points, international reference tables for thermocouples and resistance thermometers.*

**President:** **Prof. Hüseyin Ugur**  
 Director  
 National Metrology Institute of Turkey  
 P.O. Box 21  
 41470 Gebze-Kocaeli  
 Turkey  
 Tel: + 90 262 679 5000  
 Fax: +90 262 646 9062  
 E-mail: huseyin.ugur@ume.tubitak.gov.tr

**Executive Secretary:** **Dr Michael Stock**, BIPM  
 Tel: + 33 1 45 07 70 24  
 Fax: +33 1 45 07 62 62  
 E-mail: mstock@bipm.org

**Members:**

CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Institut National de Métrologie [BNM-INM], Paris  
 Institute for Physical-Technical and Radiotechnical Measurements, Gosstandart of Russia [VNIIFTRI], Moscow  
 Istituto di Metrologia "Gustavo Colonnetti" del Consiglio Nazionale delle Ricerche [IMGC-CNR], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 Measurement Standards Laboratory of New Zealand [MSL], Lower Hutt  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMi VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

Centro Español de Metrología [CEM], Madrid  
 Centro Nacional de Metrología [CENAM], Querétaro  
 Instituto Nacional de Tecnología Industrial [INTI], Buenos Aires  
 Instituto Português da Qualidade [IPQ], Caparica

**Delegates and experts of member laboratories  
at the last meeting (May 2003)**

**President: Prof. Hüseyin Ugur**

**Members:**

**Mr Masaru Arai**, NMIJ/AIST  
Tel: + 81 29 861 4295  
Fax: + 81 29 861 4216  
E-mail: masaru-arai@aist.go.jp

**Prof. Dmitri Astrov**, VNIIFTRI  
Tel: + 7 095 535 0864 or 9348  
Fax: + 7 095 535 9348  
E-mail: cryom@vniiftri.ru

**Dr Mark Ballico**, NML CSIRO  
Tel: + 61 2 9413 7767  
Fax: + 61 2 9413 7202  
E-mail: mark.ballico@csiro.au

**Dr Mauro Battuello**, IMGC-CNR  
Tel: + 39 011 3977 338  
Fax: + 39 011 3977 347  
E-mail: m.battuello@imgc.cnr.it

**Dr Stephanie Bell**, NPL  
Tel: + 44 208 943 6402  
Fax: + 44 208 943 6306  
E-mail: stephanie.bell@npl.co.uk

**Mr Georges Bonnier**, BNM-INM  
Tel: +33 1 40 27 21 58  
Fax: +33 1 40 27 26 32  
E-mail: bonnier@cnam.fr

**Mr Martin J. de Groot**, NMI VSL  
Tel: + 31 15 269 1661  
Fax: + 31 15 261 2971  
E-mail: mdegroot@nmi.nl

**Dr Stanislav Duris**, SMU  
Tel: + 421 2 6029 4277  
Fax: + 421 2 6542 9592  
E-mail: duris@smu.gov.sk

**Dr Bernd Fellmuth**, PTB  
Tel: + 49 30 3481 224  
Fax: + 49 30 3481 490  
E-mail: bernd.fellmuth@ptb.de

**Dr Joachim Fischer**, PTB  
Tel: + 49 30 34 81 473  
Fax: + 49 30 34 81 508  
E-mail: joachim.fischer@ptb.de

**Dr Yves Hermier**, BNM-INM  
Tel: + 33 1 40 27 21 87  
Fax: + 33 1 40 27 26 32  
E-mail: hermier@cnam.fr

**Mr Ken D. Hill**, NRC  
Tel: + 1 613 998 6077  
Fax: + 1 613 952 1394  
E-mail: ken.hill@nrc.ca

**Dr Carol Johnson**, NIST  
Tel: + 1 301 975 2322  
Fax: + 1 301 869 5700  
E-mail: cjohnson@nist.gov

**Dr Kee Hoon Kang**, KRISS  
Tel: + 82 42 868 5190  
Fax: + 82 42 868 5022  
E-mail: khkang@kriss.re.kr

**Mr Hans Liedberg**, CSIR-NML  
Tel: + 27 12 841 2753  
Fax: + 27 12 841 2131/4458  
E-mail: hliedber@csir.co.za

**Dr Graham Machin**, NPL  
Tel: + 44 208 943 6742  
Fax: + 44 208 943 6755  
E-mail: graham.machin@npl.co.uk

**Dr Piero Marcarino**, IMGC-CNR  
Tel: + 39 011 3977 339  
Fax: + 39 011 3977 347  
E-mail: p.marcarino@imgc.cnr.it

**Dr Mikhail Matveyev**, VNIIM  
Tel: + 7 812 323 9637  
Fax: + 7 812 113 01 14  
E-mail: m.s.matveyev@vniim.ru

**Prof. Anatoly Pokhodun, VNIIM**

Tel: + 7 812 315 52 07

Fax: + 7 812 113 01 14

E-mail: a.i.pokhodun@vniim.ru

**Mr John Redgrove, NPL**

Tel: + 44 208 943 6513

Fax: + 44 208 943 6662

E-mail: john.redgrove@npl.co.uk

**Dr Dean C. Ripple, NIST**

Tel: + 1 301 975 4801

Fax: + 1 301 548 0206

E-mail: dean.ripple@nist.gov

**Dr Richard Rusby, NPL**

Tel: + 44 208 943 7036

Fax: + 44 208 943 6364

E-mail: richard.rusby@npl.co.uk

**Dr Alan Steele, NRC**

Tel: + 1 613 993 9384

Fax: + 1 613 952 1394

E-mail: alan.steele@nrc.ca

**Mr Osamu Tamura, NMIJ/AIST**

Tel: + 81 29 861 4297

Fax: + 81 29 861 4038

E-mail: o.tamura@aist.go.jp

**Dr Erich Tegeler, PTB**

Tel: + 49 30 3481 525

Fax: + 49 30 3481 504

E-mail: erich.tegeler@ptb.de

**Dr Sevilay Ugur, UME**

Tel: + 90 262 679 5000 Ext. 3453

Fax: + 90 262 679 5001

E-mail: sevilay.ugur@ume.tubitak.gov.tr

**Mr Rod White, MSL**

Tel: + 64 4 5690 491

Fax: + 64 4 5690 003

E-mail: r.white@irl.cri.nz

**Mr Yoshiro Yamada, NMIJ/AIST**

Tel: + 81 29 861 4003

Fax: + 81 29 861 4010

E-mail: y.yamada@aist.go.jp

**Observers:****Mr Vicente Chimenti Ruíz, CEM**

Tel: + 34 91 807 4714

Fax: + 34 91 807 4807

E-mail: vchimenti@mfom.es

**Dr Maria Eduarda Filipe, IPQ**

Tel: + 351 21 294 8184

Fax: + 351 21 294 8188

E-mail: efilipe@mail.ipq.pt

**Dr Edgar Méndez-Lango, CENAM**

Tel: + 52 442 211 0545

Fax: + 52 442 211 0548

E-mail: emendez@cenam.mx

**Invited by the President:****Dr Peter Bloembergen**

Tel: + 31 71 514 2409

Fax: + 31 71 514 8329

E-mail: pbloembergen@phys.leidenuniv.nl

**Dr Marten Durieux, KOL**

Tel: + 31 71 527 5619 or 527 5480

Fax: + 31 71 527 5404

E-mail: durieux@phys.leidenuniv.nl

**CCT Working Group 1***Defining fixed points and interpolating instruments***Chairman:****Dr Dean C. Ripple**, NIST

Tel: + 1 301 975 4801

Fax: + 1 301 548 0206

E-mail: dean.ripple@nist.gov

**Members:****Dr Martin de Groot**, NMi VSL

Tel: + 31 15 269 1660

Fax: + 31 15 261 2971

E-mail: mdegroot@nmi.nl

**Dr Bernd Fellmuth**, PTB

Tel: + 49 30 3481 224

Fax: + 49 30 3481 490

E-mail: bernd.fellmuth@ptb.de

**Dr Maria Eduarda Filipe**, IPQ

Tel: + 351 21 294 8184

Fax: + 351 21 294 8188

E-mail: efilipe@mail.ipq.pt

**Dr Yves Hermier**, BNM-INM

Tel: + 33 1 40 27 21 87

Fax: + 33 1 42 71 37 36

E-mail: hermier@cnam.fr

**Mr Ken D. Hill**, NRC

Tel: + 613 998 6077

Fax: + 613 952 1394

E-mail: ken.hill@nrc.ca

**Dr Kee Hoon Kang**, KRISS

Tel: + 82 42 868 5190

Fax: + 82 42 868 5022

E-mail: khkang@kriss.re.kr

**Dr Piero Marcarino**, IMGC-CNR

Tel: + 39 0 11 3977 339

Fax: + 39 0 11 3977 347

E-mail: marcarino@imgc.cnr.it

**Dr Anatoly Pokhodun**, VNIIM

Tel: + 7 812 315 52 07

Fax: + 7 812 113 01 14

E-mail: a.i.pokhodun@vniim.ru

**Assisted by:****Dr Peter Bloembergen**

Tel: + 31 71 514 2409

Fax: + 31 71 514 8329

E-mail: pbloembergen@phys.leidenuniv.nl

**Dr Mikhail Matveyev**, VNIIM

Tel: + 7 812 259 1064

Fax: + 7 812 113 0114

E-mail: m.s.matveyev@vniim.ru

## CCT Working Group 2

*Secondary fixed points and techniques of approximation to the ITS-90***Chairman:**

**Mr Ken D. Hill**, NRC  
 Tel: + 1 613 998 6077  
 Fax: + 1 613 952 1394  
 E-mail: ken.hill@nrc.ca

**Members:**

**Dr Yuning Duan**, NIM  
 Tel: + 86 10 6421 8637  
 Fax: + 86 10 6429 1990/6421 8703  
 E-mail: duanyn@nim.ac.cn

**Dr Frank Edler**, PTB, Berlin  
 Tel: + 49 30 3481 538  
 Fax: + 49 30 3941 490  
 E-mail: frank.edler@ptb.de

**Mr Murat Kalemci**, UME  
 Tel: + 90 262 679 5000 Ext. 3451  
 Fax: + 90 262 679 5001  
 E-mail: murat.kalemci@ume.tubitak.gov.tr

**M. Hans Liedberg**, CSIR-NML  
 Tel: + 27 12 841 2753  
 Fax: + 27 12 841 2131/4458  
 E-mail: hliedber@csir.co.za

**Dr Piero Marcarino**, IMGC-CNR  
 Tel: + 39 011 3977 339  
 Fax: + 39 011 3977 347  
 E-mail: p.marcarino@imgc.cnr.it

**Mr Rod White**, MSL  
 Tel: +64 4 5690 491  
 Fax: +64 4 5690 003  
 E-mail: r.white@irl.cri.nz

**Mr Yoshiro Yamada**, NMIJ/AIST  
 Tel: + 81 298 61 4031  
 Fax: + 81 298 61 4010  
 E-mail: y.yamada@aist.go.jp

**Dr Yong-Gyoo Kim**, KRISS  
 Tel: + 82 42 868 5634  
 Fax: + 82 42 868 5022  
 E-mail: dragon@kriss.re.kr

Assisted by:

**Dr Peter Bloembergen**  
 Tel: + 31 71 514 2409  
 Fax: + 31 71 514 8329  
 E-mail: pbloembergen@phys.leidenuniv.nl

**Dr Bernd Fellmuth**, PTB  
 Tel: + 49 30 3481 224  
 Fax: + 49 30 3481 490  
 E-mail: bernd.fellmuth@ptb.de

**Masahiko Gotoh**, Tamagawa Univ. Japan  
 Tel: + 81 42 739 8405  
 Fax: + 81 42 739 8858  
 E-mail: mgotoh@eng.tamagawa.ac.jp

## CCT Working Group 3

*Uncertainties***Chairman:****Mr Rod White, MSL**

Tel: +64 4 5690 491

Fax: +64 4 5690 003

E-mail: r.white@irl.cri.nz

**Members:****Dr Masaru Arai, NMIJ/AIST**

Tel: + 81 298 61 4295

Fax: + 81 298 61 4216

E-mail: masaru-arai@aist.go.jp

**Dr Mark Ballico, NML CSIRO**

Tel: + 61 2 9413 7767

Fax: + 61 2 9413 7202

E-mail: mark.ballico@tp.csiro.au

**Mr Vicente Chimenti Ruíz, CEM**

Tel: + 34 91 807 4714

Fax: + 34 91 807 4807

E-mail: vchimenti@mfom.es

**Mrs Aliye Kartal Dogan, UME**

Tel: + 90 262 679 5000 Ext. 3452

Fax: + 90 262 679 5001

E-mail: aliye.kartal@ume.tubitak.gov.tr

**Dr Stanislav Duris, SMU**

Tel: + 421 2 6029 4277

Fax: + 421 2 6542 9592

E-mail: duris@smu.gov.sk

**Mrs Maria Eduarda Filipe, IPQ**

Tel: + 351 21 294 8184

Fax: + 351 21 284 8188

E-mail: efilipe@mail.ipq.pt

**Mrs Alina Ivanova, VNIIM**

Tel: + 7 812 113 0114

Fax: + 7 812 259 1087

E-mail: a.g.ivanova@vniim.ru

**Dr Edgar Méndez-Lango, CENAM**

Tel: + 52 442 211 0545

Fax: + 52 442 211 0548

E-mail: emendez@cenam.mx

**Dr Christopher Meyer, NIST**

Tel: + 1 301 975 4825

E-mail: christopher.meyer@nist.gov

**Dr Franco Pavese, IMGC-CNR**

Tel: + 39 011 3977 341

Fax: + 39 011 3977 347

E-mail: f.pavese@imgc.cnr.it

**Dr Andrea Peruzzi, NMI VSL**

Tel: + 31 15 269 1519

Fax: + 31 15 261 2971

E-mail: aperuzzi@nmi.nl

**Mrs Eliane Renaot, BNM-INM**

Tel.: +33 1 40 27 20 21

Fax: +33 1 42 71 37 36

E-mail: renaot@cnam.fr

**Dr Steffen Rudtsch, PTB**

Tel.: +49 30 3481 650

Fax: +49 30 3481 504

E-mail: steffen.rudtsch@ptb.de

**Dr Michael Stock, BIPM**

Tel: + 33 1 45 07 70 24

Fax: +33 1 45 07 62 62

E-mail: mstock@bipm.org



**CCT Working Group 4***Thermodynamic temperature determinations and extension of the ITS-90 to lower temperatures***Chairman:**

**Dr R.L. Rusby**, NPL  
 Tel: + 44 208 943 7036  
 Fax: + 44 208 943 6755  
 E-mail: rlr@newton.npl.co.uk

**Members:**

**Dr Joachim Fischer**, PTB Berlin  
 Tel: + 49 30 34 81 369  
 Fax: + 49 30 34 81 490  
 E-mail: joachim.fischer@ptb.de

**Dr Michael R. Moldover**, NIST  
 Tel: + 1 301 975 2459  
 E-mail: michael.moldover@nist.gov

**Dr Lex Reesink**, NRC  
 Tel: + 1 613 993 9384  
 Fax: + 1 613 952 1394  
 E-mail: lex.reesink@nrc.ca

**Mr Peter Steur**, IMG C  
 Tel: + +39 011 3977 342  
 Fax: +39 011 3977 347  
 E-mail: p.steur@imgc.cnr.it

**Mr Rod White**, MSL  
 Tel: +64 4 5690 491  
 Fax: + 64 4 5690 003  
 E-mail: r.white@irl.cri.nz

Assisted by:

**Dr Marten Durieux**, KOL  
 Tel: + 31 71 527 5619 or 527 5480  
 Fax: + 31 71 527 5404  
 E-mail: durieux@phys.leidenuniv.nl

**Dr Ralph P. Hudson**, Ultim et International  
 Tel: + 1 301 657 9704  
 Fax: + 1 301 975 5378 (at NIST)  
 E-mail: rhudson@worldnet.att.net

**CCT Working Group 5***Radiation thermometry***Chairman:**

**Dr Joachim Fischer**, PTB Berlin  
 Tel: + 49 30 34 81 369  
 Fax: + 49 30 34 81 490  
 E-mail: joachim.fischer@ptb.de

**Members:**

**Dr Mark Ballico**, NML CSIRO  
 Tel: + 61 2 9413 7767  
 Fax: + 61 2 9413 7202  
 E-mail: mark.ballico@tip.csiro.au

**Dr Mauro Battuello**, IMG C-CNR  
 Tel: + 39 011 3977 338  
 Fax: + 39 011 3977 347  
 E-mail: m.battuello@imgc.cnr.it

**Dr Howard W. Yoon**, NIST  
 Tel: + 1 301 975 2482  
 E-mail: howard.yoon@nist.gov

**Dr Graham Machin**, NPL  
 Tel: + 44 208 943 6742  
 Fax: + 44 208 614 0491  
 E-mail: graham.machin@npl.co.uk

**Dr Mikhail Matveyev**, VNIIM  
Tel: + 7 812 259 1064  
Fax: + 7 812 113 0114  
E-mail: m.s.matveyev@vniim.ru

**Dr Seung Nam Park**, KRIS  
Tel: +82 42 868 5222  
Fax: +82 42 868 5188  
E-mail: snpark@kriss.re.kr

**Mr Mohamed Sadli**, BNM-INM  
Tel: + 33 1 40 27 21 55  
Fax: 01 42 71 37 36  
E-mail: sadli@cnam.fr

**Dr Fumihiko Sakuma**, NMIJ/AIST  
Tel: + 81 298 61 4031  
Fax: + 81 298 61 4010  
E-mail: fsakuma@aist.go.jp

**Dr Peter Saunders**, MSL  
Tel: +64 4 569 0000  
Fax: + 64 4 569 0003  
E-mail: p.saunders@irl.cri.nz

**Dr Sevilay Ugur**, UME  
Tel: + 90 262 679 5000 Ext. 3453  
Fax: + 90 262 679 5001  
E-mail: sevilay.ugur@ume.tubitak.gov.tr

**Dr Eric van der Ham**, NMi VSL  
Tel: + 31 15 2691 586  
Fax: + 31 15 2612 971  
E-mail: evdham@nmi.nl

**Dr Li Wang**, SPRING Singapore  
Tel: + 65 772 9776  
Fax: + 65 778 3798  
E-mail: wangli@spring.gov.sg

**Dr Yuan Zundong**, NIM  
Tel: + 86 10 6421 8637  
Fax: + 86 10 6429 1990  
E-mail: yuanzd@nim.ac.cn

Assisted by:

**Dr Peter Bloembergen**  
Tel: + 31 71 514 2409  
Fax: + 31 71 514 8329  
E-mail: pbloembergen@phys.leidenuniv.nl

**Mr Yoshiro Yamada**, NMIJ/AIST  
Tel: + 81 29 861 4003  
Fax: + 81 29 861 4010  
E-mail: y.yamada@aist.go.jp

Liaison with CCPR:

**Dr Nigel Fox**, NPL  
Tel: + 44 208 943 6825  
Fax: + 44 208 943 6935  
E-mail: nigel.fox@npl.co.uk

**CCT Working Group 6***Humidity measurements***Chairman:****Dr Peter H. Huang**, NIST

Tel: + 1 301 975 2621

Fax: + 1 301 548 0206

E-mail: phuang@nist.gov

**Members:****Dr Stephanie Bell**, NPL

Tel: + 44 208 943 6402

Fax: + 44 208 943 6306

E-mail: sab@newton.npl.co.uk

**Mr Bernard Cretinon**, BNM

Tel: +33 1 56 56 88 88

Fax: +33 1 56 56 88 70

**Dr Vito Fernicola**, IMGC-CNR

Tel: +39 011 3977 337

Fax: + 39 011 3977 347

E-mail: v.fernicola@imgc.cnr.it

**Mr Y. Hong**, NRCCRM**Dr Hiroshi Kitano**, NMIJ/AIST

Tel: + 81 298 61 4222

Fax: + 81 298 61 4135

E-mail: h.kitano@aist.go.jp

**Mr Jeremy Lovell-Smith**, MSL

Tel: +64 4 569 0000

Fax: +64 4 569 0003

E-Mail: j.lovell-smith@irl.cri.nz

**Dr George Mamontov**, VNIIM

Tel: + 7 812 176 9483

Fax: + 7 812 176 9483

**Dr Enrique Martines-López**, CENAM

Tel: + 52 442 211 0500 Ext. 3420

Fax: + 52 442 211 0548

E-mail: emartine@cenam.mx

**Mr Hyun-Soo Nham**, KRISS

Tel: + 82 42 868 5195

Fax: + 82 42 868 5290

E-mail: nhs@kriss.re.kr

**Mr Jan Nielsen**, NMI VSL

Tel: + 31 15 269 1622

Fax: + 31 15 261 2971

E-mail: jnielsen@nmi.nl

**Dr Günter Scholz**, PTB

Tel: + 49 531 592 3230

Fax: + 49 531 592 3369

E-mail: guenter.scholz@ptb.de

**Dr Sevilay Ugur**, UME

Tel: + 90 262 679 5000 Ext. 3453

Fax: + 90 262 679 5001

E-mail: sevilay.ugur@ume.tubitak.gov.tr

**Dr Li Wang**, SPRING Singapore

Tel: + 65 7729 776

Fax: + 65 3410 846

E-mail: wangli@spring.gov.sg

## CCT Working Group 7

*Key comparisons***Chairman:****Dr Alan Steele, NRC**

Tel: + 1 613 993 9384

Fax: + 1 613 952 1394

E-mail: alan.steele@nrc.ca

**Members:****Dr Mark Ballico, NML CSIRO**

Tel: + 61 2 9413 7767

Fax: + 61 2 9413 7202

E-mail: mark.ballico@tip.csiro.au

**Dr Franco Pavese, IMGC-CNR**

Tel: + 39 011 3977 341

Fax: + 39 011 3977 347

E-mail: f.pavese@imgc.cnr.it

**Dr Stephanie Bell, NPL**

Tel: + 44 208 943 6402

Fax: + 44 208 943 6306

E-mail: sab@newton.npl.co.uk

**Dr Richard Rusby, NPL**

Tel: + 44 208 943 7036

Fax: + 44 208 943 6755

E-mail: richard.rusby@npl.co.uk

**Mr Georges Bonnier, BNM-INM**

Tel: + 33 1 40 27 21 58

Fax: + 33 1 40 27 26 32

E-mail: bonnier@cnam.fr

**Dr Michael Stock, BIPM**

Tel: + 33 1 45 07 70 24

Fax: +33 1 45 07 62 62

E-mail: mstock@bipm.org

**Dr Martin J. de Groot, NMi VSL**

Tel: + 31 15 269 1661

Fax: + 31 15 261 2971

E-mail: mdegroot@nmi.nl

**Mr Gregory F. Strouse, NIST**

Tel: + 1 301 975-4803

Fax: + 1 301 548 0206

E-mail: gstrouse@nist.gov

**Dr Kee Hoon Kang, KRISS**

Tel: + 82 42 868 5190

Fax: + 82 42 868 5022

E-mail: khkang@kriss.re.kr

**Dr Erich Tegeler, PTB**

Tel: + 49 30 3481 525

Fax: + 49 30 3481 504

E-mail: erich.tegeler@ptb.de

**CCT Working Group 8***Calibration and measurement capabilities***Chairman:****Dr Martin J. de Groot**, NMI VSL

Tel: + 31 15 269 1661

Fax: + 31 15 261 2971

E-mail: mdegroot@nmi.nl

**Members:****Dr Mark Ballico**, NML CSIRO

Tel: + 61 2 9413 7767

Fax: + 61 2 9413 7202

E-mail: mark.ballico@csiro.au

**Prof. Anatoly Pokhodun**, VNIIM

Tel: + 7 812 315 52 07

Fax: + 7 812 113 01 14

E-mail: a.i.pokhodun@vniim.ru

**Mr Hans Liedberg**, CSIR-NML

Tel: + 27 12 841 2753

Fax: + 27 12 841 2131/4458

E-mail: hliedber@csir.co.za

**Mr Gregory F. Strouse**, NIST

Tel: + 1 301 975 4803

Fax: + 1 301 548 0206

E-mail: gstrouse@nist.gov

**CCT Working Group 9***Thermophysical properties***Chairman:****Mr John Redgrove**, NPL

Tel: + 44 208 943 6513

Fax: + 44 208 943 6458

E-mail: john.redgrove@npl.co.uk

**Members:****Dr Giancarlo Bussolino**, IMGC

Tel: + 39 011 3977 342

Fax: +39 011 3977 347

E-mail: g.bussolino@imgc.cnr.it

**Dr Jean-Rémy Filtz**, BNM-LNE

Tel: + 33 1 3069 1215

Fax: + 33 1 3069 1234

E-mail: jean-remy.filtz@lne.fr

**Prof. Carlos Nieto de Castro**, IPQ

Tel: + 351 212 948 105

Fax: + 351 212 948 110

E-mail: ncastro@mail.ipq.pt

**Dr Leonard Hanssen**, NIST

Tel: + 1 301 975 2344

E-mail: leonard.hanssen@nist.gov

**Dr Juntaro Ishii**, NMIJ

Tel: + 81 298 61 4031

Fax: + 81 298 61 4010

E-mail: j-ishii@aist.go.jp

**Dr Sang Hyun Lee**, KRISS

Tel: + 82 42 868 5199

Fax: + 82 42 868 5022

E-mail: leesh@kriss.re.kr

**Mrs Ping Qiu**, NIM

Tel: + 86 10 6421 8637

Fax: + 86 10 6429 1990

E-mail: qiup@nim.ac.cn

**Dr Stefan Sarge**, PTB

Tel: + 49 531 592 3140

E-mail: stefan.sarge@ptb.de

VNIIM (nominee not yet known)

## Consultative Committee for Length (CCL)

Created in 1952

*Present activities concern matters related to the definition and realization of the metre, practical length and angle measurement and advice to the CIPM in the field of length metrology.*

**President:** **Dr Myung Sai Chung**  
 President  
 University of Science and Technology (UST)  
 52 Eoeun-dong  
 Yuseong-gu  
 305-333 Daejeon  
 Korea, Republic of  
 Tel: + 82 42 864 5550  
 Fax: + 82 42 865 3974  
 E-mail: mschung@kriss.re.kr or mschung@ust.ac.kr

**Executive Secretary:** **Mr Raymond Felder**, BIPM  
 Tel: + 33 1 45 07 70 52  
 Fax: + 33 1 45 34 20 21  
 E-mail: rfelder@bipm.org

### Members:

Centre for Metrology and Accreditation/Mittatekniikan Keskus [MIKES], Helsinki  
 Centro Nacional de Metrología [CENAM], Querétaro  
 Czech Metrology Institute [CMI], Praha  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Institut National de Métrologie [BNM-INM], Paris  
 Istituto di Metrologia «Gustavo Colonnetti» del Consiglio Nazionale delle Ricerche [IMGC-CNR], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg/Joint Institute for Laboratory  
 Astrophysics [JILA], Boulder  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

### Observers:

Centro Español de Metrología [CEM], Madrid  
 CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore

**Delegates and experts of member laboratories  
at the last meeting (September 2003)**

**President: Dr Chung Myung Sai**

**Members:**

**Dr Petr Balling, CMI**

Tel: + 420 257 288 326

Fax: + 420 257 328 077

E-mail: pballing@cmi.cz

**Dr Jürgen Helmcke, PTB**

Tel: + 49 531 592 4300

Fax: + 49 531 592 4305

E-mail: juergen.helmcke@ptb.de

**Dr Rob H. Bergmans, NMI VSL**

Tel: + 31 15 269 1641

Fax: + 31 15 261 2971

E-mail: rbergmans@nmi.nl

**Dr Leo W. Hollberg, NIST**

Tel: + 1 303 497 5770

Fax: + 1 303 497 7845

E-mail: hollberg@boulder.nist.gov

**Dr Fabrizio Bertinotto, IMGC-CNR**

Tel: + 39 011 3977 454/455

Fax: + 39 011 3977 459

E-mail: f.bertinotto@imgc.cnr.it

**Dr Patrick Juncar, BNM-INM**

Tel: + 33 1 40 27 27 05

Fax: + 33 1 42 71 37 36

E-mail: juncar@cnam.fr

**Dr Nick Brown, NML CSIRO**

Tel: + 61 2 9413 7157

Fax: + 61 2 9413 7202

E-mail: nick.brown@csiro.au

**Dr Alexander N. Korolev, VNIIM**

Tel: + 7 812 251 8638

Fax: + 7 812 113 0114

E-mail: a.korolev@vniim.ru or al\_korolev@mail.r

**Dr Cheon Il Eom, KRISS**

Tel: + 82 42 868 5106

Fax: + 82 42 868 5608

E-mail: cieom@kriss.re.kr

**Dr Antti Lassila, MIKES**

Tel: + 358 9 6167 521

Fax: +358 9 6167 467

E-mail: antti.lassila@mikes.fi

**Dr Roman Fíra, SMU**

Tel: + 421 2 602 94 232

Fax: + 421 2 654 29 592

E-mail: fira@smu.gov.sk

**Dr Andrew Lewis, NPL**

Tel: + 44 208 943 6124

Fax: + 44 208 614 0533

E-mail: andrew.lewis@npl.co.uk

**Prof. Sitian Gao, NIM**

Tel: + 86 10 8425 6784

Fax: + 86 10 8425 1574

E-mail: gaost@nim.ac.cn

**Dr Alan Madej, NRC**

Tel: + 1 613 993 9385

Fax: + 1 613 952 1394

E-mail: alan.madej@nrc.ca

**Dr Patrick Gill, NPL**

Tel: + 44 208 943 6986

Fax: + 44 208 943 7153

E-mail: patrick.gill@npl.co.uk

**Dr Hirokazu Matsumoto, NMIJ/AIST**

Tel: + 81 29 861 4034

Fax: + 81 29 861 4006

E-mail: hi.matsumoto@aist.go.jp

**Dr Mikhail Gubin, VNIIM**

E-mail: mgubin@okb.lpi.troitsk.ru or

mgubin@x4lebedev.ru

**Dr Atsushi Onae, NMIJ/AIST**

Tel: + 81 29 861 4274

Fax: + 81 29 861 4045

E-mail: a-onae@aist.go.jp



**Dr Jim Pekelsky, NRC**  
Tel: + 1 613 993 7578  
Fax: + 1 613 952 1394  
E-mail: jim.pekelsky@nrc.ca

**Dr Daniele Rovera, BNM-SYRTE**  
Tel: + 33 1 40 51 22 12  
Fax: + 33 1 43 25 55 42  
E-mail: danielle.rovera@obspm.fr

**Dr Attilio Sacconi, IMGC-CNR**  
Tel: + 39 011 3977 466/306  
Fax: + 39 011 346 761  
E-mail: a.sacconi@imgc.cnr.it

**Dr Harald Schnatz, PTB**  
Tel: + 49 531 592 4311  
Fax: + 49 531 592 4305  
E-mail: harald.schnatz@ptb.de

**Dr Jack Stone, NIST**  
Tel: + 1 301 975 5638  
Fax: + 1 301 869 0822  
E-mail: jack.stone@nist.gov

**Dr Rudolf Thalmann, METAS**  
Tel: + 41 31 32 33 385  
Fax: + 41 31 32 33 210  
E-mail: rudolf.thalmann@metas.ch

**Mr Georges-Pierre Vaillau, BNM-LNE**  
Tel: + 33 1 40 43 38 24  
Fax: + 33 1 40 43 37 37  
E-mail: georges.vaillau@lne.fr

**Dr Miguel Viliesid, CENAM**  
Tel: + 52 442 211 0574  
Fax: + 52 442 215 3903  
E-mail: mviliesi@cenam.mx

**Dr Tanfer Yandayan, UME**  
Tel: + 90 262 679 5000  
Fax: + 90 262 679 5001  
E-mail: tanfer.yandayan@ume.tubitak.gov.tr

**Dr Tai Hyun Yoon, KRIS**  
Tel: + 82-42-868-5280  
Fax: + 82 42 868 5282  
E-mail: thyoon@kriss.re.kr

#### Observers:

**Mr Oelof Kruger, CSIR-NML**  
Tel: + 27 12 841 4340  
Fax: + 27 12 841 4458  
E-mail: oakruger@csir.co.za

**Mr Emilio Prieto, CEM**  
Tel: + 34 91 8074 716  
Fax: + 34 91 8074 807  
E-mail: eprieto@mfom.es

**Dr Siew Leng Tan, SPRING Singapore**  
Tel: + 65 7729 598  
Fax: + 65 7795 235  
E-mail: siewleng@spring.gov.sg

## CCL Working Group on Dimensional Metrology (WGDM)

List of the participants at the meeting of 17-18 September 2002

<b>Chairman:</b> Nick Brown, NML CSIRO	nick.brown@tip.csiro.au
<b>Chung Myung Sai</b> , President CCL, KRISS	mschung@kriss.re.kr or mschung@ust.ac.kr
<b>Jim Pekelsky</b> , Outgoing Chairman, NRC	pekelsky@nrc.ca
<b>Terry J. Quinn</b> , Former Director of the BIPM	tquinn@bipm.org
<b>Andrew Wallard</b> , Deputy Director, BIPM	awallard@bipm.org
<b>Andrew Lewis</b> , Rapporteur, NPL	andrew.lewis@npl.co.uk
<b>Regional member organizations:</b>	
APMP: <b>Cheon Il Eom</b> , KRISS	cieom@kistep.re.kr
SADCMET: <b>Oelof Kruger</b> , CSIR NML	oakruger@csir.co.za
SIM: <b>Miguel Viliesid</b> , CENAM	mviliesi@cenam.mx
<b>Discussion group moderators:</b>	
<b>Ruedi Thalmann</b> , METAS	rudolf.thalmann@metas.admin.ch
<b>John Stoup</b> , NIST	wgdm5.moderator@nist.gov
<b>Leonid Vitushkin</b> , BIPM	wgdm7@bipm.org
<b>Hirokazu Matsumoto</b> , NMIJ	hi.matsumoto@aist.go.jp
<b>Other participants:</b>	
<b>Alesandro Balsamo</b> , IMGC	a.balsamo@imgc.to.cnr.it
<b>Rob Bergmans</b> , NMi VSL	rbergmans@nmi.nl
<b>Jennifer Decker</b> , NRC	jennifer.decker@nrc.ca
<b>Klaus Hasche</b> , PTB	klaus.hasche@ptb.de
<b>Antti Lassila</b> , MIKES	antti.lassila@mikes.fi
<b>Emilio Prieto</b> , CEM	eprieto@mfom.es
<b>Jack Stone</b> , NIST	jack.stone@nist.gov
<b>Toshiyuki Takatsuji</b> , NMIJ	toshiyuki.takatsuji@aist.go.jp
<b>Siew Leng Tan</b> , SPRING	siewleng@spring.gov.sg
<b>Claudine Thomas</b> , BIPM	cthomas@bipm.org
<b>Georges Vailleau</b> , BNM-LNE	georges.vailleau@lne.fr
<b>Gan Xu</b> , SPRING	xugan@spring.gov.sg
<b>Tanfer Yandayan</b> , UME	tanfer.yandayan@ume.tubitak.gov.tr

**CCL Working Group for the "*Mise en pratique*"**

**Chairman: Dr Patrick Gill, NPL**  
Tel: + 44 208 943 6986  
Fax: + 44 208 943 2945  
E-mail: [patrick.gill@npl.co.uk](mailto:patrick.gill@npl.co.uk)

**Members:**

BNM-INM  
BNM-SYRTE  
CENAM  
CMI  
IMGC  
KRISS  
MIKES  
NIST  
NMIJ/AIST  
NMI VSL  
NML CSIRO  
NPL  
NRC  
PTB  
UME  
BIPM

**Consultative Committee for Time and Frequency (CCTF)****Created in 1956**

*Present activities concern matters related to the definition and realization of the second, establishment and diffusion of International Atomic Time (TAI) and Coordinated Universal Time (UTC) and advice to the CIPM on matters related to time and time scales.*

**President:**       **Prof. Sigfrido Leschiutta**  
 President  
 Politecnico Torino  
 c/o Istituto Elettrotecnico Nazionale "Galileo Ferraris"  
 Strada delle Cacce, 91  
 I-10135 Torino  
 Italy  
 Tel: + 39 011 39 19 543  
 Fax: + 39 011 346 384  
 E-mail : siglesc@ien.it

**Executive Secretary:**   **Dr Elisa Felicitas Arias, BIPM**  
 Tel: + 33 1 45 07 70 76  
 Fax: + 33 1 45 07 70 59  
 E-mail: farias@bipm.org

**Members :**

Institute for Physical-Technical and Radiotechnical Measurements, Gosstandart of Russia [VNIIFTRI], Moscow  
 International Telecommunication Union [ITU], Radiocommunication Bureau  
 International Union of Geodesy and Geophysics [IUGG]  
 International Union of Radio Science [URSI]  
 International Astronomical Union [IAU]  
 Istituto Elettrotecnico Nazionale "Galileo Ferraris" [IEN], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 National Institute of Information and Communications Technology [NICT], Tokyo  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Boulder  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL], Teddington  
 National Physical Laboratory of India [NPLI], New Delhi  
 National Physical Laboratory of Israel [INPL], Jerusalem  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Observatoire Cantonal [ON], Neuchâtel  
 Observatoire Royal de Belgique [ORB], Bruxelles  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Real Instituto y Observatorio de la Armada [ROA], Cadiz  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 SYstèmes de Référence Temps Espace [BNM-SYRTE], Paris  
 Technical University [TUG], Graz  
 U.S. Naval Observatory [USNO], Washington  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 Space Research Center of the Polish Academy of Sciences [SRC], Warsaw  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore

**Delegates and experts of member laboratories  
 at the last meeting (April 2004)**

**President : Prof. Sigfrido Leschiutta**

**Members:**

**Dr Thomas R Bartholomew, ITU-R**

**Dr Andreas Bauch, PTB**

Tel: + 49 531 592 4320

Fax: + 49 531 592 4479

E-mail: andreas.bauch@ptb.de

**Dr Ronald Beard, ITU-R**

Tel: + 1 202 404 7054

Fax: + 1 202 767 2845

E-mail: ronald.beard@nrl.navy.mil or  
 ronald.beard@ties.itu.int

**Dr Claude Boucher, IUGG**

Tel: + 33 1 55 55 98 96

Fax: + 33 1 55 55 98 46

E-mail: cbpro@club-internet.fr or  
 boucher@ensg.ign.fr

**Dr Jean-Simon Boulanger, NRC**

Tel: + 1 613 993 5698

Fax: + 1 613 952 1394

E-mail: jean-simon.boulanger@nrc.ca

**Dr André Clairon, BNM-SYRTE**

Tel: + 33 1 40 51 23 33

Fax: + 33 1 43 25 55 42

E-mail: andre.clairon@obspm.fr

**Dr Gerrit de Jong, NMi VSL**

Tel: + 31 15 2691 623

Fax: + 31 15 2612 971

E-mail: gdejong@nmi.nl

**Dr Pascale Defraigne, ORB**

Tel: + 32 2 373 0260

Fax: + 32 2 374 9822

E-mail: pascale.defraigne@oma.be

**Dr Noël Dimarcq, BNM-SYRTE**

Tel: + 33 1 40 51 22 53

Fax: + 33 1 43 25 55 42

E-mail: noel.dimarcq@obspm.fr

**Dr Yury S. Domnin, VNIIFTRI**

Tel: + 7 095 535 9151

Fax: + 7 095 534 0609

E-mail: ydomnin@imvp.aspnet.ru

**Dr Gregor Dudle, METAS**

Tel: + 41 31 32 33 298

Fax: + 41 31 32 33 210

E-mail: gregor.dudle@metas.ch

**Dr Peter Fisk, NML CSIRO**

Tel: + 61 2 9413 7221

Fax: + 61 2 9413 7383

E-mail: peter.fisk@csiro.au

**Prof. Dr Toshio Fukushima, IAU**

Tel: + 81 422 34 3613

Fax: + 81 422 34 3810

E-mail: toshio.fukushima@nao.ac.jp

**Dr Francisco Javier Galindo, ROA**

Tel: + 34 956 599 286

Fax: + 34 956 599 366

E-mail: jgalindo@roa.es

**Prof. Xiaoxun Gao, NIM**

Tel: + 86 10 6421 6289

Fax: + 86 10 6421 6289

E-mail: gaoxx@nim.ac.cn

**Dr Aldo Godone, IEN**  
 Tel: + 39 011 391 9232  
 Fax: + 39 011 391 9259  
 E-mail: godone@ien.it

**Dr Dale Henderson, NPL**  
 Tel: + 44 208 943 6747  
 Fax: + 44 208 943 7138  
 E-mail: dale.henderson@npl.co.uk

**Dr Mizuhiko Hosokawa, NICT**  
 Tel: + 81 42 327 7557  
 Fax: + 81 42 327 6694  
 E-mail: hosokawa@nict.go.jp

**Dr Takeshi Ikegami, NMIJ/AIST**  
 Tel: + 81 29 861 4253  
 Fax: + 81 29 861 4245  
 E-mail: t.ikegami@aist.go.jp

**Dr Kenneth J. Johnston, USNO**  
 Tel: + 1 202 762 1513  
 Fax: + 1 202 762 1461  
 E-mail: johnston.kenneth@usno.navy.mil

**Dr Nicholas Koshelyaevsky, VNIIFTRI**  
 Tel: + 7 095 534 8222  
 Fax: + 7 095 534 0609  
 E-mail: nkoshelyaevsky@imvp.aspnet.ru

**Dr Ho Seong Lee, KRIS**  
 Tel: + 82 42 868 5020  
 Fax: + 82 42 868 5022  
 E-mail: hslee@kriss.re.kr

**Dr Judah Levine, NIST**  
 Tel: + 1 303 497 3903  
 Fax: + 1 303 497 6461  
 E-mail: jlevine@boulder.nist.gov

**Dr Alan Madej, NRC**  
 Tel: + 1 613 993 9385  
 Fax: + 1 613 952 1394  
 E-mail: alan.madej@nrc.ca

**Dr Demetrios N. Matsakis, USNO**  
 Tel: + 1 202 762 1587  
 Fax: + 1 202 762 1511  
 E-mail: dnm@usno.navy.mil

**Mr James Mc A. Steele, URSI**  
 Tel: + 44 1276 22231  
 Fax: + 44 208 943 2155  
 E-mail: james.steele@tesco.net

**Dr Dennis McCarthy, USNO**  
 Tel: + 1 202 762 1837  
 Fax: + 1 202 762 1563  
 E-mail: dmc@maia.usno.navy.mil

**Mr Takao Morikawa, NICT**  
 Tel: + 81 42 327 7554  
 Fax: + 81 42 327 6687  
 E-mail: tak@nict.go.jp

**Dr Thomas R. O'Brian, NIST**  
 Tel: + 1 303 497 4570  
 E-mail: obrian@boulder.nist.gov

**Dr Shin-ichi Ohshima, NMIJ/AIST**  
 Tel: + 81 29 861 4252  
 Fax: + 81 29 861 4210  
 E-mail: s.ohshima@aist.go.jp

**Dr Juan Palacio, ROA**  
 Tel: + 34 956 599 286  
 Fax: + 34 956 599 366  
 E-mail: jpalacio@roa.es

**Dr Thomas E. Parker, NIST**  
 Tel: + 1 303 497 7881  
 Fax: + 1 303 497 6461  
 E-mail: tparker@boulder.nist.gov

**Dr Fritz Riehle, PTB**  
 Tel: + 49 531 592 4010  
 Fax: + 49 531 592 4015  
 E-mail: fritz.riehle@ptb.de

**Dr Patrizia Tavella, IEN**  
 Tel: + 39 011 391 9235  
 Fax: + 39 011 391 9259  
 E-mail: tavella@ien.it

**Dr Pierre Thomann, ON**  
 Tel: + 41 32 889 6870 or 889 8836 (direct)  
 Fax: + 41 32 722 0420  
 E-mail: pierre.thomann@ne.ch

**Dr Pierre Uhrich, BNM-SYRTE**  
 Tel: + 33 1 40 51 22 17  
 Fax: + 33 1 43 25 55 42  
 E-mail: pierre.uhrich@obspm.fr

**Dr Dai Hyuk Yu, KRIS**  
 Tel: + 82 42 868 5145  
 Fax: + 82 42 868 5287  
 E-mail: dhyu@kriss.re.kr

**Observers:**

**Mr Hock Ann Chua**, SPRING Singapore  
Tel: + 65 6773 9850  
Fax: + 65 6773 9804  
E-mail: hachua@spring.gov.sg

**Mr Louis Marais**, CSIR-NML  
Tel: + 27 12 841 3013  
Fax: + 27 12 841 2131  
E-mail: elmarais@csir.co.za

**Dr Ramiz Hamid**, UME  
Tel: + 90 262 679 5000  
Fax: + 90 262 679 5001  
E-mail: ramiz.hamid@ume.tubitak.gov.tr

**Dr Jerzy Nawrocki**, SRC  
Tel: + 48 22 851 1810 or 840 3570  
Fax: + 48 22 840 3131  
E-mail: nawrocki@cbk.poznan.pl

**Invited by the President:**

**Dr William J. Klepczynski**,  
Tel: + 1 410 798 8457  
Fax: + 1 410 798 8567  
E-mail: wklepczy@comcast.net or  
klepczynskiwj@state.gov

**Dr Mohd Nasir Zainal Abidin**, NML-SIRIM  
Tel: + 60 3 5544 6831  
Fax: + 60 3 5544 6841  
E-mail: mohd.nasir\_z.abidin@sirim.my

**Dr Chia-Shu Liao**, TL  
Tel: + 886 3 424 4441  
Fax: + 886 3 424 5474  
E-mail: csliao@ms.chttl.com.tw

**Dr Robert A. Nelson**, SERC  
Tel: + 1 301 657 9641  
Fax: + 1 301 657 9642  
E-mail: robtnelson@aol.com

**Dr Ken Senior**, NRL  
Tel: + 1 202 767 2043  
Fax: + 1 202 767 2845  
E-mail: ken.senior@nrl.navy.mil

**CCTF Working Group on the Consequences of the CIPM MRA**

**Chairman:**

**Dr Gerrit de Jong**, NMI VSL  
Tel: + 31 15 2691 623  
Fax: + 31 15 2612 971  
E-mail: gdejong@nmi.nl

**CCTF Working Group on TAI**

*The CCTF working group on TAI was set up by the CCDS in 1985 to make proposals for improvements in TAI and UTC based upon the needs of users. It organizes meetings of representatives of contributing laboratories to TAI, on the days preceding meetings of CCTF.*

**Chairwoman: Dr Patrizia Tavella, IEN**

Tel : + 39 011 391 9235

Fax : + 39 011 391 9259

E-mail: [tavella@tf.ien.it](mailto:tavella@tf.ien.it)

**Members:**

Representative of the IAU

Representative of the IUGG

Representative of the URSI

Representative of the ITU

Representative of the CIPM

**Prof. Jean Kovalevsky**

Tel: + 33 4 93 40 53 87

Fax: + 33 4 93 40 53 33

E-mail: [kovalevsky@obs-azur.fr](mailto:kovalevsky@obs-azur.fr)

**Prof. Andrew Wallard**

Tel: + 33 1 45 07 70 00

Fax: + 33 1 45 34 86 70

E-mail: [awallard@bipm.org](mailto:awallard@bipm.org)

BIPM Time section

**Dr Gérard Petit**

Tel: + 33 1 45 07 70 67

Fax: + 33 1 45 07 70 59

E-mail: [gpetit@bipm.org](mailto:gpetit@bipm.org)



**CCTF Group on GNSS\* Time Transfer Standards (CGGTTS)**

\*GNSS = Global navigation satellite systems

**Chairman:****Dr Judah Levine, NIST**

Tel: + 1 303 497 3903

Fax.: + 1 303 497 6461

E-mail: jlevine@boulder.nist.gov

**Members:**

No official membership has been drawn up for the sub-group which organizes open forums whose attendees are representatives of national timing centres and manufacturers of GPS and GLONASS time receivers. However, a core of members can be listed as follows.

**Dr D.W. Allan** (Chairman till December 1996)

Tel: + 1 801 445 3216

Fax: + 1 801 445 3215

E-mail: 103077.1377@compuserve.com

**Mr Jacques Azoubib, BIPM**

Tel: + 33 1 45 07 70 62

Fax: + 33 1 45 07 70 59

E-mail: jazoubib@bipm.org

**Dr Franco Cordara, IEN**

Tel: + 39 0 11 39 19 239

Fax: + 39 0 11 34 87 046

E-mail: cordara@tf.ien.it

**Mr J. Danaher**

3S Navigation

Tel: + 1 714 830 3777

Fax: + 1 714 830 8411

E-mail: glonassman@aol.com

**Mr Michito Imae, NICT**

Tel: + 81 423 27 7566

Fax: + 81 423 27 6686

E-mail: imae@nict.go.jp

**Dr Gerrit de Jong, NMi VSL**

Tel: + 31 15269 16 23

Fax: + 31 15261 29 71

E-mail: gdejong@nmi.nl

**Prof. Dr Dieter Kirchner, TUG**

Tel: + 43 316 873 7441

Fax: + 43 316 873 46 36 97

E-mail: kirchner@inw.tu-graz.ac.at

**Dr William J. Klepczynski**

Innovative Solutions International

Tel: + 1 703 841 2669

Fax: + 1 703 465 9158

E-mail: wklepczy@aol.com

**Dr N. Kosheylevsky, NPO-VNIIFTRI**

Tel: + 7 095 534 8222

Fax: + 7 095 534 0609

E-mail: atime@adonis.iasnet.com

**Dr Wlodzimierz Lewandowski, BIPM**

(Secretary of the Working Group)

Tel: + 33 1 45 07 70 63

Fax: + 33 1 45 07 70 59

E-mail: wlewandowski@bipm.org

**Dr Gérard Petit, BIPM**

Tel: + 33 1 45 07 70 67

Fax: + 33 1 45 07 70 59

E-mail: gpetit@bipm.org

**Dr Pierre Uhrich, BNM-SYRTE**

Tel: + 33 1 40 51 22 16

Fax: + 33 1 43 25 55 42

E-mail: pierre.uhrich@obspm.fr

**Dr M.A. Weiss, NIST**

Tel: + 1 303 497 3261

Fax: + 1 303 497 6461

E-mail: mweiss@boulder.nist.gov

### Sub-Group of the CCTF Working Group on TAI on Algorithms

#### Chairwoman:

**Dr Patrizia Tavella**, IEN  
 Tel: + 39 011 391 9235  
 Fax: + 39 011 391 9259  
 E-mail: tavella@tf.ien.it

No official membership is established.

### CCTF Working Group on Two-way Satellite Time and Frequency Transfer

#### Chairman:

**Dr William J. Klepczynski**  
 Tel: + 1 703 841 2669  
 Fax: + 1 703 465 9158  
 E-mail: wklepczy@aol.com

#### Members:

No official membership has been drawn up for this working group which organizes meetings whose attendees are representatives of national timing centres interested in two-way time and frequency transfer and manufacturers of two-way equipment. However, a core of members can be listed as follows:

**Mr Jacques Azoubib**, BIPM  
 Tel: + 33 1 45 07 70 62  
 Fax: + 33 1 45 07 70 59  
 E-mail: jazoubib@bipm.org

**Dr Françoise Baumont**, OCA/CERGA  
 Tel: + 33 4 93 40 53 38  
 Fax: + 33 4 93 40 53 33  
 E-mail: baumont@obs-azur.fr

**Dr Franco Cordara**, IEN  
 Tel: + 39 0 11 39 19 239  
 Fax: + 39 0 11 34 87 046  
 E-mail: cordara@tf.ien.it

**Dr J. Davis**, NPL  
 Tel: + 44 208 943 71 37  
 Fax: + 44 208 943 71 39  
 E-mail: jad@newton.npl.co.uk

**Dr G. de Jong**, NMi VSL  
 Tel: + 31 15269 16 23  
 Fax: + 31 15261 29 71  
 E-mail: gdejong@nmi.nl

**Dr J.A. De Young**  
 U.S. Naval Observatory  
 Tel: + 1 202 762 15 00  
 Fax: + 1 202 762 15 11  
 E-mail: dey@herschel.usno.navy.mil

**Dr Peter Fisk**, NML CSIRO  
 Tel: + 61 2 9413 7221  
 Fax: + 61 2 9413 7200  
 E-mail: peterf@swifty.tip.csiro.au

**Dr P. Hetzel**, PTB  
 Tel: + 49 531 592 44 30  
 Fax: + 49 531 592 44 79  
 E-mail: peter.hetzel@ptb.de

**Mr Michito Imae**, NICT  
 Tel: + 81 423 27 7566  
 Fax: + 81 423 27 6686  
 E-mail: imae@nict.go.jp

**Prof. Dr Dieter Kirchner**, TUG  
 Tel: + 43 316 873 7441  
 Fax: + 43 316 873 46 36 97  
 E-mail: kirchner@inw.tu-graz.ac.at

**Dr Wlodzimierz Lewandowski**, BIPM  
(Secretary of the Working Group)  
Tel: + 33 1 45 07 70 73  
Fax: + 33 1 45 07 70 59  
E-mail: wlewandowski@bipm.org

**Dr Demetrios N. Matsakis**, USNO  
Tel: + 1 202 762 1587  
Fax: + 1 202 762 1511  
E-mail: dnm@usno.navy.mil

**Dr Juan Palacio**, ROA  
Tel: + 34 956 599 286  
Fax: + 34 956 599 366  
E-mail: jpalacio@roa.es

**Dr T. Parker**, NIST  
Tel: + 1 303 497 7881  
Fax: + 1 303 497 6461  
E-mail: tparker@boulder.nist.gov

**Dr Setnam Shemar**, NPL  
Tel: + 44 208 943 7118  
Fax: +44 208 943 7138  
E-mail: setnam.shemar@npl.co.uk

**Dr Li Zhigang**, CSAO  
Tel: + 86 29 389 0320  
Fax: + 86 29 389 0196  
E-mail: kyc@ms.sxso.ac.cn

### CCTF Working Group on the Expression of Uncertainties in Primary Frequency Standards

#### Chairman:

**Dr Rob J. Douglas**, NRC  
Tel: + 1 613 993 5186  
Fax: + 1 613 952 1394  
E-mail: rob.douglas@nrc.ca

#### Members:

**Dr D.W. Allan**  
Tel: + 1 801 445 3216  
Fax: + 1 801 445 3215  
E-mail: 103077.1377@compuserve.com

**Dr Andreas Bauch**, PTB  
Tel: + 49 531 592 44 10  
Fax: + 49 531 592 44 79  
E-mail: time@ptb.de

**Dr Jean Simon Boulanger**, NRC  
Tel: + 1 613 993-5698  
Fax: + 1 613 952 5113  
E-mail: jean-simon.boulanger@nrc.ca

**Prof. Andrea De Marchi**  
Politecnico di Torino  
Tel: + 39 0 11 564 4049  
Fax: + 39 0 11 564 4099  
E-mail: demarchi@polito.it

**Dr R. Drullinger**, NIST  
Tel: + 1 303 497 7845  
Fax: + 1 303 497 3183  
E-mail: rdrullinger @boulder.nist.gov

**Dr Peter Fisk**, NML CSIRO  
Tel: + 61 2 9413 7221  
Fax: + 61 2 9413 7200  
E-mail: peterf@swifty.tip.csiro.au

**Dr Alexander Lepek**, INPL  
Tel: + 972 2 661 856  
Fax: + 972 2 652 0797  
E-mail: clock@vms.huji.ac.il

**Mr Jacques Azoubib**, BIPM  
(Secretary of the Working Group)  
Tel: + 33 1 45 07 70 62  
Fax: + 33 1 45 07 70 59  
E-mail: jazoubib@bipm.org

**Dr François Vernotte**  
 Observatoire de Besançon  
 Tel: + 33 3 81 66 69 22

Fax: + 33 3 81 66 69 44  
 E-mail: françois@obs-besancon.fr

**IGS/BIPM pilot project to study accurate time and frequency comparisons  
 using GPS phase and code measurements**

**Co-chairman for IGS:**

**Dr Jim Ray**, National Geodetic Survey  
 Tel: + 1 301 713 2850 ext.112  
 Fax: + 1 301 713 4475  
 E-mail: jimr@ngs.noaa.gov

**Co-chairperson for BIPM:**

**Dr Elisa Felicitas Arias**  
 Tel: + 33 1 45 07 70 76  
 Fax: + 33 1 45 07 70 59  
 E-mail: farias@bipm.org

No official membership is established. A list of participating laboratories and persons may be found on the web site <http://maia.usno.navy.mil/gpst.html>.

**CCTF Working Group on Key Comparisons in Time and Frequency**

**Chairman:**

**Dr Gerrit de Jong**, NMI VSL  
 Tel: + 31 15 2691 623  
 Fax: + 31 15 2612 971  
 E-mail: gdejong@nmi.nl

**Members:**

**Dr Rob Douglas**, NRC  
 Tel: + 613 993-5186  
 Fax: + 613 952 1394  
 e-mail: rob.douglas@nrc.ca

**Dr Shin-ichi Ohshima**, NMIJ/AIST  
 Tel: + 81 298 61 4312  
 Fax: + 81 298 61 4313  
 e-mail: s.ohshima@aist.go.jp

**Dr Alexander Lepek**, INPL  
 Tel: + 972 2 566 1856, 5635698, 6585724  
 Fax: + 972 2 652 0797  
 e-mail: clock@vms.huji.ac.il

**Dr Juan Palacio**, ROA  
 Tel: + 34 956 599 286  
 Fax: + 34 956 599 366  
 e-mail: jpalacio@roa.es

**Dr Donald B. Sullivan**, NIST  
 Tel: + 1 303 497 3772  
 Fax: + 1 303 497 6461  
 e-mail: donald.sullivan@boulder.nist.gov

**Consultative Committee for Ionizing Radiation (CCRI)****Created in 1958**

*Present activities concern matters related to the definitions of quantities and units, standards and comparisons for x-ray,  $\gamma$ -ray and neutron dosimetry, radioactivity measurement and the International Reference System for radionuclides (SIR), and advice to the CIPM on matters related to ionizing radiation standards.*

**President:**     **Prof. Giorgio Moscati**  
 INMETRO Adviser  
 INMETRO and Instituto de Fisica  
 Universidade de São Paulo  
 Caixa Postal 66318  
 05315-970 São Paulo-SP  
 Brazil  
 Tel: + 55 21 2293 9002  
 Fax: + 55 21 2502 1438  
 E-mail: moscati@inmetro.gov.br

**Executive Secretary:**   **Dr Penelope Allisy-Roberts, BIPM**  
 Tel: + 33 1 45 07 70 90  
 Fax: + 33 1 45 34 20 21  
 E-mail: allisy-roberts@bipm.org

**Members :**

The Chairman of Section I (**Dr Peter Sharpe, NPL**)  
 The Chairman of Section II (**Dr Bruce Simpson, CSIR-NML**)  
 The Chairman of Section III (**Dr Horst Klein, PTB**)  
 The Director of the BIPM (**Prof. Andrew J. Wallard**)

**Section I (X and  $\gamma$  rays, electrons)**

**Chairman:**     **Dr Peter Sharpe, NPL**  
 Tel: + 44 208 943 6647  
 Fax: + 44 208 943 6680  
 E-mail: peter.sharpe@npl.co.uk

**Members:**

Australian Radiation Protection And Nuclear Safety Agency [ARPANSA], Yallambie  
 Bundesamt für Eich- und Vermessungswesen [BEV], Vienna  
 Central Office of Measures/Główny Urząd Miar [GUM], Warsaw  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Ente per le Nuove Tecnologie, l'Energia e l'Ambiente -Istituto Nazionale di Metrologia delle Radiazioni Ionizzanti [ENEA-INMRI], Roma  
 International Commission on Radiation Units and Measurements [ICRU]  
 Laboratoire National Henri Becquerel [BNM-LNHB], Gif sur Yvette  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba

National Office of Measures/Országos Mérésügyi Hivatal [OMH], Budapest  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 Dr Antonio Brosed [CIEMAT], Madrid  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 Czech Metrology Institute [CMI], Brno  
 International Atomic Energy Agency [IAEA]  
 International Organization for Medical Physics [IOMP]  
 International Radiation Protection Association [IRPA]  
 National Laboratory for Metrology of Ionising Radiation/Institute of Radiation Protection and Dosimetry  
 CNEN [LNMRI/IRD], Rio de Janeiro  
 Swedish Radiation Protection Institute/Statens Stralskyddsinstitut [SRPI], Stockholm

**Delegates and experts of member laboratories  
 at the last meeting of Section I (May 2003)**

**Chairman: Dr Peter Sharpe, NPL**

**Members:**

**Dr A.H.L. Aalbers, NMI VSL**  
 Tel: + 31 15 269 1500  
 Fax: + 31 15 261 2971  
 E-mail: aalbers@nmi.nl

**Dr Raffaele Fedele Laitano, ENEA-INMRI**  
 Tel: + 39 06 3048 3559  
 Fax: + 39 06 3048 3558  
 E-mail: laitano@casaccia.enea.it

**Dr István Csete, OMH**  
 Tel: + 36 1 458 5945  
 Fax: + 36 1 458 5937  
 E-mail: icsete@omh.hu

**Dr David Rogers, NRC**  
 Tel: + 1 613 993 2715  
 Fax: + 1 613 952 9865  
 E-mail: dave@irs.phy.nrc.ca

**Mr Franck Delaunay, BNM-LNHB**  
 Tel: + 33 1 69 08 84 05  
 Fax: + 33 1 69 08 47 73  
 E-mail: franck.delaunay@cea.fr

**Mr Stephen M. Seltzer, NIST, acting also as  
 ICRU representative**  
 Tel: + 1 301 975 5552  
 Fax: + 1 301 869 7682  
 E-mail: s.seltzer@nist.gov

**Dr Simon Duane, NPL**  
 Tel: + 44 208 943 6568  
 Fax: + 44 208 943 6797  
 E-mail: simon.duane@npl.co.uk

**Dr Nobuhisa Takata, NMIJ/AIST**  
 Tel: + 81 29 861 5662  
 Fax: + 81 29 861 5673  
 E-mail: n.takata@aist.go.jp

**Dr Hans-Michael Kramer, PTB**  
 Tel: + 49 531 592 6200  
 Fax: + 49 531 592 6405  
 E-mail: hans-michael.kramer@ptb.de

**Dr Gerhard Ulm, PTB**  
 Tel: + 49 30 3481 312  
 Fax: + 49 30 3481 550  
 E-mail: gerhard.ulm@ptb.de

**Dr David Webb**, ARPANSA  
 Tel: + 61 3 9433 2227  
 Fax: + 61 3 9432 1835  
 E-mail: david.webb@health.gov.au

**Dr Josef Witzani**, BEV  
 Tel: + 43 1 49 110 ext. 530  
 Fax: + 43 1 49 20 875  
 E-mail: j.witzani@metrologie.at

**Personal Member:**

**Dr Antonio Brosed**, CIEMAT  
 Tel: + 34 91 3466 097  
 Fax: + 34 91 3466 442  
 E-mail: antonio.brosed@ciemat.es

**Observers:**

**Dr Jaco Mostert**, CSIR-NML  
 Tel: + 27 12 841 2297  
 Fax: + 27 12 841 3121  
 E-mail: jmostert@csir.co.za

**Dr Ken R. Shortt**, IAEA  
 Tel: + 43 1 2600 21664  
 Fax: + 43 1 26007 21662  
 E-mail: k.shortt@iaea.org

**Dr José Guilherme Peixoto**, LNMRI/IRD  
 Tel: + 55 21 3411 8158  
 Fax: + 55 21 3411 8163  
 E-mail: guilherm@ird.gov.br

**Invited by the Chairman:**

**Dr Muhammed Deniz**, UME  
 Tel: + 90 262 679 5000  
 Fax: + 90 262 679 5001  
 E-mail: muhammed.deniz@ume.tubitak.gov.tr

**Dr Vladimir Sochor**, CMI  
 Tel: + 420 266 020 497  
 Fax: + 420 266 020 466  
 E-mail: vsochor@cmi.cz

**Dr Antti Kosunen**, STUK  
 Tel: + 358 9 7598 8446  
 Fax: + 358 9 7598 8450  
 E-mail: antti.kosunen@stuk.fi

**Dr Gerhard Stucki**, METAS  
 Tel: + 41 31 323 3331  
 Fax: + 41 31 323 3210  
 E-mail: gerhard.stucki@metas.ch

**Section II (Measurement of radionuclides)**

**Chairman: Dr Bruce Simpson**, CSIR-NML  
 Tel: + 27 21 686 2759 or 685 4325  
 Fax: + 27 21 686 2759 or 686 6116  
 E-mail: bsimpson@csir.co.za

**Members:**

Australian Nuclear Science & Technology Organisation [ANSTO], Menai  
 Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas [CIEMAT], Madrid  
 CSIR - National Metrology Laboratory [CSIR-NML], Cape Town  
 Czech Metrology Institute [CMI], Brno  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg

Ente per le Nuove Tecnologie, l'Energia e l'Ambiente -Istituto Nazionale di Metrologia delle Radiazioni Ionizzanti [ENEA-INMRI], Roma  
 Institute for Reference Materials and Measurements [IRMM], Geel  
 Institut de Radiophysique Appliquée [IRA-METAS], Lausanne  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 Laboratoire National Henri Becquerel [BNM-LNHB], Gif sur Yvette  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Office of Measures/Országos Mérésügyi Hivatal [OMH], Budapest  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Radioisotope Centre POLATOM [RC], Swierk  
 Prof. Dr Gerhard Winkler [IIK], Vienna  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

Czech Metrology Institute [CMI], Praha  
 International Commission on Radiation Units and Measurements [ICRU]  
 International Organization for Medical Physics [IOMP]  
 International Radiation Protection Association [IRPA]  
 National Laboratory for Metrology of Ionising Radiation/Institute of Radiation Protection and Dosimetry  
 CNEN [LNMRI/IRD], Rio de Janeiro  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft

**Delegates and experts of member laboratories  
 at the last meeting of Section II (May 2003)**

**Chairman: Dr Bruce Simpson, CSIR-NML**

**Members:**

**Dr Dimitri Alexiev, ANSTO**  
 Tel: + 61 2 9717 3182  
 Fax: + 61 2 9717 9265  
 E-mail: dax@ansto.gov.au

**Dr Herbert Janßen, PTB**  
 Tel: + 49 531 592 6100  
 Fax: + 49 531 592 6305  
 E-mail: herbert.janszen@ptb.de

**Dr Ryszard Broda, RC**  
 Tel: + 48 22 718 07 21  
 Fax: + 48 22 718 03 50  
 E-mail: rbroda@polatom.pl

**Dr Steven Judge, NPL**  
 Tel: + 44 208 943 8582  
 Fax: + 44 208 943 7037  
 E-mail: steven.judge@npl.co.uk

**Dr Nelcy Coursol, BNM-LNHB**  
 Tel: + 33 1 69 08 27 78 or 69 08 85 67  
 Fax: + 33 1 69 08 26 19  
 E-mail: nelcy.coursol@cea.fr

**Dr José Maria Los Arcos, CIEMAT**  
 Tel: + 34 91 346 6288  
 Fax: + 34 91 346 6442  
 E-mail: jm.losarcos@ciemat.es

**Dr Yoshio Hino, NMIJ/AIST**  
 Tel: + 81 29 861 5667  
 Fax: + 81 29 861 5673  
 E-mail: y.hino@aist.go.jp

**Ms Freda Morris, CSIR-NML**  
 Tel: + 27 21 685 7776  
 Fax: + 27 21 686 2759  
 E-mail: fmorris@csir.co.za



**Dr Tae Soon Park, KRISS**

Tel: + 82 42 868 5372  
 Fax: + 82 42 868 5671  
 E-mail: tspark@kriss.re.kr

**Mr Dietmar F.G. Reher, IRMM**

Tel: + 32 14 57 12 63  
 Fax: + 32 14 58 42 73  
 E-mail: dietmar.reher@irmm.jrc.be

**Dr Carl Ross, NRC**

Tel: + 1 613 993 9352  
 Fax: + 1 613 952 9865  
 E-mail: carl.ross@nrc.ca

**Dr Sergey Sepman, VNIIM**

Tel: + 7 812 323 9612  
 Fax: + 7 812 323 9617  
 E-mail: s.v.sepman@vniim.ru

**Mr László Szücs, OMH**

Tel: + 36 1 458 5911  
 Fax: + 36 1 458 5937  
 E-mail: lszucs@omh.hu

**Dr Michael P. Unterweger, NIST**

Tel: + 1 301 975 5536  
 Fax: + 1 301 926 7416  
 E-mail: michael.unterweger@nist.gov

**Dr Uwe Wätjen, IRMM**

Tel: + 32 14 57 12 63  
 Fax: + 32 14 58 42 73  
 E-mail: uwe.waetjen@irmm.jrc.be

**Mr Michael John Woods, NPL**

Tel: + 44 208 943 6425  
 Fax: + 44 208 943 7037  
 E-mail: michael.woods@npl.co.uk

**Personal Member:****Prof. Dr Gerhard Winkler, IIK**

Tel: + 43 1 4277 51754  
 Fax: + 43 1 4277 51752  
 E-mail: winkler@ap.univie.ac.at

**Observers:****Dr Wim de Vries, NMi VSL**

Tel: + 31 30 253 9098  
 Fax: + 31 30 253 9095  
 E-mail: wdevries@nmi.nl

**Dr Pavel Dryák, CMI**

Tel: + 02 660 204 97  
 Fax: + 02 660 204 66  
 E-mail: pdryak@cmi.cz

**Prof. Barry D. Michael, ICRU**

Tel: + 44 192 382 8611  
 Fax: + 44 192 383 5210  
 E-mail: michael@gci.ac.uk

**Dr Walsan Wagner Pereira, LNMRI/IRD**

Tel: + 55 21 3411 8170 or 8171  
 Fax: + 55 21 4411 8163  
 E-mail: walsan@ird.gov.br

**Invited by the Chairman:****Dr Horst Klein, PTB**

Tel: + 49 531 592 6400  
 Fax: + 49 531 592 7205  
 E-mail: horst.klein@ptb.de

**Dr Peter Sharpe, NPL**

Tel: + 44 208 943 6647  
 Fax: + 44 208 943 6797  
 E-mail: peter.sharpe@npl.co.uk

**Dr Brian Zimmerman, IAEA**

Tel: + 43 1 2600 21659 or 21634  
 Fax: + 43 1 26007 21662  
 E-mail: b.zimmerman@iaea.org or  
 dosimetry@iaea.org



### Section III (Neutron measurements)

**Chairman: Dr Horst Klein, PTB**  
 Tel: + 49 531 592 6400  
 Fax: + 49 531 592 7205  
 E-mail: horst.klein@ptb.de

#### Members:

Czech Metrology Institute [CMI], Brno  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Institute for Reference Materials and Measurements [IRMM], Geel  
 Laboratoire National Henri Becquerel [BNM-LNHB], Gif sur Yvette  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Laboratory for Metrology of Ionising Radiation/Institute of Radiation Protection and Dosimetry  
 CNEN [LNMRI/IRD], Rio de Janeiro  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL], Teddington  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Prof. Dr. J.J. Broerse [IRI], Delft  
 The Director of the International Bureau of Weights and Measures [BIPM]

#### Observers:

Chinese Institute of Atomic Energy [CIAE], Beijing  
 International Atomic Energy Agency [IAEA]  
 International Commission on Radiation Units and Measurements [ICRU]

### Delegates and experts of member laboratories at the last meeting of Section III (May 2003)

**Chairman: Dr Horst Klein, PTB**

#### Members:

**Dr Teresa Bolognese, BNM**  
 Tel: + 33 1 58 35 80 79  
 Fax: + 33 1 58 35 97 77  
 E-mail: teresa.bolognese@irsn.fr

**Dr David M. Gilliam, NIST**  
 Tel: + 1 301 975 6206  
 Fax: + 1 301 869 7682  
 E-mail: david.gilliam@nist.gov

**Mr Nikolay N. Moiseev, VNIIM**  
 Tel: + 7 812 323 9614  
 Fax: + 7 812 323 9617

E-mail: n.n.moiseev@vniim.ru

**Dr Walsan Wagner Pereira, LNMRI/IRD**  
 Tel: + 55 21 3411 8170 or 8171  
 Fax: + 55 21 4411 8163  
 E-mail: walsan@ird.gov.br

**Dr Arjan Plompen, IRMM**  
 Tel: + 32 14 571 381  
 Fax: + 32 14 571 376  
 E-mail: plompen@irrm.jrc.be

**Dr David Thomas, NPL**  
Tel: + 44 208 943 6853  
Fax: + 44 208 943 7037  
E-mail: david.thomas@npl.co.uk

**Dr Akira Uritani, NMIJ/AIST**  
Tel: + 81 29 861 2253  
Fax: + 81 29 861 5673  
E-mail: a-uritani@aist.go.jp

**Observer:**

**Prof. André Wambersie, ICRU**  
Tel: + 32 2 764 5468  
Fax: + 32 2 764 9425  
E-mail: wambersie@rbnt.ucl.ac.be

**Invited by the Chairman:**

**Dr Miloslav Kralik, CMI**  
Tel: + 420 266 020 299  
Fax: + 420 266 020 466  
E-mail: mkralik@cmi.cz

**Dr Bruce Simpson, CSIR-NML**  
Tel: + 27 21 686 2759 or 685 4325  
Fax: + 27 21 686 2759 or 686 6116  
E-mail: bsimpson@csir.co.za

**Consultative Committee for Units (CCU)****Created in 1964**

*Present activities concern matters related to the development of the International System of Units (SI),  
preparation of successive editions of the SI brochure  
and advice to the CIPM on matters concerning units of measurement.*

**President:**           **Prof. Ian M. Mills**  
University of Reading - Department of Chemistry  
Whiteknights  
Reading, RG6 6AD  
United Kingdom  
Tel: + 44 118 378 8456  
Fax: + 44 118 378 6331  
E-mail : i.m.mills@reading.ac.uk or millsat57@onetel.net.uk

**Executive Secretary:**   **Dr Claudine Thomas, BIPM**  
Tel: + 33 1 45 07 70 73  
Fax: + 33 1 45 34 20 21  
E-mail: cthomas@bipm.org

**Members:**

Commission internationale de l'éclairage [CIE]  
International Astronomical Union [IAU]  
International Commission on Radiation Units and Measurements [ICRU]  
International Electrotechnical Commission [IEC]: Technical Committee 25  
International Federation of Clinical Chemistry and Laboratory Medicine [IFCC]  
International Organization for Standardization [ISO]: Technical Committee 12  
International Organization of Legal Metrology [OIML]  
International Union of Pure and Applied Chemistry [IUPAC]: Commission STU  
International Union of Pure and Applied Physics [IUPAP]: Commission SUN-AMCO  
National Institute of Metrology [NIM], Beijing  
National Institute of Standards and Technology [NIST], Gaithersburg  
National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
National Physical Laboratory [NPL], Teddington  
Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
State Committee of the Russian Federation for Standardization and Metrology [Gosstandart], Moscow  
Dr Terry Quinn CBE FRS, Sèvres  
Prof. Marc Himbert [BNM-INM], Paris  
The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observer:**

Centro Español de Metrología [CEM], Madrid

**Delegates and experts of member laboratories  
at the last meeting (May 2004)**

**President: Prof. Ian M. Mills**

**Members:**

**Dr Jean Bastie, CIE**

Tel: + 33 1 40 27 20 25

Fax: + 33 1 42 71 37 36

E-mail: bastie@cnam.fr

**Prof. Carlo Angelo Borghi, IEC/TC 25**

Tel: + 39 051 209 3566

Fax: + 39 051 209 3588

E-mail: ca.borghi@mail.ing.unibo.it

**Dr Nicole Capitaine, IAU**

Tel: + 33 1 40 51 22 31

Fax: + 33 1 40 51 22 91

E-mail: nicole.capitaine@obspm.fr

**Dr René Dybkaer, IFCC**

Tel: + 45 38 16 38 70 or 71

Fax: + 45 38 16 38 79

**Dr Jeff Flowers, NPL and IUPAP/SUN-AMCO**

Tel: + 44 208 943 6671

Fax: + 44 208 614 0417

E-mail: jeff.flowers@npl.co.uk

**Dr Kenichi Fujii, NMIJ/AIST**

Tel: + 81 29 861 4316

Fax: + 81 29 850 1464

E-mail: fujii.kenichi@aist.go.jp

**Dr Arnold Leitner, OIML**

Tel: +43 1 49 110 322

Fax: +43 1 49 110 334

E-mail: a.leitner@metrologie.at

**Dr Zuliang Lu, NIM**

Tel: + 86 10 8425 1573

Fax: + 86 10 6421 8703

E-mail: luzl@nim.ac.cn

**Prof. Ian M Mills FRS, IUPAC**

Tel: + 44 118 378 8456

Fax: + 44 118 378 6331

E-mail: i.m.mills@reading.ac.uk or  
millsat57@onetel.net.uk

**Dr Bernd R.L. Siebert, PTB**

Tel: + 49 531 592 7510

Fax: + 49 531 592 8106

E-mail: bernd.siebert@ptb.de

**Dr Barry N. Taylor, NIST**

Tel: + 1 301 975 4220

Fax: + 1 301 975 2183

E-mail: barry.taylor@nist.gov

**Prof. Anders J Thor, ISO/TC 12**

Tel: + 46 8 555 521 59

Fax: + 46 8 555 520 01

E-mail: anders.j.thor@sis.se

**Prof. André Wambersie, ICRU**

Tel: + 32 2 764 5468

Fax: + 32 2 764 9425

E-mail: wambersie@rbnt.ucl.ac.be

**Dr Robert L. Watters, NIST**

Tel: + 1 301 975 4122

Fax: + 1 301 926 0416

E-mail: robert.watters@nist.gov

**Personal Members**

**Dr Terry Quinn CBE FRS**

E-mail: terry.quinn@physics.org

**Prof. Marc Himbert, BNM-INM**

Tel: + 33 1 40 27 24 19

Fax: + 33 1 42 71 37 36

E-mail: himbert@cnam.fr

**Observer**

**Dr Teresa López, CEM**

Tel: + 34 91 807 4751

Fax: + 34 91 807 4807

E-mail: mtlopez@cem.es

**Invited by the President:**

**Ms Zhao Yan, AQSIQ**

Tel: + 86 10 8226 1847

Fax: + 86 10 8226 0131

E-mail: zhaoy@aqsiq.gov.cn

**Consultative Committee for Mass and Related Quantities (CCM)****Created in 1980**

*Present activities concern matters related to the comparisons of mass standards with the international prototype of the kilogram, considerations affecting the definition of the unit of mass, also density, pressure and force standards and advice to the CIPM on these matters.*

**President: Dr Mitsuru Tanaka**  
 Deputy Director  
 National Metrology Institute of Japan, AIST  
 Tsukuba Central 3  
 Tsukuba 305-8563  
 Japan  
 Tel: + 81 298 61 4059  
 Fax: + 81 298 61 4009  
 E-mail: mitsuru.tanaka@aist.go.jp

**Executive Secretary: Dr Richard S. Davis, BIPM**  
 Tel: + 33 1 45 07 70 11  
 Fax: + 33 1 45 34 20 21  
 E-mail: rdavis@bipm.org

**Members:**

Central Office of Measures/Główny Urząd Miar [GUM], Warsaw  
 CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Institut National de Métrologie [BNM-INM], Paris  
 Istituto di Metrologia "Gustavo Colonnelli" del Consiglio Nazionale delle Ricerche [IMGC-CNR], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava  
 Swedish National Testing and Research Institute [SP], Borås  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

Centro Español de Metrología [CEM], Madrid  
 Centro Nacional de Metrología [CENAM], Querétaro  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 National Physical Laboratory of India [NPLI], New Delhi



**Delegates and experts of member laboratories  
at the last meeting (May 2002)**

**The President: Dr Mitsuru Tanaka**

**Members:**

**Dr Anil K. Agarwal, NRC**

Tel: + 613 991 0615

Fax: + 613 952 1394

E-mail: anil.agarwal@nrc.ca

**Dr Noel Bignell, NML CSIRO**

Tel: + 61 2 9413 7484

Fax: + 61 2 9413 7161

E-mail: noel.bignell@csiro.au

**Dr George Chapman, NRC**

Tel: + 1 613 993 2351

Fax: + 1 613 952 1394

E-mail: george.chapman@nrc.ca

**Dr Natalia G. Domostroeva, VNIIM**

Tel: + 7 812 323 9670

Fax: + 7 812 323 9671

E-mail: n.g.domostroeva@vniim.ru or  
hal@onti.vniim.spb.su

**Mrs Hanna Durlik, GUM**

Tel: + 48 22 652 2831

Fax: + 48 22 620 8378

E-mail: mass.force@gum.gov.pl

**Dr Kenichi Fujii, NMIJ/AIST**

Tel: + 81 298 61 4316

Fax: + 81 298 50 1464

E-mail: fujii.kenichi@aist.go.jp

**Dr Alessandro Germak, IMGC-CNR**

Tel: + 39 011 3977 367

Fax: + 39 011 3977 426

E-mail: a.germak@imgc.cnr.it

**Dr Michael Gläser, PTB**

Tel: + 49 531 592 1110

Fax: + 49 531 592 1155

E-mail: michael.glaeser@ptb.de

**Mr André Gosset, BNM-LNE**

Tel: + 33 1 40 43 37 28

Fax: + 33 1 40 43 37 37

E-mail: andre.gosset@lne.fr

**Mr Jan Hjelmgren, SP**

Tel: + 46 33 16 51 08

Fax: + 46 33 16 56 20

E-mail: jan.hjelmgren@sp.se

**Dr Zeina J. Jabbour, NIST**

Tel: + 1 301 975 4468

Fax: + 1 301 417 0514

E-mail: zeina.jabbour@nist.gov

**Dr Claude Jacques, NRC**

Tel: + 1 613 993 9330

Fax: + 1 613 998 5396

E-mail: claude.jacques@nrc.ca

**Mr Michel Lecollinet, BNM-INM**

Tel: + 33 1 40 27 26 94

Fax: + 33 1 42 71 37 36

E-mail: michel.lecollinet@cnam.fr

**Dr Albert Lee, NIST**

Tel: + 1 301 975 2857

Fax: + 1 301 208 6962

E-mail: albert.lee@nist.gov

**Dr Woo Gab Lee, KRIS**

Tel: + 82 42 868 5112

Fax: + 82 42 868 5012

E-mail: woogab@kriss.re.kr

**Mrs Pauline Leggat, NPL**

Tel: + 44 208 943 6321

Fax: + 44 208 943 6132

E-mail: pauline.leggat@npl.co.uk

**Mr Jean-Claude Legras, BNM-LNE**

Tel: + 33 1 40 43 38 08

Fax: + 33 1 40 43 37 37

E-mail: jean-claude.legras@lne.fr

**Dr George Mattingly, NIST**

Tel: + 1 301 975 5939

Fax: + 1 301 975 8288

E-mail: george.mattingly@nist.gov

**Dr Archie P. Müller**, NIST  
 Tel: + 1 301 975 5932  
 Fax: + 1 301 208 6962  
 E-mail: archie.miiller@nist.gov

**Dr Akira Ooiwa**, NMIJ/AIST  
 Tel: + 81 298 61 4024  
 Fax: + 81 298 61 4020  
 E-mail: akira-ooiwa@aist.go.jp

**Dr Leslie R. Pendrill**, SP  
 Tel: + 46 33 16 54 44  
 Fax: + 46 33 16 56 20  
 E-mail: leslie.pendrill@sp.se

**Prof. Dr Manfred Peters**, PTB  
 Tel: + 49 531 592 1010 or 1011  
 Fax: + 49 531 592 1015  
 E-mail: manfred.peters@ptb.de

**Dr Philippe Richard**, METAS  
 Tel: + 41 31 323 3415  
 Fax: + 41 31 323 3210  
 E-mail: philippe.richard@metas.ch

#### Observers:

**Dr A.K. Bandyopadhyay**, NPLI  
 Tel: + 91 11 585 1338  
 Fax: + 91 11 585 2678  
 E-mail: akband@csnpl.ren.nic.in

**M. in. Sc Luis Omar Becerra**, CENAM  
 Tel: + 52 442 211 0500 to 04  
 Fax: + 52 442 215 3904  
 E-mail: lbecerra@cenam.mx

**Mrs Ireen Field**, CSIR-NML  
 Tel: + 27 12 841 3623  
 Fax: + 27 12 841 3121  
 E-mail: ibfield@csir.co.za

**Dr Ignacio Hernandez**, CENAM  
 Tel: + 52 442 211 0570  
 Fax: + 52 442 211 0568  
 E-mail: ihernan@cenam.mx

**Dr Ian Severn**, NPL  
 Tel: + 44 208 943 6862  
 Fax: + 44 208 614 0435  
 E-mail: ian.severn@npl.co.uk

**Dr Robert Spurný**, SMU  
 Tel: + 421 2 6029 4350  
 Fax: + 421 2 6542 9592  
 E-mail: spurny@smu.gov.sk

**Mrs Inge van Andel**, NMi VSL  
 Tel: + 31 15 269 1754  
 Fax: + 31 15 2612 971  
 E-mail: ivandel@nmi.nl

**Mrs Chi Wang**, NIM  
 Tel: + 86 10 6421 8637  
 Fax: + 86 10 6429 1990  
 E-mail: wangch@nim.ac.cn

**Mr Yue Zhang**, NIM  
 Tel: + 86 10 6421 8628  
 Fax: + 86 10 6421 8703  
 E-mail: zhangy@nim.ac.cn

**Dr Cihan Kuzu**, UME  
 Tel: + 90 262 679 5000  
 Fax: + 90 262 679 5001  
 E-mail: cihan.kuzu@ume.tubitak.gov.tr

**Mrs Maria del Carmen Matilla Vicente**, CEM  
 Tel: + 34 91 807 4717  
 Fax: + 34 91 807 4808  
 E-mail: cmatilla@mfom.es

**Dr Mihail Patrascioiu**, CSIR-NML  
 Tel: + 27 12 841 3698  
 Fax: + 27 12 841 3121  
 E-mail: mpatras@csir.co.za

**Invited by the President:****Mr Luis Brito, IPQ**

Tel: + 351 21 294 8100

Fax: + 351 21 294 8188

E-mail: lbrito@mail.ipq.pt

**Mr Victor Loayza, INMETRO**

Tel: + 55 21 2679 9023

Fax: + 55 21 2679 1505

E-mail: vmloayza@inmetro.gov.br

**Dr Vaidotas Gegevicus, COOMET**

Tel: + 370 5 213 5882

Fax: + 370 5 213 3727

E-mail: vmc@taide.lt

**Dr Lars Nielsen, EUROMET**

Tel: + 45 4593 1144

Fax: + 45 4593 1137

E-mail: ln@dfm.dtu.dk

**Dr Kozo Izuka, NMIJ/AIST**

Tel: + 81 3 3245 3053

Fax: +81 3 3245 3056

E-mail: k-iizuka@tk.kubota.co.jp

**Dr Chris M. Sutton, APMP**

Tel: + 64 4 569 0499

Fax: + 64 4 569 0117

E-mail: c.sutton@irl.cri.nz

**Mr Shih Mean Lee, SPRING Singapore**

Tel: + 65 772 9750

Fax: + 65 777 8996

E-mail: smlee@spring.gov.sg

**Dr Masaki Takamoto, NMIJ/AIST**

Tel: + 81 298 61 4228

Fax: + 81 298 61 4242

E-mail: m-takamoto@aist.go.jp

**CCM Working Group on Density****Chairman:****Dr Kenichi Fujii, NMIJ/AIST**

Tel: + 81 298 61 4316

Fax: + 81 298 50 1464

E-mail: fujii.kenichi@aist.go.jp

**Members:**IMGC-CNR (**Dr A. Peuto**)

KRISS

NIM

NIST (**Dr Z. Jabbour**)

NMIJ/AIST

NML CSIRO

NPL (**Mr S. Downes**)NRC (**Dr C. Jacques**)METAS (**Dr P. Richard**)PTB (**Dr M. Spieweck**)SMU (**Dr R. Spurný**)SP (**Dr L. Pendrill**)BIPM (**Dr Richard S. Davis**)

### CCM Working Group on Mass Standards

#### Chairman:

**Dr Michael Gläser**, PTB

Tel: +49 531 592 1110

Fax: + 49 531 592 1155

E-mail: michael.glaeser@ptb.de

#### Members:

BNM-INM (**Dr P. Pinot**)

CEM

CENAM

CSIR-NML

GUM

IMGC-CNR (**Dr W. Bich**)

KRISS

METAS (**Dr P. Richard**)

NIM

NIST (**Dr Z. Jabbour**)

NMi VSL

NMIJ/AIST (**Mr Y. Nezu**)

NML CSIRO

NPL (**Dr I. Severn**)

NPLI

NRC (**Dr G. Chapman**)

SMU (**Dr R. Spurný**)

VNIIM (**Dr A.P. Shyolkina**)

BIPM (**Dr Richard S. Davis**)

### CCM Working Group on High Pressures

#### Chairman:

**Dr Jean-Claude Legras**, BNM-LNE

Tel: + 33 1 40 43 38 08

Fax: + 33 1 40 43 37 37

E-mail: jean-claude.legras@lne.fr

#### Members:

CENAM (J.C. Torres Guzman)

IMGC-CNR (Mercede Bergoglio)

INMETRO (P.R. Guimaraes Couto)

KRISS (Sam-Yong Woo)

MSL (M. Fitzgerald, C. Sutton)

NIM (Z. Pengcheng)

NIST (D.A Olson, A. Lee)

NMi VSL (J. Veerbeck)

NMIJ (A.Ooiwa, T. Kobata)

NML CSIRO (N. Bignell)

NPL (I. Severn)

NPLI (A.K. Bandyopadhyay)

NRC (A. Agarwal)

PTB (W. Sabuga)

SMU (P. Farar)

UME (I. Kocas)

VNIIFTRI (V. Borovkov)

**CCM Working Group on Low Pressures****Chairman:**

**Dr Archie P. Miiller**, NIST  
Tel: + 1 301 975 5932  
Fax: + 1 301 208 6962  
E-mail: archie.miiller@nist.gov

**Members:**

BNM-LNE (**J. Legras**)  
IMGC-CNR (**A. Calcatelli**)  
KRISS  
NMIJ/AIST (**Akira Ooiwa**)  
NPL (**F.J. Redgrave**)  
NPLI  
NRC  
PTB (**K. Jouston**)  
SMU (**J. Krc-Turba**)

**CCM Working Group on Medium Pressures****Interim Chair:**

**Dr Ian Severn**, NPL  
Tel: + 44 208 943 6862  
Fax: + 44 208 614 0435  
E-mail: ian.severn@npl.co.uk

**Members:**

BNM-INM  
CSIR-NML  
IMGC-CNR (**Dr Anita Calcatelli**)  
NIM (**Mrs Han Huiwen**)  
NIST (**Dr Charles R. Tilford**)  
NMIJ/AIST (**Dr Akira Ooiwa**)  
NML CSIRO  
NPLI  
NRC  
SMU (**Dr T. Skrovanek**)  
BIPM (**Dr Richard Davis**)

## CCM Working Group on Force

**Chairman:****Prof. Dr Manfred Peters**, PTB

Tel: + 49 531 592 1010

Fax: + 49 531 592 1015

E-mail: manfred.peters@ptb.de

**Members:****Mr Sinan Fank**, UME

Tel: + 90 262 679 5000

Fax: +90 262 646 5914

**Dr Carlo Ferrero**, IMGC-CNR

Tel: + 39 011 397 7426

Fax: + 39 011 346 761

**Mr A. Gosset**, BNM-LNE

Tel: + 33 1 40 43 37 28

Fax: + 33 1 40 43 37 37

E-mail: andre.gosset@lne.fr

**Mr D. Groeneveld**, NML CSIRO

Tel: + 61 2 467 6211

Fax: + 61 2 416 7902

**Dr Dae-Im Kang**, KRISS

Tel: + 82 42 868 5246

Fax: + 82 42 861 1494

**Mr A. Knott**, NPL

Tel: + 44 208 943 6180

Fax: + 44 208 943 6184

**Mr A. Larsson**, SP

Tel: + 46 33 16 50 00

Fax: + 46 33 10 20 15

**Mr C. MacKenzie**, NRC

Tel: + 1 613 993 5647

Fax: + 1 613 952 7136

**Dr R. Muilwijk**, NMi VSL

Tel: + 31 15 26 91 640

Fax: + 31 15 26 12 971

**Mr A. Pusa**, Raute Precision Oy

Tel: + 358 13 829 4275

Fax: + 358 13 829 4101

**Dr Qingzhong Li**, NIM

Tel: + 86 10 6420 478

Fax: + 86 10 6420 4788

E-mail: liqznim@hotmail.com

**Dr A. Robles**, CEM

Tel: + 34 91 807 4700

Fax: + 34 91 407 4807

**Dr J. C. Torres Guzmán**, CENAM

Tel: + 52 442 2 11 05 72

Fax: + 52 442 2 11 05 78

E-mail: jtorres@cenam.mx

**Mr Andre van Tonder**, CSIR-NML

Tel: +27 12 841 2127

Fax: +27 12 841 4458

E-mail: anvtonde@csir.co.za

**Dr Kazunaga Ueda**, NMIJ/AIST

Tel: + 81 298 61 4097

Fax: + 81 298 61 4096

E-mail: kazunaga-ueda@aist.go.jp

**Mr W. Vincke**, IGM

Tel: + 32 2 247 96 27

Fax: + 32 2 245 76 73

**Dr Simone L. Yaniv**, NIST

Tel: + 1 301 975 4917

Fax: + 1 301 869 3536

E-mail: simone.yaniv@nist.gov

## CCM Working Group on the Avogadro Constant

**Chairman:**

**Dr Peter Becker**, PTB  
Tel: + 49 531 592 6130  
Fax: + 49 531 592 6015  
E-mail: peter.becker@ptb.de

**Members:**

**Mr A. Bergamin**, IMGC-CNR  
Fax: + 39 0 11 346 761  
E-mail: bergamin@imgc.cnr.it

**Dr Richard S. Davis**, BIPM  
Fax: + 33 1 45 34 20 21  
E-mail: rdavis@bipm.org

**Prof. Paul De Bièvre**, IRMM  
Fax: + 32 14 584 273  
E-mail: paul.de.bievre@skynet.be

**Dr R.D. Deslattes**, NIST  
Fax: + 1 301 975 3038  
E-mail: rdeslattes@nist.gov

**Mr W. Giardini**, NML CSIRO  
Fax: + 61 3 544 1128  
E-mail: giardini@rivett.mst.csiro.au

**Dr D.N. Gulidov**, VNIIM  
Fax: + 7 812 113 0114

**Dr M. Kenny**, NML CSIRO  
Fax: + 61 2 431 7238  
E-mail: michaelk@swifty.dap.csiro.au

**Mr A. Leistner**, NML CSIRO  
Fax: + 61 2 413 7200  
E-mail: achim@swifty.dap.csiro.au

**Dr Giovanni Mana**, IMGC-CNR  
Fax: + 39 011 346 761  
E-mail: g.mana@imgc.cnr.it

**Dr K. Nakayama**, NMIJ/AIST  
Fax: + 81 298 61 4135  
E-mail: nakayama@aist.go.jp

**Prof. B. Pajot**, Université Paris VII  
Paris (France)  
Fax: + 33 1 44 27 79 47  
E-mail: pajot@gps.jussieu.fr

**Dr H.S. Peiser**, Washington (U.S.A.)  
Fax: + 1 301 762 1173  
E-mail: hspeiser@aol.com

**Dr Anna Peuto**, IMGC-CNR  
Fax: + 39 011 346 761  
E-mail: a.peuto@imgc.cnr.it

**Dr S.V. Potapov**, VNIIM  
E-mail: potapov@onti.vniim.spb.su

**Dr Terry J. Quinn FRS**, BIPM  
Fax: + 33 1 45 34 86 70  
E-mail: tqinn@bipm.org

**Dr Mitsuru Tanaka**, NMIJ/AIST  
Tel: + 81 298 61 4059  
Fax: + 81 298 61 4009  
E-mail: mitsuru.tanaka@aist.go.jp

**Dr Barry N. Taylor**, NIST  
Fax: + 1 301 869 7682  
E-mail: barry.taylor@nist.gov

**Dr K. Nakayama**, NMIJ/AIST  
Fax: + 81 298 61 4135  
E-mail: nakayama@aist.go.jp

**Prof. G. Zosi**, Istituto di Fisica  
Generale “A. Avogadro”  
Turin (Italy)  
Fax: + 39 0 11 658 444  
E-mail: zosi@tox37.to.infn.it

**CCM Working Group on Hardness****Chairman:**

**Dr Alessandro Germak**, IMGC-CNR

Tel: + 39 011 3977 367

Fax: + 39 011 3977 426

E-mail: a.germak@imgc.cnr.it

**Members:**

**G.W. Bahng**, KRISS

**T. Bell**, NML CSIRO

**G. Chapman**, NRC

**N. Domostroyeva**, VNIIM

**D. Elkington**, NPL

**K. Herrmann**, PTB/Secretary of IMEKO TC 5

**H. Ishida**, NMIJ/AIST

**A.O. Karczmarek**, GUM

**G. Kotte**, NMi VSL

**H. Li**, NIM

**S.R. Low**, NIST/Secretary of CCM WG Hardness

**F. Meli**, METAS

**L. Pendrill**, SP

**P. Pinot**, BNM INM

**R. Spurny**, SMU

**S.W. Stiefel**, NIST/Secretariat of OIML/TC 10/SC 5

**CCM Working Group on Fluid Flow****Interim Chair:**

**Dr Masaki Takamoto**, NMIJ/AIST

Tel: + 81 29 861 4228

Fax: + 81 29 861 4242

E-mail: m-takamoto@aist.go.jp



## CCM Working Group on Gravimetry

**Chairman:****Dr Leonid Vitushkin**, BIPM

Tel: + 33 1 45 07 70 81

Fax: + 33 1 45 34 20 21

E-mail: lvitushk@bipm.org

**Members:****Dr Jean-Pierre Barriot**, BGI/OMP

Fax: +33 (0) 5 61 25 30 98

Tel: +33 (0) 5 61 33 28 94

E-mail: jean-pierre.barriot@cnes.fr

**Dr André Clairon**, BNM/SYRTE

Fax: +33 (0) 1 43 25 55 42

Tel: +33 (0) 1 40 51 23 33

E-mail: andre.clairon@obspm.fr

**Dr James E. Faller**, NIST

Fax: +1 303 735 2498

Tel: +1 303 492 8509

E-mail: faller@jila.colorado.edu

**Prof., Dr Olivier Francis**, ECGS

Fax: + 352 33 14 87 88

Tel: + 352 33 14 87 35

E-mail: olivier@ecgs.lu

**Dr Alessandro Germak**, IMGC

Fax: +39 011 39 77 426

Tel: +39 011 39 77 358

E-mail: a.germak@imgc.cnr.it

**Dr Evgeny P. Krivtsov**, VNIIM

Fax: +7 812 113 01 14/+7 812 422 48 91

Tel: +7 812 422 15 60/7 812 251 61 71

E-mail: krivtsov@hotmail.ru

**Prof. Jan Krynski**, IGC

Fax: +48 22 827 03 28

Tel: +48 22 828 02 69/113

E-mail: krynski@igik.edu.pl

**Mr Jacques Liard**, NRC

Fax: +1 613 992 66 28

Tel: +1 613 992 48 89

E-mail: jliard@nrcan.gc.ca

**Dr Jaakko Mäkinen**, FGI

FIN-02430 Masala

Fax: +358 9 29 55 52 00

Tel: +358 9 29 55 50

E-mail: jaakko.makinen@fgi.fi

**Mr Shigeki Mizushima**, NMIJ/AIST

Fax: +81 298 61 43 99

Tel: +81 298 61 43 52

E-mail: s.mizushima@aist.go.jp

**Prof., Dr Giorgio Moscati**, INMETRO/IoP-USP

Fax: +55 11 3812 0135

Tel: +55 11 3032 6457/ 30 31 31 21

E-mail: moscati@ifp.usp.br

**Dr Philippe Richard**, METAS

Fax: +41 31 32 33 210

Tel: +41 31 32 33 415

E-mail: philippe.richard@metas.ch

**Dr Ian Robinson**, NPL

Fax: +44 20 8943 6939

Tel: +44 20 8943 7139

E-mail: ian.robinson@npl.co.uk

**Prof. Dr Arkady E. Sinelnikov**, VNIIM

Fax: +7 812 113 01 14/+7 812 422 48 91

Tel: +7 812 422 15 60/7 812 251 61 71

E-mail: sinelnikov@mail.convey.ru

**Dr Michel Van Camp**, ORB

Fax: +32 2 373 0339

Tel: +32 2 373 0265

E-mail: mvc@oma.be

## Working Group on Viscosity Measurement

List of the attendees at the meeting of 15 November 2002

### Interim Chair:

#### Dr Robert Kaarls

Tel: + 31 71 580 22 31  
 Fax: + 31 71 580 47 77  
 E-mail: rkaarls@euronet.nl

### Participants:

#### Mr Roberto Arias, CENAM

Tel: + 52 442 211 0500 ext. 3765  
 Fax: + 52 442 211 0500 ext. 3776  
 E-mail: rarias@cenam.mx

#### Dr Harro Bauer, PTB

Tel: + 49 531 592 3100  
 Fax: + 49 531 592 3205  
 E-mail: harro.bauer@ptb.de

#### Mr Mathieu Brizard, BNM-LNE

Tel: 01 40 43 37 55  
 Fax: 01 40 43 37 37  
 E-mail: mathieu.brizard@lne.fr

#### Prof. Carlos Nieto de Castro, IPQ

Tel: + 351 212 948 105  
 Fax: + 351 212 948 110  
 E-mail: ccastro@mail.ipq.pt

#### Dr Natalia G. Domostroeva, VNIIM

Tel: + 7 812 323 9670  
 Fax: + 7 812 323 9671  
 E-mail: n.g.domostroeva@vniim.ru or  
 hal@onti.vniim.spb.su

#### Mrs Maria Ferreira, IPQ

Tel: + 351 212 948 164  
 Fax: + 351 212 948 188  
 E-mail: mcferreira@mail.ipq.pt

#### Dr Kenichi Fujii, NMIJ/AIST

Tel: + 81 298 61 4316  
 Fax: + 81 298 50 1464  
 E-mail: fujii.kenichi@aist.go.jp

#### Dr M. Richard Hoover, Cannon Instrument Company

Tel: + 1 814 353 8000 ext.228  
 Fax: + 1 814 353 3320  
 E-mail: mrhoover@cannon-ins.com

#### Dr Günther Klingenberg, PTB

Tel: + 49 531 592 3120  
 Fax: + 49 531 592 3205  
 E-mail: guenther.klingenberg@ptb.de

#### Mr Yasumitsu Kurano, NMIJ/AIST

Tel: + 81 298 61 4017  
 Fax: + 81 298 50 1464  
 E-mail: y.kurano@aist.go.jp

#### Mr Tripurari Lal, NPLI

Tel: + 91 11 574 2610/2611/2612 ext.2348  
 Fax: + 91 11 572 6938 or 6952  
 E-mail: tlal@csnpl.ren.nic.in

#### Dr Salvatore Lorefice, IMGC-CNR

Tel: + 39 011 3977 1  
 Fax: + 39 011 3977 437  
 E-mail: s.lorefice@imgc.cnr.it

#### Mr Emmanuel Mahé, BNM-LNE

Tel: + 33 1 40 43 3858  
 Fax: + 33 1 40 43 37 37  
 E-mail: emmanuel.mahe@lne.fr

#### Mr Mohammed Megharfi, BNM-LNE

Tel: + 33 1 40 43 39 54  
 Fax: + 33 1 40 43 37 37  
 E-mail: mohamed.megharfi@lne.fr

#### Dr Mostafa Mekawy, NIS

Tel: + 20 2 386 7451  
 Fax: + 20 2 386 7451  
 E-mail: m\_mekawy@yahoo.com

#### Mrs Jadwiga Nawra, GUM

Tel: + 48 22 620 0241 ext.208, 529  
 Fax: + 48 22 620 6646  
 E-mail: physchem@gum.gov.pl

**Mr Dusan Trochta**, SMU  
Tel: + 421 2 602 942 14  
Fax: + 421 2 654 295 92  
E-mail: trochta@smu.gov.sk

**Dr James Whetstone**, NIST  
Tel: + 1 301 975 2609  
Fax: + 1 301 975 8288  
E-mail: james.whetstone@nist.gov

**Mrs Inge van Anandel**, NMi VSL  
Tel: + 31 15 269 1754  
Fax: + 31 15 2612 971  
E-mail: ivandel@nmi.nl

**Consultative Committee for Amount of Substance: metrology in chemistry (CCQM)****Created in 1993**

*Present activities concern primary methods for measuring amount of substance and international comparisons, establishment of international equivalence between national laboratories and advice to the CIPM on matters concerned with metrology in chemistry.*

**President: Dr Robert Kaarls**  
 Klaverwydenstraat 13  
 2381 VX Zoeterwoude  
 The Netherlands  
 Tel: + 31 71 580 22 31  
 Fax: + 31 71 580 47 77  
 E-mail : rkaarls@euronet.nl

**Executive Secretary: Dr Robert Wielgosz, BIPM**  
 Tel: + 33 1 45 07 62 51  
 Fax: + 33 1 45 34 20 21  
 E-mail: rwielgosz@bipm.org

**Members:**

Centro Nacional de Metrología [CENAM], Querétaro  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Danish Institute of Fundamental Metrology [DFM], Lyngby  
 Institute for Reference Materials and Measurements [IRMM], Geel  
 International Atomic Energy Agency [IAEA]  
 International Federation of Clinical Chemistry and Laboratory Medicine [IFCC]  
 International Organization for Standardization, Committee on Reference Materials [ISO REMCO]  
 International Union of Pure and Applied Chemistry [IUPAC]  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 Laboratoire National d'Essais [BNM-LNE], Paris  
 National Institute of Metrology [NIM]/National Research Center for Certified Reference Material [NRCCRM], Beijing  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO]/National Analytical Reference Laboratory-  
 Australian Government Analytical Laboratories [NARL-AGAL], Lindfield and Pymble respectively  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL]/Laboratory of the Government Chemist [LGC], Teddington  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB]/Federal Institute for Materials Research and Testing /  
 Bundesanstalt für Materialforschung und -prüfung [BAM], Berlin  
 Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava  
 State Laboratory [SL], Dublin  
 Swedish National Testing and Research Institute [SP], Borås  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern/Swiss Federal Laboratories  
 for Materials, Testing and Research [EMPA], St Gall  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

Central Office of Measures/Główny Urząd Miar [GUM], Warsaw  
 Centro Español de Metrología [CEM], Madrid  
 CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 Istituto di Metrologia "Gustavo Colonnetti" del Consiglio Nazionale delle Ricerche [IMGC-CNR], Torino  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 National Office of Measures/Országos Mérésügyi Hivatal [OMH], Budapest  
 National Physical Laboratory of India [NPLI], New Delhi  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore

**Delegates and experts of member laboratories  
 at the last meeting (April 2004)**

**President: Dr Robert Kaarls**

**Members:**

**Dr Laurie Besley**, NML CSIRO/NARL-AGAL

Tel: + 61 2 9413 7770

Fax: + 61 2 9413 7383

E-mail: <laurie.besley@csiro.au> and  
 <laurie.besley@agal.gov.au>

**Dr Philippe Charlet**, BNM-LNE

Tel: + 33 1 40 43 39 80

Fax: + 33 1 40 43 37 37

E-mail: philippe.charlet@lne.fr

**Dr Koichi Chiba**, NMIJ/AIST

Tel: + 81 29 861 4100

Fax: + 81 29 861 4100

E-mail: kk-chiba@aist.go.jp

**Prof. Dr Paul De Bièvre**, ISO REMCO

Tel: + 32 14 851 338

Fax: + 32 14 853 908

E-mail: paul.de.bievre@skynet.be

**Dr Ed W.B. de Leer**, NMi VSL

Tel: + 31 15 269 1712

Fax: + 31 15 269 1515

E-mail: edeleer@nmi.nl

**Ms Maria del Rocio Arvizu-Torres**, CENAM

Tel: + 52 442 211 0500 ext. 3902

Fax: + 52 442 211 0569

E-mail: marvizu@cenam.mx

**Dr David L. Duewer**, NIST

Tel: + 1 301 975 3935

Fax: + 1 301 926 8671

E-mail: david.duewer@nist.gov

**Dr René Dybkaer**, IFCC

Tel: + 45 38 16 38 70 or 71

Fax: + 45 38 16 38 79

**Prof. Dr Hendrik Emons**, IRMM

Tel: + 32 14 571 722

Fax: + 32 14 590 406

E-mail: hendrik.emons@cec.eu.int

**Dr Hugo Ent**, NMi VSL

Tel: + 31 15 2 691500/675/680

Fax: + 31 15 2 612971

E-mail: hent@nmi.nl

**Dr Ales Fajgelj**, IAEA and IUPAC

Tel: + 43 1 2600 28233

Fax: + 43 1 2600 28222

E-mail: a.fajgelj@iaea.org

**Dr Bernd Güttler**, PTB

Tel: + 49 531 592 3100

Fax: + 49 531 592 3015

E-mail: bernd.guettler@ptb.de

**Dr Hans-Peter Haerri**, METAS

Tel: + 41 31 3233 534

Fax: + 41 31 3233 210

E-mail: hans-peter.haerri@metas.ch

**Dr Werner Hässelbarth, BAM**

Tel: + 49 30 81 04 11 01

Fax: + 49 30 81 04 55 77

E-mail: werner.haesselbarth@bam.de

**Dr Euijin Hwang, KRISS**

Tel: + 82 42 868 5343

Fax: + 82 42 868 5042

E-mail: ehwang@kriss.re.kr

**Dr Toshihide Ihara, NMIJ/AIST**

Tel: + 81 29 861 4120

Fax: + 81 29 861 4099

E-mail: t.ihara@aist.go.jp

**Dr Hans D. Jensen, DFM**

Tel: + 45 4525 5874

Fax: + 45 4593 1137

E-mail: hdj@dfm.dtu.dk

**Dr Yury Kustikov, VNIIM**

Tel: + 7 812 325 54 53

Fax: + 7 812 327 97 76

E-mail: lkonop@mail.rcom.ru or

lkonop@b10.vniim.ru

**Ms Judith Velina Lara-Manzano, CENAM**

Tel: + 52 442 211 0564

Fax: + 52 442 211 0569

E-mail: vlara@cenam.mx

**Ms Hongmei Li, NRCCRM**

Tel: + 86 10 6427 1639

Fax: + 86 10 6427 1639

E-mail: lihm@nrccrm.org.cn

**Dr Bertil Magnusson, SP**

Tel: + 46 33 16 52 75

Fax: + 46 33 12 37 49

E-mail: bertil.magnusson@sp.se

**Dr Michal Máriássy, SMU**

Tel: + 421 2 6029 4522

Fax: + 421 2 6542 9592

E-mail: michal.mariassy@smu.gov.sk

**Dr Alain Marschal, BNM-LNE**

Tel: + 33 1 40 43 37 50

Fax: + 33 1 40 43 37 37

E-mail: alain.marschal@lne.fr

**Dr Ralf Matschat, BAM**

Tel: + 49 30 8104 5841 or 1110

Fax: + 49 30 8104 1117

E-mail: ralf.matschat@bam.de

**Dr Willie E. May, NIST**

Tel: + 1 301 975 3108

Fax: + 1 301 926 8671

E-mail: willie.may@nist.gov

**Dr James W. McLaren, NRC**

Tel: + 1 613 993 7319

Fax: + 1 613 990 6439

E-mail: jim.mclaren@nrc.ca

**Dr Martin J.T. Milton, NPL**

Tel: + 44 208 943 6826

Fax: + 44 208 943 6755

E-mail: martin.milton@npl.co.uk

**Dr Yoshito Mitani, CENAM**

Tel: + 52 442 211 0560

Fax: + 52 442 211 0569

E-mail: ymitani@cenam.mx

**Dr Dae Won Moon, KRISS**

Tel: + 82 42 868 5390

Fax: + 82 42 868 5032

E-mail: dwmoon@kriss.re.kr

**Dr Irene Nehls, BAM**

Tel: + 49 30 81 04 11 20

Fax: + 49 30 81 04 11 27

E-mail: irene.nehls@bam.de

**Prof. Dr Kensaku Okamoto, NMIJ/AIST**

Tel: + 81 29 861 4420

Fax: + 81 29 861 4420

E-mail: kensaku-okamoto@aist.go.jp

**Ms Helen Parkes, LGC**

Tel: + 44 208 943 7676

Fax: + 44 208 943 2767

E-mail: helen.parkes@lgc.co.uk

**Dr Mike Sargent, LGC**

Tel: + 44 208 943 7360

Fax: + 44 208 943 2767

E-mail: ms@lgc.co.uk

**Dr Martin Seah, NPL**

Tel: + 44 208 943 6634

Fax: + 44 208 943 6453

E-mail: martin.seah@npl.co.uk

**Prof. Dr Hun-Young So, KRISS**

Tel: + 82 42 868 5040

Fax: + 82 42 868 5042

E-mail: hys@kriss.re.kr

**Dr Ralph Sturgeon, NRC**  
 Tel: + 1 613 993 6395  
 Fax: + 1 613 993 2451  
 E-mail: ralph.sturgeon@nrc.ca

**Dr Philip Taylor, IRMM**  
 Tel: + 32 14 571 605  
 Fax: + 32 14 571 863  
 E-mail: philip.taylor@cec.eu.int

**Prof. Dr Joseph Thijssen, IFCC**  
 Tel: + 31 30 250 4264  
 Fax: + 31 30 250 5378  
 E-mail: j.thijssen@azu.nl

**Dr Máire C. Walsh, SL**  
 Tel: + 353 1 802 5800  
 Fax: + 353 1 821 7320  
 E-mail: maire.walsh@statelab.ie

#### Observers:

**Mr Ibrahim Akdag, UME**  
 Tel: + 90 262 679 5000  
 Fax: + 90 262 679 5001  
 E-mail: ibrahim.akdag@ume.tubitak.gov.tr

**Dr Angelique Botha, CSIR-NML**  
 Tel: + 27 12 841 3800  
 Fax: + 27 12 841 2131  
 E-mail: abotha@csir.co.za

**Dr Éva Deák, OMH**  
 Tel: + 36 1 458 5836  
 Fax: + 36 1 458 5807  
 E-mail: e.deak@omh.hu

#### Invited by the President:

**Dr Leonard A. Barrie, WMO**  
 Tel: + 41 22 730 82 40  
 Fax: + 41 22 730 80 49  
 E-mail: lbarrie@wmo.int

**Dr Vanderléa de Souza, INMETRO**  
 Tel: + 55 21 2679 9069  
 Fax: + 55 21 2679 9069  
 E-mail: vsouza@inmetro.gov.br

**Dr Michael Weber, EMPA**  
 Tel: + 41 71 274 7794  
 Fax: + 41 71 274 7788  
 E-mail: michael.weber@empa.ch

**Dr Steve Wood, LGC**  
 Tel: + 44 208 943 7670  
 Fax: + 44 208 943 2767  
 E-mail: steve.wood@lgc.co.uk

**Dr Fangdi Wu, NRCCRM**  
 Tel: + 86 10 8425 7794  
 Fax: + 86 10 6422 8404  
 E-mail: wufd@nrccrm.com.cn

**Prof. Yadong Yu, NRCCRM**  
 Tel: + 86 10 6422 8403  
 Fax: + 86 10 6422 8404  
 E-mail: yuyd@nrccrm.org.cn or  
 yydh@public.bta.net.cn

**Dr Mario Gallorini, IMGC-CNR**  
 Tel: + 39 0382 526 252  
 Fax: + 39 0382 423 578  
 E-mail: m.gallorini@imgc.cnr.it

**Dr Teresa López, CEM**  
 Tel: + 34 91 807 4751  
 Fax: + 34 91 807 4807  
 E-mail: mtlopez@cem.es

**Dr Wynand Louw, CSIR-NML**  
 Tel: + 27 12 841 4227  
 Fax: + 27 12 841 3382  
 E-mail: wlouw@csir.co.za

**Dr Monique Getrouw, INMETRO**  
 Tel: + 55 21 2679 9069  
 Fax: + 55 21 2293 0954  
 E-mail: magetrouw@inmetro.gov.br

**Dr Dimka Ivanova, NCM**  
 Tel: + 359 2 72 36 33  
 Fax: + 359 2 71 70 50  
 E-mail: ncm@sasm.orbitel.bg

**Dr Gabriela Massiff**, Fundacion Chile

Tel: + 56 2 242 8180

Fax: + 56 2 242 8182

E-mail: gmassiff@fundacionchile.cl

**Dr Ana Padilla**, WHO

Tel: + 41 22 791 3892

Fax: + 41 22 791 4836

E-mail: padillaa@who.int

**Dr Vera M. L. Ponçano A. Silva**, IPT

Tel: + 55 11 3767 4540/11 819 2877

Fax: + 55 11 3767 4009

E-mail: vponcano@ipt.br

**Dr Wolfgang Richter**

Tel: + 49 531 32 94 77

E-mail: wolfgang.k.richter@t-online.de

**Prof. Dr Lothar Siekmann**, Institut für Klinische  
Biochemie

Tel: + 49 228 287 5911

Fax: + 49 228 287 5033

E-mail: lothar.siekmann@ukb.uni-bonn.de

**Mr Alan Squirrel**, ILAC

Tel: + 61 2 9736 8374

Fax: + 61 2 9736 8373

E-mail: alan.squirrel@nata.asn.au

**Mr Alex Williams**

Tel: + 44 1252 542 854

Fax: + 44 8700 548 926

E-mail: alex\_williams@camberley.demon.co.uk

**CCQM Working Group on Key Comparisons and CMC Quality****Chairman:****Dr James W. McLaren**, NRC

Tel: + 1 613 993 7319

Fax: + 1 613 990 6439

E-mail: jim.mclaren@nrc.ca

**Members:**

BIPM

BNM-LNE

KRISS

LGC

NIST

NMi VSL

NPL

VNIIM

**CCQM Working Group on Gas Analysis****Chairman:****Dr Ed W.B. de Leer**, NMi VSL

Tel: + 31 15 269 1712

Fax: + 31 15 269 1515

E-mail: edeleer@nmi.nl



**CCQM Working Group on Electrochemical Analysis****Chairman:****Dr Michal Máriássy**, SMU

Tel: + 421 2 6029 4522

Fax: + 421 2 6542 9592

E-mail: mariassy@smu.gov.sk or michal.mariassy@smu.gov.sk

**CCQM Working Group on Inorganic Analysis****Chairman:****Dr Mike Sargent**, LGC

Tel: + 44 208 943 7360

Fax: + 44 208 943 2767

E-mail: ms@lgc.co.uk

**Members:**

BAM

BNM-LNE

CENAM

CSIR-NML

GUM

IAEA

IMGC-CNR

INTEC

IPT

IRMM

KRISS

LGC

METAS/EMPA

NIST

NMI VSL

NMIJ/AIST

NML CSIRO/NARL

NRC

NRCCRM

OMH

PTB

SMU

SP

VNIIM

**CCQM Working Group on Organic Analysis****Chairman:****Dr Willie May**, NIST

Tel: + 1 301 975 3108

Fax: + 1 301 926 8671

E-mail: willie.may@nist.gov

**Members:**

BAM

KRISS

LGC

METAS/EMPA

NARL

NIST

NMI VSL

NMI/GIST-Brocades

NMIJ/AIST

NML CSIRO

NRC

NRCCRM

OMH/Technical University of Budapest

PTB

SMU/Slovak University of Technology

VNIIM

**CCQM Working Group on Bioanalysis**

**Co-Chair:**

**Dr Helen Parkes, LGC**  
Tel: + 44 208 943 7676  
Fax: + 44 208 943 2767  
E-mail: helen.parkes@lgc.co.uk

**Dr Vincent Vilker, NIST**  
Tel: + 1 301 975 5066  
E-mail: vincent.vilker@nist.gov

**CCQM Working Group on Surface Analysis**

**Chairman:**

**Dr Martin Seah, NPL**  
Tel: + 44 208 943 6634  
Fax: + 44 208 943 6453  
E-mail: martin.seah@npl.co.uk

## Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV)

Created in 1998

*In addition to its formal work in the organisation of key comparisons in acoustics (airborne and underwater), in ultrasound and in vibration measurement, the CCAUV acts as the focus for this diverse community, seeking to develop common aims and increased collaboration between national metrology institutes and appropriate designated organisations in Member Countries of the Metre Convention.*

**President:** **Dr Joaquín Valdés**  
 Quality and Metrology Manager  
 Instituto Nacional de Tecnología Industrial  
 Parque Tecnológico Miguelete  
 Av. Gral. Paz e/Albarellos y Constituyentes (B1650KNA)  
 C.C. 157 - (B1650WAB) San Martín - Prov. de Buenos Aires  
 Argentina  
 Tel: + 54 11 4724 6200/300/400 int.6412  
 Fax: + 54 11 4724 6244  
 E-mail: jovaldes@inti.gov.ar

**Executive Secretary:** **Dr Penelope Allisy-Roberts, BIPM**  
 Tel: + 33 1 45 07 70 90  
 Fax: + 33 1 45 34 20 21  
 E-mail: allisy-roberts@bipm.org

### Members:

Centro Nacional de Metrología [CENAM], Querétaro  
 CSIR - National Metrology Laboratory [CSIR-NML], Pretoria  
 D.I. Mendeleev Institute for Metrology, Gosstandart of Russia [VNIIM], St Petersburg  
 Danish Institute of Fundamental Metrology [DFM]/Danish Primary Laboratory for Acoustics [DPLA],  
 Naerum  
 Institut National de Métrologie [BNM-INM], Paris  
 Istituto di Metrologia "Gustavo Colonnetti" del Consiglio Nazionale delle Ricerche [IMGC-CNR], Torino  
 Istituto Elettrotecnico Nazionale "Galileo Ferraris" [IEN], Torino  
 Korea Research Institute of Standards and Science [KRISS], Daejeon  
 National Institute of Metrology [NIM], Beijing  
 National Institute of Metrology, Standardization and Industrial Quality [INMETRO], Rio de Janeiro  
 National Institute of Standards and Technology [NIST], Gaithersburg  
 National Measurement Laboratory CSIRO [NML CSIRO], Lindfield  
 National Metrology Institute of Japan, AIST [NMIJ/AIST], Tsukuba  
 National Physical Laboratory [NPL], Teddington  
 National Physical Laboratory of India [NPLI], New Delhi  
 National Research Council of Canada [NRC], Ottawa  
 Nederlands Meetinstituut/Van Swinden Laboratorium [NMI VSL], Delft  
 Physikalisch-Technische Bundesanstalt [PTB], Braunschweig  
 Swiss Federal Office of Metrology and Accreditation [METAS], Bern-Wabern  
 The Director of the International Bureau of Weights and Measures [BIPM], Sèvres

**Observers:**

Bundesamt für Eich- und Vermessungswesen [BEV], Vienna  
 Central Office of Measures/Główny Urząd Miar [GUM], Warsaw  
 Czech Metrology Institute [CMI], Praha  
 Institute for Physical-Technical and Radiotechnical Measurements, Gosstandart of Russia [VNIIFTRI],  
 Moscow  
 Instituto Português da Qualidade [IPQ]/Laboratório Nacional de Engenharia Civil [LNEC], Lisboa  
 International Electrotechnical Commission [IEC]  
 International Organization for Standardization [ISO]  
 National Metrology Institute of Turkey [UME], Gebze-Kocaeli  
 Slovak Institute of Metrology/Slovenský Metrologický Ústav [SMU], Bratislava  
 Standards, Productivity and Innovation Board [SPRING Singapore], Singapore  
 State Agency for Metrology and Technical Surveillance [SAMTS], Sofia

**Delegates and experts of the member laboratories  
 at the last meeting (October 2002)**

**President: Dr Joaquín Valdés**

**Members:**

**Mr Richard Barham, NPL**

Tel: + 44 208 943 6725

Fax: +44 208 943 6217

E-mail: richard.barham@npl.co.uk

**Mr Christian Barreau, BNM-INM**

Tel: + 33 5 57 04 45 89

Fax: + 33 5 57 04 54 28

E-mail: christian.barreau@antigone.cea.fr

**Msc Salvador Barrera-Figueroa, CENAM**

Tel: + 45 4525 3966

Fax: + 45 4588 0577

E-mail: sbf@oersted.dtu.dk

**Dr Giuseppe Basile, IMGC-CNR**

Tel: + 39 011 3977 424

Fax: + 39 011 3977 426

E-mail: g.basile@imgc.cnr.it

**Dr Klaus Beißner, PTB**

Tel: + 49 531 592 1431

Fax: + 49 531 592 1405

E-mail: klaus.beissner@ptb.de

**Mr Jean-Noël Durocher, BNM-LNE**

Tel: + 33 1 30 69 14 88

Fax: + 33 1 30 69 12 34

E-mail: jean-noel.durocher@lne.fr

**Dr José Salvador Echeverría-Villagómez,  
 CENAM**

Tel: + 52 442 211 0550

Fax: + 52 442 211 0553

E-mail: saleche@cenam.mx

**Dr Alfredo Elías, CENAM**

Tel: + 52 442 211 0551

Fax: + 52 442 211 0553

E-mail: alfredo.elias@cenam.mx

**Dr James Filliben, NIST**

Tel: + 1 301 975 2855

E-mail: james.filliben@nist.gov

**Mr Erling Frederiksen, DPLA**

Tel: +45 4580 0500

Fax: +45 7741 2013

E-mail: erlingfred@bksv.com

**Dr Claudio Guglielmo, IEN**

Tel: + 39 011 391 9626

Fax: + 39 011 391 9621

E-mail: guglielm@ac.ien.it

**Mr Michel Lecollinet, BNM-INM**

Tel: + 33 1 40 27 26 94

Fax: + 33 1 42 71 37 36

E-mail: michel.lecollinet@cnam.fr

**Dr Victor Nedzelnitsky, NIST**  
 Tel: + 1 301 975 6638  
 Fax: + 1 301 417 0514  
 E-mail: victor.nedzelnitsky@nist.gov

**Prof. Knud Rasmussen, DPLA**  
 Tel: + 45 4525 3937  
 Fax: + 45 4588 0577  
 E-mail: kr@oersted.dtu.dk

**Dr Rainer Reibold, PTB**  
 Tel: + 49 531 592 1400  
 Fax: + 49 531 592 1405  
 E-mail: rainer.reibold@ptb.de

**Mr Stephen Robinson, NPL**  
 Tel: +44 208 943 7152  
 Fax: + 44 208 943 6217  
 E-mail: stephen.robinson@npl.co.uk

**Dr Sojun Sato, NMIJ/AIST**  
 Tel: + 81 298 61 5519  
 Fax: + 81 298 61 5592  
 E-mail: sojun.sato@aist.go.jp

**Dr Victor Smirnov, VNIIM**  
 Tel: + 7 812 422 0159  
 Fax: + 7 812 113 0114  
 E-mail: hal@onti.vniim.spb.su

**Dr Sang Joon Suh, KRISS**  
 Tel: + 82 42 868 5300  
 Fax: + 82 42 868 5643  
 E-mail: sjs@kriss.re.kr

**Dr Suzanne Thwaites, NML CSIRO**  
 Tel: + 61 2 9413 7416  
 Fax: + 61 2 9413 7161  
 E-mail: suszanne.thwaites@csiro.au

#### Observers:

**Dr Alexander Enyakov, VNIIFTRI**  
 Tel: + 7 095 535 9397  
 Fax: + 7 095 535 9230  
 E-mail: enyakov@vniiftri.ru

**Dr Anatolij Konkov, VNIIFTRI**  
 Tel: + 7 095 535 9256  
 Fax: + 7 095 535 9256 or 9230  
 E-mail: akustika@vniiftri.ru

**Dr Takashi Usuda, NMIJ/AIST**  
 Tel: + 81 298 61 4356  
 Fax: + 81 298 61 4047  
 E-mail: takashi.usuda@aist.go.jp

**Dr Arnie Lee Van Buren, NIST**  
 Tel: + 1 401 832 3617  
 Fax: + 1 401 832 4157  
 E-mail: vanburenal@npt.nuwc.navy.mil

**Dr Paul van Kan, NMI VSL**  
 Tel: + 31 15 269 1500  
 Fax: + 31 15 361 3497  
 E-mail: pvankan@nmi.nl

**Mr Ian Veldman, CSIR-NML**  
 Tel: + 27 12 841 4008  
 Fax: + 27 12 841 2131  
 E-mail: csveldma@csir.co.za

**Dr Hans-Jürgen von Martens, PTB and ISO**  
 Tel: + 49 531 592 1220  
 Fax: + 49 531 592 1241  
 E-mail: hans-juergen.v.martens@ptb.de

**Dr George Wong, NRC**  
 Tel: + 1 613 993 6159  
 Fax: + 1 613 990 8765  
 E-mail: george.wong@nrc.ca

**Dr Bajram Zeqiri, NPL**  
 Tel: + 44 208 943 6806  
 Fax: + 44 208 943 6161  
 E-mail: bajram.zeqiri@npl.co.uk

**Mr Yue Zhang, NIM**  
 Tel: + 86 10 6421 8628  
 Fax: + 86 10 6421 8703  
 E-mail: zhangy@nim.ac.cn

**Dr Enver Sadikoglu, UME**  
 Tel: + 90 262 679 5000  
 Fax: + 90 262 679 5001  
 E-mail: enver.sadikoglu@ume.tubitak.gov.tr

**Dr Merita Sinojmeri, BEV**  
 Tel: + 43 1 49 110 390  
 Fax: + 43 1 49 20 875  
 E-mail: m.sinojmeri@metrology.at

**Ms Maria Szelag, GUM**  
Tel: + 48 22 620 4259  
Fax: + 48 22 620 8378  
E-mail: [acoustics@gum.gov.pl](mailto:acoustics@gum.gov.pl)

**Invited by the President:**

**Mr Gustavo Ripper, INMETRO**  
Tel: + 55 21 2679 9191 or 9112  
Fax: + 55 21 2679 1296  
E-mail: [lavib@inmetro.gov.br](mailto:lavib@inmetro.gov.br)

## Acronyms and Addresses

**ANSTO** Australian Nuclear Science & Technology  
Organisation  
Organization Building 16  
Private Mail Bag 1  
2234 Menai  
Australia

**ARPANSA** Australian Radiation Protection And  
Nuclear Safety Agency  
Lower Plenty Road  
Yallambie  
3085 Victoria  
Australia

**BAM** Federal Institute for Materials Research and  
Testing/Bundesanstalt für Materialforschung  
und -prüfung  
Unter den Eichen 87  
D-12205 Berlin  
Germany

**BEV** Bundesamt für Eich- und Vermessungswesen  
Arltgasse 35  
A-1160 Vienna  
Austria

**BNM** Bureau National de Métrologie  
1, rue Gaston Boissier  
75015 Paris  
France

**BNM-INM** Institut National de Métrologie  
292, rue Saint-Martin  
75141 - CEDEX 03 Paris  
France

**BNM-LNE** Laboratoire National d'Essais  
1, rue Gaston Boissier  
75015 Paris  
France

**BNM-LNE/LAMA** Laboratoire André Marie  
Ampère  
29, avenue Roger Hennequin  
78197 Trappes cedex  
France

**BNM-LNHB** Laboratoire National Henri Becquerel  
DIMRI - CEA Saclay  
Boite postale 52  
91193 Gif-sur-Yvette  
France

**BNM-SYRTE** SYstèmes de Référence Temps-  
Espace  
Observatoire de Paris  
61 avenue de l'Observatoire  
75014 Paris  
France

**CEM** Centro Español de Metrología  
Calle del Alfar nº 2  
28760 Tres Cantos - Madrid  
Spain

**CENAM** Centro Nacional de Metrología  
km 4,5 Carretera a Los Cués  
Municipio El Marqués  
76241 Querétaro  
Mexico

**CIAE** China Institute of Atomic Energy  
P.O. Box 275 (20)  
102413 Beijing  
China

**CIE** Commission internationale de l'éclairage  
Central Bureau  
Kegelgasse 27  
A-1030 Vienne  
Austria

**CIEMAT** Centro de Investigaciones Energéticas,  
Medioambientales y Tecnológicas  
Ministerio de Industria y Energía  
Avenida Complutense, 22  
28040 Madrid  
Spain

**CMI** Czech Metrology Institute  
110 00 Praha 1  
Hybernská 8  
Praha  
Czech Republic

**CSIR-NML** CSIR - National Metrology Laboratory  
P.O. Box 395  
0001 Pretoria  
South Africa

**CSIR-NML** CSIR - National Metrology Laboratory  
Radioactivity Standards Laboratory  
15 Lower Hope Road  
Rosebank 7700 Cape Town

- South Africa
- DFM** Danish Institute of Fundamental Metrology  
Matematiktorvet  
Building 307  
DK-2800 Lyngby  
Denmark
- DPLA** Danish Primary Laboratory for Acoustics  
Brüel & Kjaer A/S  
Shodsborgvej 307  
DK-2850 Naerum  
Denmark
- EMPA** Swiss Federal Laboratories for Materials,  
Testing and Research  
Lerchenfeldstrasse 5  
CH-9014 St. Gall  
Switzerland
- ENEA-INMRI** Ente per le Nuove Tecnologie,  
l'Energia e l'Ambiente -Istituto Nazionale di  
Metrologia delle Radiazioni Ionizzanti  
via Anguillarese km 1,300  
00060 S. M. di Galeria  
C. P. 2400 Roma  
Italy
- GOSSTANDART** State Committee of the Russian  
Federation for Standardization and Metrology  
Leninsky prospekt, 9  
117049 Moscou  
Russian Federation
- GUM** Central Office of Measures/Główny Urząd  
Miar  
P.O. Box P-10  
PL 00-950 Warsaw  
Poland
- HUT** Helsinki University of Technology  
P.O. Box 3000  
FIN-02015 Espoo  
Finland
- IAEA** International Atomic Energy Agency  
Wagramerstrasse, 5  
P.O. Box 100  
A-1400 Vienna  
Austria
- IAU** International Astronomical Union  
IAU Secretariat  
98 bis, Boulevard Arago  
75014 Paris  
France
- ICRU** International Commission on Radiation  
Units and Measurements  
7910 Woodmont Avenue  
Suite 800  
MD 20814-3095 Bethesda  
United States
- IEC** International Electrotechnical Commission  
3, rue de Varembe  
P.O. Box 131  
1211-20 Geneva  
Switzerland
- IEN** Istituto Elettrotecnico Nazionale "Galileo  
Ferraris"  
Strada delle Cacce 91  
I-10135 Turin  
Italy
- IFA-CSIC** Instituto de Física Aplicada-Consejo  
Superior de Investigaciones Cientificas  
Calle Serrano, 144  
28006 Madrid  
Spain
- IFCC** International Federation of Clinical  
Chemistry and Laboratory Medicine
- IKK** Institut für Isotopenforschung und Kernphysik  
"Radiuminstitut"  
der Universität Wien  
Boltzmannngasse 3  
A-1090 Vienna  
Austria
- IMGC-CNR** Istituto di Metrologia "Gustavo  
Colonnetti" del Consiglio Nazionale delle  
Ricerche  
Strada delle Cacce, 73  
I-10135 Turin  
Italy
- INMETRO** National Institute of Metrology,  
Standardization and Industrial Quality  
Santa Alexandrina St, 416  
Rio Comprido  
20261-232 Rio de Janeiro  
Brazil
- INPL** National Physical Laboratory of Israel  
Danciger "A" Bldg  
Hebrew University, Givat-Ram  
91904 Jerusalem  
Israel
- INTI** Instituto Nacional de Tecnología Industrial  
Parque Tecnológico Miguelote



- Av. Gral. Paz e/Albarellos y Constituyentes  
(B1650KNA)  
C.C. 157 - (B1650WAB) San Martín Prov.  
Buenos Aires  
Argentina
- IOMP** International Organization for Medical  
Physics
- IPQ** Instituto Português da Qualidade  
Laboratório Central de Metrologia  
Rua António Gião, 2  
2829-513 Caparica  
Portugal
- IRA-METAS** Institut de Radiophysique Appliquée  
Centre Universitaire  
CH-1015 Lausanne  
Switzerland
- IRI** Interfaculty Reactor Institute  
Department of Radiation Technology  
Mekelweg 15  
2629 JB Delft  
The Netherlands
- IRMM** Institute for Reference Materials and  
Measurements  
European Commission - Directorate General  
JRC  
Retieseweg  
B-2440 Geel  
Belgium
- IRPA** International Radiation Protection  
Association
- ISO** International Organization for Standardization  
Central Secretariat  
1, rue de Varembé  
Case postale 56  
CH-1211 Geneva  
Switzerland
- ISO REMCO** International Organization for  
Standardization, Committee on Reference  
Materials
- ITU** International Telecommunication Union  
Radiocommunication Bureau  
Place des Nations  
CH-1211 Genève 20  
Switzerland
- IUGG** International Union of Geodesy and  
Geophysics
- IUPAC** International Union of Pure and Applied  
Chemistry  
P.O. Box 13757  
Research Triangle Parc  
NC 27709-3757  
United States
- IUPAP** International Union of Pure and Applied  
Physics
- JILA** Joint Institute for Laboratory Astrophysics  
80303-0440 Colorado, Boulder,  
United States
- JV** Justervesenet  
Norwegian Metrology and Accreditation  
Service  
Fetveien 99  
2007 Kjeller  
Norway
- KRISS** Korea Research Institute of Standards and  
Science  
P.O. Box 102  
Yuseong  
305-600 Daejeon  
Korea, Republic of
- LGC** Laboratory of the Government Chemist  
Queens Road  
Middlesex TW11 OLY  
Teddington  
United Kingdom
- LNCC** Laboratório Nacional de Engenharia Civil  
Av. Brasil, 101  
1700-066 Lisbonne  
Portugal
- LNMI/IRD** National Laboratory for Metrology of  
Ionising Radiation/Institute of Radiation  
Protection and Dosimetry CNEN  
Av. Salvador Allende  
s/n° - Recreio  
CEP. 22780-160 Rio de Janeiro  
Brazil
- METAS** Swiss Federal Office of Metrology and  
Accreditation  
Lindenweg 50  
CH - 3003 Bern-Wabern  
Switzerland
- MIKES** Centre for Metrology and Accreditation  
P.O. Box 239  
FIN-00181 Helsinki

Finland	NSW 2070 Lindfield Australia
<b>MSL</b> Measurement Standards Laboratory of New Zealand PO Box 31 310 Lower Hutt New Zealand	<b>NPL</b> National Physical Laboratory Queens Road Middlesex TW11 0LW Teddington United Kingdom
<b>NARL-AGAL</b> National Analytical Reference Laboratory-Australian Government Analytical Laboratories PO Box 385 NSW 2073, Pymble Australia	<b>NPLI</b> National Physical Laboratory of India Dr K.S. Krishnan Road 110012 New Delhi India
<b>NICT</b> National Institute of Information and Communications Technology 4-2-1 Nukui-Kitamachi Koganei 184-8795 Tokyo Japan	<b>NRC</b> National Research Council of Canada Institute for National Measurement Standards Montreal Road K1A 0R6 Ottawa Canada
<b>NIM</b> National Institute of Metrology N° 18, Bei San Huan Dong Lu 100013 Beijing China	<b>NRCCRM</b> National Research Center for Certified Reference Material N° 18 Bei San Huan Dong Lu Chaoyangqu 100013 Beijing China
<b>NIST</b> National Institute of Standards and Technology 325 Broadway CO 80305-3328 Boulder United States	<b>OIML</b> International Organization of Legal Metrology
<b>NIST</b> National Institute of Standards and Technology 100 Bureau Drive Maryland 20899-0001, Gaithersburg United States	<b>OMH</b> National Office of Measures/Országos Mérésügyi Hivatal P.O. Box 919 1535 Budapest Hungary
<b>NMi VSL</b> Nederlands Meetinstituut/Van Swinden Laboratorium Schoemakerstraat 97 P.O. Box 654 2600 AR Delft The Netherlands	<b>ON</b> Observatoire Cantonal de Neuchâtel 58, rue de l'Observatoire CH-2000 Neuchâtel Switzerland
<b>NMIJ/AIST</b> National Metrology Institute of Japan, AIST Department of National Institute of Advanced Industrial Science and Technology Tsukuba Central 3 305-8563 Tsukuba Japan	<b>ORB</b> Observatoire Royal de Belgique Avenue Circulaire, 3 B-1180 Bruxelles Belgium
<b>NML CSIRO</b> National Measurement Laboratory CSIRO Bradfield Road, West Lindfield PO Box 218	<b>PTB</b> Physikalisch-Technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig Germany
	<b>RC</b> Radioisotope Centre POLATOM Metrological Laboratory of Radioactive Materials 05-400 Otwock- Swierk Poland

- ROA** Real Instituto y Observatorio de la Armada  
Cecilio Pujazón S/N  
11.110 San Fernando Cadiz  
Spain
- SAMTS** State Agency for Metrology and Technical  
Surveillance  
21, "6th Septemvri" St.  
1000 Sofia  
Bulgaria
- SL** State Laboratory  
Abbotstown  
15 Dublin  
Ireland
- SMU** Slovak Institute of Metrology/Slovenský  
Metrologický Ústav  
Karloveská 63  
842 55 Bratislava  
Slovakia
- SP** Swedish National Testing and Research Institute  
PO Box 857  
S-501 15 Borås  
Sweden
- SPRING Singapore** Standards, Productivity and  
Innovation Board  
National Metrology Centre  
1 Science Park Drive  
118 221 Singapur  
Singapore
- SRC** Space Research Centre of Polish Academy of  
Sciences  
Bartycka 18A  
00-716 Warszawa  
Poland
- SRPI** Swedish Radiation Protection  
Institute/Statens Stralskyddsinstitut  
S-171 16 Stockholm  
Sweden
- STUK** Radiation and Nuclear Safety Authority  
P.O. Box 14  
Laippatie 4  
FIN-00881 Helsinki
- TUG** Technical University of Graz  
Rechbauerstraße 12  
A-8010 Graz  
Austria
- UME** National Metrology Institute of Turkey  
P.O. Box 54  
41470 Gebze-Kocaeli  
Turkey
- URSI** International Union of Radio Science  
Secrétariat Général  
c/o INTEC, Universiteit Gent  
Sint-Pietersnieuwstraat 41  
B-9000 Gent  
Belgium
- USNO** U.S. Naval Observatory  
Time Service Department  
3450 Massachusetts Avenue NW  
20392-5420 Washington D.C.  
United States
- VNIIFTRI** Institute for Physical-Technical and  
Radiotechnical Measurements, Gosstandart of  
Russia  
Mendeleev  
141570 Moscow  
Russian Federation
- VNIIM** D.I. Mendeleev Institute for Metrology,  
Gosstandart of Russia  
19, Moskowsky Prospekt  
198005 St Petersburg  
Russian Federation
- VNIIOFI** Institute for Optico-Physical  
Measurements, Gosstandart of Russia  
Ozernaya 46  
119361 Moscow  
Russian Federation
- VTT Information Technology** Centre for  
Metrology and Accreditation  
Technical Research Centre of Finland  
Measurement Technology  
POB 1304  
FIN 02044 Espoo  
Finland