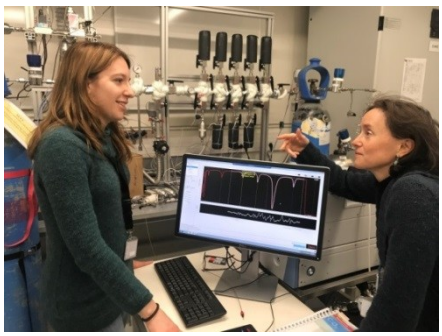
Visiting Scientist Opportunities in the BIPM Chemistry Department (2027-2028)

Developing and validating methods for the comparison of chemical and biochemical standards world-wide.

The International Bureau of Weights and Measures (BIPM) is an international organization established by the Metre Convention, through which Member States act together on matters related to measurement science and measurement standards.



About the Chemistry Department

The BIPM has several vacancies for short-term secondments in the Chemical Metrology Department, supporting the development of methods which will be used to compare national measurement standards and measurement capabilities. The BIPM chemistry laboratory activities focus on comparisons of core capabilities at National Metrology Institutes (NMIs) for value assigning primary reference materials and calibrators for small organic molecules, peptides and proteins, binary gas mixtures, and isotope ratios for light stable isotopes. The programme is strongly supported by NMI visiting scientists for the development and validation of methods and materials used in these comparisons as well as for capacity building and knowledge transfer laboratory activities.

Working on secondment at the BIPM

The BIPM offers a unique environment for a secondment. It is in Sèvres, on the outskirts of Paris (France) and has an international staff of about 75. There is a wide range of accommodation available nearby, including furnished apartments. There is an excellent public transport network to central Paris, and the international airports are in easy reach.

Terms and conditions

Applications are welcome from employees of a national measurement institute, a designated institute or a relevant international organization. You would not be employed by the BIPM and would remain an employee of your institute.

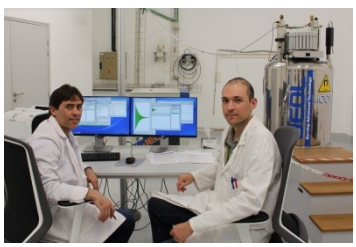
Applicants should make themselves aware of their home institute's funding schemes for visiting scientists, with the possibility of applying to the BIPM to contribute to additional living expenses.

Help will be given in finding local accommodation for the duration of the secondment.

Experience needed

The experience needed depends on the project.

A good level of English (spoken and written) is essential.



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No.	Programme Area	Name and Description of Secondment Project	Duration	Required experience of Visiting Scientist to undertake Secondment
C-1	Organic Analysis – Small Molecules	**qNMR: Characterization of internal reference standards for ^{31}P qNMR** To extend the suite of internal standards for ^{31}P qNMR, researchers will characterize candidate materials with the JEOL ECS-400 MHz spectrometer at the BIPM determining internal consistency of qNMR measurements with proton qNMR values.	Minimum 3 months, preferably 6 months	• Expertise in the theory and practice of NMR; • Background in analytical organic chemistry; • Experience in performing qNMR measurements Practical knowledge of the operation of NMR spectrometers and the optimization of their operating parameters is essential. Previous experience with JEOL NMR systems and the Mnova NMR software an advantage.
C-2	Organic Analysis – Small Molecules	**qNMR: Purity characterization of amino acid materials** To characterize and value assign pure phenylalanine, leucine, isoleucine, proline, valine and alanine materials for mass fraction of main component using ^{1}H qNMR.	Minimum 3 months, preferably 6 months	• Expertise in the theory and practice of NMR; • Background in analytical organic chemistry; • Experience in performing qNMR measurements Practical knowledge of the operation of NMR spectrometers and the optimization of their operating parameters is essential. Previous experience with JEOL NMR systems and the Mnova NMR software an advantage.
C-3	Organic Analysis – Small Molecules	**LC-UV/MS homogeneity and stability of Drug Materials** Visiting scientists are sought to apply LC-UV/MS methods method for homogeneity and stability testing of the main component and impurities in pure drug materials.	6 months, preferably 12 months	Previous experience in the following: • LC-UV/MS of small organic molecules • Performing homogeneity and stability testing.
C-4	Organic Analysis – Small Molecules	**LC-UV/MS purity characterization of nucleotides** Visiting scientists are sought to apply develop LC-UV/MS methods for quantifying related structure impurities in deoxynucleotides monophosphate (dNTPs) materials.	6 months, preferably 12 months	Previous experience in the following: • LC-UV/MS of small organic molecules • Performing homogeneity and stability testing.
C-5	Organic Analysis – Large Molecules	**Peptide impurity corrected amino acid analysis** Visiting scientists are sought to develop the PICAA approach for IgG quantification based on quantifying constituent amino acids (LC-IDMS) following hydrolysis of the material (microwave-assisted vapour-phase hydrolysis) and correction for amino acids originating from impurities, to support future protein standard comparisons (CCQM-K115 series).	Minimum 3 months, preferably 6 months	• Experience with liquid chromatography – mass spectrometry Previous experience in one or more of the following • LC-IDMS(/MS) of peptides/proteins • Hydrolysis of peptides/proteins.
C-6	Organic Analysis – Large Molecules	**High resolution mass spectrometry of peptides/proteins: IgG** Visiting scientists are sought to develop LC-hrMS(/MS) (Orbitrap) methods to characterize IgG material in preparation for future protein standard comparisons which will focus on future rounds of CCQM-K115.	6 months, preferably 12 months	• Experience with liquid chromatography – mass spectrometry Previous experience in one or more of the following • LC-MS(/MS) of peptides/proteins • Peptide mapping • Experience in use of high-resolution mass spectrometry (Orbitrap) would be an advantage

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No.	Programme Area	Name and Description of Secondment Project	Duration	Required experience of Visiting Scientist to undertake Secondment
C-7	Organic Analysis – Large Molecules	**Quantification of Tryptic Digest Peptides for de novo proteins** Visiting scientists are sought to further develop quantification methods for tryptic digest peptide using (LC-IDMS), to support future pure primary peptide calibrator comparisons (CCQM-K115 series).	6 months, preferably 12 months	• Experience with liquid chromatography – mass spectrometry Previous experience in one or more of the following • LC-IDMS(/MS) of peptides/proteins • Tryptic digest of proteins Previous experience with a SCIEX 6500+ would be an advantage.
C-8	Gas and Isotope Standards and Comparisons	**Validation of CH_4 Scale Comparison facility** To validate the BIPM's GHG scales facility for comparisons of CH_4 scales using both standard and reduced flow configurations.	3 months	• Experience in Picarro or other CRDS instrument operation • Experience in gas handling and GHG measurements • Experience with ISO 6143 and GLS regression analysis.
C-9	Gas and Isotope Standards and Comparisons	**Extension of VPBD scale to -70 ‰ : development and validation** To extend and validate the BIPM's SIRMGEN system for CO_2 mixtures to produce standard samples at $\delta_{VPDB}(^{13}C)$ close to −70 ‰ using highly depleted gas and produce a stable reference point for scale realization . Analysis to be performed by IRMS with a MAT−253+ mass spectrometer.	6−12 months preferred	• Experience in IRMS operation and data analysis • Experience in gas handling • Experience with Isodat Script Language would be an advantage.
C-10	Gas and Isotope Standards and Comparisons	**Linking $\delta^{18}O$ measurements to VPDB-CO_2 and VSMOW-SLAP scales** To extend and validate the BIPM's SIRMGEN system for CO_2 mixtures to allow equilibration with water standards to produce CO_2 gases with $\delta^{18}O$ values anchored to the VSMOW-SLAP scale. Analysis to be performed by IRMS with a MAT−253+ mass spectrometer.	6−12 months preferred	• Experience in IRMS operation and data analysis • Experience in gas handling and working with isotopic water standards • Experience with Isodat Script Language would be an advantage • Experience with cryogenic trapping/water equilibration would be an advantage.
C-11	Gas and Isotope Standards and Comparisons	**CBKT on NO_2 Dynamic Standards** To develop competence on the operation of primary dynamic standard systems based on permeation for the value assignment of transfer standards over the range 1000 nmol/mol to 50 nmol/mol of NO_2 in N_2/air.	6 months preferred	• Completed BIPM eLearning course on FTIR for Gas Standard Analysis • Experience in gas metrology • External funding for living allowance required.
C-12	Gas and Isotope Standards and Comparisons	**Modelling of Ozone Standard Network Performance** To develop a digital representation of the international network of ozone primary standards based on instrument operation and comparison data to predict stability of network interrelationships and optimized comparison model	3 to 6 months (Can be remote)	• Experience in modelling the performance of networks of measurement instruments • Experience in the development of digital twins to model and predict system performance.

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No.	Programme Area	Name and Description of Secondment Project	Duration	Required experience of Visiting Scientist to undertake Secondment
C-13	Organic Analysis – Large Molecules	**Quantification of Tryptic Digest Peptides for IgG** Visiting scientists are sought to further develop quantification methods for tryptic digest peptide using (LC-IDMS), to support future pure comparison on monoclonal antibody material (CCQM-K115 series).	6 months, preferably 12 months	• Experience with liquid chromatography – mass spectrometry Previous experience in one or more of the following • LC-IDMS(/MS) of peptides/proteins • Tryptic digest of proteins Previous experience with a SCIEX 6500+ would be an advantage
C-14	Gas and Isotope Standards and Comparisons	**$\delta^{13}C$ and $\delta^{18}O$ value transfer to pure CO2 gas samples using IRMS carbonate phosphoric acid reference method** To Transfer $\delta^{13}C$ and $\delta^{18}O$ values to BIPM's primary pure CO_2 gas standards from IAEA-603 carbonate CRM, with traceability to the VPDB scale, using the BIPM carbonate-acid reference method and facility. Develop a well-defined uncertainty budget for the value transfer. Analysis to be performed by IRMS with a MAT−253+ mass spectrometer.	6−12 months preferred	• Experience in IRMS operation and data analysis • Experience in gas handling and working with carbonate standards • Experience with Isodat Script Language would be an advantage.

How to apply

Please contact the Department Director, Dr Robert Wielgosz (rwielgos@bipm.org) to discuss the project and confirm whether the secondment opportunity is still available. If you decide you would like to go ahead, please forward a copy of your CV so that the BIPM can confirm that the project would be suitable. The BIPM will then send a copy of a Secondment Contract which should be signed by the authorized person at your organization.

If the secondment opportunity is no longer available or the project is not suitable, the BIPM would be pleased to discuss opportunities for a secondment in the future.