

# Ionizing Radiation Metrology: Secondment Opportunities at the BIPM

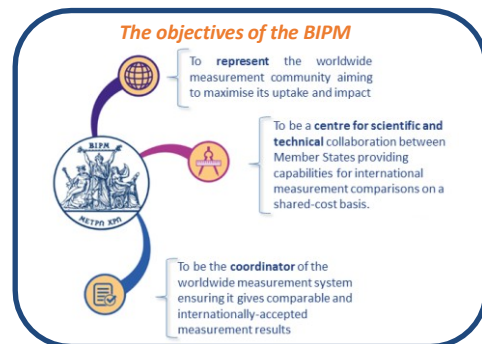
*Helping the development of new cancer therapies  
and supporting environmental protection.*

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.

The BIPM has a number of vacancies for short-term secondments in the Ionizing Radiation Department. Two types of secondment are available:

- 1) Contributing to the improvement of measurement techniques.
- 2) Working with BIPM staff to carry out and analyze comparison exercises, to learn about metrology at the international level.

Both are opportunities for career development, involve working with scientists from the BIPM and colleagues from national metrology institutes, helping to deliver the BIPM Work Programme and contributing to the international measurement system that underpins the safe use of ionizing radiation in healthcare and the nuclear industry.

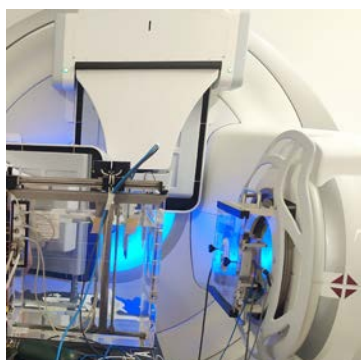


## ▪ About the Ionizing Radiation Department

The mission of the department is to support national metrology institutes in demonstrating the international equivalence of standards for radiation dosimetry and radioactivity. The department develops and maintains the technical infrastructure to enable comparisons of primary standards; it has a set of irradiation facilities and standards for dosimetry, access to a high-energy photon beam facility, a radiochemistry laboratory and a range of specialist radioactivity measurement systems (ionization chambers, liquid scintillation counters, gamma spectrometer, etc). It has a staff of nine scientists and specialist technicians.

## ▪ Working on secondment at the BIPM

The BIPM offers a unique environment for a secondment. It is located 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 an international organization such as the IAEA. You would not be employed by the BIPM and would remain an employee of your institute. The BIPM will normally pay an allowance to cover your 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 or French (spoken and written) is essential.



▪ Secondments – 2023

Index	Aim	Project	Duration*	Qualifications / experience needed
IR-S1	Development of a prototype of what would be a centralized digital service to allow NMIs/DIs to compare their digital signal processing capabilities for the realization of the becquerel	<ul style="list-style-type: none"> <li>- Participate in the development of data structure, comparison protocols and forms</li> <li>- Develop codes to simulate list mode data of beta-gamma coincidence counting and model-based approaches (TDCR, CIEMAT/NIST)</li> <li>- Produce and analyse list mode data from TDCR and NaI(Tl) detectors</li> <li>- Contribute to the preparation of a pilot study</li> </ul>	3-6 months (2024)	<ul style="list-style-type: none"> <li>- Good level in computer science and in data science</li> <li>- Experience in radionuclide metrology</li> <li>- “Good English or French”</li> </ul>
IR-S2	Setup and characterization of an ionization current measurement system using an ULCA module for the SIR	<ul style="list-style-type: none"> <li>- Setup and characterization of an ionization current measurement system using an ULCA module (Ultra-low noise current amplifier) and a voltmeter (VDM), down to 0.5 pA. This system will be connected to new ionization chambers purchased in view to build a second SIR for activity comparisons.</li> <li>- Development of LabView interface for measurements using two different voltmeters to be compared</li> </ul>	6 months (2024)	<ul style="list-style-type: none"> <li>- Electrical metrology</li> <li>- Low current measurement</li> <li>- Noise troubleshooting</li> <li>- LabView</li> <li>- Experience of ULCA measurements is a plus</li> </ul>
IR-S3	Monte-Carlo simulations of the SIRT1 4π NaI(Tl) detector using PENELOPE	<ul style="list-style-type: none"> <li>- The geometry file of the SIRT1 and the source is already available</li> <li>- Estimation of detection efficiency and uncertainty of radionuclide sources taking account of cascades and uncertainty in the decay scheme</li> <li>- Comparison with available measurement data</li> <li>- Evaluation of SIRT1 uncertainty budget related to the liquid source geometry for <sup>153</sup>Sm and <sup>56</sup>Mn</li> <li>- Preparation of a publication is expected</li> </ul>	6 months (2024-2025)	<ul style="list-style-type: none"> <li>- Monte-Carlo simulation using PENELOPE including compilation of Fortran code</li> <li>- Basic knowledge of LINUX is a plus</li> </ul>
IR-S4	Link measurements to the SIR of the BIPM (backup) SIRT1	<ul style="list-style-type: none"> <li>- For 6 radionuclides (<sup>18</sup>F, <sup>99m</sup>Tc, <sup>64</sup>Cu, <sup>68</sup>Ga, <sup>166</sup>Ho or <sup>201</sup>Tl), from source preparation to data analysis, in collaboration with the BIPM team and production of the report</li> </ul>	6 months (2025)	<ul style="list-style-type: none"> <li>- Basic knowledge of nuclear instrumentation for NaI(Tl) and HPGe detectors</li> <li>- Radionuclide metrology at an uncertainty level of 0.1 %</li> <li>- Experience of dilution of radioactive solution is a plus</li> </ul>

*\*The duration of the project is flexible, to meet your requirements*

▪ How to apply

Please contact the Department Director, Dr Vincent Gressier ([Vincent.gressier@bipm.org](mailto:Vincent.gressier@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.