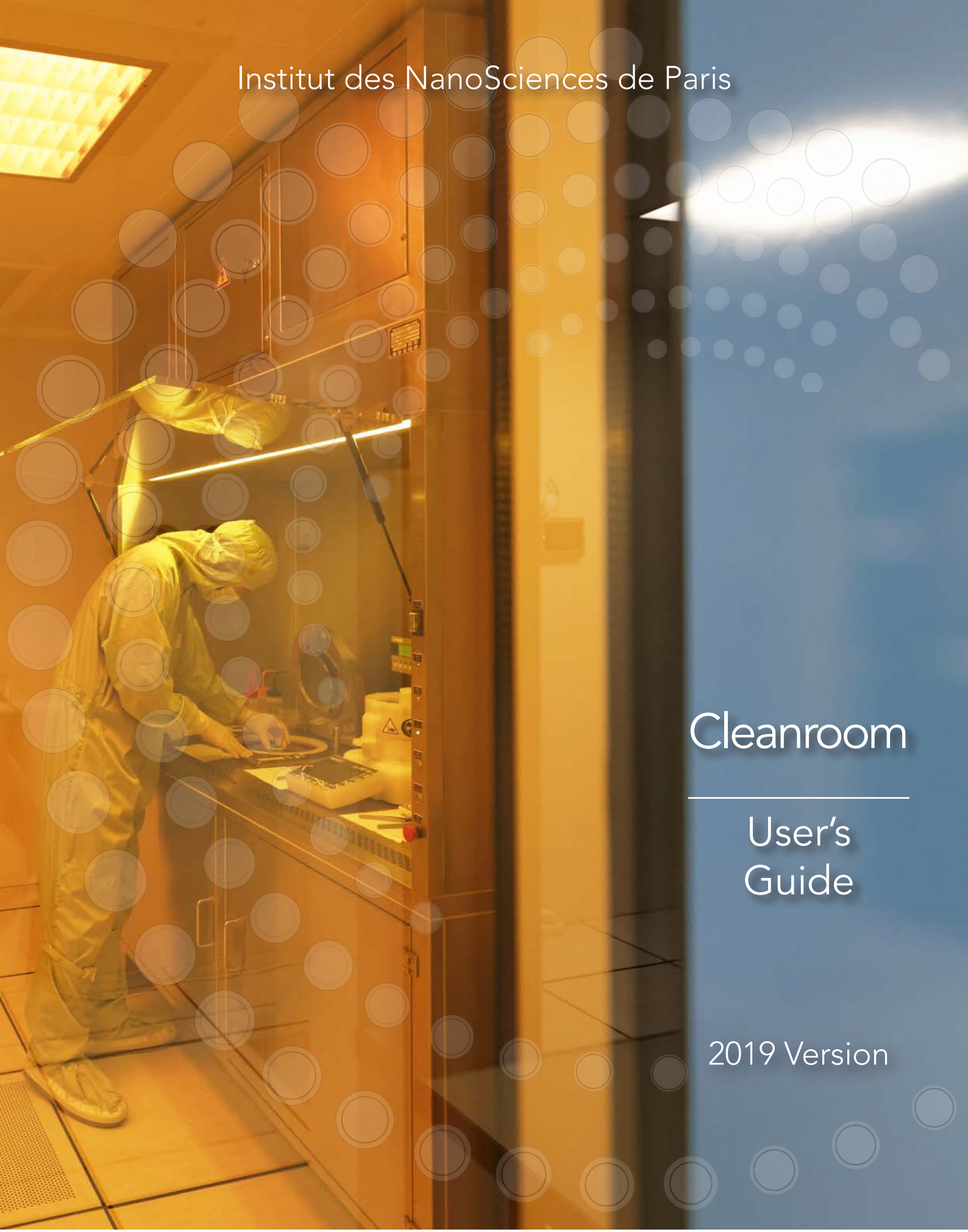
Institut des NanoSciences de Paris



Cleanroom

User's Guide

2019 Version

Photos on cover and next pages: © Laurent Ardhuin pour SU

INSP INSTITUT DES NANOSCIENCES DE PARIS

cnrs

SORBONNE UNIVERSITÉ

1 Introduction



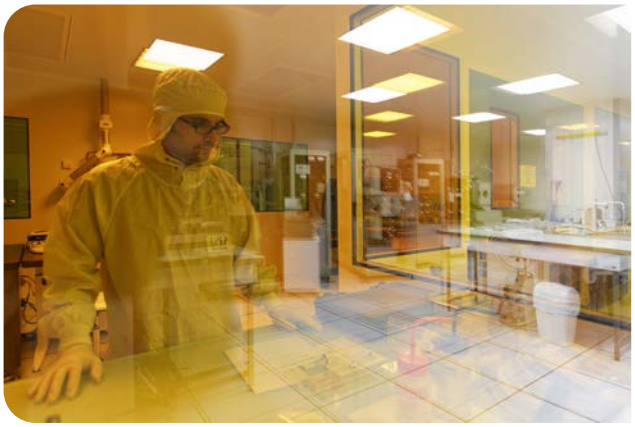
The INSP cleanroom is a state-of-the-art facility dedicated to research and teaching activities in the field of the micro-nano fabrication and of electronic, optical, phononic or photonic devices characterization. This cleanroom obtained the certifications class 10000 (Iso 7) and class 1000 (Iso 6), and constitutes an ideal environment for the realization of works on the nanostructures and the nanocomponents. The conservation of the quality of this environment is the object of the biggest attention and requires constant participation of all users. This user's guide presents the rules of functioning allowing to realize this goal, while ensuring the safety and the well-being of people. It also contains information necessary for the realization of the manipulations in the cleanroom and describes the precautions to be taken during these operations.

This guide aims to be as practical as possible. It is aimed at both experimented and new users. Comments and contributions to improve or complete its contents are hardly appreciated (for this, please contact Loïc Becerra or Erwan Dandeu).

IMPORTANT REMARK

Non-compliance with safety rules and good behavior by a user of the cleanroom can lead to his definitive exclusion from the installation…

For the first visit / entry in cleanroom, the presence of a person in charge of the cleanroom is mandatory, so that he can inform you about the different procedures to be followed (dressing, rules of cleanliness, safety, …) to ensure proper functioning of the installation.



2 Main rules

In the cleanroom, the users remain the biggest source of «pollution». That is why it is vital for each to respect some rules to preserve such an environment.

Users must:

1. Avoid working alone in cleanroom.

2. Respect the modalities of access to the cleanroom (reservation with GRR or by e-mail).
Except vacation or exceptional closure, the room is opened from Monday to Friday, from 9:30 am till 5:30 pm.

3. Ensure to work safely and in an orderly way.
Clean and store all the used material, as well as the workstations.
Label (product name, the user, date) any glassware used and work under chemical hoods.
Abrupt movements should be avoided to limit the turbulences in the cleanroom.

4. Respect the clothing procedure: combination, then overshoes, and finally gloves (+ optional mask [smokers in particular]).
Do not let drag on the floor combinations and watch to use the overshoes on the good side of the bench dedicated for it.

5. Use necessarily the individual protection equipment (safety glasses and anti-acid gloves) available for the concerned manipulations.
For more information, refer to the paragraph D.

6. Avoid taking in/out objects from the room.
Any material belonging to the cleanroom has to stay inside the cleanroom.
Respect the conditions related to the introduction of objects inside the cleanroom.
Clean (air gun, alcohol) everything which is going to enter the cleanroom.
Ban to bring papers, cardboard, wood or pencils. Everything needed is in the cleanroom.
No food and no drink.

7. Write necessarily what was done in cleanroom on the various manipulations books planned for that purpose.

8. Acquire the adequate training and obtain the necessary approvals before the use of an equipment.
User does not mean trainer!

9. Be sure of actions to be carried out during a manipulation, otherwise ask for help.
In case of doubt, do not hesitate to ask for help or advice!

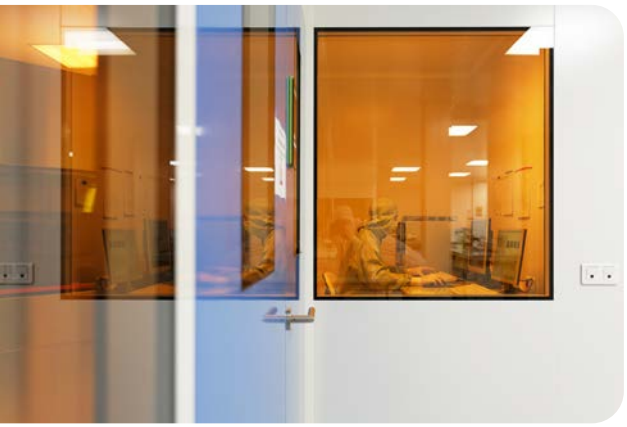
10. Inform the cleanroom staff of any defect or abnormal behavior of a device or tool.

11. Warn the cleanroom staff when a lack of supplies is approaching.

12. Respect usage rules inherent to the use of common computer hardware.
No installation / removal of programs on the computers.
Be careful with USB keys or mobile hard disks…

13. Know and respect safety procedures.
For more information, refer to the part 4.

14. Immediately report to a colleague any forgetfulness, error or violation to these rules.





3 Access to the cleanroom and use

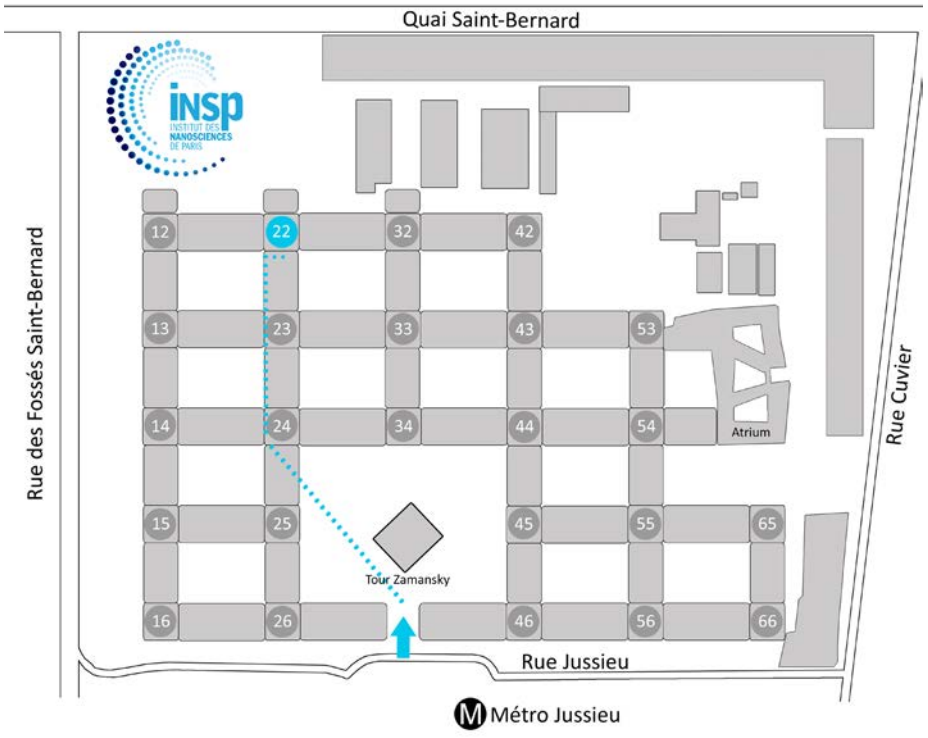
THIS PLATFORM MEETS THE NEEDS OF INSP MEMBERS AND IS ALSO OPENED TO THE SCIENTIFIC COMMUNITY AND COMPANIES.

The technical persons in charge of the cleanroom are:

Loïc Becerra	**01 44 27 40 03**	**bureau 22-32-321**
Erwan Dandeu	**01 44 27 42 43**	**bureau 22-32-321**

Access and use:

The entrance of the INSP cleanroom is located on the campus of Jussieu, in tower 22, at Ground Floor (door 2223-SB01, in front of the freight elevator).



Keys allowing a direct access to the cleanroom are only detained by the people responsible for this platform. The room is not self-service.
For any proposed handling in cleanroom, it is thus imperative to make a reservation on the GRR schedule set up for that purpose or to contact before one of the persons in charge (Loïc Becerra, or Erwan Dandeu) to arrange an appointment.

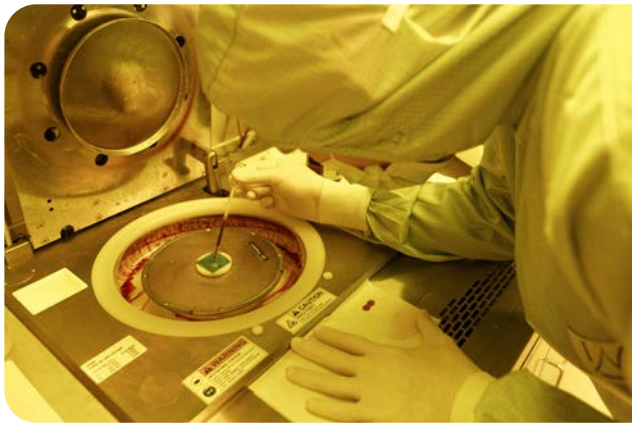
FOR OBVIOUS REASONS OF ORGANIZATION, ALL BOOKINGS ON THE GRR SCHEDULE MUST BE MADE AT LEAST 24 HOURS IN ADVANCE.

The access to the schedule of reservation GRR (only for the INSP members and the outside people having made a request beforehand with the persons in charge of the cleanroom) is made via the INSP Intranet or directly using this link:
http://www.insp.upmc.fr/grr
Identifiers necessary for the connection are the ones of your INSP email account.

The day of the appointment, a person in charge will be present to give you access to the room and to guide you through your experiments. An intercom located at the cleanroom entrance allows you to inform the people already present inside of your presence.

Furthermore, some studies/works (in particular external services) made in INSP cleanroom can be subject to pricing. For any requests of information, quotes or invoices, contact the persons in charge of the cleanroom.





4 Some safety rules

What to do in case of emergency:

The cleanroom has two emergency exits, both localized in the Iso 7 part (class 10000). The first exit is the usual exit of the cleanroom, leading towards the dressing room and then towards the outside of the room (tower 22). The second exit is situated at the opposite (next to the Alcatel sputtering) and gives access to a corridor leading towards the tower 23. This second exit is to be borrowed only in case of emergency.
When the alarm system of the University starts ringing, you have to immediately get out of the cleanroom by using the nearest exit.
In this case, you must get out with the combination. This latter will be removed when you reach the gathering point and given to a person in charge of the cleanroom to be sent to the cleaning. The reintegration of the cleanroom will be made with the agreement of a person in charge of the room.

IN CASE OF ACCIDENT, WARN ONE OF THE PERSONS IN CHARGE OF THE CLEANROOM. CALL THE HELP (18 FROM A FIXED POST OR 01-44-27-55-55 FROM A MOBILE PHONE).

https://intranet.sorbonne-universite.fr/fr/ressources-humaines/sante-et-qualite-de-vie-au-travail/protection-sociale/accident-de-travail-de-service/numeros-d-urgence.html?-search-keywords=urgence

AP of the INSP:

Isabelle Trimaille, Loïc Becerra : http://www.insp.upmc.fr/H-S-a-l-INSP.html

Isolated worker protection in cleanroom:

A PTI / DATI device is available in the cleanroom. Anyone found working alone in the cleanroom must bring this pager to protect themselves from this risk.

Individual equipment of protection and emergency facilities available in cleanroom:

Safety glasses, a visor, anti-acid gloves, calcium gluconate gel (neutralizing HF acid), eyewash and a portable shower (looking a green fire extinguisher) are available in cleanroom.
All these equipment are stored in the piece of furniture located in the Iso7 room (class 10000), just next to the 2 sinks.

- In case of burns or cutaneous projections, wash with running water the part of the body affected during at least 15 minutes.
- If the accident involves some HF acid, after this rinsing with water, apply immediately some calcium gluconate gel. (this gel is stored in the piece of furniture located in the Iso room, just next to the 2 sinks)
- For a projection in eyes, rinse by means of an eyewash. (they are also stored in the piece of furniture located in the Iso 7 room, just next to the 2 sinks)
- In case of ingestion, do not make vomit.
- In case of inhalation, leave the cleanroom to go in an airy place.

Recycling of the chemical solutions:

The various solvents, acids or bases used must not be thrown to the sink after use. Recycling cans are present in the cleanroom (a can of solvents in the room of the spin coater and all other cans under the chemical hood of the big room Iso 7) in order to sort out and evacuate this chemical waste outside the cleanroom.
Never screw completely a recycling can: risk of rise in pressure of the can.
Do not fill a can completely. Use another empty can.
Full cans will be evacuated out of the room by persons in charge of the cleanroom, who will also take care of the resupplying in new recycling cans.

It is essential not to mix chemicals used in one recycling can. Thank you for respecting the indications mentioned on the various cans. Be careful, some mixtures can be explosive…

Exemple: the nitric acid HNO_3

This product is highly reactive. It is both a powerful oxidizer and a strong acid. Among compounds used on a large scale (generally in the form of aqueous solutions), it is the one that was involved most of the time in documented incidents. It is incompatible with bases, alkaline metals and reducing agents. The reaction can be violent, even explosive. It is incompatible with most metals, metallic oxides and powdered metals. Especially with powdered metals, the reaction can be very violent (spontaneous combustion, explosion).
Moreover, in contact with metals (except gold, platinum, rhodium and iridium), hydrogen can be produced, a highly flammable and potentially explosive gas. It is also incompatible with a very large number of organic substances: anhydrides, alcohols, aldehydes, ketones, ethers, amines, hydrocarbons, toluene, acetonitrile, acrylonitrile, chlorobenzene, chloride of methyl alcohol, etc… In many cases, the reaction can be very violent (spontaneous combustion, explosion). Nitric acid easily reacts with combustible organic materials such as paper, coal, wood dusts and the clothes. The reaction can be violent (spontaneous combustion or explosion after a certain time).
It is also incompatible with many sulfides, non-metallic hydrides, carbides and acetylenures. Here also, the reaction can be violent (spontaneous combustion or explosion after a certain time). It generates heat and can lead to increased pressure in a closed tank when put in touch with numerous products such as: water, vinyl acetate, allyl alcohol, ammonium hydroxide, chlorosulfonic acid, cresols, cumene, 2-aminoethanol, ethylene diamine, ethylene imine, glyoxal, isoprene, propylene oxide, pyridine, and beta-propiolactone. Hence the necessity of respecting what is written on the various recycling cans.

FURTHERMORE, IT IS HIGHLY RECOMMENDED TO ALL MEMBERS OF THE INSP (PERMANENT AND NON-PERMANENT) TO FOLLOW THE SAFETY TRAINING COURSES PROVIDED BY THE UNIVERSITY.
IT IS A MATTER OF YOUR OWN INTEREST…

https://intranet.sorbonne-universite.fr/fr/l-universite/prevention-des-risques-professionnels.html