

Nanoquim Plataform

Basic Course



Scientific Director: Teresa Puig

Technicians: Neus Romà, Luigi Morrone, Marta Riba, Oriol Sabater

Outline

1. What is a Clean Room?
2. Nanoquim Plataform
3. Laboratory Rules
4. Safety at Laboratories
5. Management Nanoquim Platform
6. User Type and Equipment Booking Request

1. What is a Clean Room?

General Features

A **cleanroom** is an environment, typically used in manufacturing or scientific research, that has a low level of environmental pollutants such as dust, airborne microbes, aerosol particles and chemical vapors.

ISO 14644-1 cleanroom standards



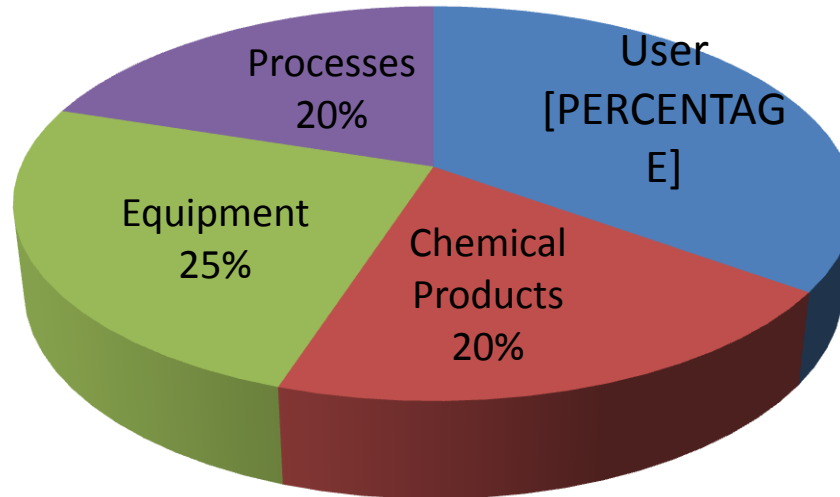
Class	maximum particles/m ³						FED STD 209E equivalent
	≥0.1 μm	≥0.2 μm	≥0.3 μm	≥0.5 μm	≥1 μm	≥5 μm	
ISO 1	10	2					
ISO 2	100	24	10	4			
ISO 3	1,000	237	102	35	8		Class 1
ISO 4	10,000	2,370	1,020	352	83		Class 10
ISO 5	100,000	23,700	10,200	3,520	832	29	Class 100
ISO 6	1,000,000	237,000	102,000	35,200	8,320	293	Class 1000
ISO 7				352,000	83,200	2,930	Class 10,000
ISO 8				3,520,000	832,000	29,300	Class 100,000
ISO 9				35,200,000	8,320,000	293,000	Room air

Cleanrooms are classified according to the number and size of particles permitted per volume of air.

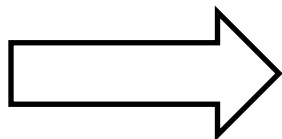
1. What is a Clean Room?

General Features

Contamination Causes



Reduce the external contamination during the whole process in the Clean Room!!



Limitation of the number of persons
Controlling the behaviour inside the Clean Room

1. What is a Clean Room?

General Features

Influence of User movement

	Particles/min ($\geq 0,3 \mu\text{m}$)
Stand straight or seated without any movement	100.000
Seated, slight movement of head, hands and arms	500.000
Seated, body and arms movement	1.000.000
Change of position, from seated to stand straight	2.500.000
Walk slowly	5.000.000
Walk normally	7.500.000
Walk quickly	10.000.000

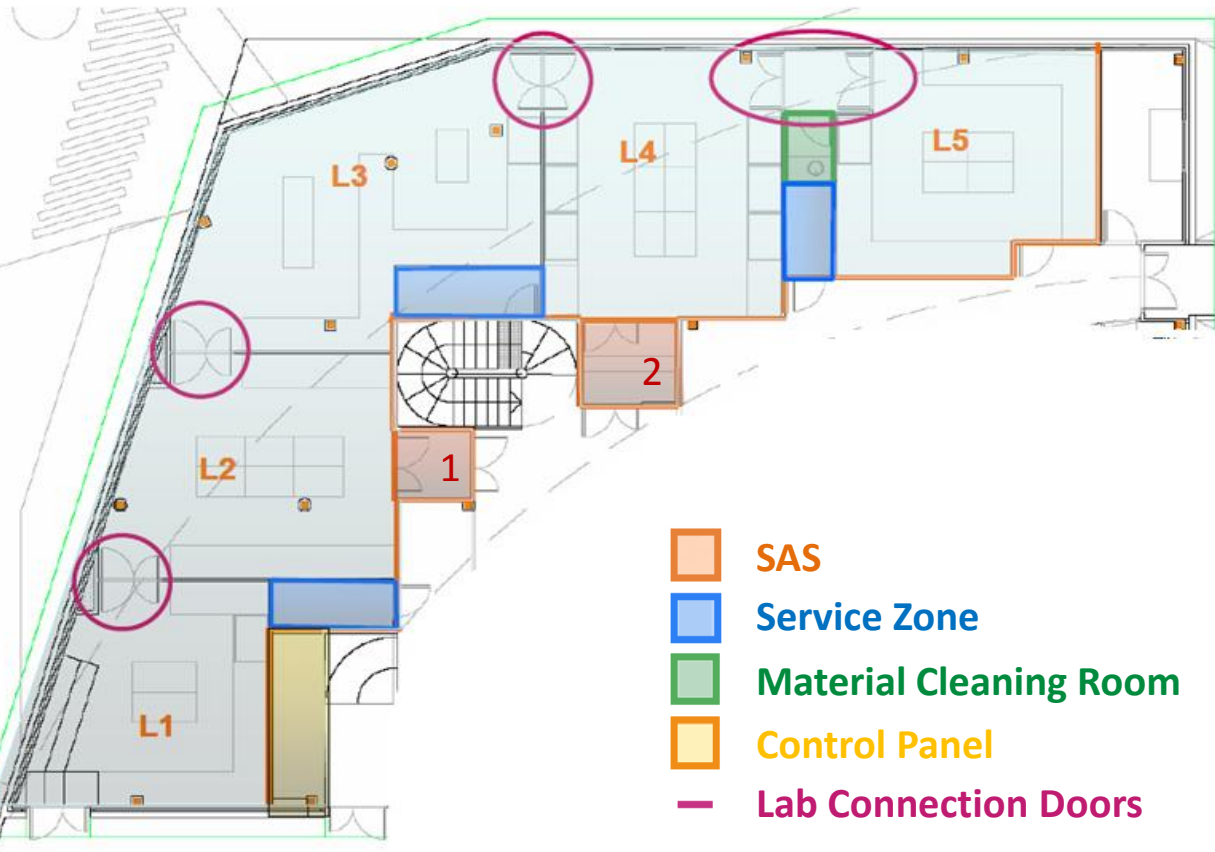
1. What is a Clean Room? Specific Clothes



2. Nanoquim Platform

General Features

Clean Room ISO 7 (Class 10000)



Features:

~30 Equipments

5 Laboratories

Controlled Environment
Conditions

L1, L2, L3, L4	L5
T=21°C	T=21°C
$\Delta P=20\text{mbar}$	$\Delta P=30\text{mbar}$
R.H.≤ 45%	R.H.≤ 35%

Furnitures:

Service Gases (N_2 , O_2 , Ar, Ar/ H_2 , Compressed Air), **Vacuum lines**, **DI Water** (15M Ω .cm & 18M Ω .cm) and **Solvents** (Acetone, Ethanol, Methanol, Isopropanol)

2. Nanoquim Platform Laboratories

L1: Advanced Optical Lithography Laboratory

Ellipsometer GESSE from Sopra

Chemical Hood (Photolithography)

Spin Coater SMA AC 6000 from SMA

Optical Microscopy OPTIPHOT from Nikon

Micro Writer from Durham Magneto Optics LTD.



L2: Characterization at the Nanoscale Laboratory

Ultrasonic Wire bonder 4526 from Kuliche & Soffa

Profiler P16+ from KLA Tencor

Profiler Nanopics 2100 from Nanopics

IR-Spectrometer Vertex 70 from Bruker (IRRAS/PM-IRRAS)

Optical Microscope from OPTIKA

Binocular Loupe from Labbox

2. Nanoquim Platform Laboratories

L3: Physico-Chemical Characterization and Nanofabrication Laboratory

Reactive Ion Etcher RIE 2000 CE from SBT South Bay Technology inc.

Evaporation System Auto 306 from Boc Edwards

Atomic Layer Deposition System Savannah from Cambrige NanoTech

Centrifuge Allegra 64R from Beckman Coulter

Rheometer HAAKE RheoStress RS600 from Thermo Electron Corporation

Contact Angle Measuring System DSA 100

from KRÜSS

Fluorimeter Perkin Elmer LS45

Ion Miller & DC-Sputtering System from TSST

Nano Dip Coater ND-DC from NADETECH



2. Nanoquim Platform Laboratories

L4: Chemical Synthesis Laboratory

Microwave Oven with controlled atmosphere

Discover Explorer Hybrid from CEM

6 Chemical Hoods with Rotavapour, Vacuum Line
and Spinner

Glove Box GP (Concept)-II-P from JACOMEX



L5: Highly control Humidity Laboratory

SPINNER SMA AC 6000 from SMA

Furnace Rapid thermal annealing (RTA) from AS-micro

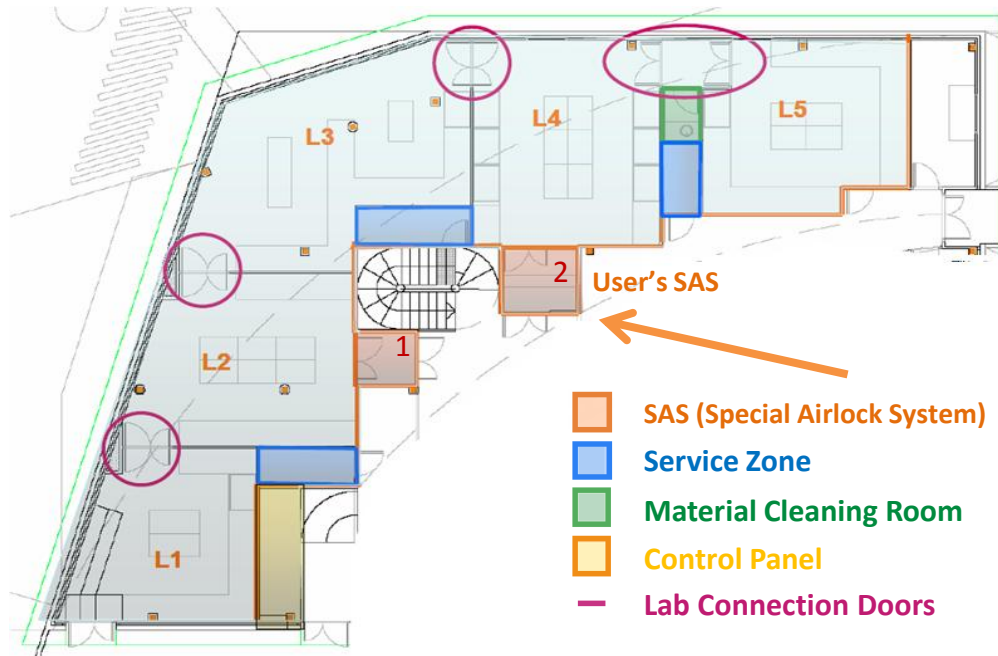
Tubular furnace ST 1002540 from HOBERSAL

Inert Atmosphere Chamber from TRALLERO

Dip Coater DipMaster-201

3. Laboratory Rules

People who enter to the laboratories must use specific clothes



Glasses



Gloves



Overshoes



3. Laboratory Rules

Gowning Protocol

SAS ZONE 1

1



Take the suit from the wardrobe

2



Put on the hair cover

3



Put on single-use shoe covers over your street shoes

4



Put on pan and coat. Make sure suit does not touch the floor while putting it on.

5



Once gowning is complete cross over zone 2 of the SAS.



Outside

3. Laboratory Rules

Gowning Protocol

S A S Z O N E 2

6



Put on clean room shoe covers.

7



Walk across the sticky carpet and enter to the clean room

Inside the Cleanroom

8



Once you are in the cleanroom put gloves and glasses

3. Laboratory Rules

Specific Rules of Clean Room

- Do not eat food, drink beverages in the laboratory (no chewing gum!)
- Do not run or walk fast inside of laboratories
- Do not make jokes
- Do not use cosmetics products, paper towels or tissues
- Do not entry personal objects inside of laboratories
- Do not comb or handle your hair in SAS areas
- Do not entry if you are ill
- Do not use clean room clothes outside of laboratories
- Do not store a lot of materials/samples in the laboratories
- Do not enter or take out anything without permission

Minimize the contamination (how??)

- It is forbidden to enter material that remove particles like cotton, wool, cork, powder chemical substances ... ask to technicians personal
- It is forbidden to enter laboratory material... ask to technicians personal



3. Laboratory Rules

Specific Rules of Clean Room

- Always wear appropriate protection (safety glasses, special clothes for HF process)
- Always use clean room gloves
- Ask about the residues generates
- Only use special paper of clean room
- Only use pen to write
- Maintain a safe and healthful environment
- Keep working area CLEAN and TIDY
- Experiments must be personally monitored

What can we do?

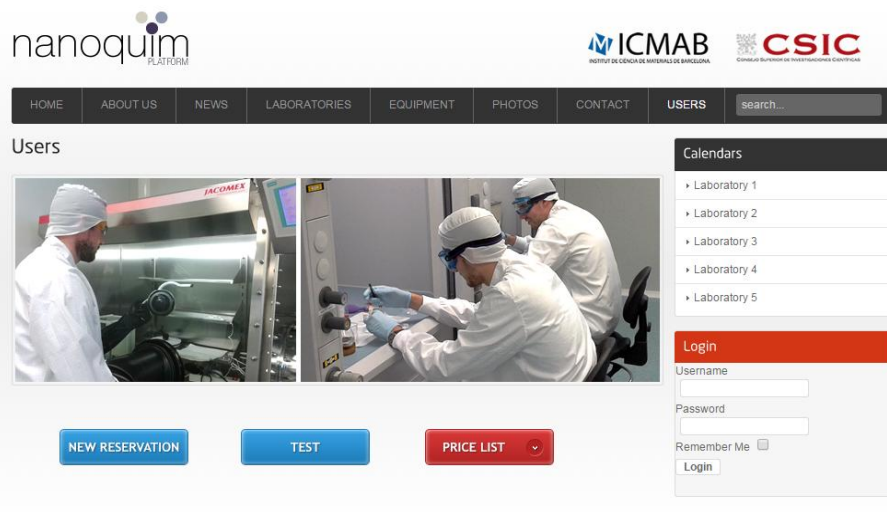
- To enter our tweezers and our samples. The samples should be inside a clean box without paper or others particles
- To use computers in order to write process or results

	EXPERIMENT EN PROCÉS		
Període de reacció: de.....a.....			
Productes presents / Reacció / Perills (especifica)			
EN CAS D'EMERGÈNCIA			
Apagar:	<input type="checkbox"/> Aigua	<input type="checkbox"/> Nitrogen / Argó	<input type="checkbox"/> Agitador
	<input type="checkbox"/> Altres (especifica).....		
Investigador:.....	Número telèfon.....		
Responsable:.....	Número telèfon.....		
Firma Responsable			
Cap de Departament:.....	Número telèfon.....		

3. Laboratory Rules

HF Protocol

It is mandatory to read and firm the HF protocol



The screenshot shows the Nanoquim Platform website. At the top, there are logos for ICMAB (INSTITUT DE CIÈNCIES MATERIALS DE BARCELONA) and CSIC (CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS). The navigation menu includes: HOME, ABOUT US, NEWS, LABORATORIES, EQUIPMENT, PHOTOS, CONTACT, USERS, and a search bar. Below the menu, there is a 'Users' section with a photo of three technicians in white lab suits working in a laboratory. To the right of the photo is a 'Calendars' section listing Laboratory 1 through Laboratory 5. Below the photo are three buttons: 'NEW RESERVATION', 'TEST', and 'PRICE LIST'. At the bottom right is a 'Login' form with fields for 'Username', 'Password', and 'Remember Me', along with a 'Login' button.



NH_4F Aprox.35% and HF prox.6.5%



The use and the access to the HF solutions into the Nanoquim Platform Labs is not free. As general rule, user who wants to use HF must be authorized.

It is mandatory to wear special suit while using HF. It is not allowed to use HF alone, always with a technician.

4. Safety at Laboratories

READ THE SAFETY AND HYGIENE WEB PAGE: <http://committees.icmab.es/csh/>

Know:

- 1) which are the resources available in the surrounding we are operating
- 2) what to do in case of an emergency
- 3) what are the hazards and risks you could be exposed to, in general in the Institute and in particular where you are working

If You Have Any Doubt Please Ask!!!

In case of EMERGENCY, KEEP CALM

In each laboratory there is a telephone.

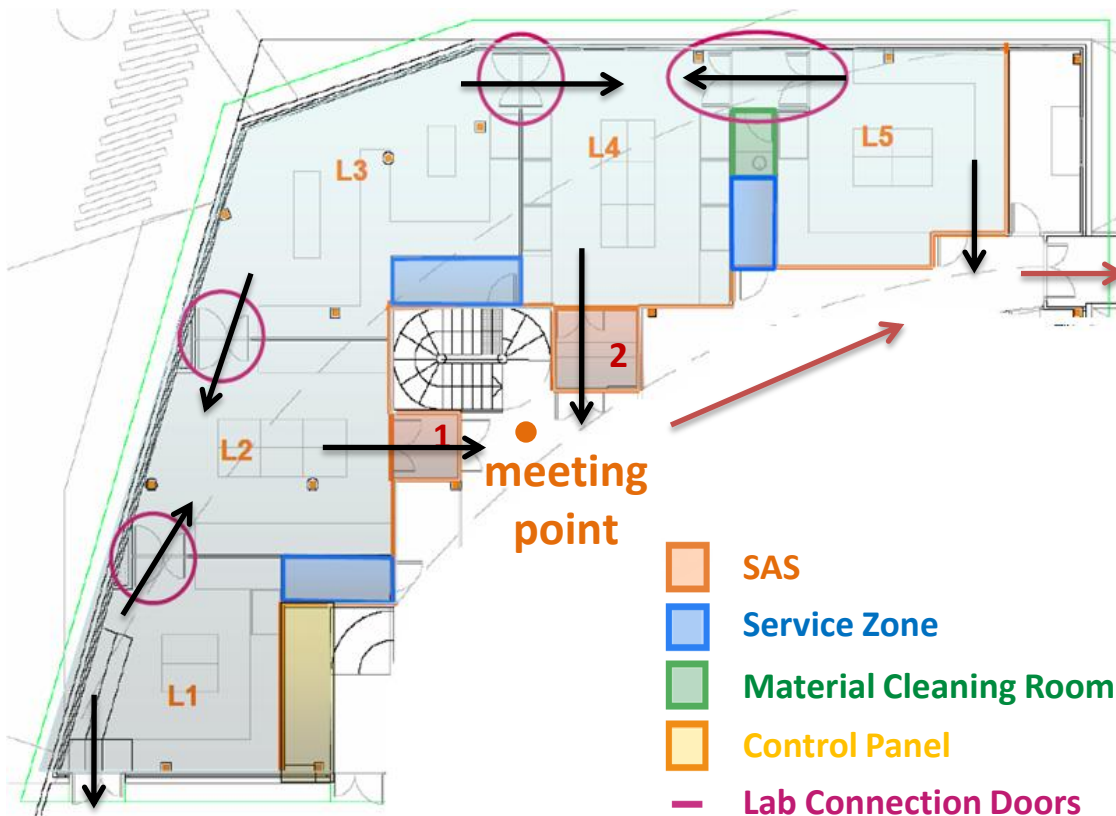
CALL 5+DIAL

Or Technicians CALL 335



4. Safety at Laboratories

EMERGENCY EXITS



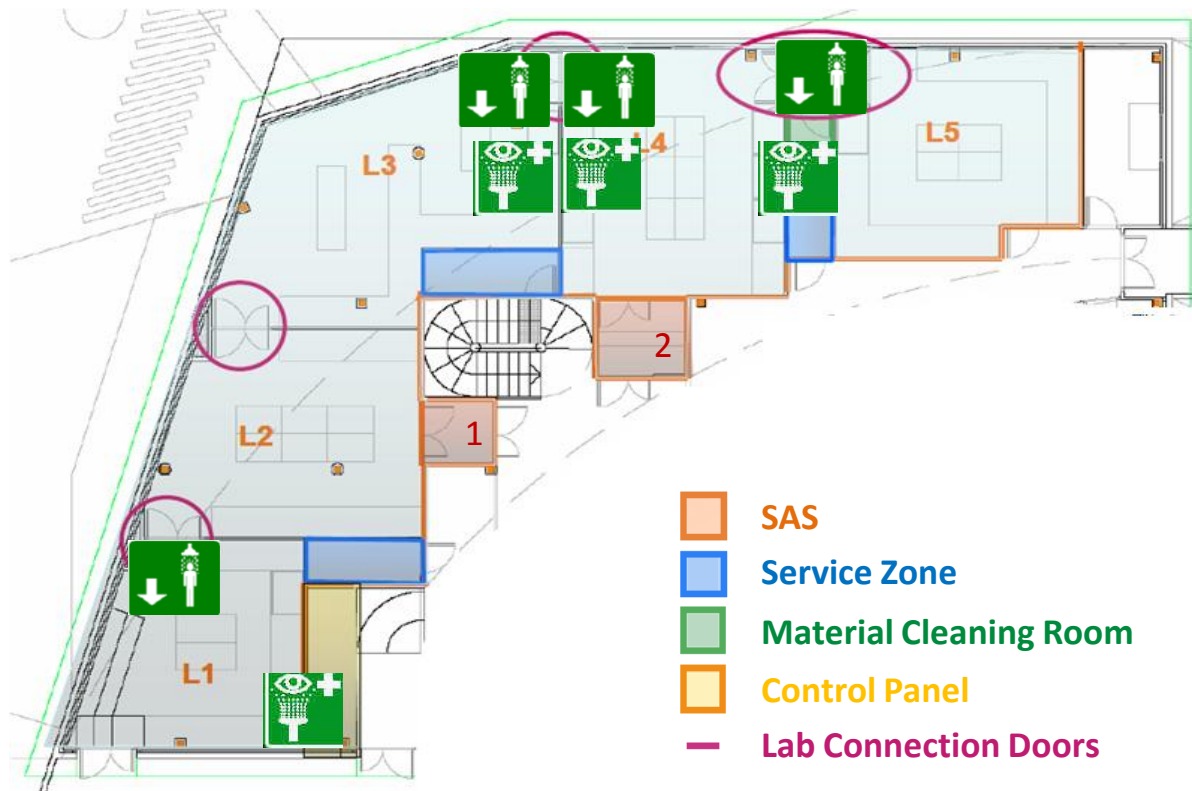
PARTIAL EMERGENCY: The **alarm sounds and soon is disconnected**: NO action necessary, the emergency team will act.

GENERAL EMERGENCY: An **intermittent alarm sounds**. Close doors and go to the **meeting point** (in front of the stairs). Leave the Clean Room clothes in SAS area. Await instructions from the head of the emergency team.

EVACUATION: A **continuous alarm sounds**. Close doors and go to the concentration point (outside of the Institute) without taking off Clean Room clothes.

4. Safety at Laboratories

SAFETY IN THE LABORATORIES IN CASE OF ACCIDENT

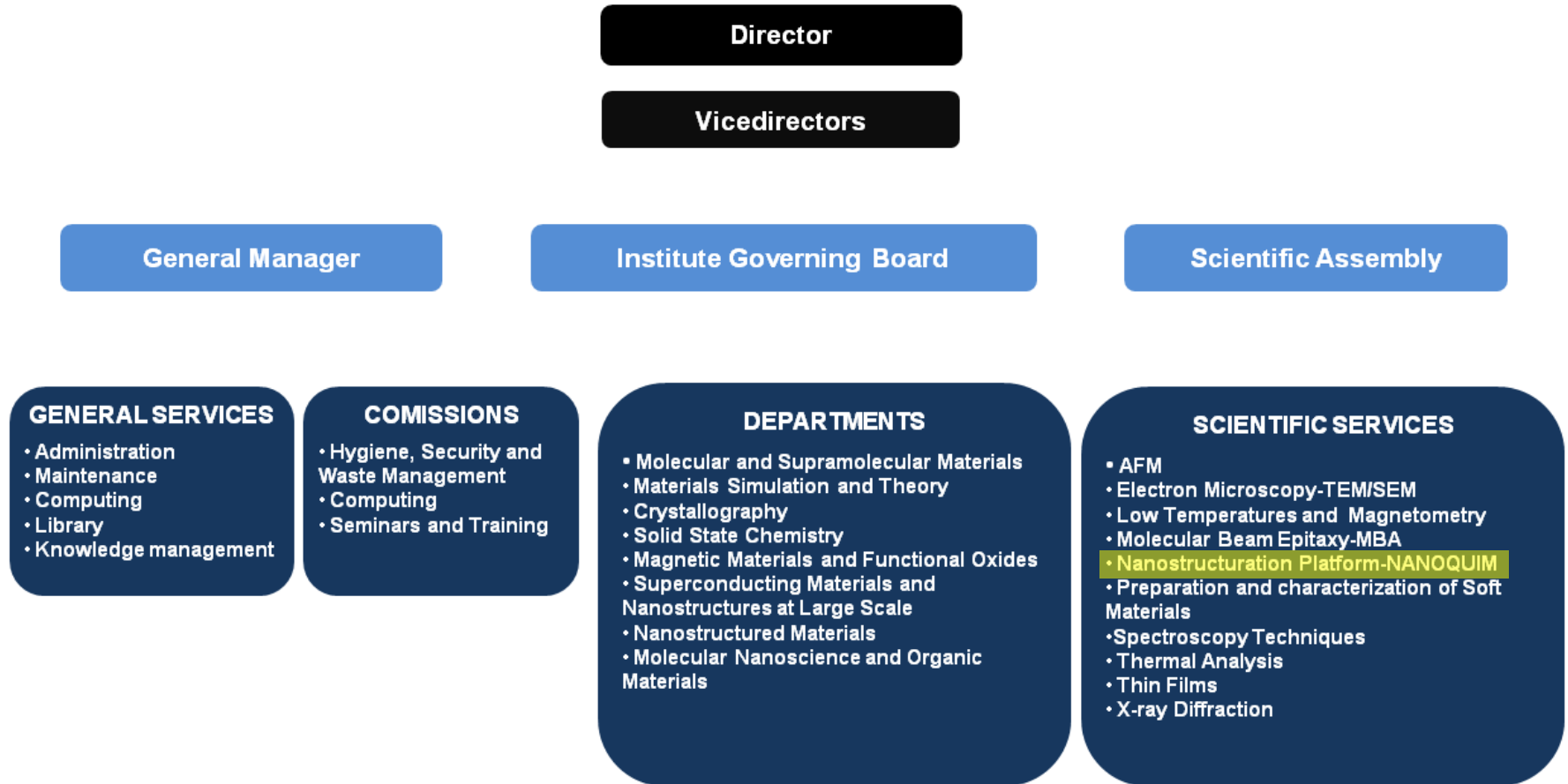


EMERGENCY SHOWERS



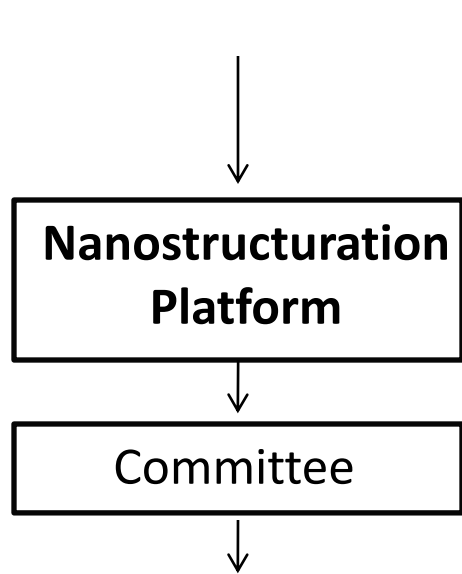
KNOW the location and operating procedures of all safety equipment: Emergency Showers. The Safety Shower and Eyes Washer gives an immediate deluge of water that dilutes and washes away harmful materials, such as caustic, acids.

5. Management Nanoquim Platform



5. Management Nanoquim Platform

Clean Room Organization



**Nanostructuring
Platform**

Committee

Technicians	(General Phone 335)
Neus Romà	Tel.935801853(364)
Luigi Morrone	Tel.935801853(363)
Marta Riba	Tel.935801853(365)
Oriol Sabater	Tel.935801853(365)

Users

T. Puig : Dept. Materials Superconductors i nanoestructuració a gran escala

-----(*Responsable científic del Servicio*)-----

M. Mas : Dept. Nanociència Molecular i materials orgànics

S. Ricart : Dept. Materials Moleculars i Supramoleculars

Ll. Balcells : Dept. Materials Magnètics i les seves aplicacions

A. Goñi : Dept. Materiales Nanoestructurats

R. Palacín : Dept. Química de Sòlids

M. Gich: Dept. de Cristal·lografia

N. Romà: Técnico responsable de la Plataforma

6. User Type and Equipment Booking Request

- **User “por parte del tecnico” (performed by the technician):**

User who demands a Clean Room service to the technicians (without the user participation).

Important! This is not the case of ICMAB users. ICMAB users have to be trained to be equipment self-user.

- **User “con soporte tecnico” (with technical support):**

User **with** technician support. Training for ICMAB users.



- **User “autousuario”(self-user):**

User **without** technician support.



Plataforma de Nanoquim

Gràcies per la vostra atenció – Thank you.

