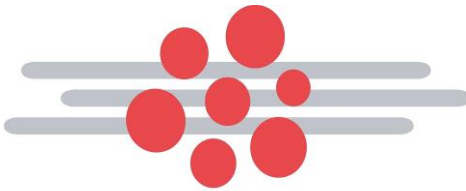


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 <p>Center for Functional Nanomaterials Brookhaven National Laboratory</p>	<p>NUMBER</p> <p>SOP-NC-2007-ELM-OPS-3</p>
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<p>Subject: Clean Room Orientation/Protocols</p>	<p>DATE</p> <p>6/11/2012</p>
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- This orientation is not a substitute for training on **any** equipment inside the clean room. Use of any equipment is subject to separate training and orientation by authorized CFN staff.
- Failure to follow these guidelines may result in loss of access to the facility. The final word on all clean room matters belongs to CFN Clean Room.
- **Contact info:**

Aaron Stein	3527	stein@bnl.gov	clean room staff
Fernando Camino	7606	fcamino@bnl.gov	clean room staff
Ming Lu	4773	mlu@bnl.gov	clean room staff
Lorraine Davis	4156	ldavis@bnl.gov	Research space manager
Grace Webster	3227	cfnuser@bnl.gov	User Admin
Bob Sabatini	3509	sabatini@bnl.gov	ES&H

- **Training:** Before entering the clean room you must read the ESR and perform the necessary training (NC-11-Clean Room 735)
 - CFN Safety Module for Users NC-ESH-USERS
 - Laboratory Standard HP-IND-220
 - Hazardous Waste Generator HP-RCRIGEN3
 - Cyber Security GE-CYBERSEC

- Nanotechnology for Nano Workers TQ-NC-HS2
- Oxygen Deficiency Hazard TQ-ODH
- Working in the CFN Clean Room NC-CLEANRM
- **COSA:** The only staff authorized to give COSA orientation and sign-off on your entry to the clean room are Aaron Stein, Fernando Camino and Ming Lu.
- **Entering the clean room:**
 - The following items are prohibited from the clean room. Lockers are provided to store your belongings while you are in the clean room.
 - Food, drink and chewing gum of any type
 - Pencils, regular paper, cardboard boxes, FedEx mailers, etc.
 - Jackets, notebooks, etc.
 - Anything that is to be brought into the clean room must be cleaned. Use isopropanol or available cleaner and vacuum if necessary.
 - **Everyone** must scan their badge at the doorway to gain entry. No tailgating – do not allow anyone else to come in with you.
 - **Everyone** must scan their badge into the log computer upon entry and exit of the clean room.
 - Enter the clean room only through the gowning area.
 - Gowning procedure:
 - Vacuum shoes
 - Shoe covers before entering gowning room
 - Head cover, then coverall.
 - Boots over shoe covers.
 - Gloves
 - If gloves get ripped or soiled during your time in the clean room, change them immediately – go back to gowning room.
 - **Safety glasses with sideshields worn at all times in the clean room!**
 - When leaving, disrobe in the opposite order. Keep blue shoe covers on until you are outside the clean room.
 - **No users** should ever go into the chase area.
 - When entering and exiting the clean room be sure to close the door behind you – do not assume the door is closed.
- **Equipment Use**
 - Do not use any instruments you have not been trained to operate.
 - Each User's training needs will be determined by the "point of contact" – no one should seek training on new systems on their own. The point of contact will set up the scheduling of training with the appropriate tool owner.
 - All equipment use is dictated by Google calendars or Facility Online Manager (FOM) (does not include spinner and hoods and microscopes).
 - Once you are trained on a tool, you will gain access to the calendar.

- If you sign up for a piece of equipment – please respect the scheduling. If you have to cancel or change a session, please change the calendar. It is not fair to other Users to block out time if it is not going to be used.
 - Be aware of other people coming to use equipment after you.
 - Many high-use instruments have booking rules which must be adhered to.
- Each piece of equipment has a log book, FOM, LabView login and/or spreadsheet log entry on a support computer. It is vital that you mark your name, time on/off, what you are doing and anything that happens of note during your run.
- **Chemical Usage:**
 - All chemical work is to be done under a hood.
 - Use only the chemicals that you are trained and authorized to use.
 - Return chemicals to proper cabinets after pouring off the needed amount.
 - Use glassware only for the labeled chemicals.
 - Clean glassware after use – solvent glass cleaned with solvents, water-solutions with DI water. Place cleaned glassware on drying rack when you are done.
 - Resist spinning and baking is covered by a separate SOP. If you are doing resist processing, you must read this document. Ask Aaron Stein for a copy if he has not already sent it to you.
 - Hydrofluoric acid, piranha cleaning or any acid etching should **not** be used unless specifically authorized by CFN staff member. This requires additional training and operator aids.
 - Chemical waste:
 - When using chemicals, be sure to use *chemical log station*.
 - Log into system, the chemicals available to you should be listed. Never use a chemical which you are not authorized to use.
 - Click the chemical and start process. The correct waste bottle code will be listed as well as a link for a map of all SAA's in the clean room.
 - When generating waste, be sure to put in the proper bottle.
 - If there is no bottle for the waste, contact a staff member – no one else should be generating new waste bottles.
 - Identify which bottle is correct, and move the bottle to the hood – do not put waste into a bottle while it is in the satellite accumulation area. (The only exception to this is the large carboy for solvent waste – only isopropanol, methanol or acetone should go into this large bottle. Everything else should go into its own waste container.)
 - Check the label to make sure the container is correct.
 - Pour the waste into the container. If necessary, use a funnel to prevent splashing.
 - Estimate how much waste there was.
 - Return to the chemical log station, log in and enter the amount of waste generated and “end process.”
 - Replace the bottle into the SAA.

- **Communication**
 - Communication is vital between users and CFN staff members. You should always feel free to express any concerns with the staff. Likewise, please be mindful of all information communicated to you by the staff:
 - All signs and postings are in place for a reason. Often a sign will be posted in the clean room or on a piece of equipment to communicate a very important piece of information. Please read them.
 - All clean room users will be added to the clean room email list. You will get occasional emails from the staff with information about the clean room and individual pieces of equipment. Please take care to read all emails you receive from CFN staff.
 - If there is a problem with a piece of equipment or system in the lab, do not attempt to fix it on your own. Immediately inform a staff member.
 - There is a dry erase board in the gowning area that can be used to leave notes when something runs out in the laboratory (gloves, wipes, etc.) or to communicate some issue to the CFN staff. Likewise, the staff may leave notes there for users. Please pay attention to this board.
- **General clean room protocols:**
 - Everything should be left in the clean/organized state in which you found it.
 - Do not plug in or unplug any equipment or change any configuration on anything yourself – ask a staff member.
 - Respect other users – use only general use tweezers, tools, etc. and do not touch other people’s belongings, samples, etc.
 - Do not remove anything from a laboratory (i.e. tweezers, scribes, etc.)
 - Respect all labels, read all signs, read all emails sent by staff – they are there for a reason.
 - Gloves are to be worn at all times
 - Safety glasses are to be worn at all times.
 - All wafer cleaving should be done in the metrology lab, 1L44.
 - Accidents/mistakes are a part of research though one we want to minimize. Please be honest and report any incident to CFN Staff immediately, failure to do so will not be tolerated!
- **Storage**
 - There is limited storage space for User samples.
 - Storage areas are assigned by CFN staff only – do not take your own space without first discussing with a staff member.
 - Each *proposal* may have one drawer inside the facility as well as an additional drawer in the gowning area if necessary. Multiple Users per proposal must share the same storage space. If you require more space than this, you are storing too much in the laboratory – please take some samples back to your home institution for storage there.
 - Lockers

- There are a limited number of locker “cubbies” in the gowning area are for high-use *proposals* and are assigned by the staff only.
- Each proposal may have one locker – multiple Users per proposal must share a locker.
- Only CFN staff may assign a locker, when it is determined you are a regular visitor to the facility. **Do not** take a locker space on your own without first discussing with a staff member.
- **Computer use**
 - There are several PC’s available inside the clean room for general use.
 - Do not download any software to any computers without permission from Clean Room Staff.
 - All network connections including xterm displays and remote desktop connections should be done over SSH **only**.
 - Keep files in an orderly manner on the computer – do not just download things to the desktop. If you need to create a folder for documents, please do so, but you should not consider these computers a long-term storage solution. Files may be deleted at the discretion of the clean room staff.
 - There is also a computer for clean room users located in cubicle NE5 upstairs in the CFN.
 - The login/password for all clean room computers is the same: user/P@ssword1.
- **Reduce, Reuse, Recycle!**
 - The CFN offers most of the materials you need to do your work including silicon wafers, resists and deposition sources. Please do not abuse this privilege: reduce the amount of material you use to the minimum necessary.
 - Substrates
 - Users must ask permission before taking silicon wafers from the cleanroom stock.
 - Resists
 - Users should only use small “satellite” bottles.
 - Users are not allowed to generate new satellite bottles or add resist to these bottles. Ask a staff member.
 - Use an appropriately sized pipette for the substrate you are using. There should only be a small amount of resist left in the pipette when you are finished.
 - Metals
 - Precious metals are kept locked up. If you need to access a target or need more material for evaporation, ask a staff member.
 - Wafer containers
 - Small plastic petri dishes are available for storing samples inside the lab.
 - There are also fluoroware containers for use when shipping samples or bringing them home. These containers are expensive and should be used sparingly.

- When you are finished with a container, it can be reused.
- Garments
 - All Tyvek clean room garments are recycled. Use them until they are dirty or torn and then put them in the white recycle bin in the gowning area.
- **Leaving the clean room**
 - First degown:
 - Remove your gloves, inside out and discard.
 - Remove the Tyvek suit, head cover and boot covers. If they are not dirty or torn, you can reuse them.
 - Leave your blue booties on until you have exited the clean room.
 - Always scan your badge to sign out before leaving.
- In event of an emergency, remember DO NOT DEGOWN, leave the clean room and get to a safe place, then dial x2222 from a laboratory phone.