URnano Nanofabrication Cleanroom
The University of Rochester

LABORATORY USAGE

&

SAFETY MANUAL

FOR

THE UNIVERSITY OF ROCHESTER

NANOFABRICATION

CLEANROOM

May 2021 (update names and pathogens note)

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Contacts

URnano Director: **Dr. Nick Bigelow (nbig@lle.rochester.edu x54766)**

Operations Manager: Brian McIntyre (brian.mcintyre@rochester.edu x53058)

Lab Engineers: **Jim Mitchel (jmitch30@ur.rochester.edu) x5-2471**

URnano Safety Coordinator: **Brian McIntyre (brian.mcintyre@rochester.edu)**

Administrative Support: **Rachel Eberle (reberle@UR.Rochester.edu) x5-4814**

In Case of Emergency: Brian McIntyre Cell 585-301-3145/ Home 585-394-0572
or Security at x13

Tool Primary Engineers: **See attached list and poster in anteroom**

Preface

URnano faculty and staff enforce all means necessary to keep the laboratory clean and safe for all users. Common sense is a good policy, but rules cannot cover all types of situations. Consult with a staff member if regulations do not seem to apply to a situation. It is the responsibility of all URnano users to act professionally, courteously, and safely in the facility. Violations of safety regulations and policies will result in remedial action and/or a loss of privileges.

OSHA and UR-EH&S require The University of Rochester to properly train and educate laboratory users. This manual, along with the parallel lab safety training session, is designed to act as the URnano Chemical Hygiene Plan (CHP) and Orientation guide. For more details contact the Safety Coordinator.

General Procedures

Introduction

These safety-oriented procedures seek to create a safe working environment at the University of Rochester Nanofabrication Facility. In this environment, all laboratory users are aware of proper safety practices and follow them consistently. This will reduce the frequency and severity of incidents. Incidents will occur despite all of our best efforts; when they do, following proper procedures can contain the incidents, preventing it from escalating to an accident where people are injured and/or property is damaged. The machines and materials in this laboratory can be very hazardous. As such, in the event of a major accident the entire building is at risk.

Safety procedures emphasize individual responsibility for each piece of equipment and type of material. They also allow the Safety Coordinator to document user practices and any changes in laboratory procedures that have an impact on overall safety.

THE BUDDY SYSTEM:

a. Rule # 1: All users working in the cleanroom must have another trained user (their "buddy") inside or in the vicinity of the cleanroom at all times.
   Undergraduates MUST have a buddy, who is not another undergraduate, with them IN the cleanroom at all times. In addition, undergraduate status at UR or any other institution will be the defining designation of a URnano user independent of any other classification (i.e. corporate employee, summer employee/intern, etc). Any additional cost in meeting this buddy requirement will be borne by the undergraduate's PI or applicable department head/dean.
b. Rule # 2: Anyone working in the wet chemical bench or other "designated dangerous" area (e.g. ALD, CVD, RIE, RTP) the buddy must be ***inside the clean room, aware of your situation, and close enough to be of assistance if you have an accident.***
c. Rule #2 does not apply to the use of the Lithography Benches. You may spin resist, develop patterns, and strip resist using the standard solvents and developers in the Litho area without a buddy present inside the clean room. You must still follow rule # 1.
d. Never work alone in the cleanroom, always ensure that your buddy knows where you are working inside the laboratory, and check on work partners regularly.

USE THE MSDS:

Materials Safety Data Sheets are available for all cleanroom materials. These sheets provide all necessary information for proper material handling, usage, and disposal. These sheets are available in the Gowning Room.

GET TRAINED:

Before using any cleanroom bays or equipment you must be trained for that specific area or tool. NEVER use a tool or area if you have not received the proper URnano training session.

BE PROFESSIONAL:

All users of the URnano are expected to adhere to the utmost standards of professional conduct. This includes reporting of unsafe equipment, areas, situations or activities to the Safety Coordinator.

Lab Access

Cleanroom access is through the main gowning entrance (anteroom) only. These doors are locked from the outside at all times; you must have a valid user ID to gain entry with the card access system. Users must complete the Safety/Orientation training prior to receiving access. University of Rochester users can present a current ID number (using the account setup forms which are in the Appendix) to the Admin Staff to have their card activated. Non-UR users will be issued an URnano ID card by the Admin Staff.

SWIPE IN / SWIPE OUT: All users are required to swipe the card reader to the left of the anteroom to unlock the door. When you're done and want to exit the cleanroom, swipe the inside card reader to unlock the door. If you do not to swipe your card when you exit you will trigger an alarm. Swiping your card also stops the user-session clock. The emergency button is to be used only for emergency situation exiting.

GOWNING PROCEDURE: People tend to be the dirtiest item in any cleanroom, hence all entrance into the cleanroom requires gowning up to prevent contamination of the area. Failure to gown up will not only compromise the area but will also void any credentials you have for entering the cleanroom. The correct procedure is as follows:

1. Leave overcoats on hooks in the hallway
2. Boots and dirty shoes should be exchanged for other footwear as appropriate.
3. Remove any jewelry or other accessories that would prevent further gowning
4. Enter anteroom using swipe-card. Walk on tacky mat to remove as much shoe dust as possible.
5. Locate your reusable cleanroom attire or find disposables in your size
6. Don hairnet and cover all hair
7. Sit on bench facing door to hallway and place booties on, swinging each bootied foot over the bench to the clean side of the room
8. Don cleanroom suit
9. Don beard-bag if you have more than one day's growth of facial hair
10. Don gloves
11. Verify all garments are properly situated and covering all clothing and skin
12. Enter cleanroom

TAILGATING: No user is allowed to follow someone into (or out of) the Cleanroom without swiping his or her ID card. If a user is caught tailgating, he or she will lose access to the Cleanroom. If the user has not completed the requirements necessary to gain access to the cleanroom or if the user bypassed the URnano safety training, the user shall also lose access to the cleanroom.

USING ANOTHER USERS CARD: Anyone who uses someone else's ID card to gain access to the cleanroom will lose forfeit their own access as well as the lender's.

NOTIFICATION: If you should ever lose your ID please notify one of the Admin staff assistants immediately.

One final note: By registering your ID with the URnano to gain access to the Cleanroom, you are stating you will comply with the above rules.

Calendaring Tool

The URnano calendar portal PPMS is used for access and control of the facility. This system will be taught to users at the orientation/safety training session.
https://ppms.us/urmc/

Materials Handling and Use

ORDERING: Staff members order all materials purchased for use at URnano only. Students or users must have a staff member order any needed materials. The URnano regularly stocks materials that are commonly used in the lab. The Safety Coordinator must approve special requests and materials before orders are placed. Prior to approval **an MSDS and Materials Handling Form must be provided *before*** the material can be used in the facility. Failure to comply will result in a loss of privileges. (Materials Handing Form available from safety coordinator, copy located at the end of this manual.)

STORAGE: Materials may be stored in or out of the lab at the URnano depending on availability and location of the appropriate storage housing. The Safety Coordinator must approve individual or special materials, and then storage space will be assigned. Personal storage containers must also be approved prior to use in the lab.

USAGE: Users are responsible for safe use of materials in the lab. When using materials, know it's hazards and properties; consult a MSDS if you do not. Use proper quantities, do not try to hurry. Always use appropriate equipment, fume hoods, protective clothing and proper tools. (See Chapter 6-H for more information on Personal Protective Equipment.)

DISPOSAL: The Safety Coordinator has established areas for storage of waste material. Users must label any container and ensure it is compatible and clean before using for waste. Waste containers must be labeled as such and the contents indicated with the full name, no abbreviations or symbols. Labels are provided for chemical waste containers. If you have compatibility questions please contact the Safety Coordinator for assistance. Also check to ensure there is not already a container started for your material. Place containers in the designated **Secondary Containment** area and Staff will remove full containers for disposal. Biological or Radioactive materials must be approved prior to use in the lab as waste concerns are different for these materials. All users must take the Chemical Waste Training session provided during the annual Lab Safety Training by UR EH&S.

MSDS (Materials Safety Data Sheets): A MSDS provides all specifications, hazards, precautions and safety concerns for a given material. All materials used in the lab must have MSDS in the binder located in the gowning room. On-line copies are kept on file as well. If you have questions on a material consult these sources prior to use. Materials handling requires common sense and knowledge of any specific dangers associated with a given material.

Equipment

TRAINING and USAGE: Prior to using any lab equipment, all users must attend an equipment training session with a URnano Engineer. The training sessions vary in length and in the materials covered. They are specific sessions designed by the engineer to ensure you can use the equipment safely and productively. After successful completion, you may use the equipment freely, noting that equipment must be reserved using the Calendaring Tool.

Using a tool in the Nanofab, you have a responsibility to know what you are doing. If you have any questions on sample/substrate types, recipes, or special processing conditions, please ask the tool's Primary Engineer for help.

Incidents and Accidents

Introduction: Following standard operating procedures may keep incidents from becoming accidents. Incidents and accidents must be reported to assess the causes and to provide opportunity to make needed changes to prevent reoccurrence.

Reporting: Users will avoid incidents and accidents by following proper procedures. In the event of an incident or accident you must immediately report it to the Safety Coordinator or a member of URnano staff. You are required to report any and all incidents or accidents in the cleanroom. The Safety Coordinator will investigate all incidents, with the purpose of finding a way to prevent the same incident from happening again. Even small incidents must be reported. Even if you witness an incident or accident, report it. Failure to report an incident or accident will result in a loss of lab privileges. If you have any question on how to respond to an incident, contact the Safety Coordinator.

Emergencies: When bodily injuries are part of an incident, students are to take appropriate immediate action and then go to either the Emergency Department at Strong Memorial Hospital or to University Health Service (UHS) either on River Campus or at the Hospital

After Hours/Emergency Numbers: Each phone in the URnano lists emergency numbers.

Security x13

Chemical Exposures x51164
After 5pm x13
Brian McIntyre 275-3058 office; 394-0572 home; 301-3145 cell

.

Violations of Safety Procedures:

1st Violation – Warning

2nd Violation - Additional Safety Training. PI or supervisor will be notified

3rd Violation - Suspension from Lab. PI or supervisor will be notified.

Safety Coordinator will review all violations and recommend further action as needed.

General Chemical Usage

Rules: Most chemicals for use in the cleanroom are provided. If you need a new chemical that is not provided, you must have approval from the Safety Coordinator before bringing the chemical to the facility. The Appendix of this manual contains the Materials Handling Form; you must provide a complete **MSDS and a Materials Handling Form** prior to bringing, or using the new chemical in the Nanofab. Unknown chemicals will be disposed of.

Standard chemical etching, cleaning, and processing are to be done only in the Wet Bench area only!

The lithography area is only for photosensitive materials processing.

Safety Glasses are required at all times! (Prescription glasses are not safety glasses)

When using any chemicals, they must be used in fume hoods for **proper ventilation,** except for spray bottles containing water or solvents for general cleaning.

Personal Protective Equipment (PPE): When using chemicals make sure you are properly protected. What you should wear is as follows:

Level I:General lab use, spray bottles and/or Lithography. **Lab gloves and Safety Glasses (Chemical Gloves recommended for lithography solvents)**

Level 2:Use of Chemicals in Wet Bench Area **Chemical gloves, Face Shield, Apron**

PPE should be inspected for damage before and after use. Do not wear, or put back PPE that is damaged; throw it away! Contact the Safety Coordinator for new PPE if needed.

Chemical Containers: When moving chemicals to the bench top, ensure that containers have secure lids. Glass bottles should be transported in the polypropylene bottle carriers. Be sure to check that there are no bottles of your needed chemical before opening new ones. When pouring out chemicals, never pour a chemical back into the original container, this will contaminate the chemical and make it unusable.

Glassware and plasticware in the wet bench area are to be **rinsed and dried** after each use and prior to returning it to the storage shelf. Gloves and other protective equipment also must be rinsed and dried.

Broken lab glass is to be cleaned up by the person who broke it. It is to be placed in a white container marked LAB GLASS.

Any container or chemical in use **must be labeled** with the supplied labels, regardless of whether you are monitoring the material or not! Label with your full name, date, time, and type of material.

If you must leave a container out of sight or unattended, the container must have a lid.

Leaving chemicals unattended without the proper label or lid is a direct lab violation.

Chemicals that need to be left for more than 24 hours or overnight must have a note stating the date and time the material will be left unattended.

Special mixtures must be approved prior to mixing or use by the Safety Coordinator. Special labels are used to ensure that proper approval has been given.

Hot plates must be monitored at all times during use.

Disposal/Clean-up: All chemical waste in the cleanroom must be disposed of in containers. **No chemicals will be dumped down the drain.** Rinse-Water is the only liquid allowed in the drain other than normal DI-Water. Supply bottles are reused as similar-type waste bottles, but only **PLASTIC BOTTLES!** Hazardous waste labels are provided on the storage shelf, and must be filled out in full with the complete chemical name, ***no brand names or formulas.*** Place the waste label over the original bottle label. Check to see that a chemical does not have a waste container before creating a new one. Since airtight lids can lead to container explosion (if the material releases vapor, as with most oxidizers) leave the lid or cap loose. Use the provided funnels (they must be rinsed and dried after use). The wet benches must also be wiped with wet wipers and dried after each use. Do not leave any glass, lab ware, chemicals, or waste on the wet bench surface. You are expected to clean up after yourself.

Chemical residue is hard to see, it is **required** that you wash your hands after exiting the lab.

Spills: For any spill in the cleanroom please contacts a member of staff, phone numbers are on the provided phone sheets, for assistance. In emergencies, evacuate the area, and then contact the Safety Coordinator or Dial x13 for Security.

If you are exposed or burned, remove exposed material and use the safety showers or eye wash stations. Rinse for at least 15 minutes then seek medical attention, have someone else call Security at x13 the Safety Coordinator and EH&S to contain the spill.

Specific Safety Procedures

Introduction: The safety rules for the cleanroom must be read, understood, and practiced at all times. Use common sense, think about how your actions could affect others, and never work alone. Report any safety problems you encounter to the Safety Coordinator.

Live Pathogens: Never allowed in any URnano facilities

Chemicals: A large variety of chemicals exist in the cleanroom; you are responsible for familiarizing yourself with them. MSDS (Materials Safety Data Sheets) are available in the gowning room. Other sources of information are: Chemical labels, manufacturer, Internet, Safety Coordinator, and University of Rochester Environmental Health and Safety. PPE or Personal Protective Equipment must be used at all times. PPE forms a protective barrier between you and the hazard.

Acids/Bases/Solvents-Specifics

Acids: When mixing acids, remember the common alphabetical rule A-W. Always add acid to water, not water to acid. **Be sure to leave acid waste container caps loose to avoid pressure buildup as reactions continue and/or gases are evolved.**
Acids are stored separately from Bases and Solvents in the metal cabinet marked **ACIDS.**

Hydrofluoric Acid (HF) is particularly hazardous. HF attacks glass, so it must be used and stored in plastic containers. Plastic handling equipment must be used in the place of metal or glass. It also can cause major body damage; HF will break down into free Hydrogen and Fluorine ions in the body. The Hydrogen with cause corrosive tissue burns, and the Fluorine will bond with Calcium in the body to kill nerve endings and displace the Calcium content by forming insoluble salts. If left alone, HF exposure can be fatal. If exposed, flush the area with large quantities of water. Eye wash and shower stations are located throughout the lab. Be sure to clean under fingernails as HF will wick there and is hard to remove. **Calcium gluconate gel** is available in the wet bench area, and should be applied to areas directly exposed to HF continually until you receive medical treatment. Any exposure at the URnano requires a trip to the Medical Center. HF does not produce an instant burning sensation, burning and or throbbing pain will not occur until many hours after the actual exposure. This will depend on concentration. Seek medical attention if any exposure occurs.

Piranha Etch is prohibited. It is a common name for a mixture of Hydrogen Peroxide and Sulfuric Acid. This mixture reacts with photo resist, metals, and flesh. It is very useful for cleaning wafers, but is highly reactive. The material continues to react and decompose for long periods of time after use. This causes a vapor release that can cause containers to explode. This material is highly unstable and use is not permitted. The URnano supplies a chemically stabilized version of the mixture called **Nanostrip.** This is just as effective as Piranha and is safer to use. Mixing or use of Piranha etch is a direct lab violation.

Bases: There are many types of bases at the cleanroom. Basic solutions also can harm tissue. If you become exposed, flush the area with large quantities of water. Eye wash and shower stations are located throughout the lab. Acids and Bases can be mixed in controlled amounts for known solutions, NEVER mix ACID and BASE waste together.

Peroxides are oxidizing materials; energy is released in reactions with common materials. Peroxide mixtures can be unstable and can explode. Extreme care should be used with peroxides, as they are incompatible with all forms of organic solvents and flammable materials.

Solvents: Solvents should be handled with care, as most are highly flammable. Most also can cause skin irritation and eye damage. Some have other threats, read the corresponding MSDS to ensure you know all hazards and risks.

Acetone is used commonly throughout the lab, it is very flammable and has a low flash point; it will combust very easily at low temperatures. Acetone spills can present a huge fire or explosion hazard. Handle carefully in fume hoods and keep away from direct heat sources.

Chlorinated solvents such as Chlorobenzene and Methylene Chloride are also used throughout the lab, mostly for lithography processing. These are known carcinogens, handle with care in hoods only, use separate waste containers and avoid skin contact or breathing of vapors.

Glycol Ethers are also used widely in lithography processes. These chemicals are known to cause birth defects, kidney, eye, lung, and brain damage. Avoid skin contact and breathing of vapors. Wear proper equipment and work in ventilated areas. When using chemicals you must follow the PPE guidelines.

Etiquette

Mutual consideration of your fellow users is essential to the efficient operation of the cleanroom. Remember the following:

General lab rules:

1. Sign in each time you enter URnano facilities.
2. Use the buddy system.
3. Gown from the top down.
4. Always use gloves and safety glasses.
5. Know where phones and exits are.
6. Know where PPE, eyewash, safety shower, and fire extinguishers are.
7. Stay out of unauthorized areas.
8. Report all problems or incidents.
9. Wear appropriate safety gear for chemicals.
10. Return tools to where they belong.

Do not:

1. Wear make-up or perfume.
2. Wear sandals or open shoes.
3. Bring in visitors without permission.
4. Work on or modify equipment.
5. Bring in unapproved chemicals.
6. Make electrical connections.
7. Change gas bottles.
8. Work alone.
9. Use equipment for which you haven't been trained.
10. Bring in paper products. Use ONLY cleanroom paper or cleanroom notebooks.
11. Use pencils.
12. Leave materials or belongings in the gowning room.
13. Wear dirty clothes or shoes.
14. Enter the cleanroom ungowned.
15. Bring in backpacks, purses, laptops. or other personal storage items.
16. Bring in food or drink.
17. Listen to music.

Leave your work area the way you would like to see it when you come in.

1. No chemicals or waste on bench tops.
2. No unlabeled solutions.
3. No unauthorized solutions or chemicals.
4. No waste down the drain.
5. No wet labware on storage racks.
6. No unreported equipment problems.
7. No uncleaned empty bottles.
8. Be considerate of your fellow users.
9. Share bench space cleanly and safely.
10. Show up for reserved times or cancel the reservation.

Consider the general welfare of the lab.

1. If you know how to fix a problem do so. If you're unsure don't even try.
2. Assist staff and learn from them.
3. Know what alarms mean. Don't just turn them off.
4. If you have a doubt, ask someone about it.
5. Work to reduce particle and chemical contaminants

Unusual Circumstances

Electrical: Do not make electrical connections, this will be done by staff or other approved persons. Do not overload circuits. Report all problems to the Safety Coordinator. In case of electrical shock, do not touch the person, call EH&S and get assistance to shut off the power source. RF, microwave, and other high-voltage sources are used on various equipment, be careful with liquids, and watch out for high-voltage lines and cables.

Fire: Fires can result from ignition of flammable gases, liquids or other materials and may be associated with electrical malfunctions (shorts or overheating). A major cause of lab fires is due to ignition of chemical solutions on a hot plate. Use water baths where possible. Be cautious of water use around electrical equipment. In case of a large fire, evacuate the building, pull a fire alarm, and call 911. Remain calm, if you are in the lab you will hear the fire alarm, do not ungown, find the nearest exit and quickly leave the building. DO NOT RUN. If it is a small fire you feel you can handle, fire extinguishers are located throughout the lab and building. If your clothes are ignited use eye washes or safety showers to drench you.

Gases: Gases used at the cleanroom are mostly in high pressure steel compressed cylinders. When in use gas cylinders are kept in special gas cabinets designed with exhaust ventilation and the proper valves, and regulators. When being stored gas cylinders must be securely fastened to a bracket of some kind. Cylinders often weigh up to a few hundred pounds, and can cause personal or property damage if they happen to fall. Gas cylinders must be transported on approved carts and used cautiously as compressed cylinders also can become rockets if the cylinder valves are broken or damaged.

Nitrogen, Argon, Oxygen and Compressed air is house supplied by the building. Nitrogen blowguns and compressed air are highly pressurized. At high pressures nitrogen or air can cause damage to equipment, clothing, or actually tear skin. Use common sense. Many gases in the cleanroom are corrosive, toxic, or pyrophoric. *A gas that is pyrophoric will spontaneously ignite in air.* An example of pyrophoric material used is TMA (Tri-Methyl-Aluminum). A toxic or corrosive gas is Chlorine.

***Note-** In the event of a strange smell / odor, evacuate the lab, and then call Brian McIntyre at 301-3145 or EH&S**.**

Injuries/First Aid Injuries such as minor burns and cuts can be treated using the supplied first aid kits. Trained medical personnel at the Medical Center or UHS must treat anything of a more severe nature.

Personal Protective Equipment

Eye Protection: Safety glasses must be worn in the lab at all times. Approved safety glasses are supplied, see the Safety Coordinator if you need a pair. Over the glasses pairs are also available. Note: impact resistant prescription glasses are not safety glasses

Body Protection: Lab gowns will protect against most solvents and light abrasions. Aprons and chemical resistant gloves are supplied for wet bench use. Heavy-duty aprons and specialized gloves or other body protection is available upon request for special approved projects or for dewar use with liquid nitrogen.

Hearing Protection: Earplugs are available for use when working near noisy equipment.

Equipment/Facilities: Throughout the lab safety equipment is provided. These include but are not limited to:

1. Calcium gluconate gel
2. First Aid kits
3. Fire extinguishers
4. Safety showers
5. Eye wash stations
6. Telephones

Appendix

URnano Material Handling Report

Material Name: _____
(Note: Put each material on a separate Material Handling Report.)

Material Classification:_____

Equipment that will use material: _____

Coordinating Researcher:_____

Primary Engineer:_____ Approval: Yes No

Date material use will begin: /___/

Specific hazards of material:

Detail usage procedure for material:

How much material will be used on an average basis?

Who will order the material? -URnano -You

How much needs to be in stock?

Safety Coordinator Approval: Yes No

Lab Manager Approval: Yes No

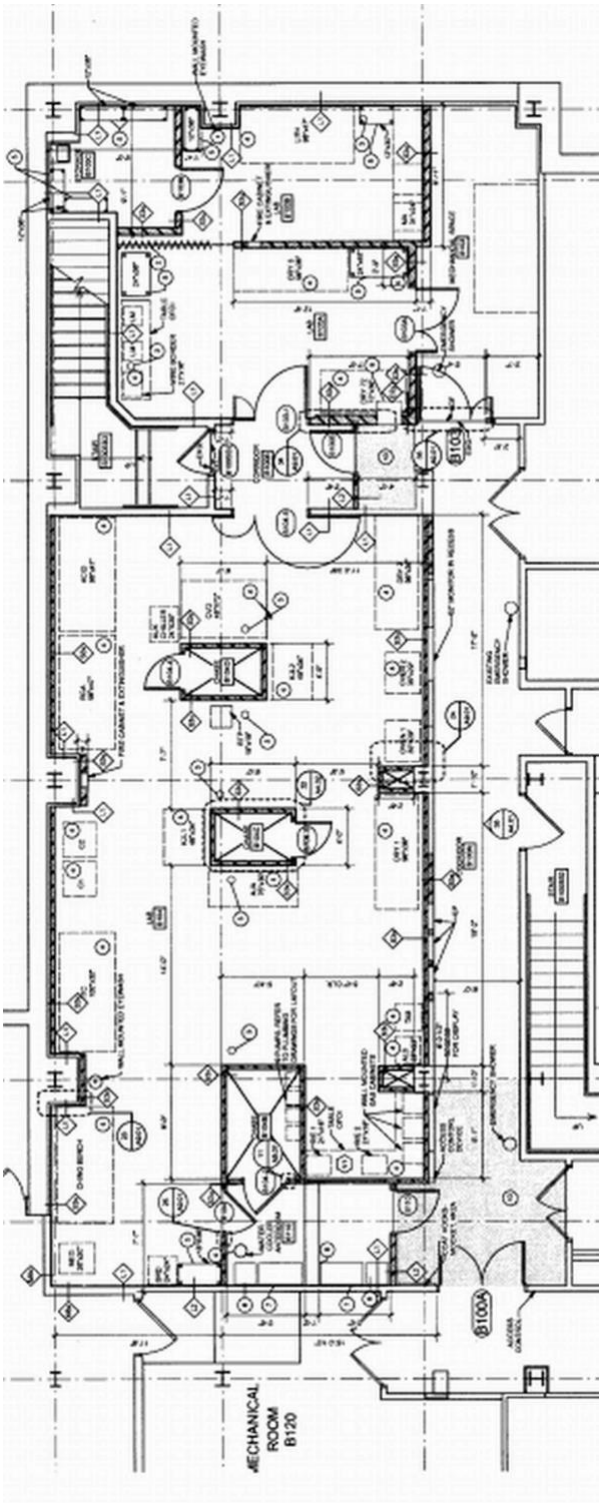
Before using any material in the cleanroom you must complete this form, provide an MSDS, and receive approval of the above individuals.

Primary Tool Engineer

Tool	Responsible Person	Email	Phone
Mask Aligner	Jim	jmitch30@ur.rochester.edu	x5-2471
Wire Bonder	Jim	jmitch30@ur.rochester.edu	x5-2471
YES CVD oven	Jim	jmitch30@ur.rochester.edu	x5-2471
Kurt Lesker PVD	Jim	jmitch30@ur.rochester.edu	x5-2471
AJA Sputtering	Jim	jmitch30@ur.rochester.edu	x5-2471
RTP	Jim	jmitch30@ur.rochester.edu	x5-2471
ALD	Jim	jmitch30@ur.rochester.edu	x5-2471
RIE	Jim	jmitch30@ur.rochester.edu	x5-2471
SBT	Jim	jmitch30@ur.rochester.edu	x5-2471
Benches	Jim	jmitch30@ur.rochester.edu	x5-2471
Microtech laserwriter	Jim	jmitch30@ur.rochester.edu	x5-2471
SEM	Brian	brian.mcintyre@rochester.edu	x5-3058
TEM	Brian	brian.mcintyre@rochester.edu	x5-3058
AFM	Brian	brian.mcintyre@rochester.edu	x5-3058
XPS	Bill	whouliha@ur.rochester.edu	

NOTES

URnano Floor Plan



UR Integrated Nanosystems Center User Facility
PI/Account Authorization Form

PI Name_____ Phone# _____
Last First
Email Address _____
Department _____
Department PO Box _____
Phone Number where you can be contacted _____

Billing Authorization Information

Department Administrative Contact _____
UR email address Bills are to be sent to: _____

Account Numbers that can be utilized by Group during the Fiscal Year:

Account Number(s) _____ Exp Date: _____
Account Number(s) _____ Exp Date: _____
(Please denote if 100% to one account or percentage to be split between multiple accounts)

Alternate Account number if one of the accounts above is Frozen or Rejected (must be a 2, 3, 4 or 6)
_____

Approval of Chair of the Department for the non-ledger 5 account number

Chair Signature _____

I agree to the terms and conditions shown below:

PI Name _____ PI Signature _____

Billings will be processed monthly for hourly uses of personnel, equipment and facilities. Billing will be based on either scheduled time or actual elapsed time (when available). Copies of monthly invoices will be sent to PI and Billing Contact. Invoiced amounts will automatically be charged against the account listed above at the end of each month. Rejected account numbers will result in access denial to all individuals within the PI's group.

URinc rates, policies and forms can be found on the URNano website: https://www.rochester.edu/urnano/

UR Integrated Nanosystems Center User Facility
Individual Authorization Form

User's Name_____ Phone Ext or Cell _____
Last First
UR ID _____
Email Address _____
Advisor/Principal Investigator Last Name _____

Status (circle one) Graduate Student Undergrad Class of _____ REU Postdoc

Tool Access to be Granted (circle all that apply) Metrology-Wilmot Clean Room - Goergen

I agree to the terms and conditions below:

All time I schedule will be billed to the research group I am currently a member of. If I am not going to use a tool, I will cancel my reservation at least 24 hours before the reservation begins, otherwise the costs will be billed to the professor. Billing will be based on either scheduled time or actual elapsed time (when available). I will not do work that is of a personal nature without setting up a personal account. I will only use my ID card to swipe into the facilities. I will not use my ID card to swipe other individuals into the facility. All issues, corrections or concerns with the scheduling tool PPMS will be email documented to the administrator urnano@pas.rochester.edu. Any requests for a change in charge because of tool malfunction will need to have been documented by an incident report in PPMS during the session along with email documentation to the administrator urnano@pas.rochester.edu

Signature _____ Date _____

Billing Authorization Information

Account Number _____Percentage _____% Acct Exp Date: _____
Account Number _____Percentage _____% Acct Exp Date: _____
(Please denote if 100% to one account or percentage to be split between multiple accounts)

PI Signature or Administrator _____ Date _____

Charges will be processed monthly for hourly users of equipment and facilities. Invoiced amounts will automatically be charged against the account listed above. Rejected account numbers will result in access denial to Labs, to all individuals within the PI's group.
Scheduler can be found at: http://ppms.us/urmc
URNano site : https://www.rochester.edu/urnano/

Metrology	**Sample Prep**	**Cleanroom**		
SEM	Sputter	RIE	Lithography	Safety
TEM	Plasma Clean	ALD	AJA	Wet Processing
FIB	Evaporator	CVD	Wire Bonder	Cleaning
STEM	Tripod	PVD-75	Other:	
AFM	Plasma trim	RTP		
X-ray				

Name:_____Date:_____PI:_____

URnano

Cleanroom Access Quiz 1

Do you need a buddy to work in the cleanroom?

Does you buddy need to be IN the cleanroom if you're operating tools?

Does you buddy need to be in the cleanroom if you're using reactive chemicals?

What are three numbers to call if there is an emergency (in the order of severity of the incident)?

Say you've spilled HF on your skin…list three things that you do:

Do you use tools without being specifically trained on them?

Are you required to wear gloves in the cleanroom?

Are you required to wear safety glasses in the cleanroom?

Are you required to wear hoods over your hair-covering in the cleanroom?

What are the emergency egress paths from the basement area?

Calcium gluconate is used for what problem?

Are the chemical safety guidelines different for the cleanroom than any other lab?

Should you use the calendaring tool for all equipment reservations? Why?

Can you show the cleanroom to your girlfriend/boyfriend/mom/dad//neighbor, etc? If so, how?

What happens after you've violated a cleanroom policy or procedure three times?