



# NanoFab Lab Manual: Rules of Conduct and Use

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# General Rules and Restrictions

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All rules must be observed at all times by all persons qualified to work in the cleanroom.

Failure to follow these rules can result in temporary or permanent loss of cleanroom access.



# Conduct Rules

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1. No member or project is more important than the safety of the members or the laboratory staff.
  - Ignorance of the rules, working under pressure, lack of common sense, language barriers, carelessness, and haste are not adequate excuses for unsafe behavior.
  - If you are tired or do not have time to perform your work correctly and safely, please leave and return later.
  - Anyone found to be in violation of any safety rule or otherwise compromising his or her personal safety or the safety of others will be denied access to the cleanroom.
2. Every member must be courteous to all member in the lab, use tools in prescribed manner, and observe our reservation policies.



# Conduct Rules

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3. No member can operate any equipment in the laboratory without having been trained and qualified.

**To become qualified for a tool, you must:**

- Read the Standard Operating Procedure
- Research how to use the tool and optimize the operating parameters
- Attend [group training](#)
- Perform a one-on-one session with the trainer and your own sample



# Conduct Rules

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4. Every laboratory member must utilize the proper Personal Protective Equipment (PPE) as identified in the Standard Operating Procedure (SOP) when operating equipment or processing wafers with hazardous chemicals.
5. Before working with a chemical or a chemical process, members are required to read the material safety data sheets (MSDS) for that chemical or process.
6. No member can work with chemicals in the laboratory without another member present (Buddy System).
  - Common solvents such as Methanol, Acetone, Isopropyl Alcohol, electron beam and photo resists and their developers are an exception to this rule.
7. No chemical process or process may be left unattended without proper labeling and member identification.
8. All workspaces must be returned to neat and clean status prior to a user leaving that workspace.



# Conduct Rules

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9. Members are not allowed to use and enable equipment with another member's Badger credentials.
10. Members not granted after-hour access may not enter or use the cleanroom outside of normal operating hours.
11. If a member cannot resolve an issue relating to the laboratory in a professional, courteous and respectful manner, that issue will be brought to the attention of the NanoFab staff for proper and expeditious resolution.
12. Members should point out rule violations or unsafe behavior immediately to the offenders, as well as later to the cleanroom management. Inappropriate reactions by individuals to such corrections should also be reported. The access of everyone to the cleanroom depends on maintaining a safe working environment.
13. If you do not know how to do something, ask a NanoFab staff member before proceeding. DO NOT GUESS.



# Breaking the Conduct Rules

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If a member is found to be in violation of any of the conduct rules or any other rules communicated during in-person training sessions, or found to work in a manner that jeopardizes the safety of other NanoFab members or staff, disciplinary action in the form of temporary or permanent loss of cleanroom privileges shall result. The severity of the disciplinary action is at the sole discretion of the NanoFab staff.



# General Rules and Restrictions

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Walk, do not run while in the lab.

Food or drinks are not allowed in the NanoFab.

Visitors and non-qualified users are allowed only by pre-approval.

- Request permission from cleanroom staff.

Always remove gloves as you exit the laboratory.

It is recommended that members wash their hands after leaving the NanoFab.







# Hours of Operation

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## Normal Operating Hours

- 9:00 AM – 5:00 PM weekdays, except CUNY staff holidays

## After-Hours

- 5:00 PM – 9:00 AM weekdays
- Weekends and CUNY staff holidays

## [CUNY Staff Holiday Calendar](#)



# After-Hours Policy

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## C-14

- To work in the cleanroom after normal operating hours, the user must have a C-14 registered to the ASRC address.

## Buddy System

- If operating a chemical process, the user must have a “buddy” in the cleanroom when handling hazardous chemicals.
- The buddy must be a registered cleanroom user and must be present in the cleanroom for the entire duration of the chemical process.

Failure to abide to the After-Hours Policy will result in loss of cleanroom access.




# After-Hours

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In the event of an emergency after-hours, the entrance of the cleanroom will be blocked. The cleanroom will be closed until further notice.





# C-14

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If you do not have a C-14, email Aldo Orlando at [aldo.orlando@asrc.cuny.edu](mailto:aldo.orlando@asrc.cuny.edu) and [nanofab@asrc.cuny.edu](mailto:nanofab@asrc.cuny.edu) to request a new C-14.

- Once your paperwork has been processed you will be granted after-hour access.

If you have a C-14 to a non-ASRC lab, email [nanofab@asrc.cuny.edu](mailto:nanofab@asrc.cuny.edu) and attach a photograph of your current C-14.

- NanoFab staff will file the paperwork to issue you a C-14 with the ASRC address.



# Bringing Objects into the Cleanroom

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In order to maintain the cleanliness standards of the ASRC NanoFab, members are discouraged from bringing in extraneous items into the cleanroom.

Items such as tweezers and other wafer handling equipment, glassware, and any other items necessary for performing work in the cleanroom should be stored in the storage area inside the cleanroom.

Any new item, not purchased through the ASRC cleanroom stockroom, must be first approved by ASRC NanoFab staff prior to bringing it in the cleanroom.

Members must unbox equipment, parts, etc. and remove packaging before bringing them into the cleanroom.



# Bringing Objects into the Cleanroom

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Members should utilize the cleanroom pass-through to bring any new items into the cleanroom. After fully gowning up, the items should be retrieved from the pass-through. All items are to be wiped down with a damp IPA wipe before being brought out of the wipe-down/storage room and into the cleanroom area.

Items **NOT** allowed in the cleanroom:

- Wood pulp-based paper products, including regular paper, tissues, Kimwipes<sup>®</sup>, cardboard, books, magazines, and lab notebooks.
- Styrofoam products, including packing material, disposable coolers, etc.
- Any powders, powdered chemical samples, or materials that shed particles.
- Food, gum, drinks, tobacco, cosmetics, or foam.
- Eraser, pencils, felt-tipped pens other than Sharpie<sup>®</sup> markers.
- Anything that can easily tear, shred, or efflux particles or plasticizers.



# Bringing Objects into the Cleanroom

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Notes can be taken on cleanroom notebooks or personal electronic devices.

All approved items that are brought into the cleanroom must be wiped down to remove dust particles and oil.

Lockers are available to store belongings, valuables, and prohibited items outside of the cleanroom.

Prohibited	Allowed
Cardboard and Paper	Plastic
Pencils	Cleanroom paper and notebooks
Cloth items	Pens
Hats and coats	Synthetic fabrics (polyester, nylon)
	Paper items sealed in plastic



# Cleanroom Stockroom

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The ASRC NanoFab facility maintains a stock of common items used in the cleanroom, available for purchase by users.

Please consult the [Cleanroom Stockroom website](#) for the most up to date list of stocked items and prices.





# Appropriate Attire

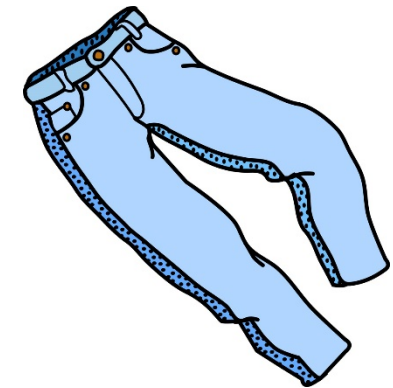
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Full length pants must be worn at all times.

Only closed-toe shoes – no sandals, open-toe shoes, hi-heels or bare feet.

Shirts with shoulders covered.

Avoid clothing that is especially fuzzy or tends to produce a lot of lint or static electricity.



# Pre-Gowning Procedure

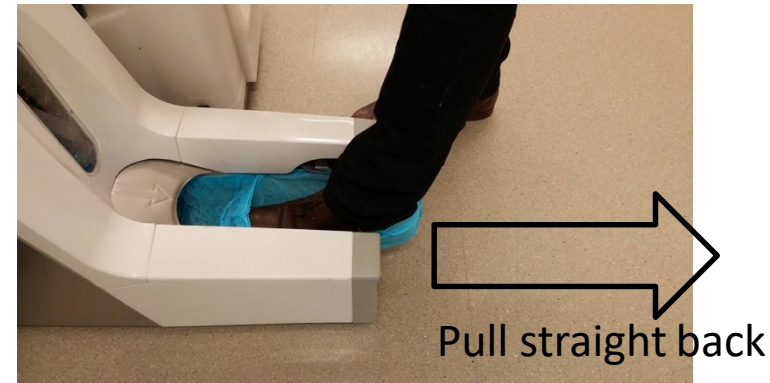
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## Shoe Cleaner

- Place your foot and shoe together inside. Hold the handle to steady yourself, then press the button. You'll feel a slight tug on your shoe from the moving brushes. Clean each shoe for 5-10 seconds.

## Bootie Butler

- Place shoe in bootie heel first, then toe. Pull straight back until bootie releases from the butler. Do not pull upward.



# Pre-Gowning Procedure

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## Face Mask

- If working in the Class 100 areas, put on face mask.

## Bouffant Cap

- Tuck all hair into hair net.

## Gloves

- Find and put on a snugly fitting pair of cleanroom gloves.



# Iris Scanner

Cleanroom access is controlled by a dual card/iris reader located to the right of the gowning room entrance.

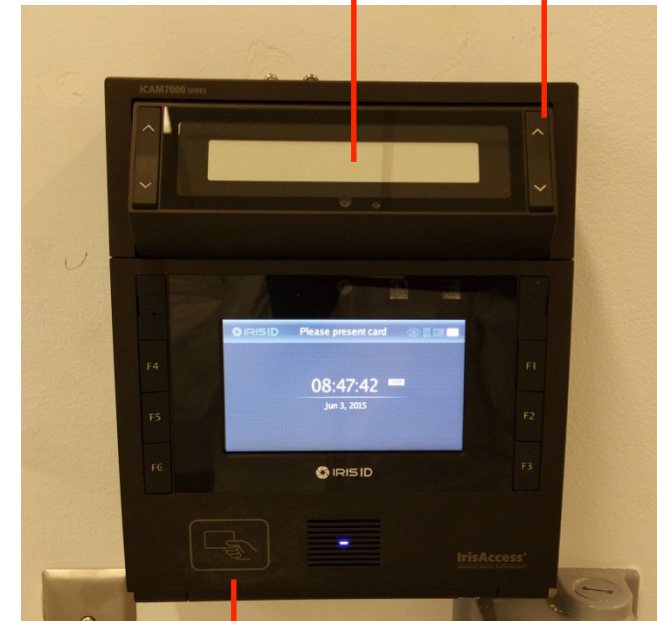
Stand approximately 2" from the box and hold your card to the reader until the system begins its audio cues.

Align your eyes so that they are visible in the alignment mirror.

The yellow indicator dot will turn green when you reach a correct position.

Hold position until access is granted.

Eye Alignment Mirror Adjustment



Card Reader



# Gowning Procedure

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1. Inspect gown for tears. If ripped or soiled, change gowns.
2. Put cleanroom hood over hair net.
3. Put on cleanroom suit – making sure no portion of the suit touches the floor. Tuck cleanroom hood into suit.
4. Put on cleanroom shoe covers overtop the booties and legs of the cleanroom jumpsuit.

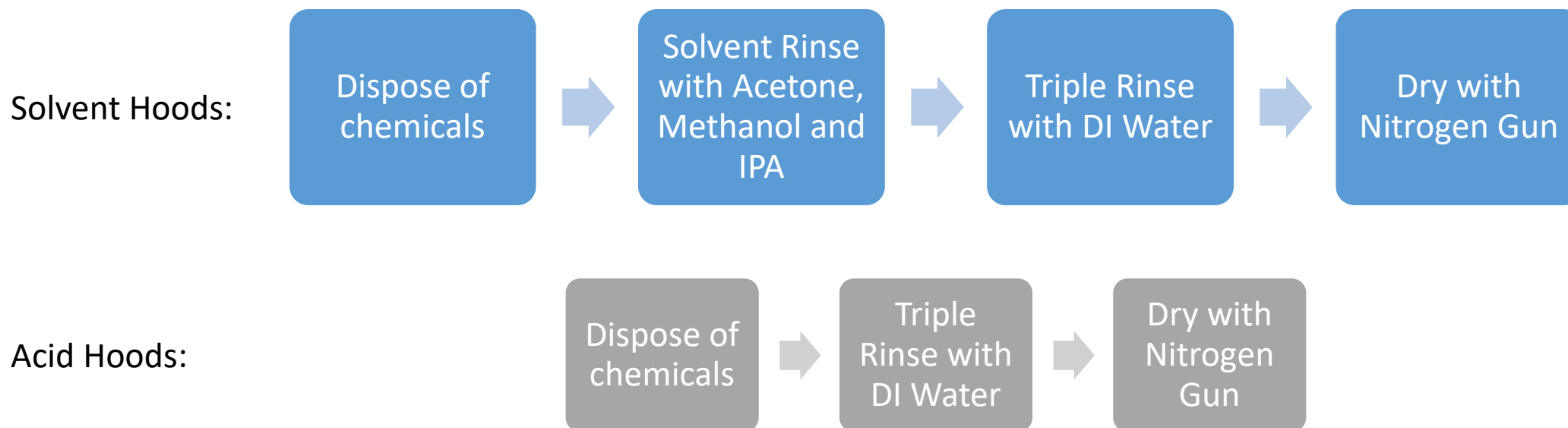
The above attire must be properly worn before entering the cleanroom.



# Housekeeping

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1. Glassware/plasticware is to be properly rinsed, dried and removed from the hood and stored on the storage racks after use or storage bins after use.



# Housekeeping

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2. Used cleanroom wipes cannot be left in the hood.
3. All trash must be placed in the appropriate bins.
4. Empty chemical bottles must be triple rinsed, labeled, and placed on top of the caustics cabinet.
5. Chemical bottles containing chemicals are to be stored in their proper storage location.
6. Lithography spinners and surrounding area must be cleaned thoroughly after use.
7. Trionic gloves are only to be used and stored in designated areas.
8. Personal tools, materials, and glassware should be stored in the storage room when not in use.
9. It is each member's responsibility to clean up their work area in preparation for the next member.



# De-gowning Procedure

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1. Remove shoe covers.
2. Remove cleanroom suit and hang on hanger.
3. Remove hood and snap the hood to the cleanroom suit.
4. Snap the shoe covers to the cleanroom suit.
  - If using the guest rack, place shoes in the proper bin in the guest rack.
5. Hang suit on the rack.

Do not throw away cleanroom suits into the trashcan.





# Tweezers and Glassware

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It is recommended that members provide their own cleanroom compatible tweezers and glassware.

We cannot guarantee the cleanliness of the community tweezers and glassware.

We can provide storage bins to users who wish to store their items on-site.

NanoFab staff can recommend vendors and specific items that are known to work well with particular processes.



# Badger

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Once qualified for a tool, members can enable/disable and make reservations for a tool through Badger.

Read the [Badger Instructions](#) to learn how to use Badger.

During normal operating hours, reservations must be kept under 3 hours.

Back-to-back reservations are not allowed.


If you are 15 minutes late to your reservation, you will lose your reserved time slot.

Welcome to Badger at CUNY ASRC

Email

Password

Lab  
All Labs



By logging in I accept the terms of the lab agreement.



# Slack

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Join the NanoFab Slack Community by requesting an [invitation](#).

Slack is used to facilitate discussions between and amongst members and staff.

- Channels: use the channels to watch out for updates on specific tools, announcements across the lab, or notes on processes.
- Direct Messaging: use the direct messages to get in touch with staff or with other members.












# NanoFab01 Drive

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All the computers in the cleanroom are connected to the NanoFab01 Drive.

MSDS and Standard Operating Procedures are stored on this drive.

Members can save pictures, files, and data to their own folder under “Users”.

Name	Date modified	Type	Size
 @Recycle	4/6/2018 11:32 AM	File folder	
 Elionix Desktop	9/16/2017 8:31 PM	File folder	
 Equipment	3/1/2018 2:42 PM	File folder	
 Milan	4/2/2018 4:45 PM	File folder	
 MSDS	11/3/2017 10:56 AM	File folder	
 Software	7/31/2017 5:07 PM	File folder	
 Staff Working Files	3/12/2018 2:20 PM	File folder	
 Standard Operating Procedures	1/25/2018 4:16 PM	File folder	
 Users	4/19/2018 11:36 AM	File folder	





# Citation Requirement

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When publishing or presenting results derived from staff and services at the ASRC NanoFab, please use the following acknowledgement:

*“This work was performed in part at the Advanced Science Research Center NanoFabrication Facility of the Graduate Center at the City University of New York.”*



# Statement of Acceptance

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I will adhere to the guidelines provided in this document while a user of the ASRC NanoFabrication Facility and understand that failure to comply with any of the regulations will lead to revocation of priveleges, suspension, and/or expulsion from the cleanroom.

**When you register as a User of the ASRC NanoFabrication Facility, you will be directed to this document and asked to confirm your acceptance of the Rules of Conduct and Use.**

