

This document is a reference manual covering the basic operational policies for use of the Nano Research Facility (NRF), the National Nanotechnology Infrastructure Network at Washington University in St. Louis (NNIN-WUSTL). NRF includes a Micro- and Nano-fabrication Laboratory, a Surface Characterization Laboratory, a Particle Technology Laboratory, and a Bio-imaging Laboratory. These facilities house state-of-the-art instruments and serve as a multi-user facility with users having access around the clock. As a result, it is truly important for all NRF users to have read and understood laboratory policies before using laboratory equipment.

It is impossible, however, to define a policy for every conceivable situation. Rules and policies are no substitute for common sense. Under these conditions, anyone who fails to act in a professional, safe, and responsible manner while in the NRF will be banned from further use of the facility. However, suggestions and feedback on the facility, its operation, and its equipment are welcome at all times. Please feel free to direct your suggestions to the laboratory manager.

1. General Procedures

1.1 Categories of Users

Professional Staff

Full or part time employees of NRF

Academic Users from WUSTL

People working on an approved research project in the labs (faculty, postdoctors, and graduate students)

Other Academic Users

People collaborating on an approved research project in the labs (faculty and staff members)

Industrial Users

People working on the hourly basis in the labs (engineers)

Off-hour Users

Users working after regular hours Monday to Friday and weekends (qualified tests are required to get an off-hour access)

Regular-hour Users

Users working during regular hours Monday to Friday when staff is available for any assistance

1.2 Access

NRF is for the exclusive use of users affiliated with and working on specifically approved research projects. Based upon the successful completion of the training sessions for the use of the equipment in NRF, the laboratory manager will issue a personal electronic key code to the user for access to the facility. The key code is your authorization to enter the facility. Sharing of key codes or permitting unauthorized access to the facility is not allowed. Loaning your key

codes to others is a serious violation. Non-authorized persons are prohibited from accompanying, observing and helping users at work, unless specifically approved by the laboratory manager. For users who are inactive for a quarter, new training sessions are required. For those who are inactive for more than two months, warm-up sessions are required.

1.3 Hours of Operation

The labs are open to qualified off-hour users both day and night, weekdays, and weekends. Usage is restricted to normal hours (9:00 a.m. to 5:00 p.m. Monday through Friday) for regular-hour users. Users have to reserve the use of instruments online. More information on rates and hours is given in section 2.3.

1.4 Facility Governance and Appeals

The laboratory manager is responsible for the continued operation of the facility. Use of the facility by any user is at the sole discretion of the management. The laboratory manager and the staff are responsible for maintaining and enhancing the equipment resource of the facility, and for assuring that the operational policies of the facility are followed. Authority and responsibility for safe operation of the laboratory flows from the director to the laboratory manager and to the staff. On matters involving equipment usage or safety, you must follow direct instructions from the staff. Both staff and users are expected to act in a courteous and professional manner at all times. Deviations from this norm by either users or staff should be reported to the laboratory manager immediately. If at any time you, as a user, feel that you have been unfairly treated by a staff member or strongly disagree with the rules imposed by a staff member, please discuss the situation with the laboratory manager. The sequence of appeals is from the laboratory manager to the director. In extreme cases, an appeal can be made directly to the director.

2. Equipment Use and Availability

2.1. Registration

Users are required to use online registration to contact the laboratory manager to indicate your interest in the use of the NRF. You must provide all of the information requested on the registration form. The laboratory manager will justify the potential research projects that you will work on and will assign professional staff to provide the required hands-on training sessions. Upon evaluation, laboratory manager and professional staff can authorize you as a user of the NRF for access to the facility and for online reservation for use of the instrument.

Much of the equipment in the facility is delicate. As a result, direct hands-on access to any equipment by the end-user would be severely restricted or prohibited. We consider hands-on access as an important part of the educational process. We set rules and procedures for the use of any instrument to assure the continued operation of the instrument. Violation of these procedures or carelessness in operation can result in damage to the equipment, downtime and considerable expense. Consequently, carelessness or damages caused while using any of

equipment will result in suspension of user privileges, either for a specific instrument or the facility as a whole.

The wet chemical hood in NRF is also treated as any other “instrument”. You must be specifically trained and authorized to use them. You are required to attend these sessions on chemical safety and chemical use prior to using any chemicals in the facility. Use of any hazardous chemicals in NRF has to be approved in advance by the laboratory manager.

2.2 Training

Users can arrange for a training session with “instrument manager”. The user is responsible for checking in five minutes prior to the appointment, and if the user does not show up within fifteen minutes of the scheduled appointment time, the training session will be cancelled, and the user charged for a 1-hour training session as penalty (see **User Fees** below). The training session currently uses a standard sample for training and the user is encouraged to bring his/her own sample in the follow-up session. The follow-up session may be conducted with the training session, which depends on the progress of the user in the session.

2.3 User Fees

User fees for use of instrumentation are outlined below. **Users may cancel up to 24 hours in advance without charge.** The hourly based charge for equipment pays for expendables and maintenance costs. Industrial rates are comparable to those charged by commercial suppliers of equivalent services where applicable. All users will be billed at the end of each month for accumulated user charges. For WUSTL users, this is via budget number. Other users should supply a purchase order number against which charges can be billed (see below). Failure to pay usage charges will result in cancellation of your project. Please discuss charges with the laboratory manager if you have any questions.

Users with access are responsible for logging in at the beginning of their session using their assigned NRF user key and password, and for logging out at the end of their session, which is how User Fees are determined. Users are charged for reserved time or used time, whichever is longer.

NRF user category: Academic User (NRF-A) and Industrial User (NRF-I)

NRF Hours: regular hour (R) - 9:00 am - 5:00 pm M-F; off hour (O) - 5:00 pm - 9:00 am M-F and weekends

Micro-and Nanofabrication Lab (Clean Room)

NRF-A: \$15/day

NRF-I: \$60/day

Training for NRF-A: \$100 per user

Training for NRF-I: \$200 per user

Particle Technology Lab

NRF-A:\$20/hr (R) and \$10/hr (O)

NRF-I:\$40/hr

Training for NRF-A:\$60/hr

Training for NRF-I:\$100/hr

Bio Imaging Lab

NRF-A: \$15/hr (R) and \$10/hr (O)

NRF-I: \$60/hr

Training for NRF-A:\$60/hr

Training for NRF-I:\$100/hr

Surface Characterization Lab

FEI Spirit TEM

NRF-A: \$30/hr (R) and \$10/hr (O)

NRF-I: \$150/hr

Training for NRF-A:\$60/hr

Training for NRF-I:\$100/hr

FEI Nova 2300 SEM

NRF-A: \$40/hr (R) and \$15/hr (O)

NRF-I: \$150/hr

Training for NRF-A:\$60/hr

Training for NRF-I:\$100/hr

Atomic Force Microscope

NRF-A: \$15/hr (R) and \$5/hr (O)

NRF-I: \$60/hr

Training for NRF-A:\$60/hr

Training for NRF-I:\$100/hr

For WUSTL users only: The laboratory manager should be informed of changes in account number, as all charges are made to the account number. If your department provides NNIN-WUSTL with a replacement account number, we will adopt it. It is important to use current, accurate account numbers at all times to avoid bounced charges and unnecessary bookkeeping. If you wish to be charged to multiple accounts, please advise the laboratory manager, so special arrangements can be made.

2.4 Equipment Scheduling

Users can reserve available time for use of instrument through our database integrated website. Users have to sign up in advance, but cannot reserve the instrument over 21 days in advance. Failure to cancel an unneeded reservation results in inefficient utilization of resources, which is subject to charge.

Users who need to get assistance from staff member have priority for system access during the normal working day (9:00 a. m. to 5:00 p.m.). This priority does not extend into the evenings or weekends. This, however, is not an excuse for indiscriminate bumping of scheduled users except in an extreme emergency situation. Please **DO NOT** sign up for more than **TWO** hours per day during regular hours, leaving more slots for other users.

Users are encouraged to schedule with a staff member as much as one week in advance if assistance is needed in the use of any instrument. It is the responsibility of the users to initiate such scheduling. All scheduled users need to coordinate with the laboratory manager to avoid conflict with resources. Priority access is provided for WUSTL users and industrial partners who have been on an annual based use at the facility. Under any circumstances, the laboratory manager has the right to schedule the use of the lab accordingly.

2.6 Problems

Problems with equipment malfunctions and breakage should be reported to the laboratory manager. Do not try to fix or adjust anything by yourself. The equipment is very expensive and much of it is very delicate. Considerable damage can be done at a great cost of both money and downtime by well-meaning attempts to fix damages. There is no reason for any user to use a tool on anything, with the exception of a small screwdriver or Allen wrench for sample mounting. If users misuse the equipment by not consulting the staff members or by disregarding the suggestions provided by the staff members, users are responsible for any damage(s).

Do not call the staff at home in the evenings or on weekends about minor problems with the equipment or your process. It will have to wait until the next business morning. Obviously, major problems such as fire, smoke, or equipment alarms should be reported immediately. If you have any doubt, call the laboratory manager first. Any emergency involving injuries, fire, chemical spills, etcetera, should be reported to WUSTL Environmental Health and Safety (EH&S) group. The phone number for EH&S is posted in the laboratory.

3. Laboratory Practice

3.1 Visitors

Users are discouraged from taking casual visitors for tours in the facility. A “visitor” is anyone without a key specifically issued to him/her. Laboratory manager needs to schedule a tour in advance for any individual visitors. Users are discouraged to bring visitors during training, qualified, or warm-up sessions, respectively.

3.2. User Storage

The laboratory manager will assign limited amount of storage space to the users in the facility. Typically, one drawer is allocated per research group for users. Storage space should be used for keeping samples. No chemicals of any kind may be stored in these drawers. Chemicals are to be stored only in the special ventilated chemical cabinets. Private stocks of glassware are not to be kept in the drawers. Please use your storage space wisely or it will be given to someone else. Do not put your stuff in a drawer that was not assigned to you. Be sure to label things with your own name and date. The staff periodically disposes of things left in unassigned drawers, as well as things labeled as belonging to non-active graduated students and research groups. See the laboratory manager for the drawer space allocations. No additional dry boxes, desiccators, cabinets, etcetera, may be left in the laboratory without permission.

3.3. Phones

Phones are provided throughout the laboratory for the use of staff and users. To place a call off-campus, you must dial nine (9). Long distance calls may not be made without an access code. The facility phones are not a substitute for office phones for WUSTL users. Users should not routinely make or receive calls in the laboratory. The facility will not routinely take messages for users.

3.4. Computers

Computers are available to staff and users for data analysis and other research activities. Users will get their passwords from the laboratory manager for access to the computers. Users are encouraged to backup their data files to a Flash Drive from computer hard drives. The laboratory manager and staff will delete data files over a period of time. Installation of any application software or reset any default in the computers has to be approved in advance by the laboratory manager.

User Agreement

I have read the basic operation policies for use of the NRF. I agree on the items and conditions described in these policies.

Name: _____
Student/Employee ID #: _____
Instrument: _____
Organization/PI: _____
Contact/Phone: _____
Signature: _____
Date: _____

Approved by: _____
Date: _____