

Scanning Electron Microscopy Facility Rules

Access and Training

According to the level of expertise, three levels of access may be granted to users:

- 1. Untrained users** – the **untrained user** will be assisted by the CNIS personnel either on collaborative projects or by fee-paying assisted service. Users in training are considered untrained until formal written approval from one of the instrument supervisors.
- 2. Trained users** – the **trained user** access privileges will be granted after an adequate training on instrument and explanation of adequate background knowledge. Certification will be provided in writing by the instrument supervisors.
- 3. After-hour users** – the after-hours access to the instrumentation will be granted only to trained users with **extensive experience and solid background** about the hardware and use of the instrument. **The users in this category are strongly encouraged to work after 18:00 during regular work days, and on weekends.**

The **trained user** or **after-hours user** maintains an **active access status** provided, in the case of minimum utilization of the instrument of 4 hours every 3 months. Fully trained users, who did not maintain **active** their **access status**, require a signature from the supervisors to reactivate their privileges. This ensures that every user owns a continuous and updated knowledge of the instrument features.

It is in the interest of all users to respect the rules and treat the instruments with the highest care to ensure ongoing access to state-of-the-art scanning electron microscopy. Access privileges may be revoked if the rules defined in this document are not strictly adhered to.

Instrument Booking (<http://www.cnis.XXXXXX>)

Untrained users:

The availability of the instrument can be checked on the online scheduling system and the booking can be made by contacting the instrument supervisors. The slots for standard book time are: 09:00-12:00 and 14:00-17:00, from Monday to Friday. Minimum booking time is one hour. In the case of a requested assisted service, a fee will be applied to the user.

Trained users:

Instrument time can be booked in the slots 09:00-12:00 and 14:00-17:00, from Monday to Friday:

- Access time may be scheduled only when the technical assistance is not needed.
- If technical assistance is needed, it's required to coordinate in advance your booking together with the instrument supervisors.
- Only reservations can be made; cancellation or modification of a reservation can be made only by the instrument supervisors;
- Reservations must be made at least 24 hours in advance. Fees are charged for the reserved time, when changes and cancellations are made less than 24 hours prior to the booked time, even if the instrument time is not used.

- Maximum booking time is 3 hours/day on SEMs. This can be extended for long experiments at the discretion of the instrument supervisors.

After-hours users:

After-hours users may book an instrument anytime during a day, 7 days a week as long as:

- The user is trained and approved to use the instrument after hours.
- The user does not need technical support.
- Reservations are made at least one working day in advance.
- The instrument supervisor (or his or her designate) is available for emergency situations (on cell phone).
- The maximum booking time is unlimited on Sundays and statutory holidays and between 9 p.m. and 7 a.m. on workdays.
- **Users in this class are strongly encouraged to book the instruments after 18:00 during weekdays and during the weekends.**

Training guidelines and access:

Zeiss Auriga Field Emission High Resolution Scanning Electron Microscope

This is a high resolution analytical SEM equipped with field emission gun, energy dispersive X-ray (EDX) system, in-lens SE, out-lens SE and BSE detector. This instrument provides publication quality data at high resolution and elemental maps using EDX. The platform is also equipped with FIB, EBL and nanomanipulators capabilities.

Training and user privileges approval is provided by one of the instrument supervisors. Training takes about 5 hours of instrument time and it will be provided for 2 to 4 users at a time.

Assistance in data interpretation and performing complicate experiments may be provided by CNIS group members on collaborative basis.

Booking is done based on user status (see **access and training**) and be accessed online at (<http://www.xxxx>).

Graduate course in electron microscopy is **not** required, but a basic knowledge of electron microscopy is highly recommended.

Detailed operating procedures (OP) are available in print next to the microscope.

In the case of a request for operating procedures not included in the written OP, it's requested a previously discussion with the instrument supervisors in order to develop new ones. Modification to the chamber set up for special needs is possible only by previous request to the instrument supervisors. In case of involved projects, procedures for data acquisition and help with interpretation will be provided by

CNIS group members on collaborative basis.

Sample Preparation Facility

Sample preparation facility is provided to users of the SEM facility at CNIS.

Training and user privileges approval is provided by lab supervisors.

Facility-wide Rules

In the case of the publishing of data acquired on CNIS instruments, an agreement will be provided to the users by CNIS personnel. This policy applies to SEM and TEM so to ensure that high quality of the data published under CNIS's. In case of insecurity about the quality of the obtained data, it's highly suggested to require assistance from CNIS personnel. It is strongly recommended that users check their work before wasting a significant amount of time in the processing and data analysis of an image. CNIS retains the right to control publication of data and this will be exercised only to ensure that the quality of the data is appropriate.

RULE 1: If you are in doubt or have any problem, ask to the instrument or lab supervisor. This applies to all instruments, to question about sample compatibility with the instrument and health and safety issues in the facility. Not knowing is normal and the CNIS facility staff are here to help you. Not asking could result in serious problems, instrument downtime or damage or injury and likely in loss of access privileges.

RULE 2: All types of samples have to get a sample approval form signed by the instrument or lab supervisor before they can be studied using NINT's instruments or brought to sample preparation area. MSDS sheets must be provided by the user when applicable to their sample. This rule is in place to keep track of history of the instruments, avoid problems with instrument contamination and protect the health and safety of users and others. This form needs to be filed only once per family of samples. However if the composition or preparation procedure for sample has changed, additional forms are required. If in doubt, submit a new form. The form is available online at: <http://www.intra.nint.org/fac/>.
NOTE: The TEM lab supervisor needs to inspect all magnetic samples, while mounted in the TEM holder, BEFORE the holder is inserted into the TEM.

RULE 3: No data will be stored on the instruments for more than 4 weeks. NINT provides a file server for long term data storage and you should upload data to the server immediately after the session. By not following this rule a user risks that the data will be deleted by NINT EM personnel possibly without notice.

RULE 4: Browsing Internet, checking e-mail and similar activities not related to use of the instrument is strictly forbidden from all computers connected to the instruments and from data processing and simulation computers in the computer room. The computers connected to the TEMs and SEMs have direct access to hardware and unauthorized access (hacking) could damage the instrument hardware. Non-compliance with this rule will result in immediate suspension of user privileges.

RULE 5: If you find a problem tell the instrument supervisor immediately. If you have problem after-hours, stop the experiment and set the instrument to a safe mode (refer to operating procedure for the instrument), report the problem (by calling the instrument supervisor) and leave its resolution to instrument supervisor. It is often easy to correct the problem when it first occurs.

RULE 6: If preventable damage (damage which can be avoided by user following Rule 1) occurred

(especially damage to TEM holder tips) your group will be required to pay full repair cost and your access privileges will be suspended until the item is repaired and repair fully paid. Attempts for repair by a user without authorization of the instrument supervisor will be viewed as additional damage to the item, thus possibly resulting in additional fees charged to your group. The aim of EM at NINT is to support research at the highest possible level and the instruments involved are delicate. Mistreatment of the instruments affects negatively all users. It is expected that most delicate items such as TEM holders will be checked by the instrument supervisor after each user session. It is in your interest to check such delicate items before using them. **Only use the functions and holders you are trained on.**

RULE 7: Making illegal copies of commercial software packages will result in immediate loss of user privileges. Note: Sharing of data processing and acquisition scripts and other non-proprietary items among users is strongly encouraged. NINT EM computing facility serves as a depository of such non-proprietary items.

RULE 8: Do not cut corners when using the instrument; maintain cleanliness. Gloves are used to protect instrument, not you. Follow usual high vacuum precautions to avoid carbonaceous contamination from fingers.

Fees

The fees below apply to users who are both NanoLab internal and external users.

Reduced fees for users outside to NanoLab will be based on project relevance to nanoscience and nanotechnology.

The fees are subject to change.

*** Users are expected to prepare their own samples with advice from the technical officer in charge of the facility. Sample preparation or computing by SEM group personnel is possible for a fee or as collaboration on case by case basis.

Other fees

The bill that will be sent to your supervisor may also include the following expenses (if applicable):

1. Fees for training. Additional training time will be charged as assisted use.
2. Fees for supplies (i.e. storage boxes, gases, etc.).
3. Fees for equipment damage and associated technical support (i.e. you may be charged for two hours of technical support if you get the SEM holder stuck inside the microscope – this is much better than getting your user privileges revoked for damaging the instrument in non-authorized repair attempt). These charges will occur on damage that can be prevented by the trained user (**see operating procedure manuals** for each instrument).

General rules to follow on each instrument:

All users must record their usage of the microscopes in the lab log book. You must specify if you received technical support and the number of hours.

- The minimum booking time is one hour and you will be charged every one hour after that.
- If you choose to delete or modify an appointment more than 48 hours in advance, there will not be any extra fees. Otherwise, you will be charged for 20% of usage time, unless you find someone else to fill the timeslot.
- If you simply don't show up for the appointment without notice, you will be charged for the booked time.
- If you finish sooner than the booked time, you will only be charged the actual usage time (rounded to half an hour).

Repeated violations of any facility rules will be reported to the CNIS scientific council and action will be taken to limit or revoke your access privileges.