Georgia Institute of Technology
FIB²Center

Users Guide

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Policies and Procedures Highlights

- Even though the FIB instruments are not within a cleanroom keep your work as clean as possible. Avoid any dirt or dust getting into the vacuum chamber. Have the chamber opened as briefly as possible.
- Check in on the instrument logsheet.
- Wear gloves when working with samples, placing them in/taking them out of the FIB chamber.
- Mount the sample carefully and tight. (pg. 7)
- NEVER work on your sample without a valid link between Z and FWD (Free Working Distance). (pg. 7)
- DO NOT use magnetic samples in the NOVA 200.
- Keep the FIB chamber under vacuum when you leave the lab.
- Log off from the XT server software and do not log off from the microscope computer (logged on as „user“); log off rom support computer and switch off the light in the lab.
- Only authorized users may operate the FIB instruments.
- Visitors must have a permission from Dr. Mizaikoff and must be accompanied by an authorized user. (pg. 5)
- Be considerate. (Clean up your own mess, don’t mess up someone else’s work)
- Ask for permission before taking anything out of the FIB labs.
- DO NOT modify anything on the FIB instrument itself. NO EXCEPTIONS! (pg. 6)
- DO NOT install any software on either of the computers. NO EXCEPTIONS! (pg. 6)
- Safe files only on the support computer. (pg. 6)
- Transfer your files after EACH session from the support computer. This is NOT a backup computer. User files older than a month will be deleted without warning. (pg. 6)

Policies and procedures

I. Introduction

The FIB instruments are highly complex instruments with a great variety of applications. Their continuous functionality should be the first goal of every user. Therefore handle them with biggest possible care and keep them as clean as possible.

When using the FIB instruments, be aware of your knowledge limitations. It is extremely important that you ask someone for help if you are unsure about the operation of these facilities. You will not lose face. Instead, you will gain respect as one who realizes that a bit of blundering can cause a great deal of damage.

It is recognized that there will be many users with more projects and even more ideas for improvement. We appreciate any idea making the work safer and cleaner and more comfortable. The manufactorer FEI is always listening for new ideas to improve their system either in the hard- or the software.

II. Enforcement

The policies and procedures described here are intended to ensure the safety of our users, protect the very complex and expensive equipment in the FIB labs and to create an environment in which many different research groups can co-exist peacefully. It is expected that the FIB users will police themselves by encouraging and assisting one another in adhering to these policies. **Flagrant or repeat offenders will be penalized, typically through suspension or expulsion from the FIBs.**

III. Schedule rules

1. Scheduling is managed via a link from our website http://www.fib2center.chemistry.gatech.edu. You will receive your personal access data when you gain access to the FIBs.
2. Booking is possible for up to two days in advance. One slot is 4 hours at the most. Slots cannot be booked consecutively. If you need more time (e.g. TEM sample preparation) contact FIB staff.
3. Comply with the schedule. Many users want to access the instruments. Users who do not use their time slots will be penalized.
4. Remove your sample from the FIB instrument and clean up the place. Note any anomalies to the next user and staff. Check out on the instrument log sheet.

IV. Access to the FIB labs

Card reader systems are installed. Please provide buzz card information to gain access to the Fib rooms.

Prior to being given access to the FIB instruments, applicants must attend a training session on the respective instrument. Applicants and their advisors must sign a form acknowledging that they have read and understood the contents of this guide. Applicants are required to write a protocol about the training session which has to be accepted by staff. After the protocol is accepted a user will receive access to the scheduling system. The first user session will be attended by staff until the user can safely handle the instrument.

Users are divided in three categories:

User level I	High capability user	Fully checked out of training and at least **70** hours of experience on either of our two instruments.	24/7 access
User level II	Routine User	Fully checked out of training	Daytime access when one of the main operators is available (8:00 am – 6:00 pm)
User level III	Occasional User	No training required	User will have no direct access to FIB. One of the main operators will process the samples.
Micromanipulator	Routine User	Special training required And at least **40** hours of experience on Nova required	Daytime access when one of the main operators is available (8:00 am – 6:00 pm).

V. Visitors

Permission is necessary. A FIB authorized user must escort them. The escort will be responsible for ensuring that the visitor follows the facility policies and procedures.

VI. Procedures and Courtesies

1. Excess storage in the FIB labs is not permitted.
2. Excess data storage on the computers is not permitted.
3. Turn off the E-beam and the I-beam and keep the chamber under vacuum when you leave the FIB. If nobody is scheduled after your session put system into sleep mode (Check before you leave scheduler, sometimes users delete their slots right before the scheduled session).
4. If you make a mess, clean it up. Return everything to its original condition, or if you want to be loved / appreciated, leave conditions a little better than you found them. This includes your entire set-up for experiments or projects.
5. Users will make proper entry each time in the log sheet. Do not forget to enter date **AND** check-in and checkout time.
6. Be aware of supplies. If quantities of stock appear to be low, report it to the FIB staff.
7. Tips for the micromanipulator, carbon pads and SEM stubs are not provided by staff. Please find more information on how to order them on our website.
8. Do not remove dedicated items from the FIB labs without FIB staff's permission.

VII. Computer handling

Each FIB instrument has two computers, a microscope computer and a support computer. The microscope computer is preinstalled by FEI and controls the complete instrument. It is absolutely prohibited to install / remove / modify any software on the microscope computer. Furthermore it is not allowed to store any user data on the microscope computer. The only exception is the temporary storage of a bitmap file to be milled which can not be read from a network drive by the software. Please delete this bitmap file after it is not needed for milling anymore.

The support computer primarily serves to save user data. It can also be used to analyze data and do other work. Standard software like Microsoft Office and CorelDraw are installed for this purpose. If for any reason a user needs to have additional software installed check with FIB staff.
Any user data has to be removed from the support computer as soon as possible. This computer can not serve as backup of your data. Data that is older than one month will be deleted by staff without warning.

To access both computers a user account will be created for the time the user has access to the FIBs.

VIII. FIB handling

1. Enter name, start time, sample, PRESSURES (please enter these values before venting) in log sheet

2. Login to computers
3. Ask for assistance from staff when you are not absolutely sure how to proceed. DO NOT try to learn it by doing it. The staff is here to assist you. NEVER try to fix any kind of problem that may occur on your own! If an error message appears on the computer screen call FIB staff.

The following procedure has to be performed
EVERY time
a new sample is mounted into the chamber!
Violation of these guidelines will cause the loss of access to the FIB!

1. Vent system to mount your sample
2. Wear gloves when mounting the sample. DO NOT touch anything inside the vacuum chamber with your bare skin.
3. Keep the chamber open for as short as possible.
4. Before closing the chamber check the maximum height of the sample with scale.

5. CAREFULLY close the chamber. Keep an eye on the LIVE CCD image and avoid any contact of your sample with either of the guns.

6. Pump down the system. Check the pump down time and enter into logsheet.
7. When vacuum is reached (icon is completely green): switch on the beams you really need. (e.g. only for SEM you do not need the Ion-Beam)
8. Reset both beam shifts to zero.
9. Image the sample and focus on the highest feature of the sample.
10. Click "Link Z to FWD"
11. CAREFULLY move sample in Z-direction to get closer to the working distance. When making larger stage moves the link between Z and FWD may be lost, which is indicated by a red ring on the "Link Z-FWD" button. In this case refocus on the highest sample feature and press the button to relink.
    Please notice, that the eucentric height for both systems is different:
    QUANTA 3D: 15 mm
    NOVA 200: 5 mm

The following procedure is only necessary if Ion-beam imaging/milling is performed:

12. Establish eucentricity:
    Bring an easy recognizable feature into the center of the E-beam quadrant. (As a help activate the center cross). While live imaging with the E-beam at a magnification around 1000-5000 tilt the stage by 5-10°. Move the recognizable feature back into the center height of the quadrant only by VERY SLOWLY moving the z-stage. Continue to tilt the stage to 52° and move the sample again to the center height of the quadrant.
13. Move the stage carefully so that a recognizable sample feature appears in the middle of the quadrant. Take an image with the E-beam and pause.
14. Image with the Ion beam and bring the feature into the middle of the quadrant with a beamshift.

Now the sample is in focus of both beams and both images overlap.