NanoEngineering Research Core Facility

Policies and Procedures

NERCF

College of Engineering

University of Nebraska-Lincoln

Version 2.0

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NanoEngineering Research Core Facility

Overview, Mission and Goals

The Nano Engineering Research Core Facility (NERCF) at the College of Engineering at the University of Nebraska-Lincoln (UNL) was completed in Spring 2016. The goal of the NERCF is to create a centralized, shared-user core facility that houses state-of-the-art research instrumentation necessary to position the UNL researchers at the forefront of global research efforts focused on advanced manufacturing of materials, nanostructures and nanodevices.

The NERCF enhances research capacity and quality by providing in-house nanofabrication and nanocharacterization instruments open to use by faculty across the University of Nebraska system. Further, it is the intent of this facility to become a regional hub for nano-engineering. The equipment and operations are funded in part by the Nebraska Research Initiative and the UNL Office of Research and Economic Development. The mission of the NERCF is to advance materials manufacturing efforts within the university and the state of Nebraska.

Collectively, NERCF supports the following primary research capabilities: 1) Nanomanufacturing and characterization of engineered devices, and 2) Characterization of bio-functional materials, including polymers, cells and bacteria etc. One unique aspect of the NERCF is its ability to conduct three-dimensional (3D) characterization of materials or manufactured parts. The 3D evaluation of materials is critical to understand material behavior fully and represents a rapidly growing research area.

For any corrections or questions on this brochure, please contact with NERCF through http://engineering.unl.edu/nercf/.

Joseph Turner
Director/Professor, NERCF

Policy Statement

The specific aims of the NERCF are to: perform and publish world-class research; educate students in the relevant scientific and engineering disciplines; promote interdisciplinary group and single-investigator grants to improve the university's national research competitiveness; and to contribute to the economic development of Nebraska through industrial collaborations. The operation shall be conducted in compliance with University of Nebraska regulations, applicable federal, state, local regulations, and University health and safety requirements and standards. User fees are charged to all users to offset the costs incurred in providing scientific equipment and technical expertise.

Reason for Policy

The NERCF provides its core instruments with consistent operational practices to ensure compliance with applicable federal, state, local regulations, University health and safety requirements and standards.

Who Should Read This Policy

NERCF Staff and Administrators

NERCF Users

Related Documents

- UNL Environmental Policy
  http://ehs.unl.edu/policystatements/EnvironmentalPolicy.pdf

- Board of Regents Safety Policy **http://ehs.unl.edu/documents/safetypolicy.pdf**

- UNL Policy on Distribution of F&A Cost at UNL
  http://research.unl.edu/sp1/policies.shtml

- UNL Conflict of Interest in Research Policy
  http://research.unl.edu/orr/docs/UNL%20Conflict%20of%20Interest%20in%20Research%20Policy.pdf

- University of Nebraska Board of Regents Policies
  http://nebraska.edu/docs/board/RegentPolicies.pdf#page=1

Use of the Core Instruments

The NERCF is open to all qualified researchers at UNL, other universities and at industrial or other laboratories with an expectation of payment for equipment use.

All users are required to take all appropriate safety training from the University Environmental Health and Safety (EHS). All users are required to obtain appropriate training and instruction specific for each instrument from the Instrument Manager. Users must demonstrate sufficient proficiency before and during equipment usage for training to be completed. Most instruments require reservation in advance of use. In the unlikely event that equipment is simultaneously needed by more than one researcher, members of the UNL community receive priority.

In general, the NERCF is open at all times to qualified users. Access to the facility outside standard business hours is limited to trained and experienced users only and access is granted at the discretion of the Facility Manager and Instrument Manager. In the event of a temporary closure, the Facility Manager will provide timely notification whenever possible.

UNL and NERCF policy requires users to acknowledge support from NERCF in publications and presentations. An example of such an acknowledgement is as follows: Manufacturing and characterization analysis were performed at the NanoEngineering Research Core Facility, University of Nebraska-Lincoln, which is partially funded from Nebraska Research Initiative funds."

Commercial Use of NERCF

UNL and NERCF policy supports and encourages the collaboration between universities, industrial and manufacturing sectors. These collaborations should promote a more rapid development of research and the dissemination of knowledge and will contribute to Nebraska's economic development through the development of new products and devices, spin-offs, and tech transfer to companies. The university and NERCF encourages its researchers to forge interdisciplinary partnerships with industry.

The facility must conform to the requirements stated in the relevant policies from UNL:

1. Commercial use of the facility must not interfere with the research mission of the NERCF.
2. Appropriate fees must be charged to recover full costs.

User Fees

- All users shall pay user fees.
- Fees charged to academic users are based on a cost-recovery principle.
- For-profit enterprises must pay the full cost of using facility resources. In addition, the facility may not directly compete with services provided by private companies in a manner that is prohibited by OMB Circular A- 110.
- Facility staff labor charges only cover direct services such as specimen preparation, instrument or equipment set-up, training of new users, and data gathering and analysis.
- Routine maintenance of instruments is not a direct service. Minor consultation on experimental techniques or simple instruction on the use of equipment is also not considered to be a direct service.
- Materials consumed during the normal operation of NERCF instruments are normally included in user fees and not billed separately. In order to keep hourly charge rates low in some cases, users are charged and billed at cost for supplies (e.g., AFM tips).
- On request, estimates can be made by an instrument manager for a project based on prior experience with the understanding that the quotation is subject to inaccuracy. The NERCF will not be held responsible for any unforeseen circumstances that do not permit the work to be completed within the estimated cost or time schedule. All work is subject to equipment availability.
- Current rates shall be posted on the NERCF website.
- User fees in each facility shall be reviewed bi-annually or more frequently if required.

Reserving Time on Facility Equipment

Most of the facility equipment requires a reservation to be made in advance. Users who have completed training will be given a user account for the Facility Online Management server. The Online Instrument Sign-up Calendar website can be reached at: http://fom-nercf.unl.edu

Reservations are scheduled on a first-come first-serve basis. Users are expected to reserve only the time they need and to be respectful of needs of other users. In addition, users are responsible for the time they have reserved and can be charged for unused time if they fail to cancel at least 12 hours in advance of the scheduled time.

The facility manager reserves the right to reschedule or cancel reservations as needed. Appropriate compensation in terms of user time will be granted if warranted.

Environmental Health and Safety

A priority of the NERCF is to maintain a safe working environment. All NERCF staff and users shall conduct operations in compliance with all applicable federal, state, local regulations, and university policies including all University health and safety requirements and standards. All NERCF staff work closely with UNL Environmental Health and Safety (EHS) and users shall obtain and maintain all required EHS safety training. The facility strives to maintain a safe working environment by keeping all the equipment and work places well kept. Users are expected to clean up after themselves. All staff and users shall conduct safety self-audits to identify non-compliance items and take corrective measures.

All NERCF users are required to finish the necessary safety training from EHS before a request is made for specific instrument training.[1]

Required Training for All Users

According to EHS policy, all NERCF users must take the following two training units for basic instrument operations:

(1) **Core - Injury and Illness Prevention Plan (IIPP)**
(2) **Core - Emergency Preparedness Training**

For basic instrument operation, at the conclusion of these two training units, users will receive an email confirmation from EHS. All potential NERCF users are required to forward the confirmation email to the NERCF e-mail address (nercf@unl.edu) in order to verify their training record. In addition, because the NERCF is an open research core facility, all users should be aware that others may be authorized to use specific chemicals. If user encounter any unknown material, it should not be handled by the user and staff should be contacted so that appropriate safety procedures may be followed. Finally, it is recommended that users accessing the facilities outside of normal business hours notify someone (family member or friend) so that their plans are known.

Chemical Safety Training

A NERCF user who plans to use any chemicals should first consult with the Facility Manager in order to understand the basic protocols associated with their usage. If necessary, the follow EHS training modules must be completed:

(3) **Chemical Safety Training**, Unit 1, Unit 2, Unit 3, Unit 4 which address OSHA's training requirement for people who work with or could be exposed to hazardous materials.
(4) **Personal Protective Equipment (PPE)** People working with or near hazardous materials must wear proper clothing and PPE. Proper clothing consists of pants or other garments that reach the ankle, close-toed shoes, and shirts with collar openings no lower than the

[1] Approved by Environmental Health and Safety on August 28, 2018

armpits. Standard PPE consists of lab coats, safety glasses and gloves resistant to the hazardous materials used. Additional PPE such as goggles, safety shields and aprons may be needed. It is the responsibility of the PI to identify appropriate PPE, make it available, train personnel on its use and limitations and ensure facility users wear it. NERCF is not responsible for providing PPE. PPE shall be removed before leaving the facility and users shall wash hands immediately upon removal of PPE.

In addition, a review of the Training Needs Assessment should be made to determine if any additional training is applicable. All of this information can be found at https://ehs.unl.edu/web-based-training. The training provided by Environmental Health and Safety (EHS) is general training. It is not a substitute for training regarding specific chemicals, techniques or procedures. Such training is the responsibility of the PI. The PI is responsible to ensure that facility users are appropriately trained and competent in their assigned duties.

In order to use hazardous chemicals and NERCF fume hoods, all the users are required to finish the chemical safety training and PPE training. Prospective users should forward the EHS confirmation email to nercf@unl.edu before requesting usage of a fume hood.

In addition to required safety training, users are required to obey the following three rules:

1) Chemical Labeling and Waste Management
   All chemical containers must be labeled in accordance with the instruction provided in the EHS SOP, Chemical Container Labeling (6/13). Chemical and radioactive waste management, including labeling of waste containers, must conform to the EHS SOP, Hazardous/Radioactive Material Collection Procedures (4/08). All wastes shall be properly containerized at the end of each workday.
2) General Housekeeping
   Users agree to keep the premises in orderly and neat condition at all times, and to maintain full access to all safety equipment, including showers and eyewash stations, at all times. Spills and leaks shall be promptly cleaned. Counters shall be promptly cleaned of debris, refuse, and contaminants. Sharps shall be properly containerized. Supplies shall be neatly organized and stored. Fume hoods shall be cleared of all extraneous equipment and chemicals during use.
3) Chemical and Biological Material Use
   Use of chemicals or biological materials at NERCF must be documented and approved by NERCF management. Users should complete the Chemical and Biological Material Use Questionnaire at the end of this manual and submit it to NERCF management for approval prior to conducting work in the facility. If appropriate, necessary safety data sheets must also be submitted along with this questionnaire. All documents are stored in an open location that is available to all NERCF users. Please contact the facility manager to find these documents.

If users do not follow the safety rules, corrective measures will be taken. The first violation will result in a warning; the second time, the user will be required to complete refresher training and the supervisor will be notified; the third time, the user will not be allowed to use the NERCF instruments for six months.

Training with Specific Instruments

NERCF provides one-on-one in-depth training on the theory and operation with different levels, range from basic training to advanced techniques to meet individual needs. First of all, users should register a new account through facility online manager (FOM) system. After that, the instrument supervisor will schedule a specific training time with the user. Different instruments require different training sessions, and all the training decisions are made by the instrument supervisor. Any new user is required to finish all training sessions, and must pass a proficiency test which is normally scheduled three days later. For an experienced user, the instrument supervisor may simplify the training sessions. Lack of instrument usage for an extended period (e.g., several months) may require refresher training.

NERCF Management

The overall management of the NERCF is the responsibility of the NERCF Director. The Facility Manager manages the daily operations and reports to the NERCF Director. Also each core instrument has at least one instrument manager appointed by the NERCF Director. Instrument managers are directly supervised by the Facility Manager.

Duties of NERCF Director

1. Supervise the general operations of the NERCF core instruments.
2. Establish suitable policies for the NERCF and to ensure those policies comply with university, state and federal governmental policies.
3. Hire and supervise facility manager.
4. Conduct periodic reviews of facility operations, activities and financial status.
5. Manage the approval of special requests and waivers.

Duties of Facility Manager

1. Manage the day-to-day operation of facility and maintain the core instruments.
2. Train and supervise facility users.
3. Coordinate and provide expert technical input on the acquisition and installation of new instrumentation.
4. Remain current on research that utilizes techniques provided by the facility.
5. Establish safety practices and policies for the facility.

Duties of Faculty Advisory Committee

1. Support the acquisition process of new equipment by collaborating on the preparation and submission of internal and external proposals.
2. Provide technical advice regarding facility operation and resources.
3. Provide expert advice in the annual update of the facility.

After completely fill in the form, please save and send email to NERCF@.unl.edu.

NanoEngineering Research Core Facility (NERCF)
Chemical and Biological Material Use Questionnaire

1. Principle Investigator	
Name:	**Address:**
Office Phone Number:	**Cellphone Number:**
E-mail address:	
2. Contacts	
Primary	**Secondary**
Name:	**Name:**
Phone Number:	**Phone Number:**
Cellphone Number:	**Cellphone Number:**
Email Address:	**E-mail Address:**
3. Names of Personnel Performing the Work	
Name	**UNL ID Number**
4. Has the EHS Training Needs Assessment been completed as well as minimum training for each facility user? Yes No	
5. Please provide an abstract of the research protocol:	
6. Provide a chemical inventory and Safety Data Sheet for each hazardous chemical. Describe how the chemicals will be used. Attach the procedures if needed.	
7. Describe the Personal Protective Equipment and any other administrative or engineering controls that will be implemented.	
8. Biosafety (*Note: Additional biosafety training may be required depending on the nature of the work conducted.)*	
Does any of the work involve biological materials (nucleic acids, microorganisms, cell or tissue culture or any human materials or body fluids, etc.)? Yes No **If 'Yes' and an IBC protocol is in place for the work, please provide the IBC protocol number:** **Otherwise, describe the biological aspect of the work:** **List disinfectants to be used:**	
9. Approved by (Principal Investigator's signature):	**Date:**

Form Instructions

As part of use agreements, NERCF personnel will give this form to the Principal Investigator (PI) for completion and return.

1. This is the name of the Principal Investigator (PI) for whom the research is being done.
2. In some cases, other researchers may guide the day-to-day activities of the research being done. If the PI is the primary or only contact, these spaces can be filled with the initials 'NA' for 'Not Applicable.' Otherwise, include the names and contact information of the primary and secondary contacts. The PI will always be considered a contact.
3. List the names and UNL ID Numbers of the researchers approved by the PI for doing work at NERCF. Attach additional names as needed. NERCF staff will use the information to provide oversight and to confer with EHS on whether required training has been taken. Note to NERCF Personnel: On receipt of the list who will be using the facility, e-mail the information or contact EHS at 2-4925. EHS will check training records and relate what training has been taken.
4. The PI must confirm that the Training Needs Assessment for each person working for them at NERCF has been done and that all personnel have been trained as needed.
5. Provide a description of the nature of the research. The goal here is to provide NERCF personnel and EHS, if need be, an idea of what is being done.
6. List the chemicals to be used. If any of the chemicals are high hazard such as highly toxic, strong corrosives or reactives, also notify NERCF personnel so that they can confer with EHS.
7. Describe the Personal Protective Equipment (PPE) and any other administrative or engineering controls used.
8. If the research is associated with an Institutional Biosafety Committee (IBC) Protocol, list the protocol ID number. It may be necessary to add NERCF spaces to the IBC Protocol and to post additional hazard signage on rooms at NERCF. If the work is not associated with an IBC protocol, briefly describe the nature of the work. Finally, the NERCF houses sensitive equipment and some disinfectants may not be compatible with equipment surfaces. For example, bleach is corrosive to stainless steel. Disinfectants must be listed with other chemicals used in question 6.
9. Researchers working on behalf of a PI might be the ones completing the form. The PI needs to review the form and sign and date that it is accurate.

For questions regarding this form, contact EHS at 2-4925.