

The Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory is a Nanoscale Science Research Center, operated as a National User Facility for the U.S. Department of Energy. The CFN's mission is to support the worldwide nanoscience community by providing leading capabilities and expertise, and to deliver breakthrough nanoscience discoveries through a program of internal research.

CFN staff and users must be able to safely execute their important nanoscience mission. Resuming CFN on-site operations is predicated on establishing and implementing new procedures that control for the new hazard posed by the SARS-COV-2 coronavirus. The CFN staff and users have extensive experience working with materials and processes that present significant hazards, including nanomaterials, chemicals, lasers, and high-voltage. We control these hazards by understanding the dangers they pose, respecting the risks they pose to our safety, and then implementing trustworthy controls to mitigate these hazards so that work can be performed safely.

More importantly, CFN staff and users must understand and trust the rationale for each new procedure we develop. The protocols must be easy enough for staff to internalize and follow — or else they will not be practiced and therefore ineffective.

The CFN will mitigate the SARS-COV-2 workplace hazard similarly to the ways we deal with other significant hazards. We will examine all aspects of CFN work practices, adapting them to control for this new hazard and establishing new, trustworthy protocols where needed. SARS- COV-2 will be a workplace hazard for the foreseeable future, so CFN practices must be sustainable.

The CFN will adapt to this new world by executing the Resume Operations Plan detailed below.

CFN Resume Operations Plan

The CFN Resume Operations Plan consists of multiple elements, to be executed according to the schedule detailed in the last section of this document. Each element of the plan is described in more detail in the sections below:

1. Establishing and implementing new procedures to control for SARS-COV-2;
2. Communicating with staff and users about CFN operational changes;
3. Prioritizing instruments and labs to return to operations;
4. Implementing an organized staff telework schedule to advance user and staff nanoscience and maintain sufficient on-site expertise in all areas;
5. Training CFN users on new procedures;
6. Implementing procedures for controlling the number of CFN users in the facility.

Establishing and implementing new procedures

There is not yet a single control for the SARS-CoV-2 workplace hazard. Until a single control exists (vaccine), the CFN will mitigate this hazard through an array of multiple controls — each individually imperfect, but highly effective when used together. The CFN will establish new procedures for many of lab and other workplace activities. More importantly, we will improve these procedures by practicing them. An important element of this plan is returning staff to the facility to practice these procedures, so that they learn them, improve them and become able to teach them to users. **The five pillars of our control strategy are:**

- Distancing, face coverings, physical barriers
- Cleaning and Hygiene
- Telework
- Self-screening
- Culture

Pillar 1: Distancing, face coverings, physical barriers

Maintaining physical distance and inserting physical barriers between people is important for preventing transmission.

Common Areas

Because the hazard posed by SARS-COV-2 extends beyond the laboratories into the entire workplace, occupants must be mindful of this and other controls from the moment they enter the facility, as well as beforehand.

- Consistent with BNL policy, everyone entering the CFN will wear a cloth face covering where social distancing is difficult to maintain. Face coverings may be brought from home. CFN will make a supply of coverings available for those who need one.
- Everyone inside the CFN will maintain a social distance of at least 6' separation at all times, except when separated by physical barriers (described below).
- The CFN will not allow congregating in hallway interaction areas, lobby, and upstairs atrium. Seating is removed from these areas.
- The occupancy of single-person offices and cubicles will be limited to one person.
- Occupancy of three-person offices will be limited to two people, with the middle desk vacant to provide physical separation. We will arrange work schedules to minimize/eliminate times when both occupants are onsite at the same time. We will evaluate the benefits of installing additional, physical barriers in multi-person offices.
- The protocol for visitors will be to knock on the office door and stand back in order to provide sufficient distance when the occupant answers the door. Floor markings denote the appropriate standing locations.

Office Space

CFN office space is private space. Only the office occupant is permitted to enter their space. Occupancy of single-person offices, multi-person offices, and cubicles is limited to one person. BNL custodians will not enter to clean office spaces. Office occupants may remove face coverings when in their office space, with door either closed or open, provided no other person is within 6 feet.

Working in laboratories

Entering many CFN laboratories already requires wearing PPE and following certain procedures. We will augment these practices with others to control for SARS-COV-2.

- Upon entering any lab, everyone will replace their face covering with a disposable one supplied by the CFN. The reason is that lab work may result in closer contact with others.
- Everyone will wear gloves in addition to other required PPE for work in that lab – regardless of the type of activity.
- The gowning protocol is to put on disposable face covering first, then other lab PPE, and gloves last.
- Laboratory maximum occupancy is determined by the Group Leader that oversees each space and is posted on each lab entrance. Occupancy will be signaled by sight. People waiting for lab entry will queue sufficiently far away to allow safe egress.
- Whenever possible, use of lab instrumentation will be scheduled using the Facility Online Manager (FOM) so that people can plan their work schedules.

Training users and instrument support

Activities, including training people to use instruments, performing laboratory procedures, and providing instrumental support are best performed in-person, with people in close contact for extended periods of time. These practices are an essential part of CFN operations, but also present high-risk activities.

- All training will be peer-to-peer, with no more than two people interacting.
- When conversing during training, people will maintain separations of 6 feet when possible.
- Face coverings will be worn at all times. In addition, use a barrier or shielding between two people.

CFN staff will also explore opportunities for incorporating methods for remote training and/or instrument support, when appropriate. These will be implemented in cases where they are effective but will not substitute for in-person interactions when those are the more appropriate forum.

User Office

The CFN User Office is a high-traffic gathering spot for both users and staff. CFN will implement new procedures to mitigate the hazards of these close interactions.

- When possible, staff and users will interface with the user office remotely. For example, we will transition the COSA training form from paper to scanned pdf.
- Entry to the user office will be limited to a single person at a time, in addition to the two staff members who staff the office.
- A plexiglass barrier will separate the staff member from the visitor.
- A basket where visitors can leave papers will be located inside the office.
- The user office visitor will stand 6' away from the user office desk when conversing,

and approach closer only briefly, if needed. The standing location will be marked on the floor.

- Outside the user office, tape marks at 6' intervals will be marked to guide visitors in the event of a queue. People waiting for user office entry will queue sufficiently far away to allow safe egress.

Seminars and meetings

Research seminars will continue to be conducted remotely. Whenever possible, meetings will also be conducted remotely. Necessary in-person meetings will be conducted in the CFN seminar room, or outside, to allow sufficient space to maintain social distancing. Meeting participants will wear face coverings during in-person meetings.

Kitchens

It is not possible to maintain appropriate social distance in any of the three CFN kitchens. Kitchen seating is removed and no gathering inside is allowed. Kitchen occupancy is limited to one person, with occupancy signaled by either the overhead light or when the occupant is within line of sight. People waiting for kitchen entry will queue sufficiently far from the doorway to allow safe egress.

Bathrooms

It is not possible to maintain appropriate social distance in any of the CFN bathrooms. Bathroom occupancy will be limited to one person, with occupancy signaled by sight. Bathroom doors will be fixed open to eliminate the need for touching. People waiting for bathroom entry will queue sufficiently far from the doorway to allow safe egress.

Elevator

It is not possible to maintain appropriate social distance in the CFN elevator. Elevator occupancy will be limited to one person. People waiting for the elevator entry will queue sufficiently far away to allow safe egress.

Pillar 2: Cleaning and Hygiene

Hand-to-face contact is also a known vector for transmitting SARS-CoV-2 and other respiratory illnesses. In order to mitigate this risk, the CFN will implement new cleaning and hygiene practices.

Hand Hygiene

Washing hands 5 times per day is known to reduce respiratory infections by ~50%.

- CFN staff and users will practice hand hygiene after every community activity involving touching something in a public space.
- Everyone will practice hand hygiene immediately upon exiting a lab, before any other activity.
- Handwashing using soap and water is preferred. Hand sanitizer dispenser are located

throughout the CFN and should be considered supplements to hand washing.

Cleaning

BNL custodial staff will continue cleaning support for the CFN building (restrooms, kitchens, handrails, door handles, light switches, tables). CFN staff and users will perform additional cleaning according to the practices described below:

- People will clean high-touch surfaces in common areas (e.g., copy machine buttons, microwave controls, water coolers) periodically with gloved hands used for touching high-touch surfaces when possible. It is highly recommended to wash hands after using high-touch surfaces.
- In laboratories, people will wipe down high-touch surfaces (e.g., instrument controls) regularly using supplies provided. It is recommended to wear disposable gloves to operate equipment.
- When performing lab work requiring safety glasses or goggles, people will use their own. Shared safety glasses and goggles will be removed from all CFN laboratories.
- When performing lab work requiring face shields that are shared, the protocol is to clean them before and after each use.
- User office staff will clean the plexiglass shield and other high-touch areas using supplies provided.
- Staff members are responsible for all cleaning within their private office spaces, including the interior and exterior doorknobs.
- CFN and BNL will provide cleaning supplies (cleaner, wipes) and PPE (gloves) to all staff members for use in maintaining cleanliness of high-touch surfaces.

Reducing need to touch high-touch surfaces

- Staff and users are encouraged to enter the building by the front door, which has hands-free entry
- When allowable by the fire codes, CFN internal doorways will be fixed open to eliminate need for touching (e.g., bathroom doors, user office door)
- CFN will adopt electronic documents wherever possible to reduce/eliminate the need for passing paper.
- CFN will ensure water fountains, sinks and water coolers in the kitchens are flushed and cleaned for drinking water.

Package receipt and delivery

Packages are delivered to the CFN receiving area twice per day. There is some evidence that SARS-COV-2 can survive for up to 24 hours on cardboard, so CFN will quarantine deliveries for 24 hours after receipt. To minimize crowding in the receiving area, the CFN Operations Group will coordinate deliveries to the labs of the respective owners, contacting them by email or phone. Staff will practice hand hygiene immediately after all handling of packages.

For urgent deliveries or when a 24-hour quarantine is inadvisable, ES&H staff will clean

package surfaces prior to delivery, wearing PPE and practicing hand hygiene immediately after all handling of packages.

Pillar 3: Telework

CFN staff will follow a predetermined telework schedule to reduce building occupancy. The schedule will be structured so that CFN can execute both parts of the user and internal research mission. The telework schedule balances the following considerations:

- Ensure sufficient on-site expertise during each workday.
- Align with overall BNL staffing level targets during each phase of restart.
- Ensure that staff teams working on common projects are onsite at the same time.
- For each staff member, cluster onsite and telework days to minimize alternating ‘day on/day off’ schedules.

The CFN telework schedule can be viewed at the URL below. The schedule is in constant revision to allow for changing conditions.

https://docs.google.com/spreadsheets/d/e/2PACX-1vS4LFMMjF_rWJn5UKRsm1Y-czyimCeVc-B2qfQjeMz46o6e2TBNG_miGlxb8hFSMvfQYT76gm2KXV1L/pubhtml

Pillar 4: Self-screening

Self-screening for symptoms of illness before entering the site is a known way to prevent sick people from coming to work. BNL will require all staff (and users/guests) to attest that they performed a self-screening when entering the front gate.

CFN will rely on everyone performing this daily task, recognizing symptoms, and staying home when sick. Self-screening is a hazard control of equal importance to others, such as wearing a mask. The plan relies on all staff and users diligently practicing this control.

Pillar 5: Culture

CFN must create a culture where all staff, students, users, and visitors are empowered to point out when people are not following these work practices. Everyone must understand and share the responsibility for correcting others, and also feel comfortable being corrected by others.

Practice of this important hazard control must span across job title, age, seniority, social culture, and any other perceived hierarchy. CFN staff must set the tone and lead by example.

Communicating with staff and users

The CFN Resume Operations Plan has resulted from close collaboration and input from all staff members. New safety protocols will similarly be developed together, with feedback on improvements from staff who practice them during the initial phases of the plan (see Schedule).

The User Office and User Points of Contact will be the primary interfaces to CFN users. We will communicate often and clearly with the user community during the early phases of the

Resume Operations Plan, well before resumption of onsite user activities. A revised User Safety Module will reflect new procedures and will be distributed, along with other safety-related training to users prior to their first return to the CFN.

Prioritizing instruments and labs to resume operations

The CFN will prioritize the instruments and laboratories to return to operations, making decisions based on the urgency of the research to be done, and the relative ease of performing the work while mitigating the hazards of SARS-COV-2. The relative urgency will be determined based on the topic (e.g., SARS-COV-2, QIS) and any milestone commitments to BES or other agencies.

The CFN Director will make final determinations of these priorities, using inputs from the group leaders.

Training CFN users on new procedures

It is essential that all users understand and follow all new work procedures. We will carry out intense training for new and returning users and monitor them closely to ensure distancing, PPE, and hygiene procedures are practiced.

- CFN will update its Users Safety Module to explain the new procedures.
- Every user (new and returning) will receive an in-person training on new signage, PPE, lab hygiene, and other practices, during their first visit to the CFN.

Implementing procedures for controlling the number of CFN users in the facility

A key element of the CFN Resume Operations Plan is planning and monitoring facility occupancy, as social distancing is a key control for mitigating SARS-COV-2. We plan to increase facility occupancy as more operations resume (schedule detailed below) but remain below full 'normal' levels for the foreseeable future.

Staff will follow predetermined work schedules (described elsewhere). We will enforce similar schedules with users, although we do not yet have a full process in place for doing so. Some of the elements of our process will include:

- Scheduling instrument and lab usage with Facility Online Manager (FOM), which is already in use on a majority of CFN instrumentation.
- Using online calendars to schedule time working in lab spaces not managed by FOM; group calendars.
- Discussions with users to schedule work shifts.

CFN Resume Operations Schedule

The CFN Resume Operations Plan follows a schedule of 5 Phases, with each phase serving a specific purpose and lasting an appropriate amount of time to accomplish a set of goals.

The Resume Operations Plan objective is to return to the facility to a state in which staff and users can safely carry out the CFN nanoscience mission, in an environment that mitigates the SARS-COV-2 workplace hazard.

The CFN Resume Operations schedule begins on the day that BNL Lab policy allows staff to return onsite.

For purposes of the schedule below, full staff occupancy is defined as ~60 FTE, which is approximately the total number of CFN permanent staff, postdocs, and students.

Phase 1 (Week 1): Assess state of the facility; install new hazard controls; place hygiene/cleaning supplies; conduct mission-critical work

Personnel onsite: CFN essential personnel, staff needed to conduct mission-critical work. Staff working in scheduled shifts according to predefined telework schedules (see above). est. <10% of full staff occupancy at all times (~6 people or fewer).

Goals:

- Ensure adequate supplies.
- Ensure facility is clean.
- Deploy new physical controls (physical barriers, floor markings, etc.).
- Stage hygiene/cleaning supplies in strategic areas.
- Assess the state of scientific instrumentation and any needs for vendor service.
- Conduct mission-critical work.

Duration: 2 weeks

Phase 2 (Week 3): Establish new work procedures; practice new procedures; continue instrument restart

Personnel onsite: Personnel from Step 1, plus CFN permanent staff. Staff working in scheduled shifts according to predefined telework schedules (see above). est. <35% full staff occupancy at all times (~20 people or fewer).

Goals:

- Establish new work procedures that were developed in advance (e.g., described in this plan).
- Practice work, PPE, and hygiene procedures and adjust them as needed.
- Identify additional activities where improved practices are needed to control hazards; develop appropriate practices.
- Restart priority instruments.

Duration: 1 week

Phase 3 (Weeks 4): Practice new procedures; train postdocs and students on new procedures; restart CFN internal research

Personnel onsite: Personnel from Step 1 and 2, plus CFN postdocs, graduate students, and 'permanent users' — i.e., a group of ~6 users who are permanently based in CFN. Staff working in scheduled shifts according to predefined telework schedules (see above). est. <45% full staff occupancy at all times (~27 people or fewer).

Goals:

- Continue practicing work, PPE, and hygiene procedures and adjust them as needed.
- Teach new procedures to postdocs, students, permanent users and monitor their practice.
- Continue identifying additional activities where improved practices are needed to control hazards; develop appropriate practices.
- Re-start priority internal CFN research, especially SARS-COV-2 activities and other strategic work.
- Develop and implement processes for controlling the number of users in the facility at all times.

Duration: 2 weeks

Phase 4 (Week 6): Restart CFN user program

Personnel onsite: Personnel from Steps 1, 2, and 3, plus external CFN users (max ~10). Staff and users working in scheduled shifts according to predefined telework schedules (see above). Est. <50% full staff occupancy at all times (~30 people or fewer).

Goals:

- Continue practicing work, PPE, and hygiene procedures and adjust them as needed.
- Teach new procedures to users and monitor their practice.
- Continue priority internal CFN research.
- Bring additional CFN capabilities into operations.
- Support external user nanoscience.

Duration: 4 weeks

Phase 5 (week 10): Conditions permitting, expand CFN user program

Personnel onsite: Personnel from Steps 1, 2, 3, 4 plus additional external CFN users (max ~15). Staff and users working in scheduled shifts according to predefined telework schedules (see above). Est. <75% full staff occupancy at all times (~45 people or fewer).

Goals:

- Continue practicing work, PPE, and hygiene procedures and adjust them as needed.
- Teach new procedures to users and monitor their practice.
- Continue priority internal CFN research.
- Bring additional CFN capabilities into operations.
- Expand support for external user nanoscience.

Duration: 8 weeks

List of additional BNL support needed

- Ideally, BNL will provide a lab-wide supply needed PPE, hygiene, and cleaning supplies, from which the CFN can purchase. The CFN prefers to purchase face coverings from an internal BNL supply, rather than externally procuring these on our own. Needed items are:
 - Cloth face coverings

- Facemasks (disposable)
- Cleaning/disinfecting supplies
- Wipes
- Disposable gloves (for cleaning, not for lab PPE)
- BNL support needed for removing seating from interaction areas, lobby, and atrium, and moving to safe storage inside CFN.
- BNL support needed for removing kitchen tables and chairs and moving to safe storage inside CFN.
- BNL ES&H support needed for cleaning packages requiring expedited delivery.
- Additional BNL custodial support needed for cleaning of high-touch surfaces, especially stairway handrails, doorknobs and bathroom fixtures.