

Facility Name: Integrated Sciences Cleanroom

Facility Location: Kenny-Cottle Library, 3rd Floor

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Facility Overview: The BC Integrated Sciences Cleanroom (BCISC) is a user facility that supports a wide range of micro- & nanotechnology by providing a contamination free environment that contains 30+ state-of-the-art systems & equipment. Research at the BCISC encompasses predominantly the biology, chemistry, & physics departments. Work within the BCISC is conducted by BC faculty, undergraduate students, graduate students, post-doctoral researchers, research assistants, & visiting professors, as well as approved users from external academia & industry. Research usually has a strong interdisciplinary emphasis and has made significant gains in such fields as solar energy, biochemical & neuro-sensors, high efficient batteries, water splitting, & microfluidics.

Ramp-Up Plan:

Part 1: Physical Space Considerations

- a. Plans regarding space, capacity, throughput, access, or sample drop-off, including potential for temporary physical barriers or other changes: New rules & protocols will be in place, clearly posted, & sent to Cleanroom (CR) users. All CR use will need to be reserved by Internal & External users, when visitors are allowed back on campus, with the permission of CR staff. CR use will be limited to 5 users at a time, with no more than 2 users per room at a time in the Deposition/Etch room and Photolithography room- maintaining a social distance of 6 ft. There will be only one user allowed in the SEM/FIB room at a time. The BC CR has a complete air turn-over of 75X per hour. For 1,500 sq ft of CR space this should be ample air flow for the maximum of 5 users + 1 staff member.

In addition to the basic CR hoods, suits, & boots- masks, gloves, & eye protection/goggles (provided) must be worn at all times. Only one user will be allowed in the gowning room at a time. After use, garments & safety glasses (provided) for each user will be stored in individual plastic bags (provided). Garments will be sent out for laundry cleaning every other week. Masks currently available for CR use are the Kimberly-Clark KIMTECH BICOSOF Fabric- M3 type. CR users will have the option of supplying & wearing their own supplied masks. If EH&S determines that the BICOSOF Fabric M3 masks are not suitable for CR use, proper masks following EH&S guidelines will need to be procured.

- b. Potential movement of furniture or instruments: To help maintain distancing within the CR- half the number of chairs will be removed. Due to existing facilities connections- N2, CDA, Gases, Vacuum, & Electricity- equipment cannot be moved.
- c. Initial cleaning plan: Prior to shutdown CR floors, walls, & surfaces (tabletop & equipment) were vacuumed & wiped down with 70% isopropyl alcohol (IPA)/water. No one, except for the Director, has entered the CR since that time. Staff will wipe down surfaces again, clean floors & walls again, & continue daily cleaning when the CR is in use. Daily cleaning will be at the end of the workday, after users have left for the day.

Part 2: Instrument Considerations

- a. Plan for instrument re-start: Initially, 2-3 days will be needed to re-start the CR. Turn on N2, gases, & CDA to equipment. Check valves & pressures. Readjust as needed. Re-start hoods, check exhaust pumps (roof), & hood differential pressures & air flows. Check DI water flow &

purity (Water Mohm meter). Check CR particle levels throughout CR (particle counter). Return equipment manuals & SOPs to the ISC.

Prioritize 30+ systems for re-start (ie. AJA Sputter, Sharon E-Beam, JEOL SEM, CN ALD, Suss Mask Aligner, Profilometer, Microwave Etch, Woollam Ellipsometer, Disco Dicing Saw, XeF2 Etch, PlasmaTherm ICP RIE, PlasmaTherm PECVD....). Begin re-starting systems one at a time. Some systems will require the purchase/receipt of components for repairs before re-start (ie. Arradiance ALD- valve actuators & cooling fans, JEOL FIB- 2 UPSs).

- b. Plan for calibration and quality control: As each system is successfully re-started, test runs will begin. Results will be checked & cross-checked to make sure each systems returns to proper operation. For example, deposition systems will be tested for resulting deposition rates, thickness, uniformity, & dielectric constant through the profilometer, ellipsometer, reflectometer, optical microscope, SEM, etc. Equipment re-calibrations will be done when deemed necessary.

It will take an approximate 4-6 weeks for all systems to be back in operation & calibrated (unless repairs are necessary and/or vendor service calls are required).

- c. Plan for cleaning surfaces and instruments: Staff will perform daily cleaning of surfaces & equipment periodically and at the end of the work day (on days when the CR has been in use). Until cleaning materials are obtained through Boston College staff will use 70% IPA to clean floors, walls, surfaces, & equipment.

- d. Consumables, reagents, and supply needs: There is a need for cleaning/disinfectant supplies for the floors, walls, surfaces, & equipment. Initially CR staff can use in-house 70% IPA & IPA saturated wipes for all cleaning. There is probably a 3 month supply of cleaning chemicals now on hand.

There is probably a 5-6 month supply of masks & gloves on-hand. Will need to obtain order masks & gloves after reopening.

Part 3: Initial Operations

- a. Plan for facility staff operation of instruments: For faculty who require CR & equipment use, but currently do not have graduate students/assistance available, CR staff will operate equipment & process samples to help maintain continued faculty research.
- b. Plan for user sample drop-off, including any new SOPs: There will be a labeled box outside of K-C 306 for sample & instructions drop-off. There will be new CR use protocol, gowning, & garment storage SOPs posted. Verbal CR use instructions will also be communicated to all users returning to the CR.
- c. Plan for user operation of instruments: Users previously trained on equipment use will be able to continue with equipment use. Initial use after the reopening will need to take place with staff in the area in case questions or problems arise. For the near term- hazardous chemical use (requiring additional protective face shields, protective aprons, protective sleeves, & heavy gloves) will be done by CR staff- with the CR user present. After additional protective gear & cleaning/disinfecting materials are obtained CR users will be allowed to do their own hazardous chemical use- with an observer present (as usual).
- d. Plan for new user training: In the initial phase there will be no new user training, but eventually users will be trained by staff on needed equipment, & new users can be trained in cleanroom & equipment use.
- e. BC personnel considered by staff to be expert users may use the CR after-hours, on weekends, & generally when staff is not present- under certain conditions. CR & equipment use must be pre-approved by staff, the users may only use equipment/processes in which they are completely adept, & when involved with hazardous processes (ie. etching) expert users must have an

observer accompany them. Upon completing CR use for the day- expert users must clean & sanitize all areas & equipment utilized by them. After completing their CR use for the day, expert users must notify CR staff that they have left the CR & list any problems or issues they may have encountered. Before after-hours use commences, expert users will need to review the new CR rules & regulations with in-person with staff.

Any other concerns or considerations: Social distancing & masks are required at all times- not just in the CR- but also in the Kenny-Cottle common areas.