



**Facility manager:**

Emma Bullock: 202 478 8986

Suzy Vitale: 202 478 8918

**Secondary Contacts:**

**Emergency Information:**

Emma Bullock: 202 361 5649 (cell)

Suzy Vitale:

Gary Bors: 202-510-8577

All other emergencies: 911

**Purpose:**

The scanning electron microscope is used to perform high resolution imaging and determine elemental compositions of solid materials at the microscale using the interaction of a finely focused electron beam with the solid surface of target materials.

*All laboratories and facilities on the Broad Branch Rd. campus are controlled areas. Specific training must be completed and documented before working in this laboratory / facility.*

**Laboratory-specific information:**

- Chemicals: No chemicals are in the lab except a small quantity of ethyl alcohol for cleaning. Ethyl alcohol is flammable and will burn in the event of a fire. An MSDS for ethyl alcohol may be found at <http://www.sciencelab.com/msds.php?msdsId=9923955>.
- Radiation: Upon striking the surface of target materials, an electron beam excites electrons of target atoms and when these electrons de-excite, characteristic X-rays are generated and detected. Users are shielded from the X-rays by the electron microscope housing, which reduces user radiation exposure potential to near background levels. Radiation exposure measurements of SEM's manufactured since the 1970s have shown that they are well designed, safety interlocked and shielded, and the data assure the radiation safety of individuals near the instruments. If the shielding is removed or damaged the instrument would no longer have vacuum integrity and the electron beam could not be turned on. No personal radiation dosimeter is necessary for SEM.
- High Voltage: Although the instruments are operated at high voltages (1 to 30 keV), the cabling is well insulated and the instrument well-grounded and protected. There are no unusual electrical hazards. However, as with any piece of electronics, care need to be taken to not trip over electrical cables or spill liquids into the electronics. Beverages may not be brought into the laboratory. Chilled water lines are connected to the high vacuum pump and high voltage electronics of the instrument. Were they to rupture, they could cause danger of major instrument shorting and possible fire. If any signs of major water rupture, shorting or fire are observed during operation of these instruments, the user should immediately contact the facility manager and building maintenance personnel.
- No one, unless specifically authorized to do so by the facility manager or electronics engineer, is to go behind the SEM or touch any of its electronics or vacuum systems.
- Gas Cylinders: Cylinders of nitrogen gas are contained in the laboratories in A-G26. These are non-flammable and non-toxic. However, the tanks are under high pressure and can explode if subject to severe shock. The tanks and their regulators normally need no adjustment and should not be handled or moved by anyone except the facility manager or



another person trained in the safe handling of gas cylinders. The tanks are attached to mountings on the walls by means of straps, to remove the risk of them tipping over.

- Sharps: Scalpels and razor blades are stored in the sample preparation area of A-G26 to aid in cutting and mounting samples for analysis. Care should be taken when handling sharp cutting implements to avoid injury. A sharps disposal container is located within the samples preparation area of A-G26.
- After Hours Restrictions: Only users fully checked-out on the instrumentation and its safe operation, and appropriately authorized by the facility manager, may operate the electron microprobe after hours or at weekends.
- Training: Individuals may only be trained in the use of the scanning electron microscope by the facilities managers.
- Fire extinguisher: A fire extinguisher is located next to the entrance/exit door in A-G26.

Laboratory User

*I agree that I have thoroughly read and understood this laboratory safety document. I have access to this safety information at all times when I am working. I have been trained to be able to identify the hazards to which I may be exposed and to follow the work practices and procedures discussed in this document. I certify that I will conduct my research work safely and that I will be responsible for following stated safety policies.*

\_\_\_\_\_  
User Name (Print)

\_\_\_\_\_  
User Signature

\_\_\_\_\_  
Date

Principal Investigator

*I certify that the information presented in this safety document is accurate and complete. I agree to comply with all safety procedures and to fully train and supervise all researchers under my direction.*

\_\_\_\_\_  
PI Signature

\_\_\_\_\_  
Date