SEM Instructions:

Using the SEM:

1. Remember to **always use gloves when working with the chamber**.
2. Turn on the computer by opening the front panel and briefly turning on the momentary switch.
3. When prompted enter the password: **semedx**
4. Open **Perception** on the desktop.
5. Click **Connect**.
6. The chamber should be under vacuum. To vent the chamber, lift the black handle. After 2-3 minutes, the chamber should drop.
7. When the chamber drops, gently open the chamber and load the stub by placing it in the appropriate hole on the chuck. If you only have one stub, place it in the center hole of the chuck. The chuck can be removed if necessary by unscrewing the screw on the right-hand side.
8. Close the chamber all the way. Lower the handle to pressurize.
9. On the left-hand monitor, find the **Interlock** status. It will read: **Not Ready**. The power cannot be turned on until the chamber is pressurized. When this happens the Interlock status will be **Ready**. This should take 2-3 minutes.
10. When the **Interlock** status is **Ready,** click 

on the top right.
11. Set the **Beam Energy** to **15 kV**. To change the beam energy click on the purple circular knob corresponding to beam energy. Holding the right mouse button increases the beam energy. Holding the left mouse button decreases the beam energy. Holding the middle mouse button simultaneously with either button changes the beam energy at a faster rate. All purple knobs can be controlled in this manner.
12. Set the **Filament Drive** to **60-70%**. The **Emission Current** should be around **20-40 µA**.
13. There are three ways to move the stage:
    a. Controlling the stage with the joystick
    b. Double clicking in the appropriate region in the white box on the left-hand monitor.
    c. To center the image on the right-hand monitor on a specific spot, hold control and click with the left mouse button on the desired point on the image.
14. To focus, first increase **Magnification** to **5000-1000X** on a sharp edge.
15. Click  on the right-hand monitor to bring up a reduced view for focusing.
16. To adjust the focus, click in the **Focus** box on the left-hand monitor and drag to the right and left.
17. Adjust the stigma in the x and y directions by using the mouse to click in the **Stigmator** box and drag left, right, up and down.
18. Adjust the **Spot** slide-bar until it is within the blue margins.
19. Click **Degauss**. Now you will need to refocus the image.
20. Degauss the image again and refocus. Repeat this process several times. Each time you click degauss you should need to refocus the image less and less.
21. Adjust the **Contrast** and **Brightness** as you see fit.

Saving the Image:

1. Lower the scan speed. The lower the speed, the better the image quality.
2. Click  to save the image to the disk. **NOTE:** Saving will **NOT** save the scale bar. The only way to save that data is by using the print screen feature.

Shutting Down the SEM:

1. Click 

to turn off the power to the filament.
2. Lift the black handle to vent the chamber.
3. After 2-3 minutes, the chamber will drop. Open the chamber and remove the sample.
4. Close the chamber when done.
5. Lower the black handle to pressurize the chamber.
6. Wait 2-3 minutes until the **Interlock** status is **Ready** to verify that the chamber is under vacuum.
7. Exit the console at the top right ().
8. Shut down the computer.

Shutting Down the Pump:

1. After shutting down the computer, vent the chamber (lift the black handle).
    a. This is important – the SEM should not be under vacuum when you shut it down otherwise oil will be sucked out of the pump.
2. Once the chamber drops (after 2-3 minutes), the handle will raise.
3. Shut down the pump (power button on front of the SEM).
4. Close the chamber (lower the handle) so it is not exposed to the air.