

## COPIS Protocol: Imaging a specimen with a single camera

- A. Turn on the machine and prepare for imaging
  1. Turn the machine on with the red switch
  2. Turn on the USB hub that connects the machine and cameras to the control computer
  3. Turn on all of the panel lights around the machine
  4. Remove a side panel or curtain on one side of the machine so that you can access the interior of the staging chamber
  5. Turn on the camera that will do the imaging and take off its lens cap
  6. Open the COPIS application on the desktop
  7. Connect the machine to the computer
    - a. In the [Port] dropdown button at the top of the window select “COM5”
      - i. If COM5 doesn’t show up as a dropdown option, make sure the top USB slot is turned on at the top of the USB bar
    - b. Click the [Connect] button at the top of the window, then wait until the status in the Console at the bottom of the window says “idle”
  8. Home the machine (only necessary once a day, or if the camera chassis is accidentally bumped or manually moved around in between imaging runs)
    - a. Check that the cameras are facing forward, and if not, manually adjust the chassis.
    - b. Check that no specimens are directly underneath any cameras, or preferably, that the staging chamber is completely empty
    - c. Click the [Home] button at the top of the window
    - d. Wait until the status in the parameters box to the right says “Is homed: True”
- B. Image a specimen with autofocus using a Canon camera
  1. Load in the imaging path: File → Open Project
  2. Place a specimen (optional: on foam mount, with scalebar targets, with color correction card) in the center of the staging chamber
  3. Open the EOS utility application on the desktop
  4. Click [Remote shooting] in the EOS utility application
  5. Click [Live view shoot] in the EOS utility application to open a new window that shows the current view through the camera’s viewfinder
  6. In the COPIS application double click the top-most pose of the path, which should be facing down in the exact center of the staging chamber
  7. In the “Timeline” dialog at the bottom of the window, the top-most pose should be highlighted. Click [Play]. The camera will now move into position
  8. Manually adjust the specimen so that it is in the center of the frame in the “Live view shoot” window
  9. Check another pose, preferably one where the camera is perpendicularly facing the side of the specimen
    - a. Double click the pose
    - b. Click [Play]. The camera will move into position
    - c. Manually adjust the specimen so that it is in the center of the frame in the “Live view shoot” window
  10. Click [Ready]. The camera will now return to its homed position

11. Replace the side panel or curtain that you initially removed, as you are now ready to start the imaging path
12. At the top of the window click [Start Imaging] and then click [///> Play All]. The imaging path will now start

C. Imaging again after the path has completed

1. Transfer the images into the desired folder on the computer
2. Click the [Ready] button once the specimen imaging process has finished to reset the camera at its homed position
3. Replace the specimen being imaged with the next one, or rotate the specimen if imaging again from a different orientation
4. You may now repeat steps B6 through B12

D. Turn off COPIS at the end of the day

1. Click [Ready] to return the camera to its homed position so that it can be more quickly homed the next day
2. Click [Disconnect]
3. Close out of the COPIS application
4. Turn off the USB hub
5. Turn off all of the panel lights around the machine
6. Turn off the camera, and put the lens cap back on
7. Close the curtain or replace the side panel
8. Turn the machine off with the red switch