

Edge 3D Microscope

Powering on the system:

In order to use the edge 3D microscope, you must be trained by one of the CSIF staff. If you are the first session of the day, you will need to power on the entire system as follows:

1. Mercury arc lamp - flip the red toggle switch up on the lamp power supply located on the left side of the microscope. Then move the trigger to manual to spark the lamp.
2. Turn on the power for the control box - flip the white switch to on.
3. Turn on the control box - located on the right side of the microscope, turn the dial on top of the box to turn on the transmitted light and the z-axis focus control motor.

To turn off equipment

Follow the above instructions backwards (step 3 to step 1).

Make sure that the equipment is turned off at the end of your session if no-one is around or it is after hours. The mercury arc lamp lifetime is only 200 hours and can break the mirrors in the housing if it is left on too long.

Viewing specimen through eyepieces:

Each eyepiece has a polarizing filter which provides optimal left/right extinction for 3D viewing. Therefore you must use both eyepieces when viewing your specimen. Be sure to adjust the interocular distance to allow for maximum comfort.

Lenses on the Edge microscope

air objectives:

- 10x, 0.45 NA
- 20x, 0.75 NA
- 40x, 0.70 NA

Focusing

1. There are coarse and fine focus knobs on both the right and left sides of the microscope base. These knobs are linked by a common shaft and therefore move in unison. Do not turn one knob in the opposite direction of the other.
2. The right hand coarse focus knob operates a variable speed motor, which moves the stage at a rate that increases the farther the knob is turned. The stage's travel range during motorized operation has upper and lower limits which stop the motor from continuing past that point. Do not continue to manually focus past the cut-off point or you may damage the switch mechanism.
3. The distance moved along the z-axis can be measured using the dial on the left focus knob. Each full knob rotation moves the stage 20 microns, with each mark on the dial corresponding to a 0.1 micron stage movement.

Fluorescent illumination

1. Turn off the transmitted light source, or if you wish to use the motorized focus, turn the four individual light controls to zero.
2. Move the slider out of its blocking position to allow the light from the mercury arc lamp to reach your specimen. Pull the slider to the right to allow 100% of the light to reach your specimen. Push the slider to the left for a neutral density filter.
3. There are two additional neutral density filters in back of the slider (ND2 and ND4).
4. Filters - the microscope is equipped with filters for FITC and rhodamine. They are located in the slider below the eyepieces. FITC is on the left, rhodamine is in the middle, and the one on the right is empty.

Bightfield illumination

1. Move the slider back to the middle position to block the light from the mercury arc lamp.
2. Turn on the control box using the dial on its top, which controls the master brightness for all four lamps. This must be set to ten to allow the individual lamps to reach their maximum intensity.
3. It is recommended that you experiment with many different settings for each individual lamp. This will allow you to find the highest

contrast and depth of field for your specimen.

4. Mirror control - The knob at the front center of the microscope adjusts the height of the pyramidal mirror inside the base, which creates viewing conditions ranging from brightfield to near-darkfield. The numbers on the knob represent the relative height of the mirror, with the triangle being the default.
5. 3D viewing or photographing 3D pairs - it is important to keep the right and left lamps at equal settings. In order to increase contrast and depth of field, it may be necessary to turn down the two bottom lamps while keeping the other two on full (or vice versa).
6. Single picture 3D anaglyphs - left and right lamps may be set at slightly different levels to balance the colored elements of the image.
7. 2D viewing - image quality can be improved by turning off one or more of the four lamps.
8. Filter selectors:

PHOTO

- L Extinguishes the right-side lamps for taking the left picture of a 3D pair.
- ALL All four lamps on for observation or for taking 2D photos or single picture 3D anaglyphs.
- R Extinguishes the left-side lamps for taking the right picture of a 3D pair.

ANAGLYPH 3D

- IN Inserts magenta filters into the left light channel and green filters into the right light channel for taking single-picture 3D anaglyphs, or for employing the anaglyph 3D viewing method.
- OUT Select for normal 3D viewing, 2D viewing, and 3D-pair-photography.
- TV Similar to IN setting, except uses red instead of magenta for 3D video

DENSITY

- 1 Inserts the lighter of 2 neutral density filters.
- OUT No filter inserted.
- 2 Inserts the darker of 2 neutral density filters.

FILTERS

- G Inserts a green filter for use in B & W photography.
- OUT No filter inserted. Select when photographing with tungsten-balanced film.
- B Inserts a blue correction filter for photographing with color daylight film; can also be used to improve color balance during observation.

Please see the laminated card for a visual reference of the settings.

Photographs

When the command value is set to “L” it turns off and locks the camera. To release the lock, hold down the lock release button and turn the Command Dial to the desired setting.

Each user will be responsible for bringing film for his/her 3D or 2D pictures. To load film, slide down the camera back latch (on the left side of the camera) to open the camera back. Then align the edge of the film leader with the orange mark on the camera and close the camera back until it snaps shut. The film will then advance to frame one automatically. Make sure that the frame counter display shows one. If not, the film needs to be reloaded.

After the last frame is exposed, the camera will automatically rewind the film. When the film is completely rewound, the film cartridge symbol in the lower left of the LCD panel will blink. If it is blinking, open the camera back and remove the film cartridge. To rewind the film before reaching the last frame, press the film rewind button on the back of the camera (it has two underlined arrows next to a circle with a dot in the middle).

Film rewind is normally set to the silent mode. Pressing the film rewind button will switch to high-speed rewind mode.

There is a black lever immediately below the eyepieces which must be adjusted depending on whether you are using dual cameras or just a single camera. Slide the lever so it is pointing toward you for the dual setup, or to the left for use of the single camera. In addition, there is a silver

plunger which should be pulled up for the dual camera setting, or pushed down for use with one camera.

When taking right and left dual pictures, the amount of light will be decreased by half. Therefore, make sure to set the exposure time to twice what it was before.

Be very careful when mounting the camera. For mounting at either of the two upper ports, hold the camera upside down and rotate a quarter turn clockwise until the red dot on the camera lines up with the red dot on the camera port. To mount the camera at the lower port, align the red dots so that the camera is right side up. Make sure that the cap is on the port without a camera. To remove the camera, depress the button on the left side of the lens and rotate it in the opposite direction.

The shutter speed is displayed with values representing the denominator of a fraction of a second, e.g. 4000 = (1/4000) second. If the display shows this symbol ["], that value represents the actual number of seconds, e.g. 1"5 is equal to 1.5 seconds. The shutter speed can be seen at the top left of the LCD panel. Turn the main dial to the right to increase shutter speed and to the left to decrease it.

The two zeros directly to the right of the shutter speed display represent the aperture. Since there is no lens attached directly to the camera, this value will always read 00.

It is recommended that you use the Manual (M) mode or the Aperture Priority AE (Av) mode. The manual setting allows you to set the desired shutter speed while the Av mode will set this value automatically.

You can change the amount of exposure by +/- 2 stops in half steps. First set the quick dial control switch to 1. Then turn the dial while looking at the display at the bottom of the LCD display panel. The plus side of the scale indicates overexposure and the minus side indicates underexposure.

Alternatively, you may use autoexposure bracketing where the camera automatically changes the exposure level within the set range for three successive frames. Select AEB by pressing the function button on the back of the camera until AEB appears in the LCD panel. Then turn the main dial until the desired bracketing amount is set. The three bracketed shots are

exposed in the order of correct exposure, underexposure, and overexposure.

When you are finished, please be sure to turn the cameras off (turn the command dial back to “L” and put the eyepiece covers back on the eyepieces.