Care and Cleaning of your Microscope

- When not in use, keep the microscope protected with a plastic cover.
- Accumulated dust in a microscope can deteriorate image quality. Keep all openings covered with dust caps so that dust does not enter the microscope and settle on inaccessible lenses, mirrors, and prisms.
- Use an air blower to blow dust off of the scope's stage, base, and body. If necessary wipe it down with a damp cloth, and clean off any immersion oil or glycerol smears with ethanol or Windex.
- Carefully clean the objectives (see detailed description below).
- Remove and clean any dust or immersion oil off of the condenser and turret (see your microscope's manual for instructions on removal). Inspect each DIC prism, if any, for dust or smears. Clean gently with a blower and/or dry Kimwipe. Do not remove the phase rings unless it's necessary, as they usually need re-centering if removed.
- Remove the condenser top lens and clean it with lens paper and ethanol, if necessary.
- Remove both eyepieces and clean their surfaces with a Kimwipe and Windex. Blow any dust or dirt out of the insides with an air blower.
- Other optical components to remove and clean with a blower or dry lens paper (being careful not to touch the optic surfaces with your fingertips):
  - Polarizer
  - Neutral Density (ND) filters
  - DIC analyzer
  - Fluorescence filter cubes (outside surfaces of EX and EM filters only, do not attempt to clean the dichroic mirror)

Be careful when using air blowers, as they sometimes emit fluid when the air can is not used in an upright position. This fluid can leave difficult-to-remove spots on your optics.

Objective Care

- Remove/install objectives using both hands. Loosely cup with one hand and twist the barrel with the other, being very careful not to touch the front lens with your fingers. Take extreme caution not to drop the objective!
- Never apply strong physical force to an objective. To move another objective into position, move the rotating turret; do not grab the objective and pull on it.
- Some inverted microscope designs make it easy to accidentally strike the objective on the edges of the stage. Avoid this by focusing the objective away from the stage before rotating the nosepiece.
- If the condition of a lens is questionable, view a slide of latex beads that are below the resolution limit of the microscope and check for abnormalities. You can also do a

point-spread function to measure the resolution. Dirty and/or damaged objectives will limit a microscope's resolution.

- To remove a stuck objective, never use vice-grips or a pipe wrench, which can severely damage the optics. Attempt to loosen the threads by applying a few drops of water to dissolve salts, or an oil-dissolving agent if immersion oil is the culprit.
- Even with a state-of-the-art microscope and expensive digital camera, if you try to image using an objective lens that is anything but spotlessly cleaned your images will be less than ideal.

Objective Cleaning

- After an oil objective is used, the excess oil should immediately be wiped away with lens tissue (NOT a Kimwipe or Kleenex!). Not only does this excess oil attract dust, but it can drop down onto the stage or condenser top lens (on an upright scope) or, more insidiously if using an inverted scope, can seep into the barrel of the lens, causing the lens to stick and/or permanently damaging it.
- Take extreme care to never get immersion oil on an air-immersion objective (this often happens inadvertently when users rotate a 'dry' objective across their oil-coated slide). Since these lenses are not designed to be immersed in anything, the oil and cleaning agents can seriously damage them (not to mention degrade your images if there are oil smears on the lens).
- An occasional thorough cleaning of immersion objectives is necessary, but try to avoid doing this more often than once per week, as cleaning agents can erode an objective's anti-reflection coating over time.
- To clean, remove the objective from the turret. Fold a piece of lens tissue into fourths, and add a few drops of straight ethanol. Gently wipe the lens in a circular motion (only letting the tissue, not your fingers, come into contact with the lens element). Always immediately wipe off any excess EtOH with a dry piece of tissue – allowing ethanol to remain on the lens could be detrimental for the anti-reflection coating.
- Examine the lens carefully by removing the microscope's eyepiece, looking through it backwards, and holding it up to the edge of the objective, to see a magnified image of the lens. Angle the objective so that the room light is brightly illuminating the lens surface; it should appear spotlessly clean. If not, repeat the above procedure. This is also a good way to examine a lens closely for scratches or other imperfections.
- For some oil-immersion lenses in which the lens element is recessed and not flush with the metal part of the objective (for example, Nikon 100x lenses), cleaning can be more difficult since the outside ring of the lens can trap oil. It is difficult, if not impossible, to get into the corner edge with just lens paper. You can try wetting a folded piece of lens paper with ethanol and placing it between a cotton swab and the lens surface, or it might even be necessary to use only a cotton swab directly on the lens surface. Do this only if necessary, and use cotton swabs without adhesive.
- Another useful solvent is Sparkle, a household cleaner that (unlike Windex) does not contain harmful ammonia. Alternate between this and ethanol on lenses with stubborn smears.