

PHOTOGRAPHY

We buy all of our photography supplies from: **National Graphic Supply**

226 North Allen St.
Albany, NY 12206
George Liang
800-223-7130

(even with shipping, which NGS keeps minimal, it is still much cheaper than getting things from local photography supply companies)

TO MAKE NEGATIVES:
SUPPLIES:

- Using the Electron Microscope lab's camera--35 mm Cannon AE-1
- Tech pan 2145 film (Kodak #1299916); 150 ft. roll (\$45.00)
- tripod (we have one) or copystand apparatus (EM facility)
- lightbox (if photographing autorads)

LIGHTING:

TO SHOOT NEGATIVES OF:	TRIPOD	COPY STAND APPARATUS
AUTORADS	-lightbox -no other light Other than overhead) necessary	-lightbox -4 150W flood lights -use 2 high intensity bulbs -turn off overhead lights
PRINTS/FIGURES/GELS	-overhead light only	-use 4 150W flood lights -use 2 high-intensity bulbs -turn off overhead lights

FOCUS:

For autorads: Tape flat against the surface of the lightbox

For figures/prints: Place clean glass plate on top print or tape edges down flat

If image is hard to focus (ie. dot blots), tape a piece of paper with lines/letters flat against the autorad and focus on that.

CAMERA SETTINGS:

ASA setting (to determine the meter):

Tech pan 2145 film: 50

Shutter speed:

Variable. Generally I use the 30-60 range (for 1/30 or 1/60 second exposure)

F-Stop:

Determined by camera (once the image is focused and all the other parameters set (the ASA, lighting, and shutter speed). Push the shutter release half-way and look through the camera lens for the F-stop reading along the left-hand side of the viewing box. Use this F-stop. It is a good rule of thumb to take 2 *over-exposures* of the same print/autorad. For example, if the F-stop reading is 11, take one at 8 and 5.6 also. I typically use the "middle" exposure when making prints.

SLIDES:

-Use the copystand apparatus in the Electron Microscope lab (5th floor of Hogan)

-Using the EM facility's 35 mm camera (Cannon AE-1)

<i>Film type</i>	<i>Lighting</i>	<i>F-Stop Setting</i>	<i>Time (seconds)</i>
LPD-4 FILM (high-contrast/ black & white) (157-8327)*(\$33.39)	-all 4 150W flood lights -plus the 2 high intensity bulbs	8	2--2.5--3 (multiple exposures)
RAPID PROCESS/ CONTINUOUS TONE (Shaded gray tones) (RPC-651)*(\$65.30)	-all 4 150W flood lights -plus the 2 high intensity bulbs	3.5	14--16--18--20 (multiple exposures)

*cat.# for 150 ft. roll

-Set the shutter speed to "B" and attach the cable-release to the camera.

-Use a clean glass plate to cover the figure being shot so that it lays flat.

-Make the figure as large as possible in the viewing frame.

* NOTE *

1) Have figures prepared properly. If adding titles to already prepared figures, it is a good idea to xerox the figure with the title taped on to prevent obvious lines from showing in the slide. If this is not possible, have the title secured and aligned neatly as the line will probably show.

2) The ASA setting is not applicable for long exposures (longer than 1 second). Therefore, the LPD-4 and Rapid Process slide film do not have an ASA setting.

3) Make the figure as large as possible in the viewing frame.

- 4) Longer exposures will make the *slides* lighter/*negatives* darker.
- 5) If the shutter release will not remain open during exposures, then the camera most likely needs a new battery.
- 6) When advancing the film, make sure that the spool is turning (as viewed from the outside) to ensure that the film is properly loaded and advancing.

TO DEVELOP FILM:

Roll film onto spool *in total darkness* (no red light), place in cannister, and "snap" funnel into place so it will be "light-tight".

For single spool cannister, use 300 ml volumes.

For 2-spool cannister, use 600 ml volumes.

FOR SLIDES

FOR NEGATIVES

- 1) Add straight Dektol (at 20°C) for 6 min.

- Add HC-110 Kodak developer (dilution F) for 8 min.

For 300 ml (the "small" film cannister):

HC-110: 15 ml
dH₂O: 285 ml

Agitate frequently

Agitate frequently

- 2) Pour out and rinse under tap water 2-3 times.
- 3) Add straight Rapid Fix for 6 min. Agitate frequently.
- 4) Pour out and rinse under tap water 10 min.
- 5) Open cannister, remove film from spool and run through Photo-Flo solution 2-3 times (1 ml in 200 ml water).
- 6) Hang film to dry using a binder-clip at the free end to prevent film from curling while drying.

TO MAKE PRINTS

Supplies needed to bring to 5th floor Hogan darkroom:

- a roll of paper towels
- 3 pairs rubber-end tongs
- Dektol (500 ml)
- Rapid Fix (500 ml)
- Kodak Stop-bath
- negatives
- print paper (some suggestions are listed below)

KODAK Kodabrome II RC 8x10: (bx/250 are around \$75.00)

<u>F1:</u>	<u>F3:</u>	<u>F5:</u>	<u>F/Polycontrast:</u>
(192-1345)		(192-2913)	(183-5594)
<i>Low contrast</i>	<i>Med. contrast</i>	<i>High contrast</i>	<i>Soft/med.</i>
Immunofluorescence most dot-blots	Genomics Sequence gels Gel shifts Coomassie stain gels	Graphs/Text ECL Westerns Almost all final	Various, Applicable to Fluorography;
#4)	figures(using Ilford		filter

ILFORD POLYCONTRAST PRINT PAPER:

Multigrade III RC Rapid (glossy)
(cat#577-828) bx/250 = \$74.00

Using the Ilford filters (#0-5 by halves), I generally use filters #3-4.5. For prints of autorads, it's nice to use #3 or 3.5; the bands show up clearly, but you get a nice light grey background. These, when mounted onto a laser printout for a "final figure" can be developed using #4- or 4.5; thus retaining the sharpness of the letters and still getting a nice grey scale for the autorad.

I have converted to Ilford paper almost exclusively since the "grey" tones are seem to be much richer without compromising the background. In addition, using polycontrast paper with the Ilford filter system is very conveneient.

TO SET UP:

1. Turn on safety light.
2. Set up 3 trays along the bench top in this order from the enlarger apparatus.

- | | | | |
|----|--------------|-----------|---|
| 1) | Developer | Dektol | 500 ml (Kodak 1464726/to make 1 gal = \$3.79) |
| | (dilute 1:2) | water | 1 liter |
| 2) | Stop-bath | Stop-bath | 15 ml (Kodak 146-4247 / 1 pint = \$3.61) |
| | | water | 985 ml |
| 3) | Rapid Fix | Rapid-Fix | 500 ml (Kodak146-4106/to make 1 gal = \$6.17) |
| | (dilute 1:1) | water | 500 ml |

Place one pair of tongs in each tray.

3. Turn on water circulator in waterbath tray.
4. Turn on air dryers.
5. Make sure there is a paper cutter in the room.

THE ENLARGER APPARATUS

For 35 mm film:

<u>Print size:</u>	<u>Lens:</u>
5x7	135 mm
8x10	80 mm

1. Open the diaphragm all the way for maximum light while focusing.
2. Move condensor to the bottom slot.
3. Place negative-holder tray flat into place above lens.
4. Thread negatives--emulsion-side down--into negative tray (emulsion-side is the inner side of the curve of the film).
5. Turn on the power box for the enlarger apparatus (the Gra-lab 605--switch located on the side).
6. Turn the "outlet A" switch to "time". Turn off the overhead light (not the safe light) to make the enlarger light visible.
7. Center the appropriate sized frame of the easel (the paper holder tray). Make sure the dimensions of the light are the desired size of the print (by raising and lowering the apparatus).
8. Using the "micro-sight" focusing mirror, focus the negative--by turning the focus knob of the enlarger--until the image appears "grainy".

TO BEGIN:

1. Choose the desired exposure of the negative. As a general rule of thumb, I usually select the "middle" negative of the three exposures.

2. Set time to 2 seconds.
3. Open diaphragm all the way. Again, this can be varied if desired.
4. Move the "outlet A" switch all the way to the right. The light will shut off.

--WITH THE OVERHEAD LIGHT OFF--USING ONLY THE SAFETY LIGHT--

5. Open the box of paper and prepare a few test strips by cutting a peice of paper into strips of approximately 1x3 inches.
6. Place the test-strip (glossy side up) on the easel. Choose an area of the negative that contains various shades or contrasts if possible.
7. Press the start/hold button. The light will turn on and expose the paper for the desired time.
8. Drop the paper into the developer tray face down and submerge it entirely. Then, using the tongs and gripping only a small portion of the corner, quickly flip the paper over and gently rock the tray back and forth until the desired contrast of photo appears (full development should usually require 1-1.5 minutes). Try to avoid using the tongs on the face of the print or black smudge marks will appear on the surface of the print.
9. Immediately transfer the print to the stop bath tray to stop the print from becoming darker. Rinse well in the Stop bath before transferring to the Fix.

If the strip is too dark:

-choose a shorter time of exposure (ie. 1.5 or 1 sec.)

-OR-

-select a darker negative exposure (more contrast--less background)

-OR-

-change diaphragm setting to allow less light through lens

-OR-

-change the contrast of the paper to a higher contrast

If the strip is too light:

-choose a longer exposure (ie. 2.5-3 sec.)

-OR-

-lengthen the time in developer solution (although avoiding the appearance of a grey background)

-OR-

-choose a lighter negative exposure (less contrast)

-OR-

-open diaphragm to allow more light through

10. Repeat this procedure until strip gives the desired image. Then make a full-sized print lining up the edges along the easel tray.
11. Prints should be kept submerged in stop bath 1-2 min., agitating frequently.
12. Transfer prints to fix solution for 5 min.

Allow for no more than 4 8x10 prints in the fix tray at one time. The paper must be submerged at all times--rock the tray frequently to separate prints from one another. If portions of the prints stick together, or are left exposed, a yellow spot will appear on the print when dry. These spots can usually be removed by re-fixing.

13. Transfer the prints to the waterbath circulator tray for 5-10 min.
14. To dry prints:
Use the squeegee and/or rubber rollers to rid prints of excess water.
If black marks appear on the print (due to the tongs), they can be carefully removed at this point using a wet paper towel.

Place prints in dryers 5-10 min.

* NOTE *

All solutions will eventually go bad.

-The developer solution will usually stay good for approximately 100 prints. If the developer solution goes bad, the prints typically appear to be out of focus and will not develop properly.

-The stop-bath may need to be changed when it becomes very dark (purple in white light).

-The Fix will also eventually go bad. Unfortunately, it is hard to determine until the prints are looked at in normal light (they will appear yellow). Usually the fix and developer solutions can be changed at the same time.

-Do not interchange tongs.

-The enlarger light must be off before a piece of paper is placed into the easel tray or it will be exposed.

-The developer, stop-bath, fix, and rinse steps must all be done under safe-light (red light) only.

Misc. Supplies:

-reloadable 35 mm magazines: cat#89A903 (\$0.40 each)

-bulk loader: cat# LL-01 (\$19.95)

-GEPE Slide Mounts 2mm anti-newton with glass: cat#456-6002 (\$5.45/bx 20)

Also, we get a good deal on Polaroid 667 film from them: \$17.40/box of 20 = \$435/cs 25
(and shipping is less than \$4.00)