05 Photography 1: Framing, cameras, lenses

Wednesday, September 2, 2020 12:45 PM

Today:

- Admin
- Workflow
- Cameras

Have your camera out

Admin

- Schedule; posted. Assignments every week, sometimes two.
- For ME Entrance window competition, 6:1 wide to tall aspect ratio, good B/W.
- Friday: Download and install Darktable for image processing. https://www.darktable.org/ . Virtual light table for organizing your still images and darkroom for modifying them. Open source, please make a donation
- Next Weds:
  "MiniTool MovieMaker | Easy-to-Use Free MovieMaker Software." https://moviemaker.minitool.com/. Good for beginners, free version limited to < 2 minutes
- But Davinci Resolve is much more powerful, professional, but has steeper learning curve. Free for individuals.
- Blender, open source, powerful, written documentation terrible, but good video tutorials.
- Office hours: Here after class and by appointment. Quicker answers on Slack. Plus, other students may have the same questions, or know the answer.
- Three minutes in breakout. Get to know your partners for today. Talk about your BOW, Get Wet or Clouds 1 progress

Overview:

Make CHOICES:

1. Flow phenomenon: Water boiling? Faucet dripping?
2. Visualization technique: Add dye? See light distorted by air/water surface?
3. Lighting (source of worst image problems). Match to vis technique.
4. Image acquisition: Still? Video? Stereo? Time lapse? High speed?
5. Post processing, final output. Edit, at least crop the image, consider contrast.

OVERVIEW Choice 4: Image Acquisition.

We'll do this section in more depth than in the rest of our Overview.

RTFM

Good digital photography references:
Thousands of books and videos are out there.
LinkedIn learning: online video tutorials for photography and video production
CU has a site license. Access from MyCUInfo > CU Resources >Training > LinkedIn Learning

We'll cover basics here to get you started.

4.1) Workflow - Framing/Composition

a. #1 rule of photography: Make The Subject Fill The Frame
   Yes, you can crop to achieve this, but image dimensions of less than 700 pixels won't be accepted.
   Use your real estate well.
b. Know your scale. Take an extra image with a ruler in it.
   You'll need to specify your FOV = Field of View

i.e. "top to bottom was 10 cm"
Sometimes the image will supply the scale, such as the diameter of a jet or jar.

c. Work it. Take many images, from varied POV = Points of View
   - Get close, pull back. Move around the sides.
   - Try a mirror to see the back.
   - Consider making a stereo image: 3D!
   - Try video, a few seconds or minutes
   - Change the lighting.
   - Try time lapse (smartphone camera app is easy to use)
   - Consider the motion: Capture the whole track, and also zoom in on a particular moment/location
   - Plan lots of attempts. **Look at results at full resolution first**, not just on camera LCD. Takes time.

Don't forget to also make copious notes on your experiment. What fluids, dropped from how high. Photograph your setup, measure distances to camera, to lights, everything you can think of so you could do it again.

4.2) Cameras: Roughly 4 common types, but technology is changing quickly

All have
- AE = Auto Exposure. Automatically sets shutter time, aperture, ISO (sensor sensitivity) according to varied programs
- AF = Auto Focus. May be contrast focus and/or phase detection technology. See https://www.jmpeltier.com/2017/12/08/difference-phase-detection-contrast-detection-autofocus/

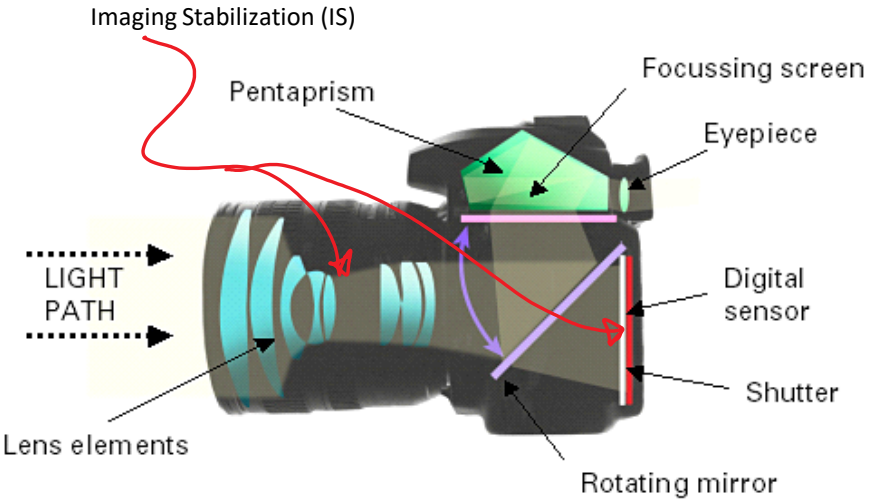
Who has what? Clicker poll:

A - DSLR	B - Mirrorless	C - Compact, Point and Shoot	D - Film	E - Phone camera only
Digital Single Lens Reflex Optical viewfinder	Interchangeable lens but no viewfinder, just LCD	PHD Push Here Dummy. LCD viewer, fixed lens		

2020:
A - 54% 73%
B - 21% 17%
C - 14% 7%
D - 4%
E - 7% 3%

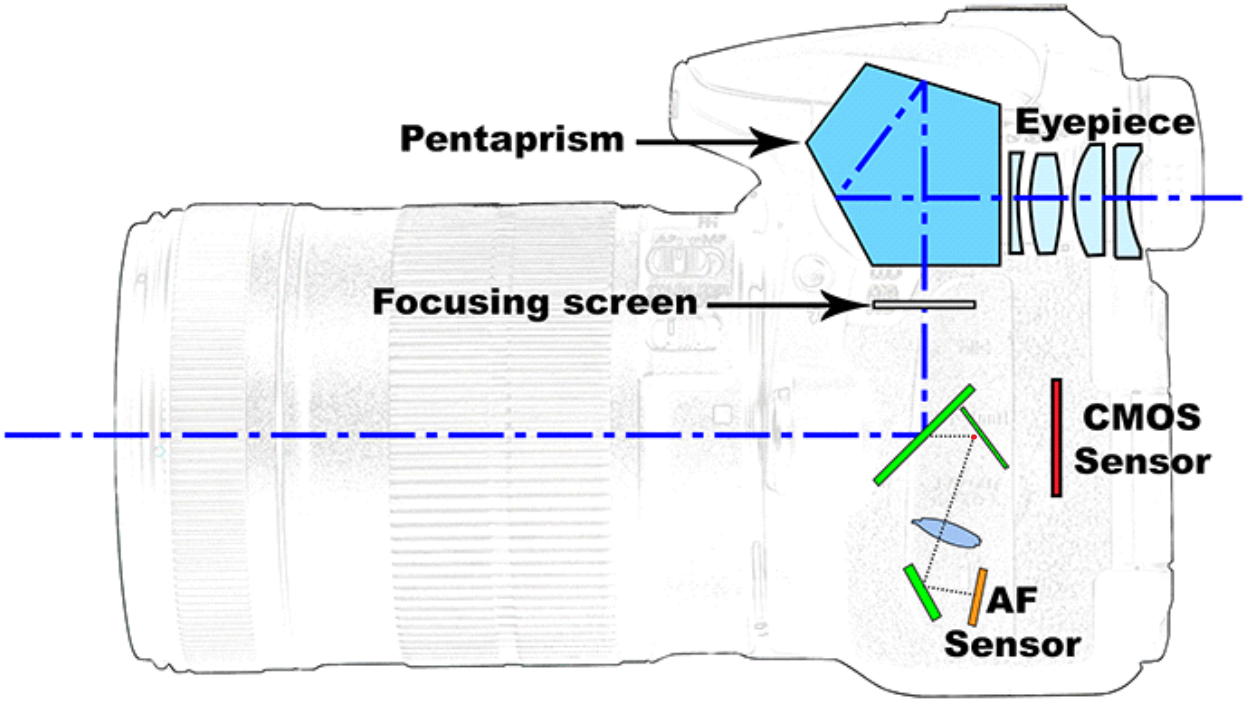
DSLR

https://www.ephotozine.com/articles/nikon-d5-dslr-hands-on-preview-28654/images/highres-Nikon-D5-Internals-Cross-Section-1_1452055157.jpg



https://george12johnson12.files.wordpress.com/2015/03/slr02.jpg
Mirror flips up when shutter triggers = REFLEX.
For long exposures, lock mirror up to prevent vibration.

DSLR animation:
https://commons.wikimedia.org/wiki/File:SLR_-_DSLR_optical_diagram_07.gif



https://2dhnizrxqvv1awj231eodql1-wpengine.netdna-ssl.com/wp-content/uploads/2017/03/AFSensor.jpg

Use circular polarizers on lens front to get past partial mirrors into AF and AE sensors. Why use a polarizer? Darker skies, no glare, keeps colors for the most part.

However, Ansel Adams used yellow or red filter to get beautiful black skies in B/W:

https://www.moma.org/collection/works/58296

https://en.wikipedia.org/wiki/Ansel_Adams

Probably the most famous landscape photographer ever. Shaped the evolution of photography and influenced technology

Mirrorless

Same capabilities as DSLR, but no optical viewfinder; LCD display only. Lighter weight as a

result. Image composition in varied lighting conditions can be difficult, harder for folks with glasses, less focus resolution. Maybe electronic shutter only?

PHD:

Small sensors; lower resolution even if mpx the same; diffraction limits approached?
Often no lens choices. Can still add close-up lens.
Composition is harder. LCD screens tough to use in sun, don't show fine focus (on low end cameras). Usually can't preview depth of field.
Much lighter, more portable.
Comparable performance at prosumer level.
Often excellent macro (close up) imaging due to small sensor and short focal length lens.
Becoming rare because

Phone cameras

Very small sensors, very short focal lengths but reasonable MPx. Often good macro imaging. Can add lenses. Often dirty or damaged lens surface. Fixed aperture size, electronic shutters only. Difficult to specify exposure or focus; specialized apps may help. Unknown image processing.

CAMCORDERS:

primarily for video, now only professionals use; prosumers use DSLRs, everybody else uses phones. Records to disk or solid state memory. Usually longer record time than still cameras. Built-in effects, maybe editing, quieter mechanisms, set white balance, better microphones
Action cameras: GoPro Hero series. Tiny, rugged, waterproof, good resolution, image stabilization. Fixed wide angle lens.

High Speed Cameras

In the ITLL Electronics shop for checkout
Phantom Miro C110

- Maximum Frame Rate: 900fps at 1280 x 1024 resolution
- Maximum Resolution: 1280 x 1024
- Up to 52,200 fps at reduced resolutions.
- Allow time to transfer to your data storage

Manual: https://drive.google.com/file/d/163452tPje9ncsiqayU0-zbFSTTFKiNyi/view?usp=drive_web

PHANTOM MIRO C110 PROCEDURE.docx

Sony NX80

- Maximum Frame Rate: 120fps
- Maximum Resolution: 3840 x 2160 px

Manual: https://drive.google.com/file/d/1q4gAEVs0-2_23rzhlQKTsUZVXIy7zahj/view?usp=drive_web

Sony NX80 Slow-Mo Guide (1).pptx

Camera technology is changing rapidly. Lines between designs are shifting. Superzooms, for example.