**Note:** All of the images were scanned at 1200dpi on the Epson scanners in the CUCC. The only modifications on them were cropping, inverting, and flipping.

Figure 1: Self-portrait, taken on the East side of 41 Cooper. Unfortunately, it's difficult not to squint and blink with the sun in my eyes, so I look pretty angry. Radi Farraj assisted with taking this photo.

The above picture is the best self-portrait with my face clearly visible. It was taken on a sunny day with the sun directly facing me with a 30 second exposure. Developing took (roughly) 60 seconds in the ordinary developer solution, 30 seconds in the stop bath, and 60 seconds in the fixer. (The times are not exact, and are approximated with counting by mouth.)

Shown below are some other portraits I took, along with the lessons learnt from each one. All of these solutions were developed in the same manner as the first.

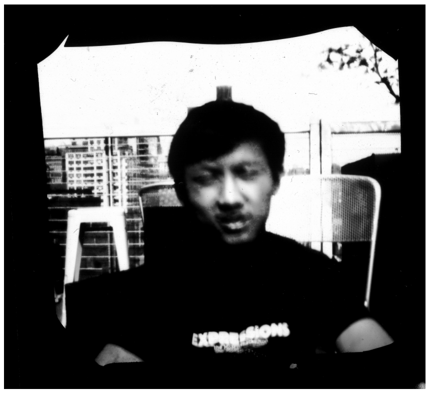

Figure 2: This is my first picture taken with this camera. There is a small light leak in the bottom right, which I fixed by adding more tape around the back edges. The fence and buildings are clearer than the foreground, so I moved the camera further away from the subject for future photos.

Figure 3: Coding! This was fun and the resolution is pretty high, but the photo is a little overexposed.

Figure 4: The second photo taken with this camera. After moving the camera further away, the subject is much clearer. It was likely not in the fixer long enough, because the photo quality greatly degraded after a day.

Figure 5: A picture of (Figure 4) from my smartphone, on the day it was taken before it was destroyed.

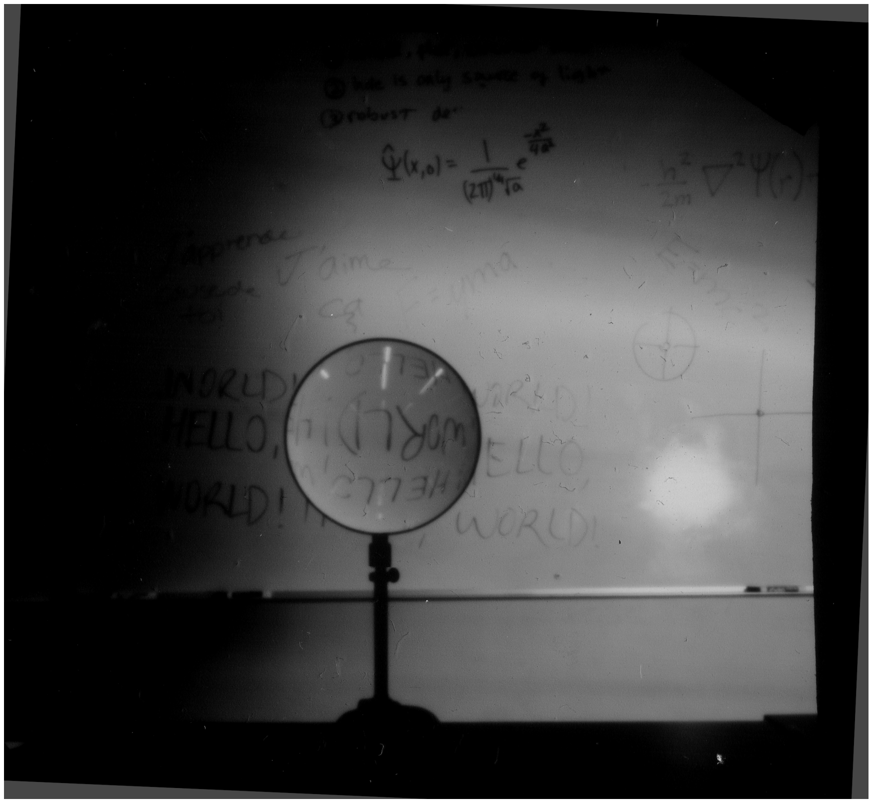

Figure 6: Photograph of refraction from a convex lens, causing the image behind it to be rotated $180^o$. The bright spot on the whiteboard (and the overall gradient) is caused by the location of the special light used to decrease exposure time; the bright lines on the lens are reflections of the overhead lights.

This image was taken in the physics lab with one of the special floodlights illuminating the whiteboard (on the right side of the above photograph), of the large convex lens in front of the words "HELLO, WORLD!" written repeatedly on the whiteboard, some of which can be seen reading upside-down and right-to-left inside of the lens. The exposure time was (roughly) 20 minutes, and the developing time was the same as the portraits.

The physical phenomenon illustrated in this photograph is refraction of light along the glass-air barrier in a lens. This is a plano-convex lens where the whiteboard is farther from the camera than the focal point, so the image is flipped (both horizontally and vertically; i.e., rotated $180^o$), and there is some curvilinear distortion. A quick schematic of what is happening is shown in (Figure 7).

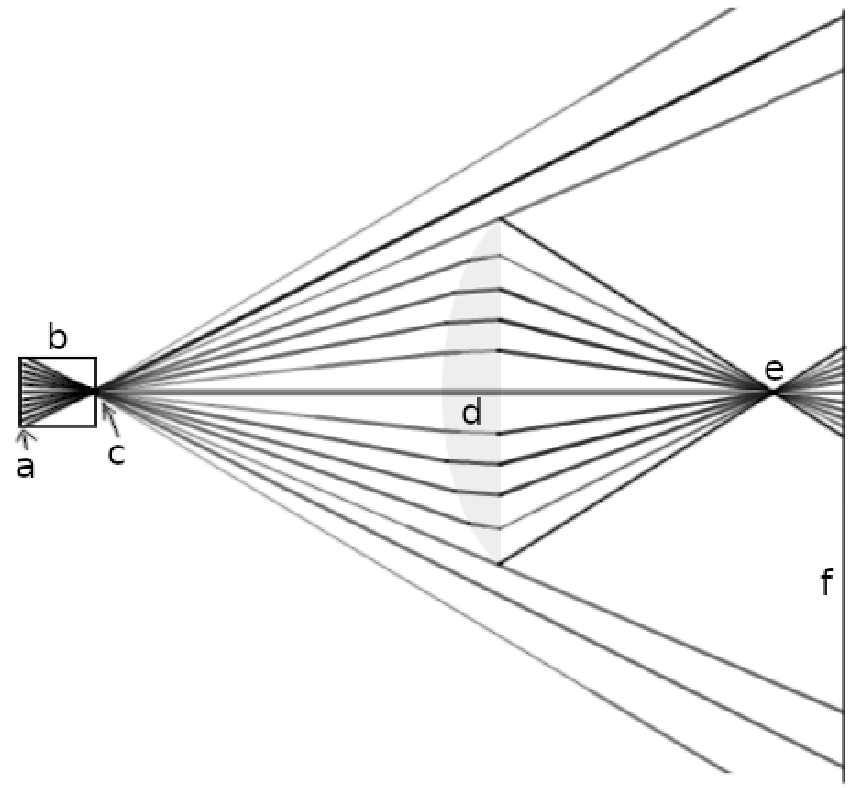


Figure 7: Schematic of the path of light rays through a convex lens. Image created in GIMP. (a) Photographic paper (film); (b) pinhole camera, light-proofed except for pinhole; (c) pinhole; (d) (plano-)convex lens; (e) focal point; (f) whiteboard (object).

As seen from this image, the light rays project an image linearly in the area outside of the lens. The light rays that intersect the lens all converge to its focal point at (e); since the whiteboard is farther than this point, the image inside of the lens appears inverted. Once the light enters the camera, all of it is inverted one more time, but this is applied to all of the light rays and doesn't change the image. At each intersection of the light between glass and air (and vice-versa), the light refracts according to Snell's Law, i.e., $n_1 \sin\theta_1 = n_2 \sin\theta_2$, where $n_1$ and $\sin\theta_1$ are the index of refraction and angle of incidence, respectively, for one material, and $n_2$ and $\sin\theta_2$ are the index of refraction and angle of refraction, respectively, for the second material.


Figure 8: Photograph of FedEx truck developed using caffenol. This was taken in front of the building on the left of the Muji store near Foundation, and was taken on top of a garbage can (on which you can see the reflection of the FedEx truck in the bottom part of the picture).

The process for photographing the truck was the same as for the other photos. It was a sunny day and the subject is in almost-direct sunlight (sun was SWW from the perspective of the camera), so the exposure was 45 seconds. Even with a few bikers and walkers walking by, this photo was surprisingly detailed and clear (you can even read "fedex.com" and "The World On Time," and barely "1.800.GoFedEx."

The recipe for the alternate developer, caffenol, was from `https://www.diyphotography.net/caffenol-processing-film-coffee-supermarket-ingredients`; this involved dissolving 60g washing soda, 16g Vitamin C supplement, and 40g instant coffee in 1L water. 12 minutes were allowed for the developing, followed by a quick rinse with tap water, and then the usual 30 seconds in stop bath, and 60 seconds in the fixer.

Here are the other notable photos taken over the period of this lab.

Figure 9: This image is a portrait that fell to the same circumstances as (Figure 4).

Figure 10: Like (Figure 5) for (Figure 4), this is an image from my smartphone of (Figure 9) before it was destroyed. You can see that it was a little underdeveloped, as it was a cloudy day and the exposure was 90 seconds.

I was experimenting multiple photos of the same image with color filters to be able to build a color image (by digital composition). Unfortunately, I only had cheap blue-red 3D glasses. Only the blue filter worked decently; the red was far too dark (see (Figure 12)), and my makeshift green filters (marker and plastic) yielded blurry images, so this experiment failed. It is also hard to tell that (Figure 11) used the blue filter at all.

Figure 11: Image of nearby buildings using the blue filter, 4.5 minute exposure.

Figure 12: Image of the same nearby buildings using the red filter, 30 minute exposure.