

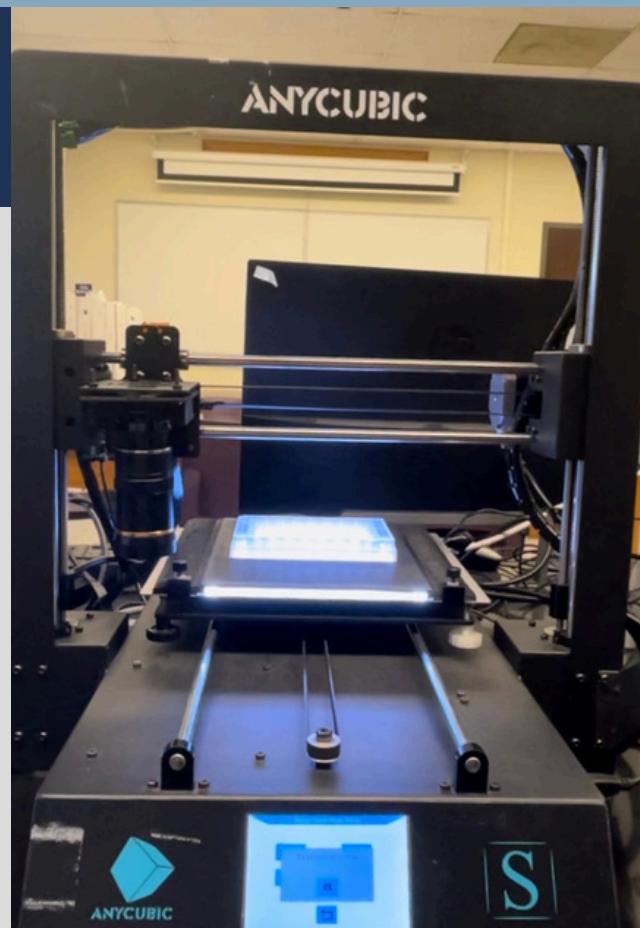


UCSF AND
SFSU

FLYCAM MANUAL

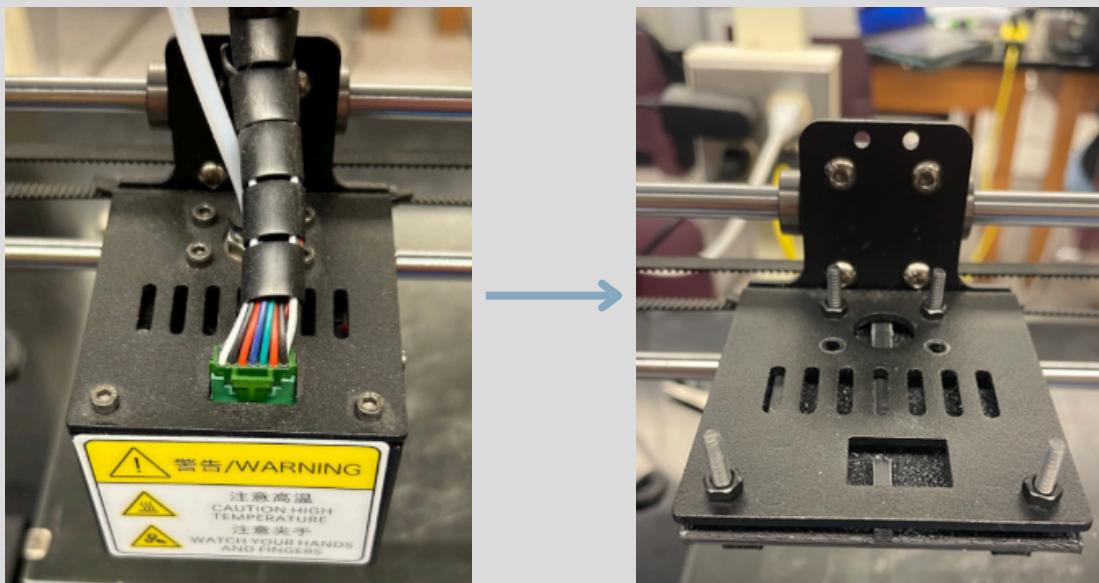
UPDATED 2024

PREPARED BY
Isabella Estevez and Keith
Curry



SECTION 1:

How to remove filament box, and
attach Flycam camera seat holder
add-on



MATERIALS:

- Assembled Anycubic Mega S 3D printer
- Scissors
- Razor
- 2.5 M allan hex wrench
- 2 M allan hex wrench
- M3 * 12 screws (x4)
- M3 washer (x4)
- M3 nut (x4)
- Flycam 3D printed camera seat holder

STEP 1. UNPLUG MACHINE, TURN ON AND OFF.



Setup prior to modifications

STEP 2. WITH SCISSORS, CUT ZIP TIE THAT CONNECTS CABLES WITH THE BACK OF THE BOX. THEN, DISCONNECT THE GREEN CABLE.

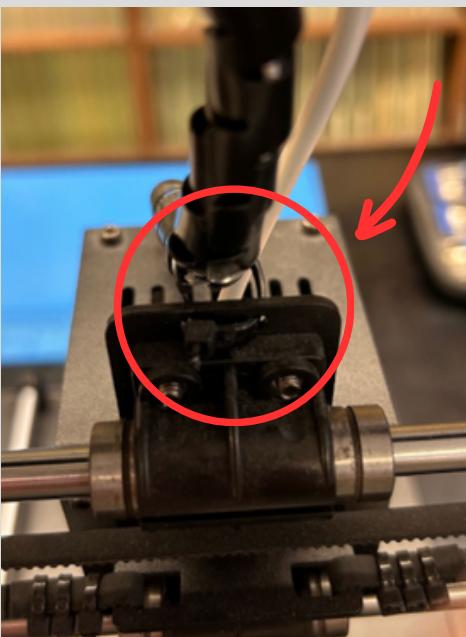
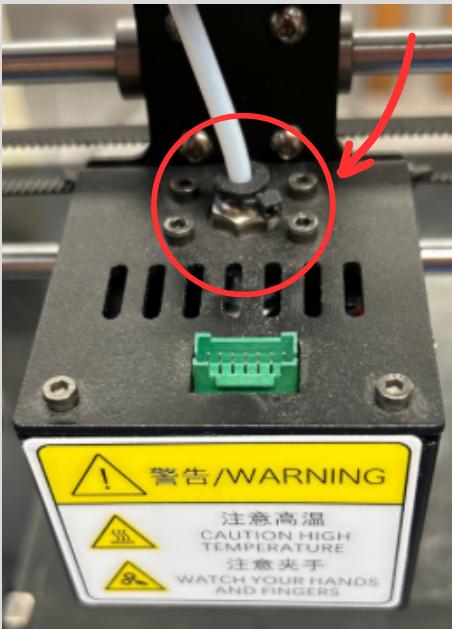


Image of first zip tie to cut



Image of disconnected green wire

STEP 3. CUT THE ZIP TIE THAT CONNECTS THE BOX TO FILAMENT WIRE USING A RAZOR.



Zip tie to cut



Setup with zip tie removed

STEP 4. TWIST OUT THE WHITE FILAMENT WIRE (USING FORCE BY PUSHING DOWN THE BLACK CIRCLE MAY HELP WITH THIS)

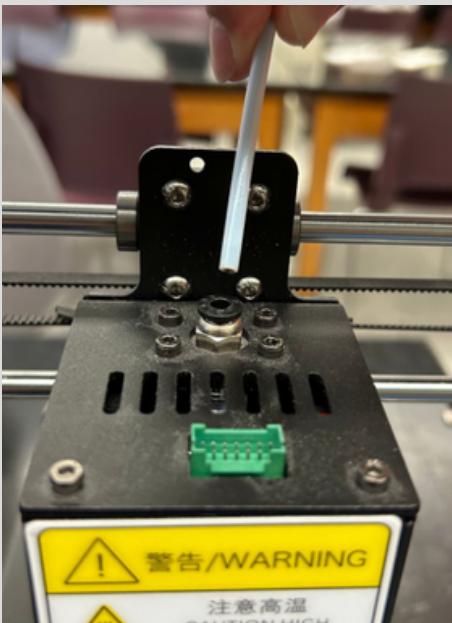
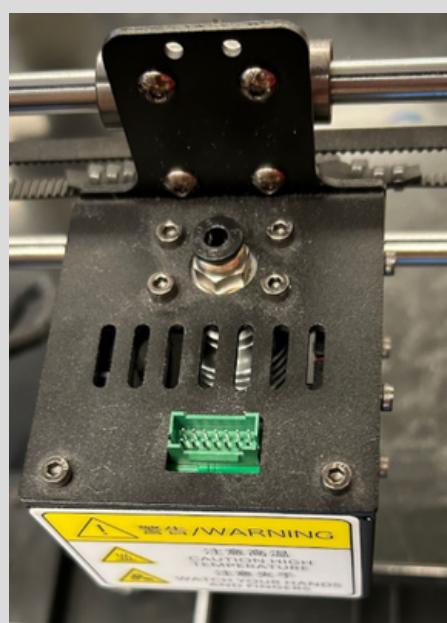
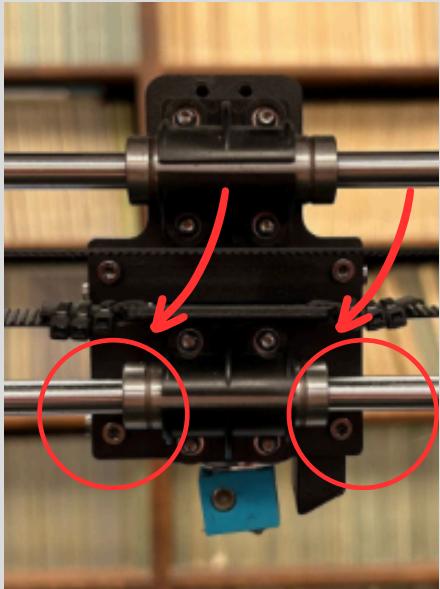


Image of filament being removed

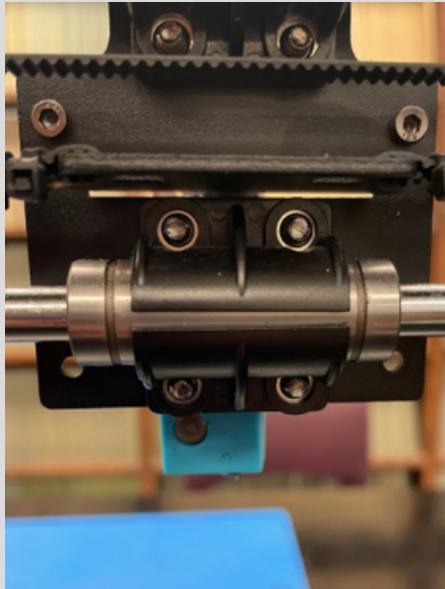


Setup with filament removed

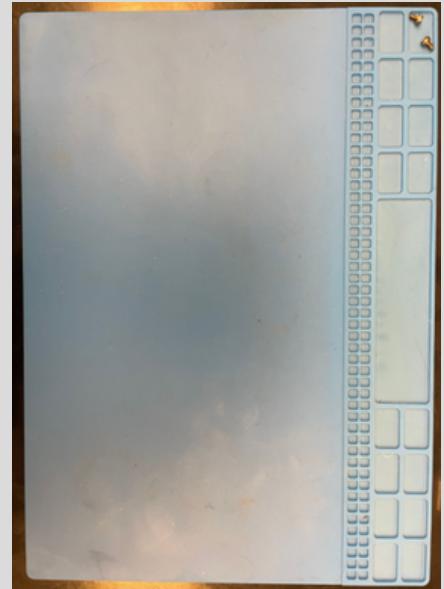
STEP 5. UNSCREW THE BACK BOTTOM SCREWS USING A 2 ½ M ALLEN HEX WRENCH.



Bottom two screws to unscrew

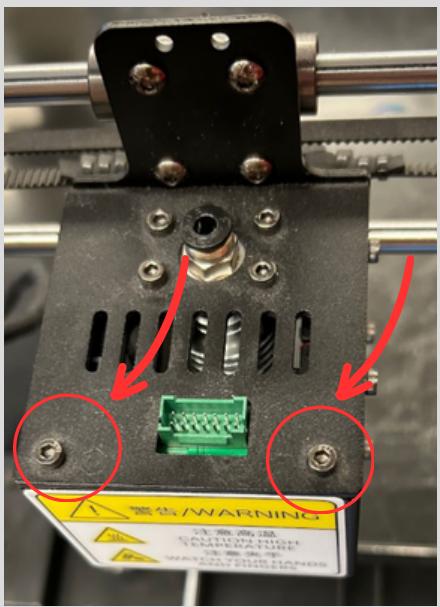


Back screws removed

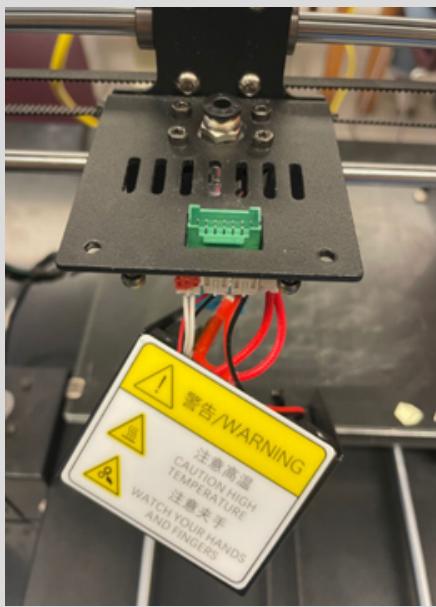


Removed items

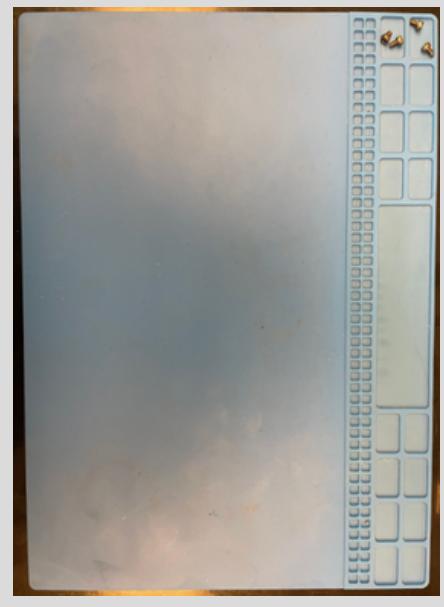
STEP 6. UNSCREW THE FRONT TWO SCREWS USING A 2 ½ M ALLEN HEX WRENCH.



Two screws to remove



Two screws removed

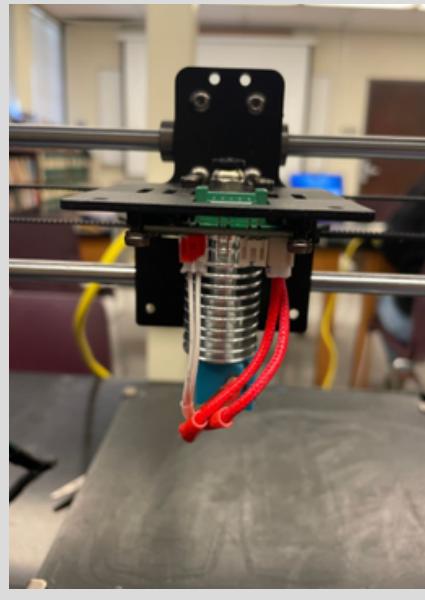


Removed items

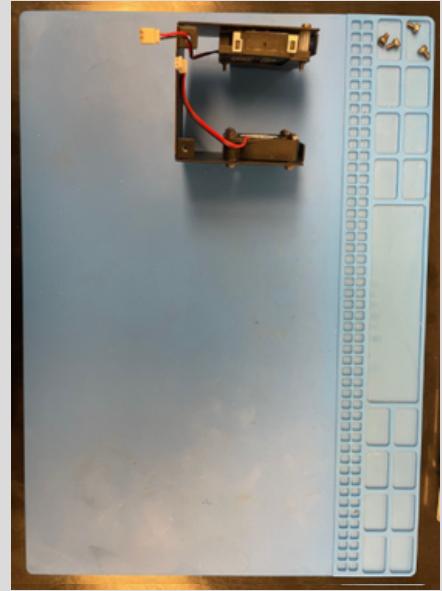
STEP 7. REMOVE THE MIDDLE TWO WIRES FROM THE GREEN CIRCUIT, THEN REMOVE THE BOX. NOTE: IT IS OKAY IF THE WHITE PART DOES NOT COME OFF WITH THE WIRE, AS THIS WILL NOT AFFECT FUTURE STEPS. IF THEY ARE REMOVED, KNOW THAT THE WIRES ARE NOW EXPOSED IN THE GREEN CIRCUIT.



Wires prior to this step

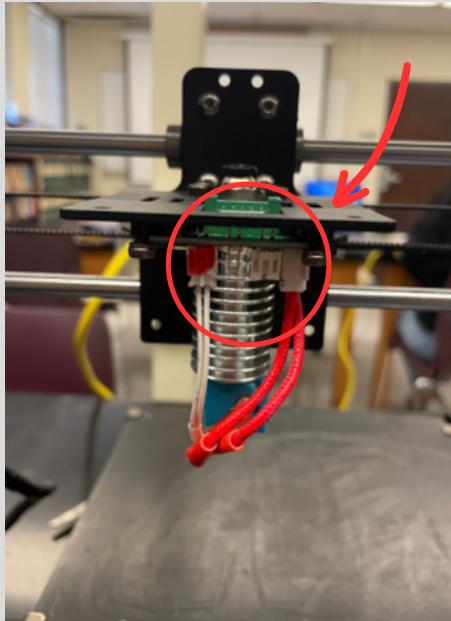


Setup after two wires
are removed, allowing
full box to be
removed

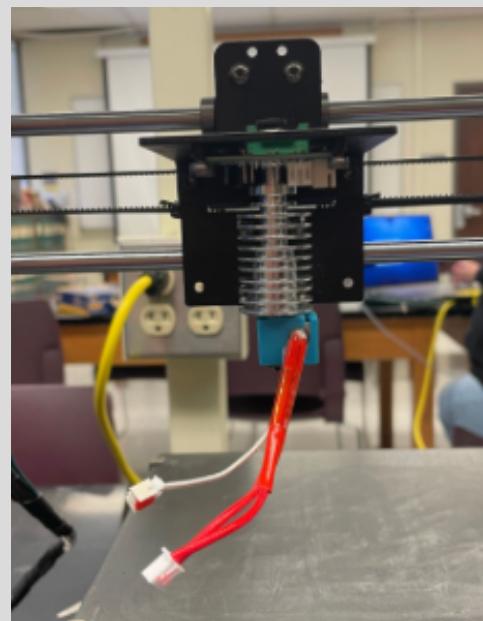


Removed items

STEP 8. REMOVE THE REMAINING TWO WIRES FROM THE GREEN CIRCUIT.

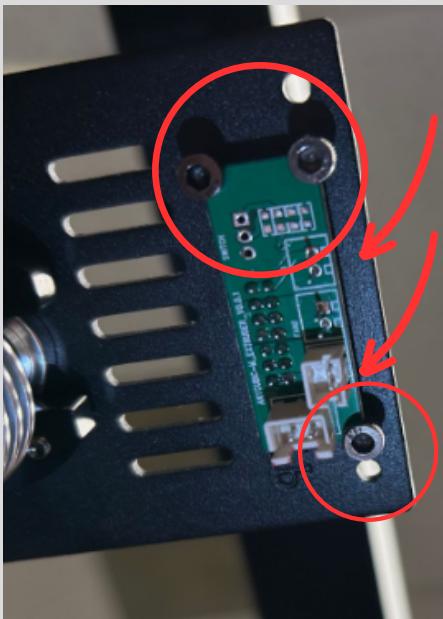


Setup looks like prior to
wire removal



Setup after wire removal

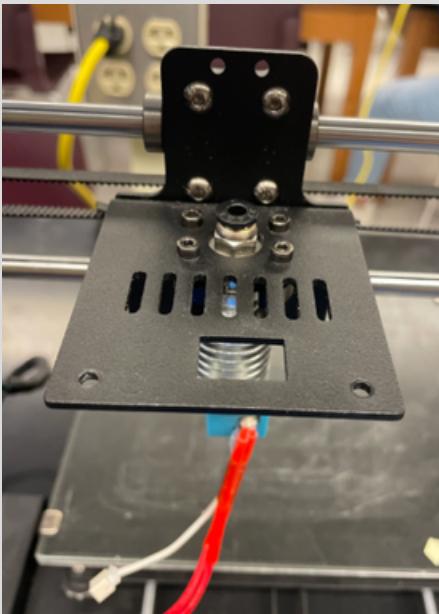
**STEP 9. UNSCREW THREE SCREWS ON THE
UNDERSIDE OF THE PLATFORM USING A 2 ½ M
ALLEN HEX WRENCH. IF THE GREEN CIRCUIT FALLS
ON ITS OWN, PUT IT TO THE SIDE. IF NOT, POP IT
DOWN/OUT AND PLACE TO THE SIDE.**



Three screws to remove



Platform after screws
are removed

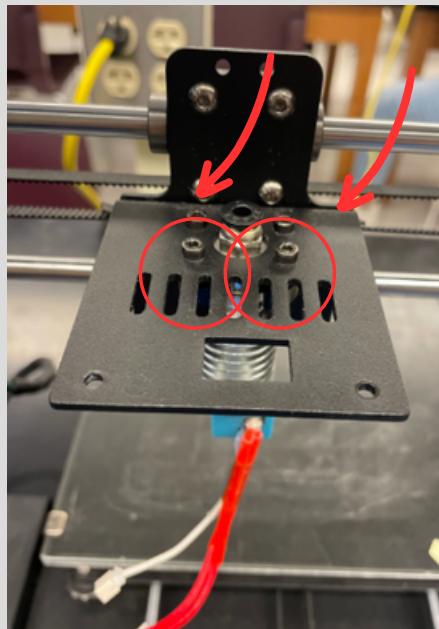


Setup with green
circuit popped off

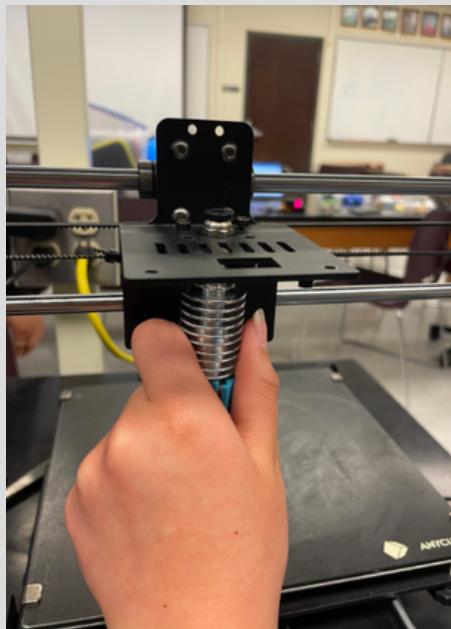


Removed items

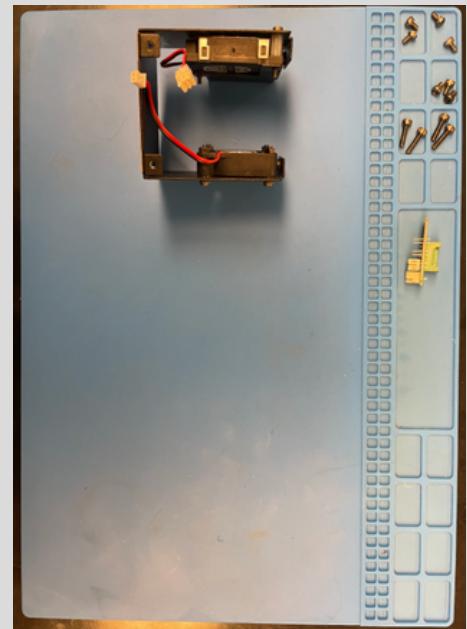
STEP 10. REMOVE TWO SCREWS CLOSEST TO THE FRONT OF THE PLATFORM USING A 2 ½ M ALLEN HEX WRENCH.



Setup prior to screw removal

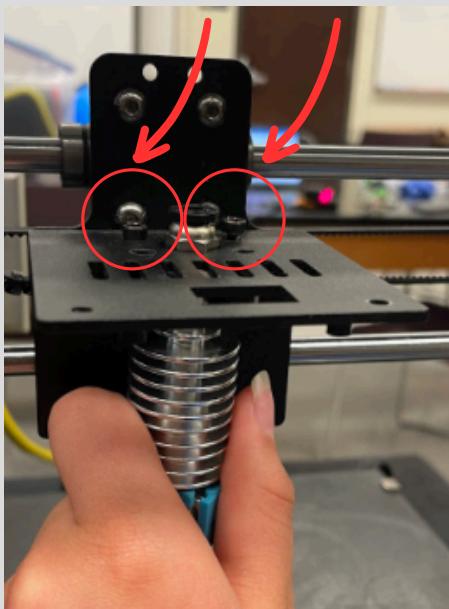


Hand placement in preparation for step 11

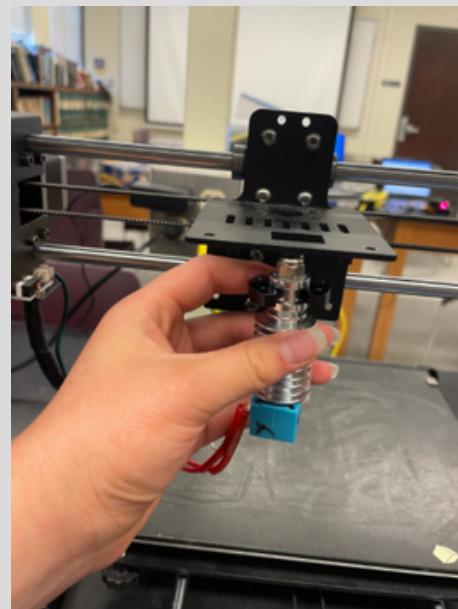


Removed items

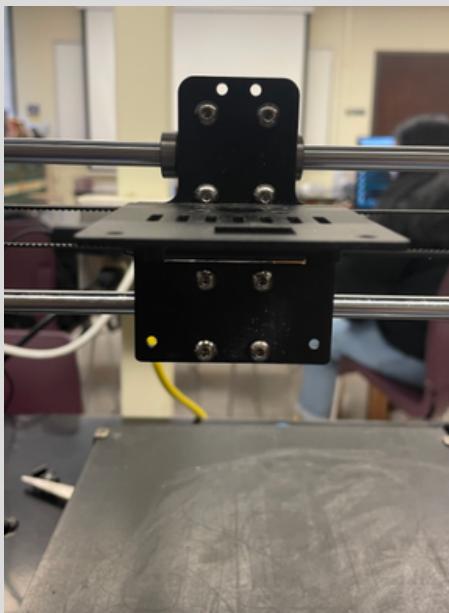
STEP 11. HOLD HOT END IN PLACE. CONTINUE TO DO THIS WHILE REMOVING REMAINING TWO SCREWS (ENSURES IT WON'T FALL). FINALLY, AFTER SCREWS ARE REMOVED, PLACE HOT END TO THE SIDE.



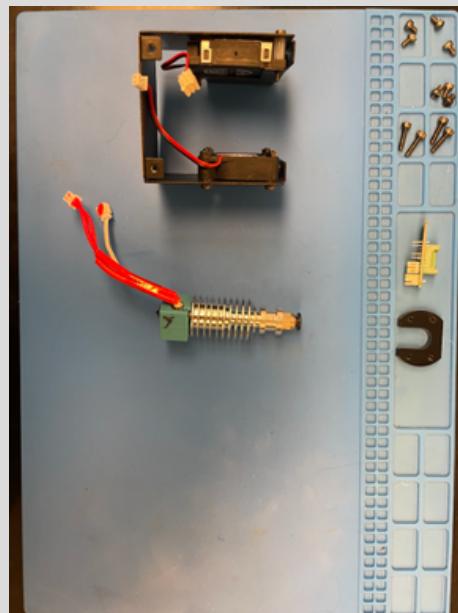
Screws that will be removed



Removing hot end after screws removed



Setup after everything is removed



Removed items

STEP 12. ADD WASHER ONTO A M3 * 12 SCREW. DO THIS FOR A TOTAL OF 4 SCREWS. HAVE CAMERA SEAT HOLDER READY FOR PLACEMENT.



Items required, in order of assembly

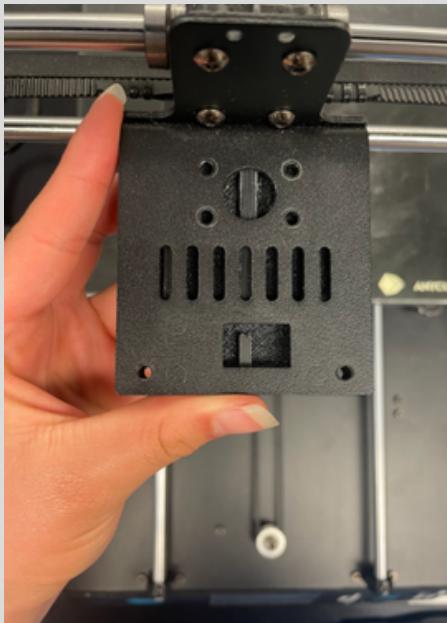


Screws once washers are added

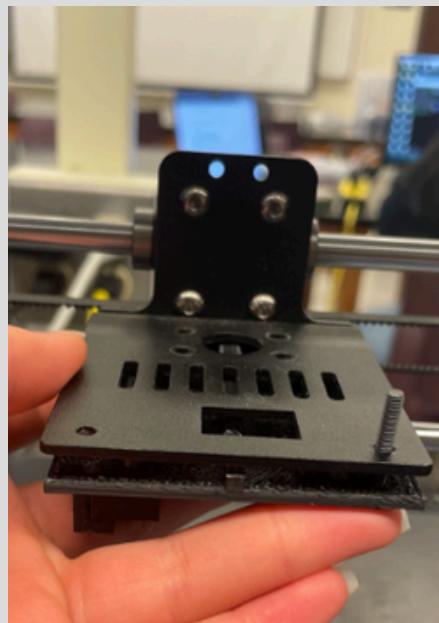


Cammer seat holder

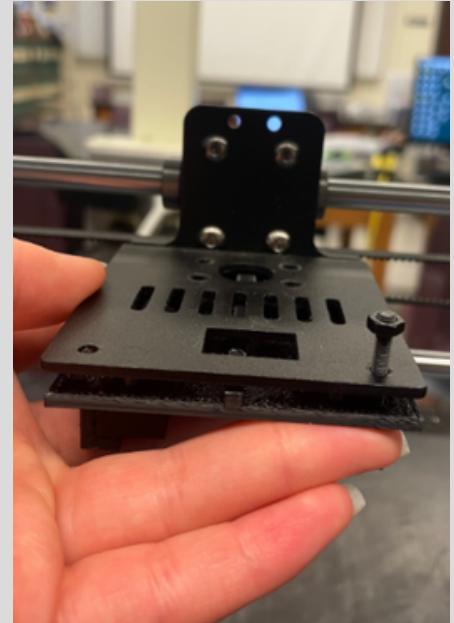
STEP 13. ADD CAMERA SEAT HOLDER TO THE 3D PRINTER PLATFORM BY SCREWING IN FOUR OF THE PREVIOUSLY ASSEMBLED SCREWS (SEE STEP 11). USE A 2 M ALLAN HEX. IT IS HELPFUL TO START WITH THE FIRST TWO SCREWS, THEN CONTINUE WITH THE TWO SCREWS AT THE BACK.



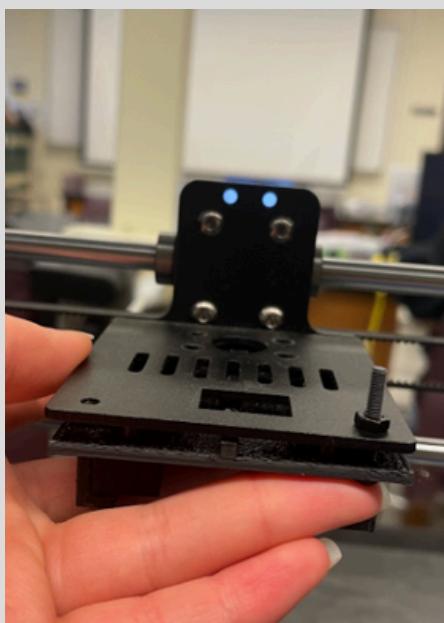
Add-on should be flush under platform



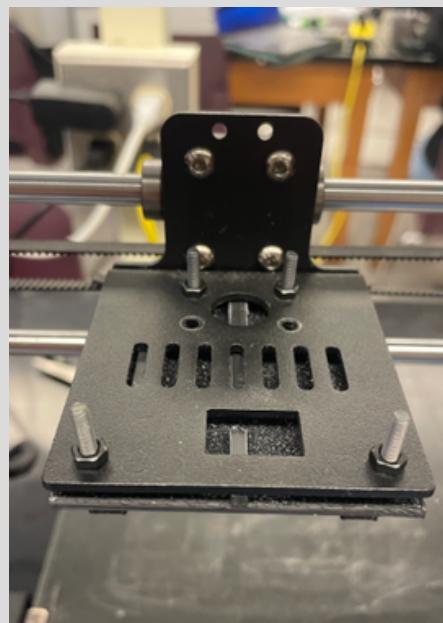
Screw placed under add on



Nut used to secure screw



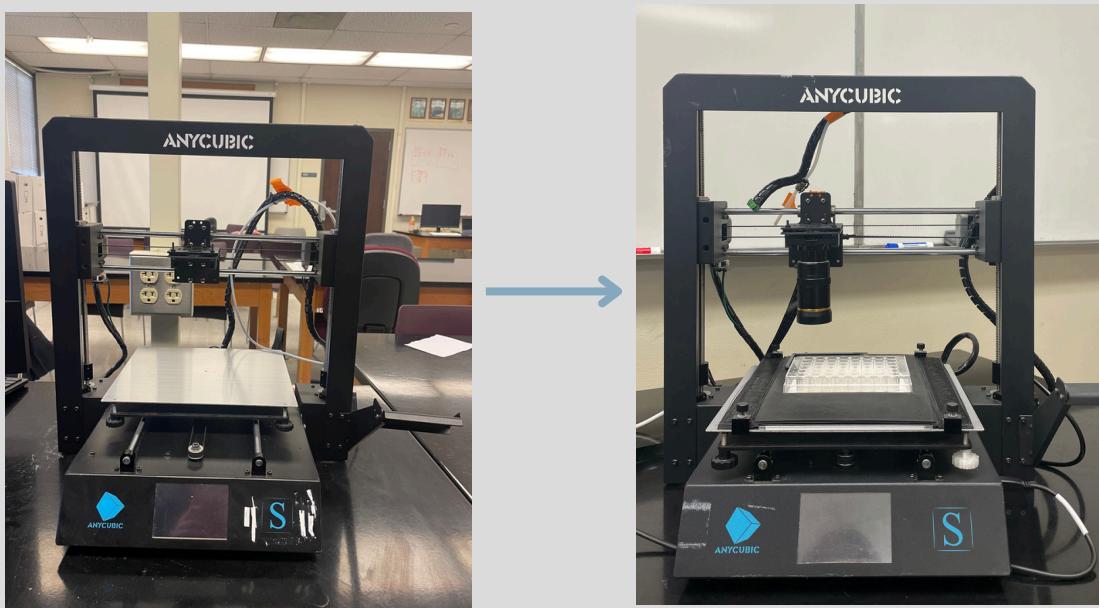
Twist until screw is completely secured (repeat for rest of screws)



Fully assembled flycam add-on

SECTION 2:

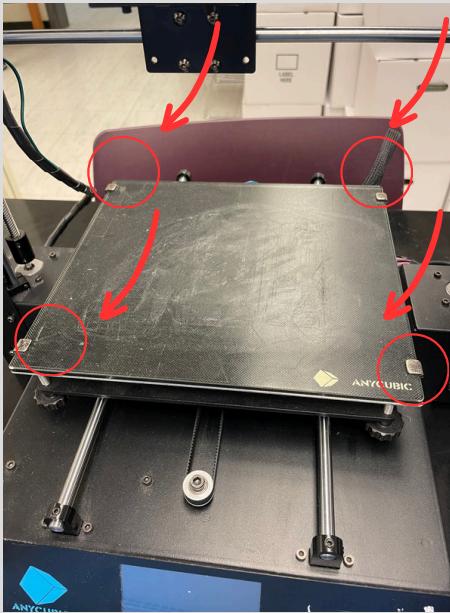
How to set up the rest of Flycam
for use (camera seat, z-stops, pie).



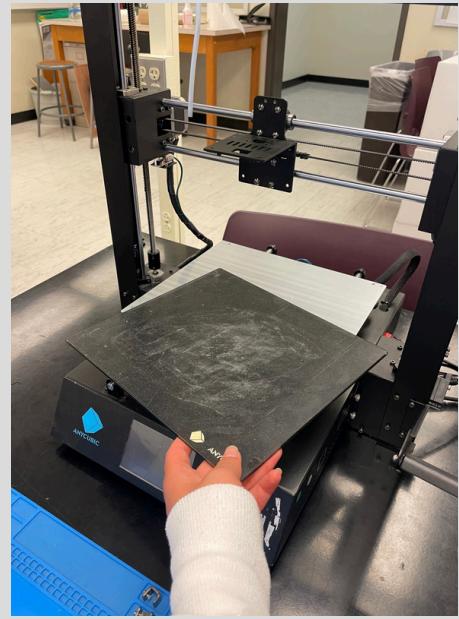
MATERIALS:

- Anycubic Mega S 3D printer
- 2 M L shaped hex key
- Screw on clamps (X4)
- Light pad
- Flycam 3D printed stage
- 1 M philip wrench
- Pliers
- Flex cable
- Flycam 3D printedcamera seat
- Pi/camera (we use version 3B here)
- Power source cord
- Monitor cord
- Mouse
- Portable drive (here we use a 5 terabyte version)
- 3D printer cable

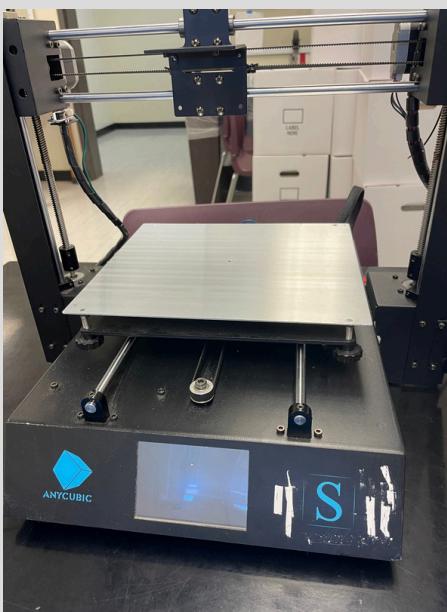
STEP 1. TWIST OFF THE 4 CLAMPS USING A 2 M L SHAPED HEX KEY TO REMOVE THE THE PRINT BED FROM THE STAGE OF THE 3D PRINTER.



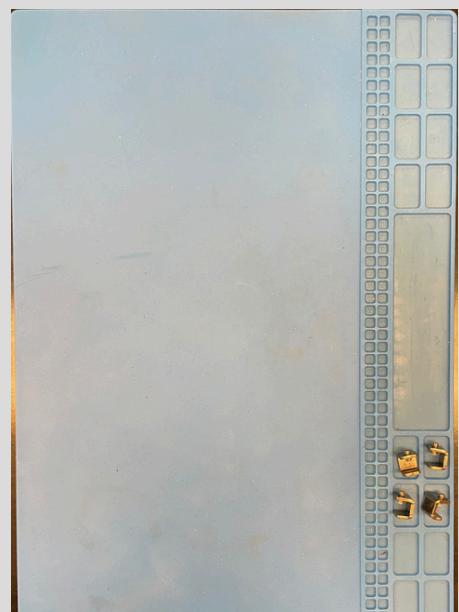
4 clamps to be removed



Removing the print bed

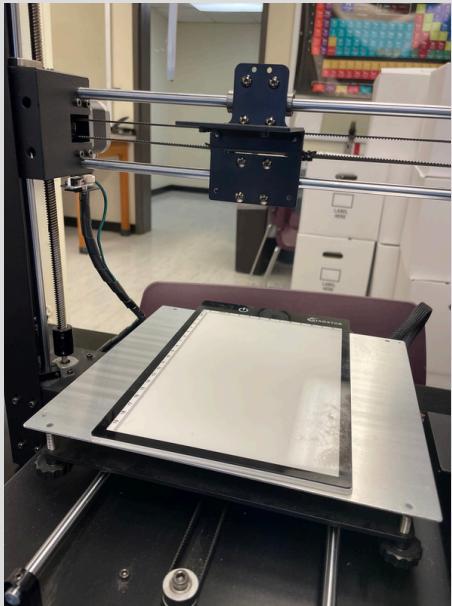


Setup after print bed is removed

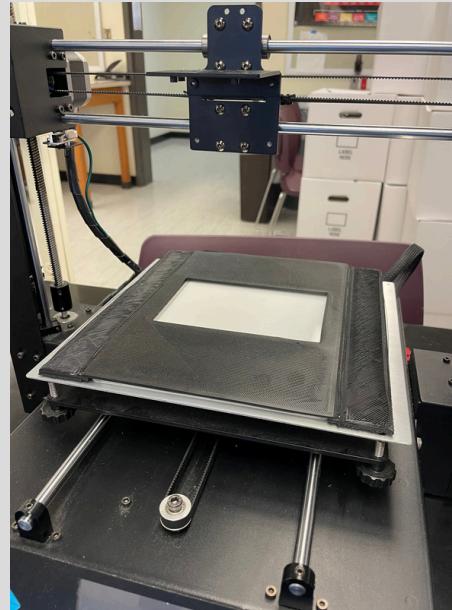


Removed items

**STEP 2. PLACE LIGHT PAD ON 3D PRINTER STAGE,
POSITION WELL PLATE HOLDER ON TOP OF PAD. TWIST 4
CLAMPS TO SECURE THE ITEMS ONTO THE BUILD.**



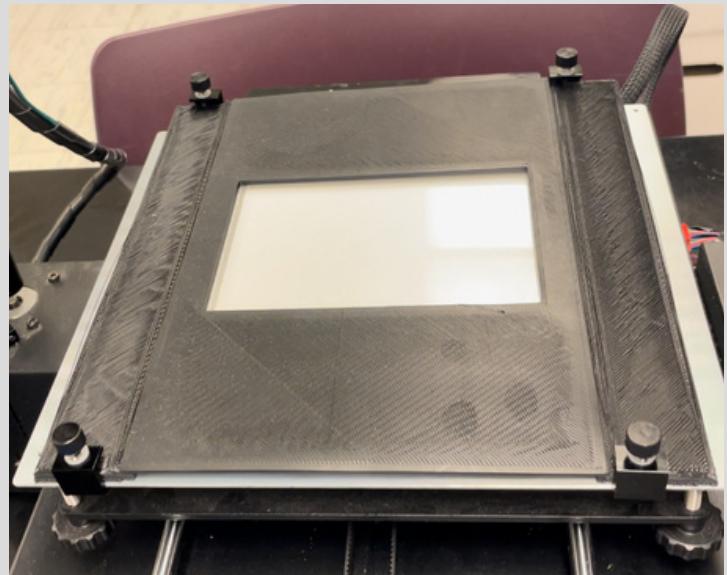
Place light pad on stage



Place well plate holder onto pad



Clamps used to secure items



Setup after clips are added

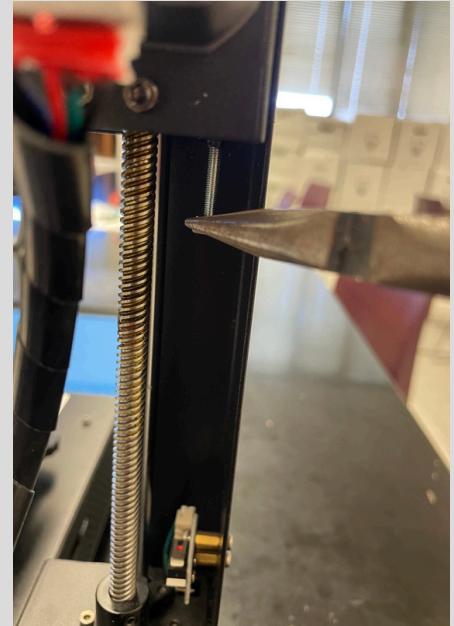
STEP 3. LOCATE A Z-AXIS ENDSTOP SCREW IN THE BACK OF THE PRINTER. USE A 1 M PHILIP TO HOLD TOP IN PLACE WHILE USING PLIERS TO TWIST THE CAPS AT THE BOTTOM OFF. REPEAT ON SECOND Z-AXIS ENDSTOP.



Cap to screw off



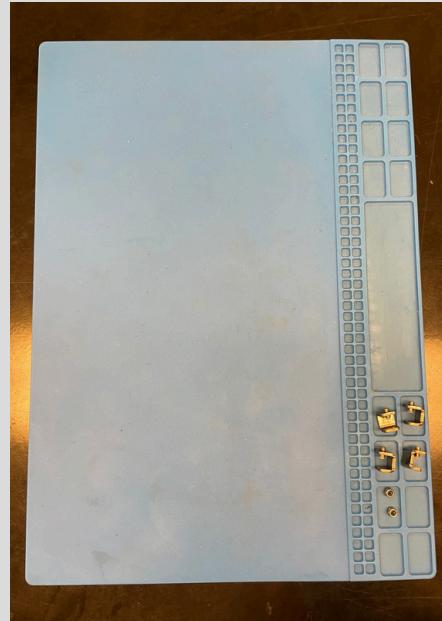
Philip used to ensure screw doesn't move



Pliers twisting off the cap



Setup without cap (repeat steps for second screw)

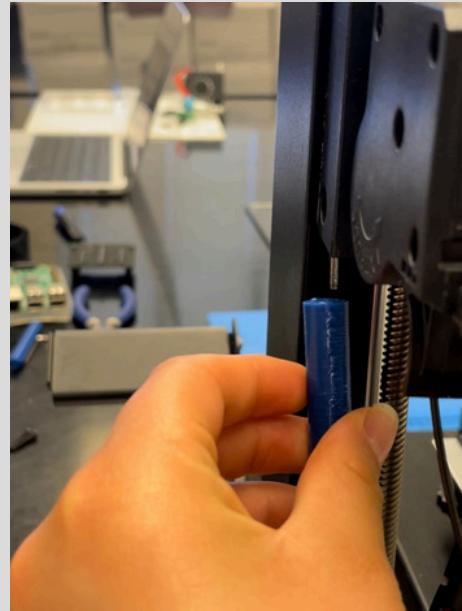


Removed items

STEP 4. LOCATE Z-AXIS ENDSTOP SCREW IN THE BACK OF THE PRINTER. USE AN ALLEN HEX TO HOLD TOP IN PLACE WHILE TWISTING THE Z-STOPPERS ONTO THE BOTTOM OF THE SCREW. REPEAT ON SECOND Z-AXIS ENDSTOP.



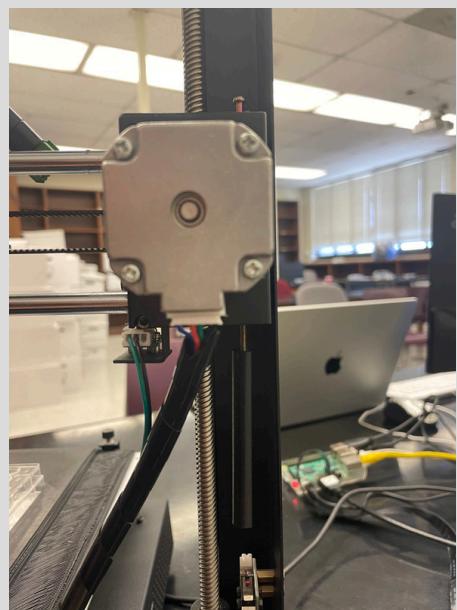
Philip used to ensure
screw doesn't move



Z-stop twisted to the
bottom of the screw



Screw isn't moving as
Z-stop twists in



Setup after Z-stop is
added (repeat steps for
second screw)

STEP 5. OBTAIN YOUR PI CAMERA, LOCATED INSIDE OF THE CAMERA SEAT ROBOCAM ATTACHMENT. PLACE THE FLEX CABLE INTO THE CSI PORT.



Setup of pi camera inside of camera seat attachment

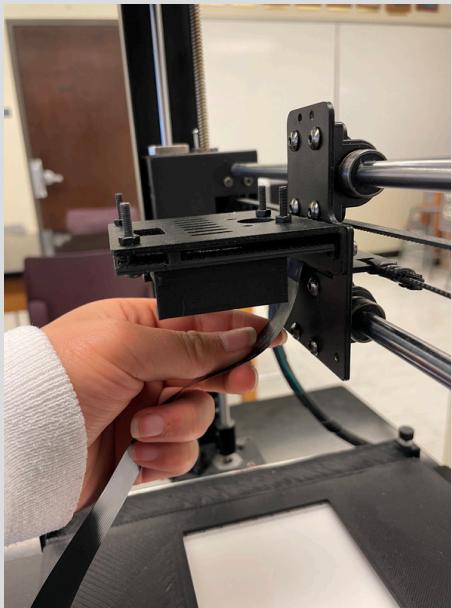


flex cable inserted into
Pi camera



Setup after flex cable is connected to pi camera

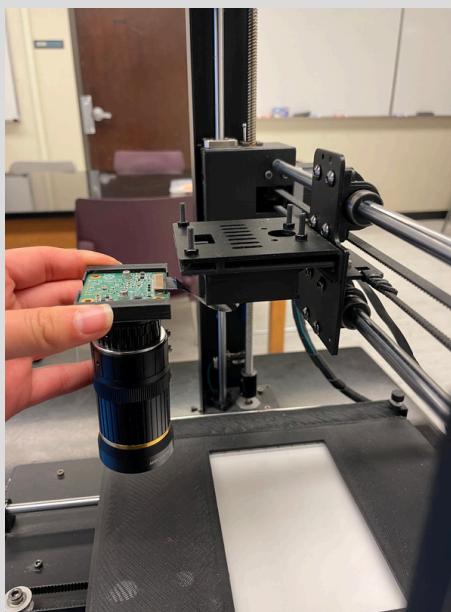
STEP 6. BRING THE FLEX CABLE INTO THE HOLE AT THE BACK OF THE PLATFORM, AND PULL IT THROUGH. SLIDE THE CAMERA SEAT HOLDER INTO THE CAMERA SEAT.



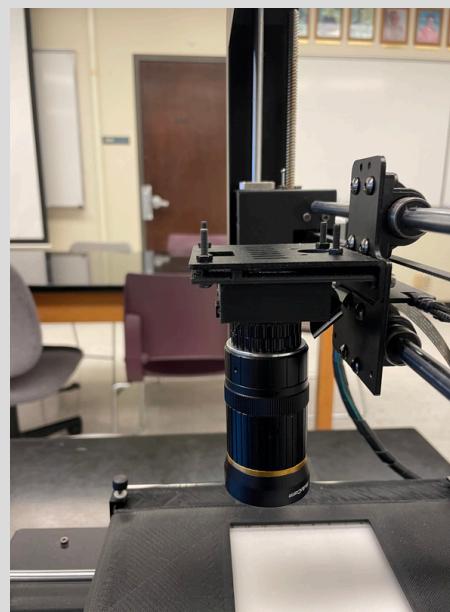
Push flex cable
through hole



Pull flex cable through
the hole



Push camera seat into
the camera seat
holder



Setup with camera
mount completed

STEP 7. CONNECT FLEX CABLE TO YOUR PI CSI PORT. THEN, ATTACH ALL REQUIRED CABLES.



Pi before any
connections



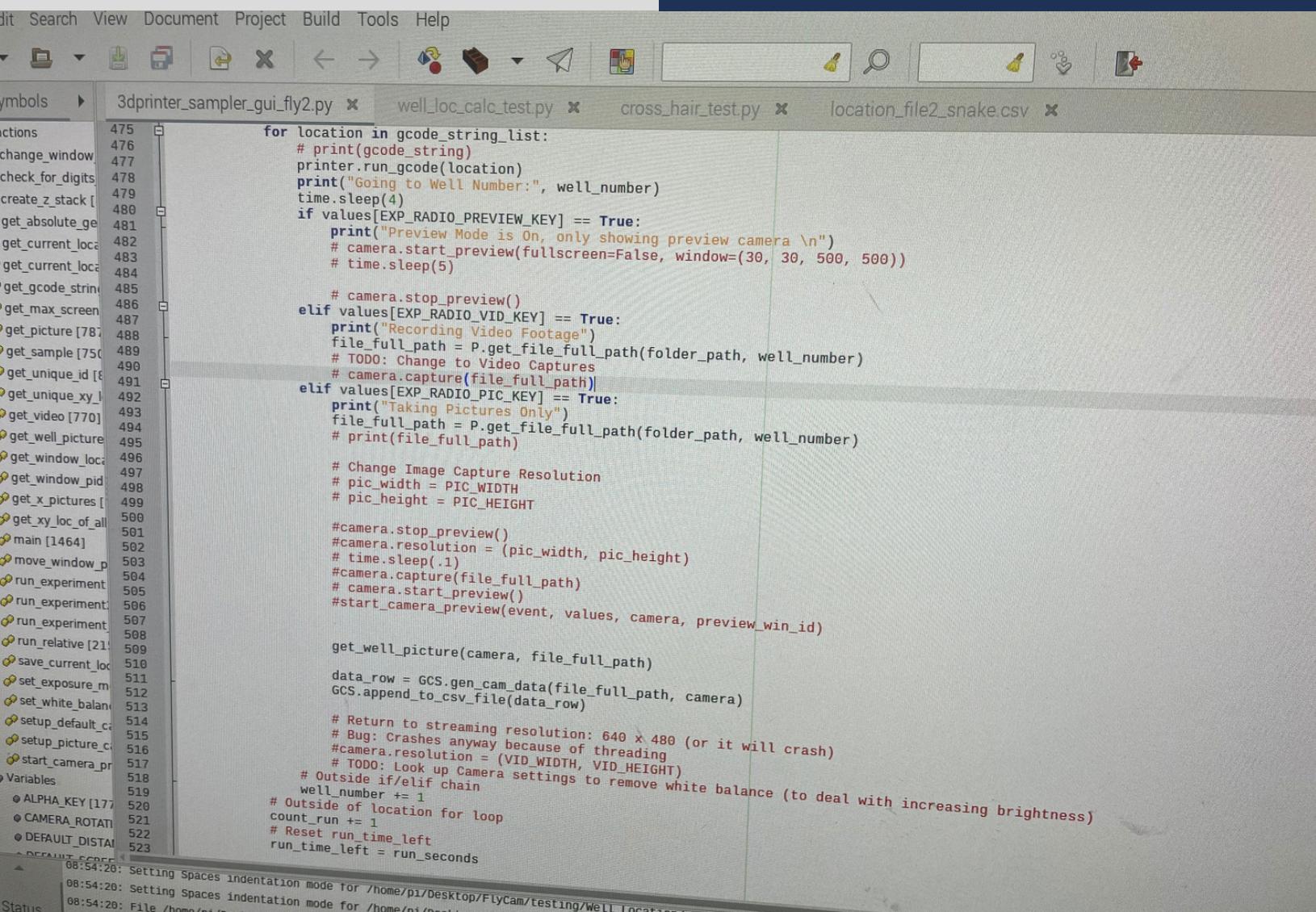
Pi after flex cable
connected



Pi with power source, monitor, mouse,
portable drive (here we use a 5 terabyte
version), and the 3D printer attached

THANK YOU FOR YOUR INTEREST!

For information on FlyCam V1 operational software, please see informational videos on YouTube.



A screenshot of a software interface, likely a Python IDE or terminal window, showing several tabs open. The tabs include:

- 3dprinter_sampler_gui_fly2.py
- well_loc_calc_test.py
- cross_hair_test.py
- location_file2_snake.csv

The main area displays a block of Python code. The code is part of a script named `3dprinter_sampler_gui_fly2.py`. It includes logic for handling camera operations based on user input keys. The code uses the `camera` module for capturing images and `GCS` for generating CSV data. There are numerous comments throughout the code, some of which are marked as TODO items.

```
475     for location in gcode_string_list:
476         # print(gcode_string)
477         printer.run_gcode(location)
478         print("Going to Well Number:", well_number)
479         time.sleep(4)
480         if values[EXP_RADIO_PREVIEW_KEY] == True:
481             print("Preview Mode is On, only showing preview camera \n")
482             # camera.start_preview(fullscreen=False, window=(30, 30, 500, 500))
483             # time.sleep(5)
484
485             # camera.stop_preview()
486         elif values[EXP_RADIO_VID_KEY] == True:
487             print("Recording Video Footage")
488             file_full_path = P.get_file_full_path(folder_path, well_number)
489             # TODO: Change to Video Captures
490             # camera.capture(file_full_path)
491         elif values[EXP_RADIO_PIC_KEY] == True:
492             print("Taking Pictures Only")
493             file_full_path = P.get_file_full_path(folder_path, well_number)
494             # print(file_full_path)
495
496             # Change Image Capture Resolution
497             # pic_width = PIC_WIDTH
498             # pic_height = PIC_HEIGHT
499
500             #camera.stop_preview()
501             #camera.resolution = (pic_width, pic_height)
502             # time.sleep(.1)
503             #camera.capture(file_full_path)
504             # camera.start_preview()
505             #start_camera_preview(event, values, camera, preview_win_id)
506
507             get_well_picture(camera, file_full_path)
508
509             data_row = GCS.gen_cam_data(file_full_path, camera)
510             GCS.append_to_csv_file(data_row)
511
512             # Return to streaming resolution: 640 x 480 (or it will crash)
513             # Bug: Crashes anyway because of threading
514             #camera.resolution = (VID_WIDTH, VID_HEIGHT)
515             # TODO: Look up Camera settings to remove white balance (to deal with increasing brightness)
516             # Outside if/elif chain
517             Well_number += 1
518
519             # Outside of location for loop
520             count_run += 1
521             # Reset run_time_left
522             run_time_left = run_seconds
523
08:54:20: Setting Spaces indentation mode for /home/pi/Desktop/FlyCam/testing/Well Locations...
08:54:20: Setting Spaces indentation mode for /home/pi/Desktop/FlyCam/testing/Well Locations...
08:54:20: File /home/pi/Desktop/FlyCam/testing/Well Locations...
```



UCSF AND
SFSU