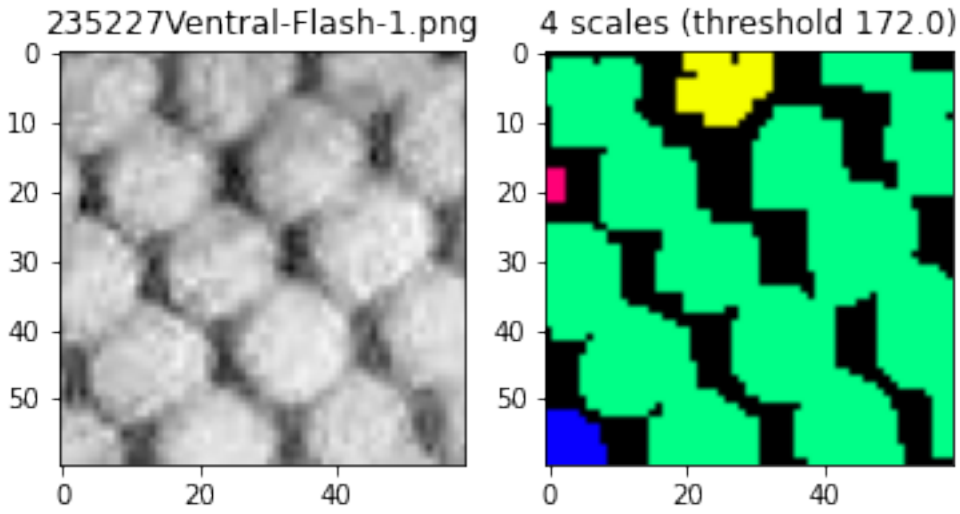
Counting_scales

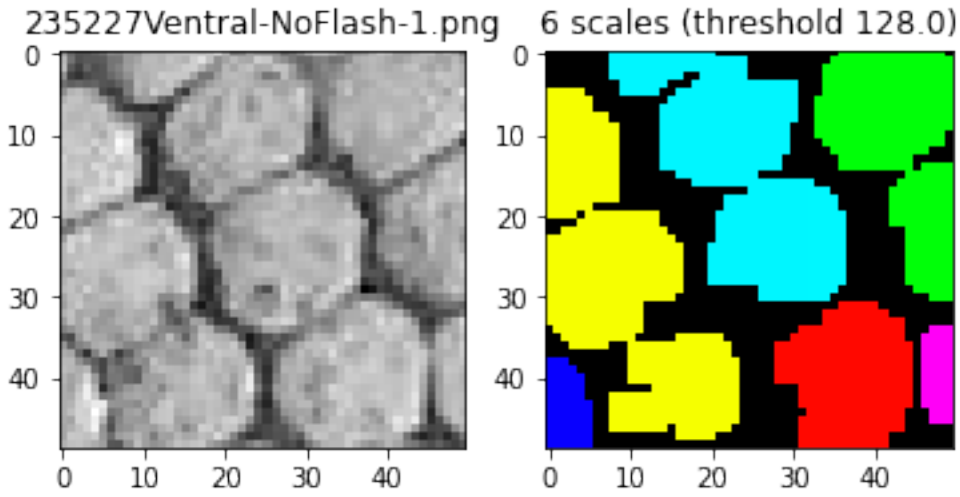
November 16, 2020

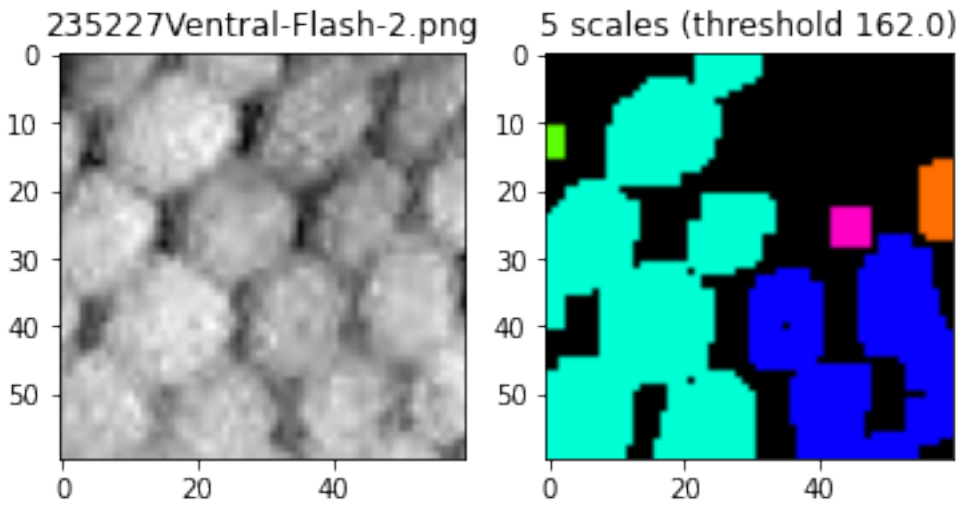
[1]:
```
import numpy as np
import cv2
from matplotlib import pyplot as plt
import os
```

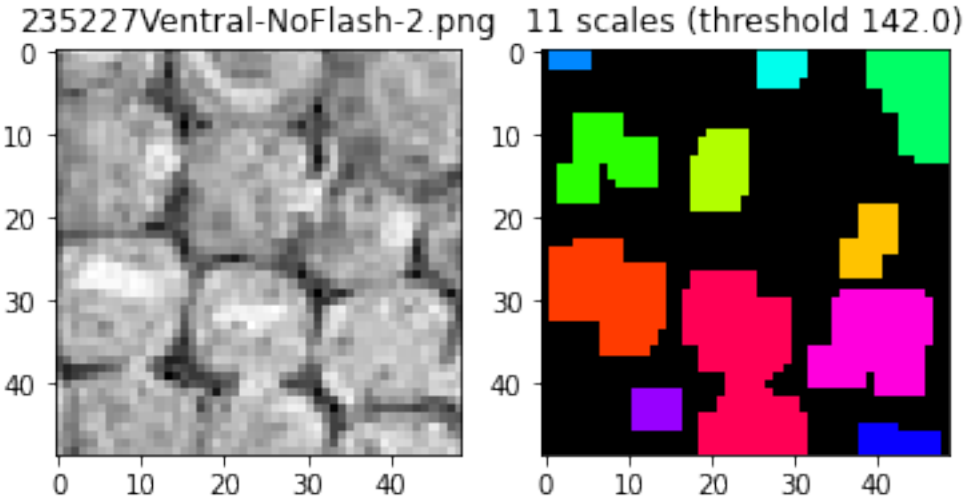
[2]:
```
def countScales(imgName):
    img = cv2.imread(imgName)
    gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)

    # Threshold using value calculated by Otsu's Binarization
    # source: https://docs.opencv.org/master/d7/d4d/tutorial_py_thresholding.
↪html
    ret, thresh = cv2.threshold(gray,0,255,cv2.THRESH_BINARY+cv2.THRESH_OTSU)

    # Remove noise
    kernel = np.ones((3,3),np.uint8)
    opening = cv2.morphologyEx(thresh,cv2.MORPH_OPEN,kernel, iterations=2)

    # Label and count
    # source: https://medium.com/analytics-vidhya/
↪images-processing-segmentation-and-objects-counting-in-an-image-with-python-and-opencv-216c
    count, labels = cv2.connectedComponents(opening)
    count = count - 1 # background doesn't count as a scale
    label_hue = np.uint8(179 * labels / np.max(labels))
    blank_ch = 255 * np.ones_like(label_hue)
    labeled_img = cv2.merge([label_hue, blank_ch, blank_ch])
    labeled_img = cv2.cvtColor(labeled_img, cv2.COLOR_HSV2BGR)
    labeled_img[label_hue == 0] = 0

    plt.subplot(1, 2, 1), plt.imshow(gray, 'gray')
    plt.title(imgName[12:])
    plt.subplot(1, 2, 2), plt.imshow(labeled_img, 'gray')
    # Title shows threshold value calculated using Otsu's
    plt.title(str(count) + ' scales (threshold ' + str(ret) + ')')
    plt.show()

    return count
```

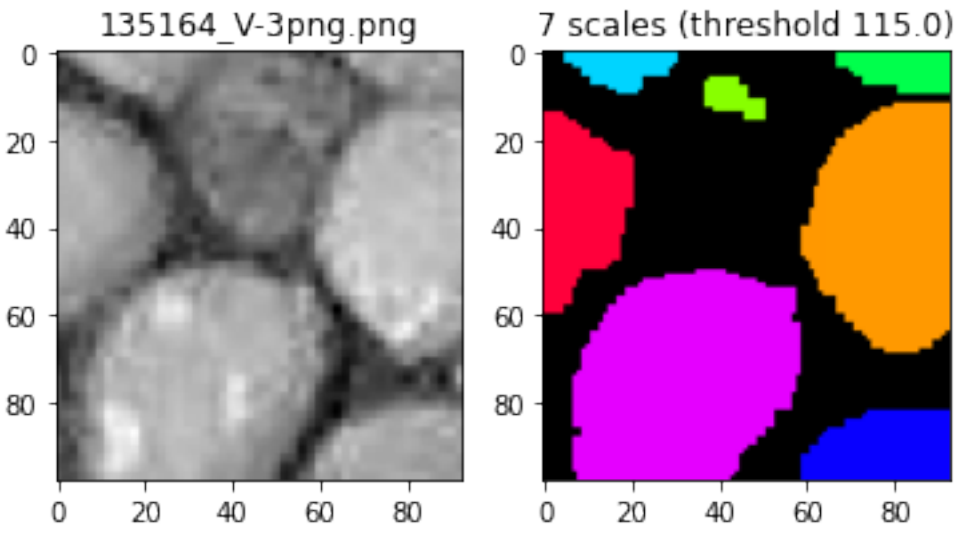
[3]:
```
#create an iterator object for img directory
directory = os.scandir('More_images')

for img in directory:
    countScales('More_images/' + img.name)
```

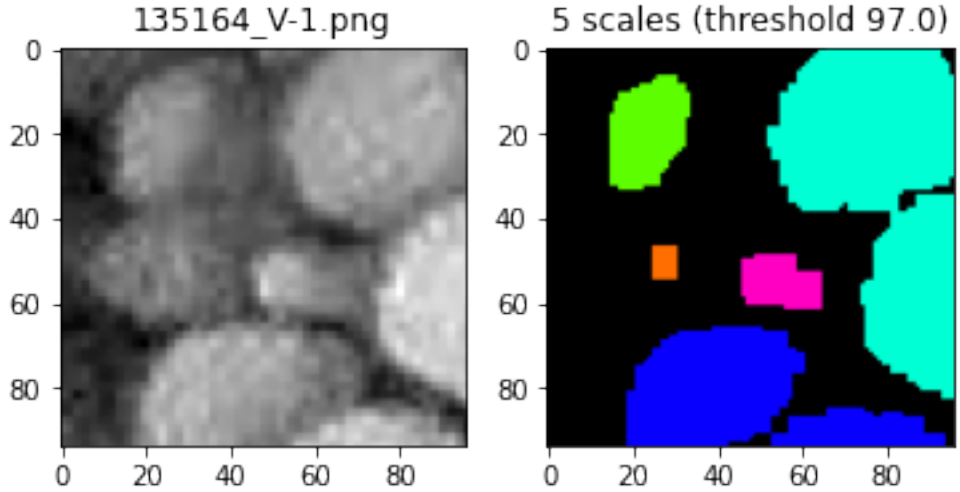


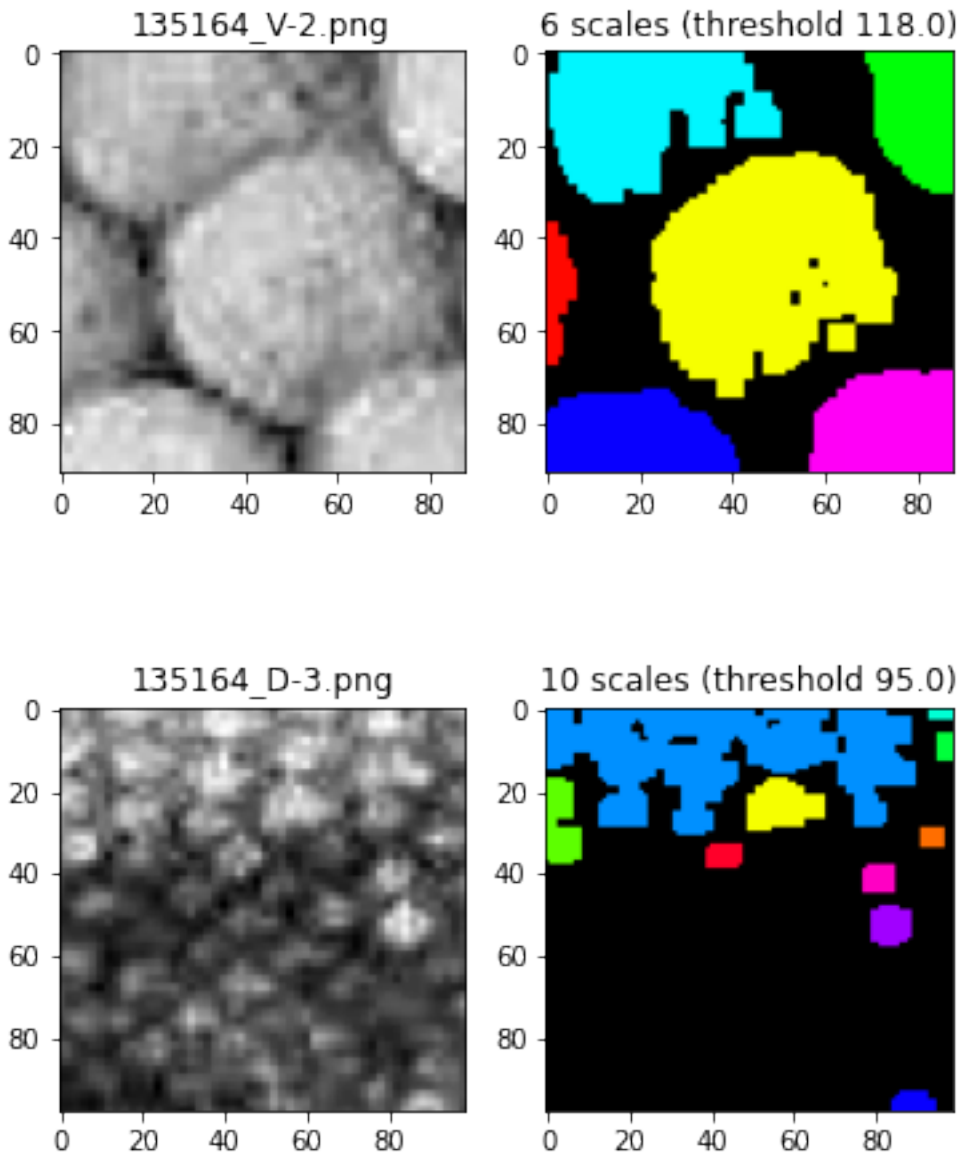


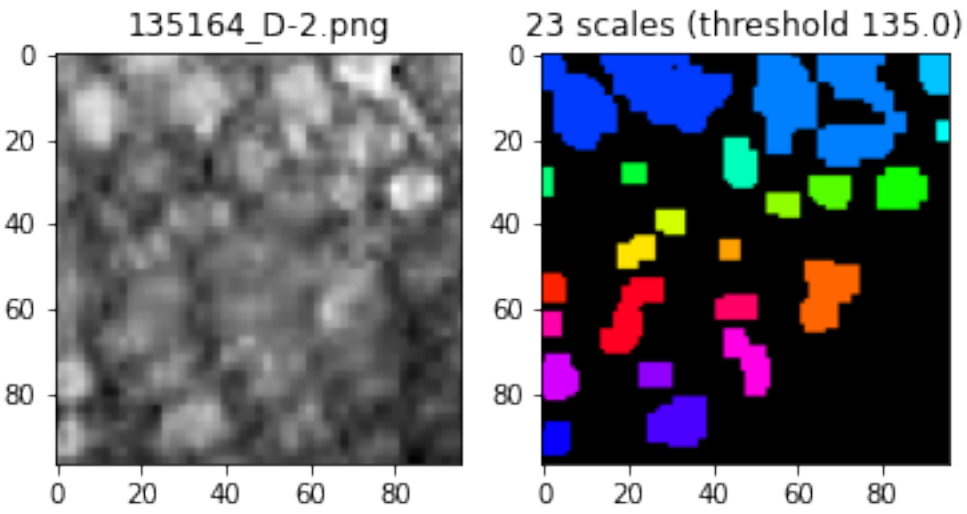

235227Ventral-Flash-2.png
5 scales (threshold 162.0)
0
10
20
30
40
50
0
20
40

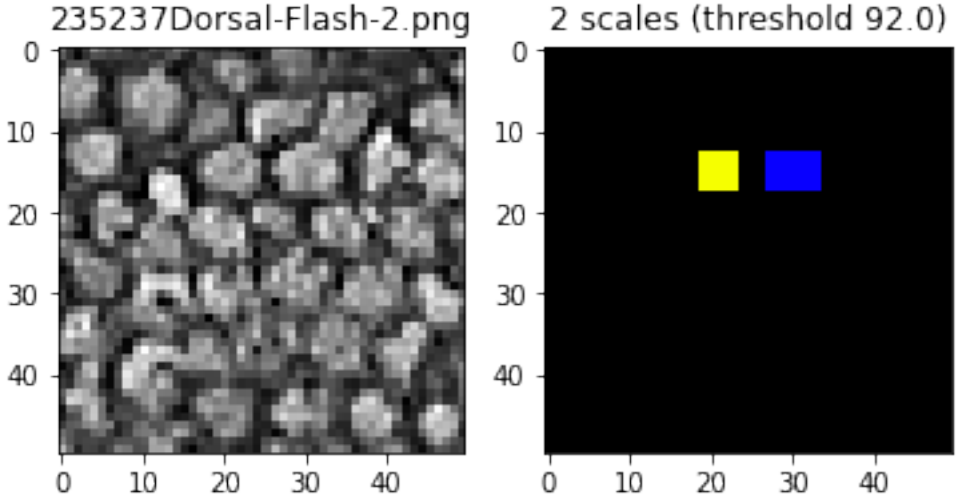

235227Ventral-NoFlash-2.png
11 scales (threshold 142.0)
0
10
20
30
40

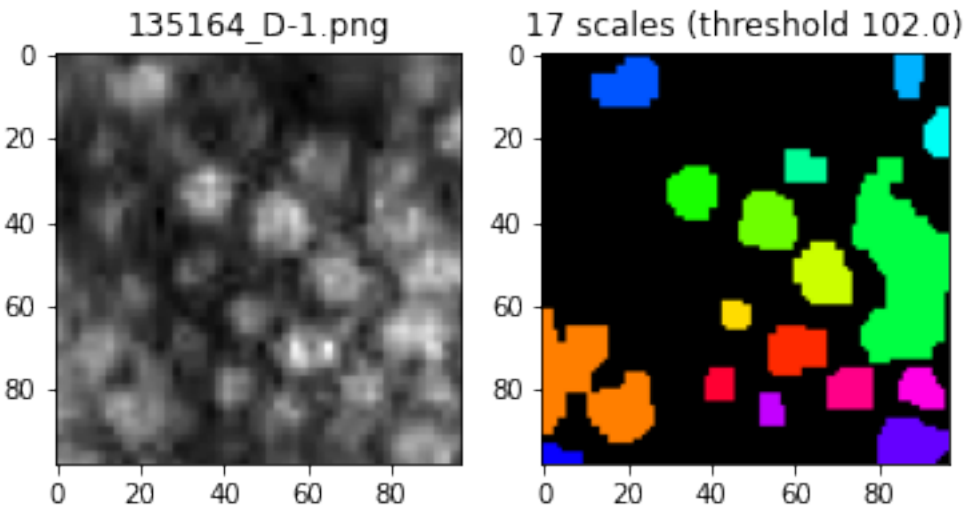

135164_V-3png.png
7 scales (threshold 115.0)
0
20
40
60
80

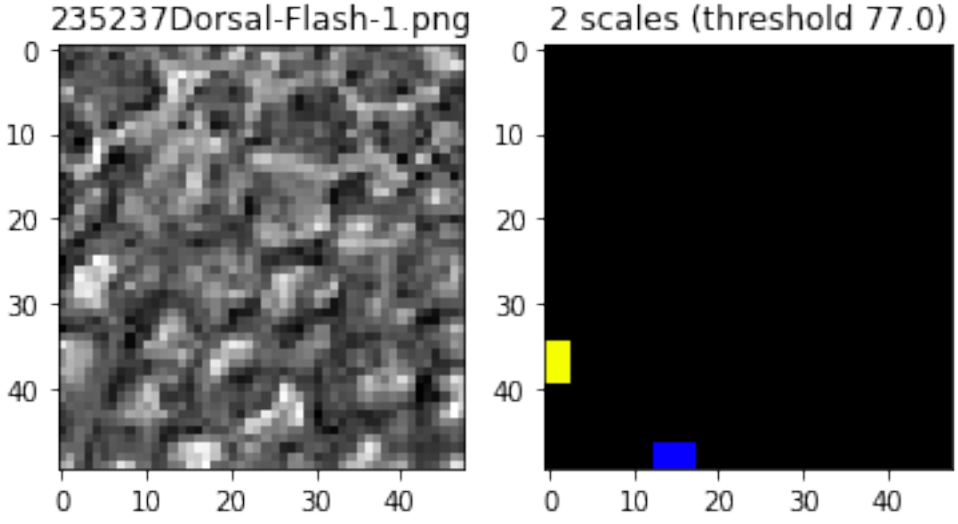

135164_V-1.png
5 scales (threshold 97.0)
0
20
40
60
80

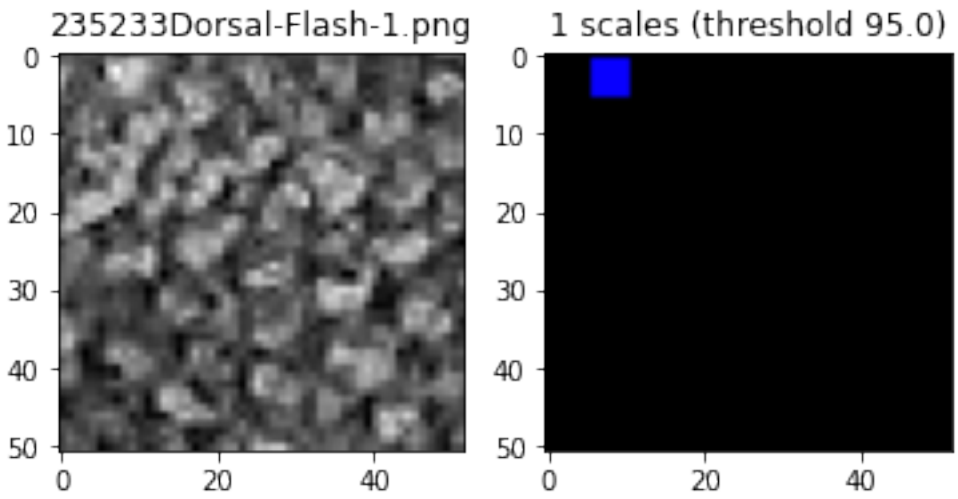

135164_V-2.png
6 scales (threshold 118.0)
135164_D-3.png
10 scales (threshold 95.0)
0
20
40
60
80


135164_D-2.png
23 scales (threshold 135.0)

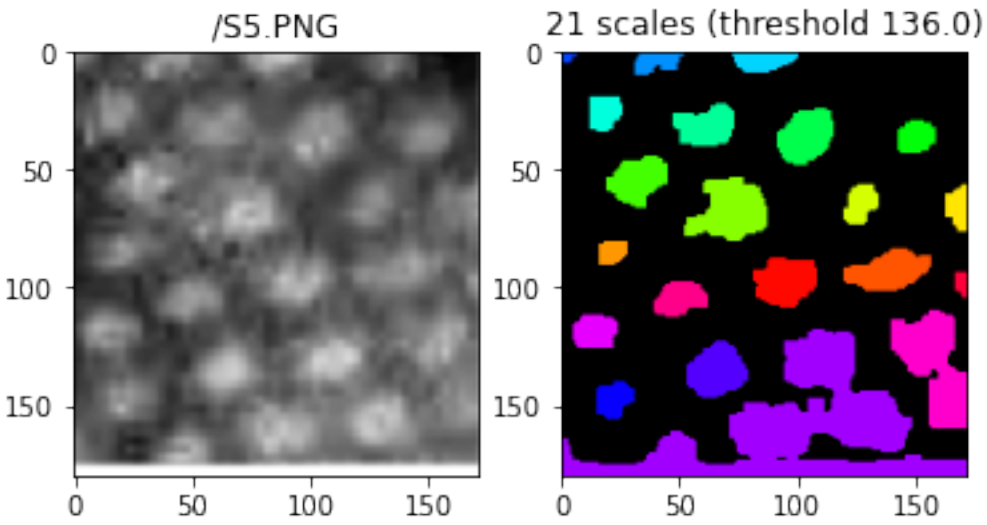

235237Dorsal-Flash-2.png
2 scales (threshold 92.0)

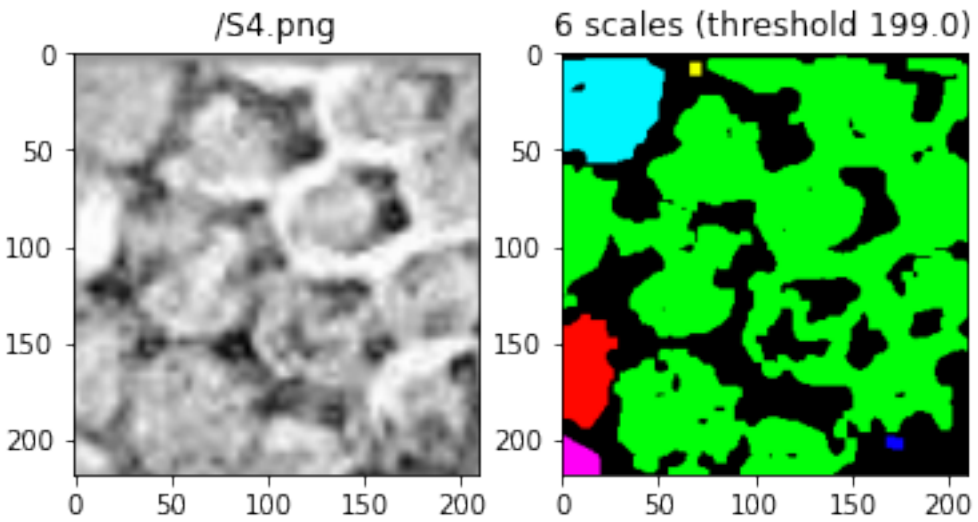

135164_D-1.png
17 scales (threshold 102.0)
0
20
40
60
80

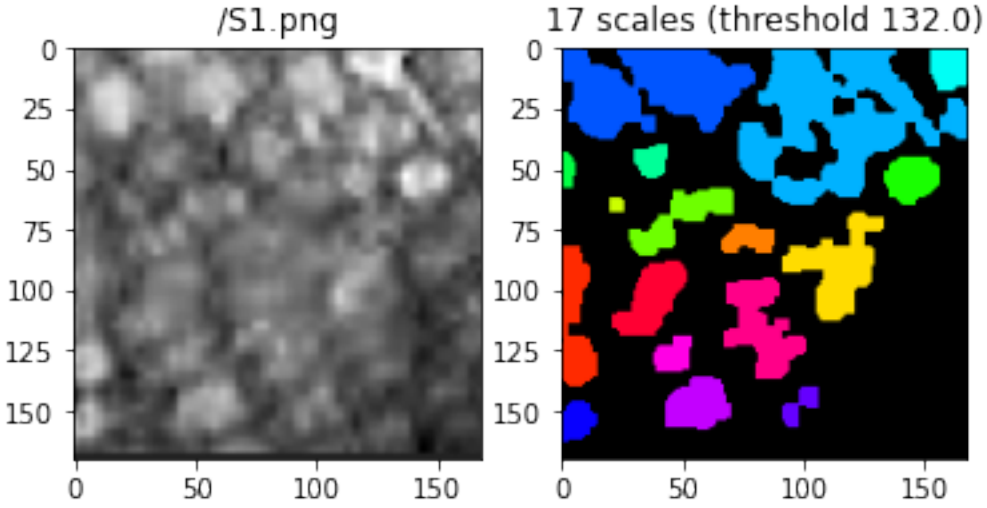

235237Dorsal-Flash-1.png
2 scales (threshold 77.0)
0
10
20
30
40

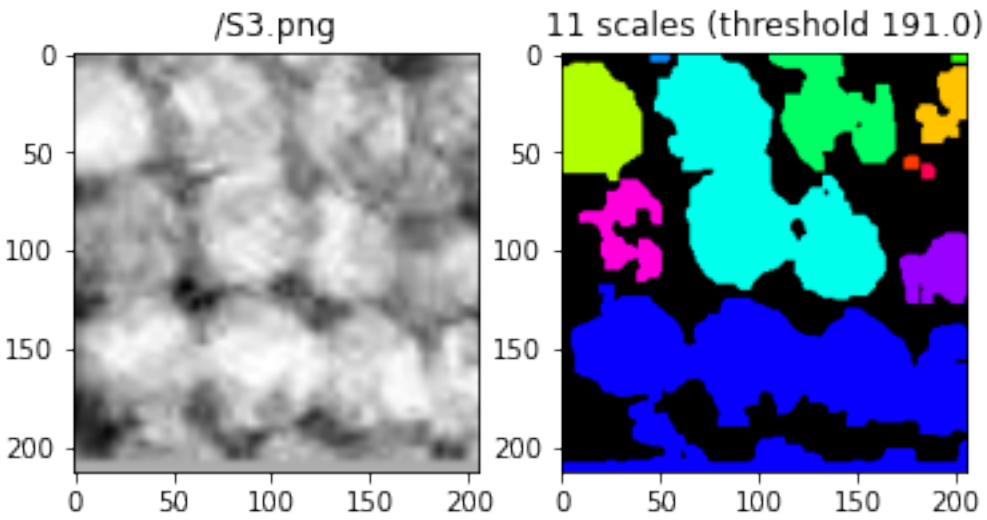


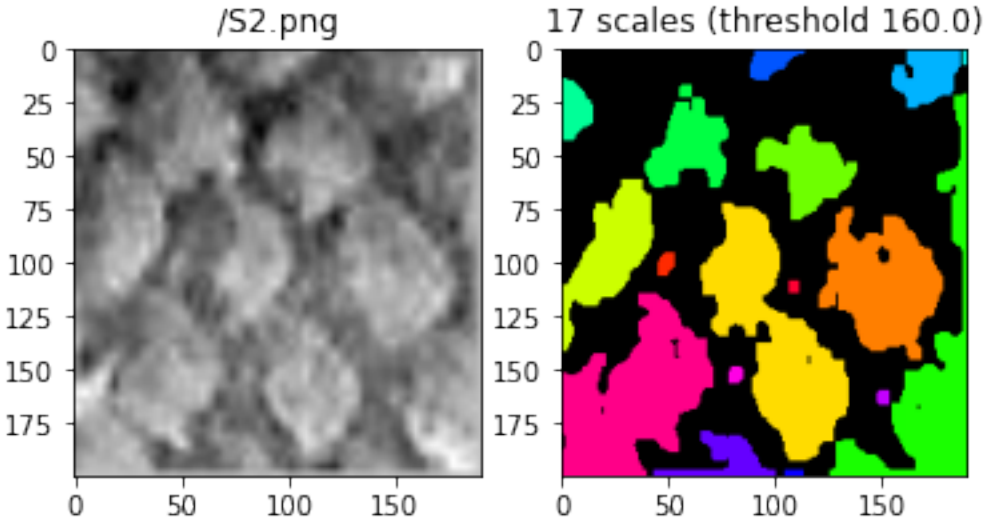
[4]:
```
directory = os.scandir('Scale_images')

for img in directory:
    countScales('Scale_images/' + img.name)
```




/S4.png
6 scales (threshold 199.0)
0
50
100
150
200


/S1.png
17 scales (threshold 132.0)
0
25
50
75
100
125
150






```
---------------------------------------------------------------------------
error                                     Traceback (most recent call last)
<ipython-input-4-57ab0cd3c113> in <module>
      2
      3 for img in directory:
----> 4     countScales('Scale_images/' + img.name)

<ipython-input-2-3c64d929daf8> in countScales(imgName)
      1 def countScales(imgName):
      2     img = cv2.imread(imgName)
----> 3     gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
```

```
      4
      5     # Threshold using value calculated by Otsu's Binarization

error: OpenCV(4.4.0) /private/var/folders/nz/vv4_9tw56nv9k3tkvyszvwg80000gn/T/
 ↪pip-req-build-gi6lxw0x/opencv/modules/imgproc/src/color.cpp:182: error: (-215
 ↪Assertion failed) !_src.empty() in function 'cvtColor'
```

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