<u>**MatLab Codes**</u>

Last updated: 6/24/2025

1. Cell_Image_Code

    a. Not currently running

    b. Original code from starting this project

2. Cell_Image_Code_Morphology

    a. Running well

    b. Giving yellow numbers and blue watershed overlay

    c. Still not correct

3. Cell_Image_Code_Box_Drive

    a. Does what it is supposed to

    b. Gives a grayscale image with a scale bar

    c. Intended to upload images back into the Box Drive

    d. Code to upload has not yet been added

4. GUI_Trial_Code

    a. Running

    b. Could play around with it some more

    c. Not really doing what I want it to though

5. Test

    a. Running

    b. Uses eccentricity

    c. Gives pink image with random red ellipses drawn all over it

    d. Is not giving the correct cells for the most part

e. Gives eccentricity values in Command Window

f. Might be printing the eccentricity values twice?

6. Test_2

   a. Gives a grayscale image with red ellipses drawn all over it

   b. Still not identifying the correct cells

   c. Prints eccentricity followed by a table containing the cell number, area, adn aspect ratio

   d. One of the better ones

7. Test_3_Paper

   a. Code that Micah and I have worked on extensively

   b. Taken from the Pattern Recognition paper titled "Splitting touching cells based on concave points and ellipse fitting"

   c. Came from prewritten algorithms

   d. Gives an image almost entirely covered in red ellipses with watershed overly and yellow numbers slightly visible in the background

   e. Does not print any values

   f. Was good at one time but not the greatest at the moment

8. Morphology_Circles_Out

   a. Done during Zoom call

   b. Intended to remove the circles (dead cells) from the image

   c. Gives three images: the original image, the black and white or binary image, and then the grayscale image with watershed overlay and yellow numbers on it

   d. All of these images are in the same figure

e. Prints out a message telling you the retained elliptical shapes, how many cells were detected, and that it removed the round cells

f. Also prints out the cell number, area, and aspect ratio

9. Circles_Out_2

a. Second version of the previous similar code also done on Zoom call

b. Gives a pink image containing that watershed overlay and yellow numbers

c. Prints out how many valid cells were detected followed by the cell number, area, aspect ratio, and eccentricity

10. Major_Axis_Line

a. Also done on Zoom call

b. Intended to draw a line on the major axis of each cell

c. Gives three images: the original image, the black and white or binary image, and a pink image with blue plus signs in the middle of green lines that are intended to be the major axes of the cells

d. All images are in one figure

e. Prints that it removed round cells and how many elliptical shapes were retained

f. Does not work for its purpose

11. Test_3_Paper_2

a. Code taken from the original Test_3_Paper

b. Gives two separate figures: the first one showing what regions were filtered out and retained (green boxes on grayscale image), and the second one showing the grayscale image with some red ellipses drawn on there with yellow numbers counting the detected cells

    c.   Does not print anything

    d.   Probably running the best so far

12. Test_3_Paper_3

    a.   Also another rendition of Test_3_Paper made after Test_3_Paper_2 was running decently well

    b.   Gives a grayscale image with a large amount of red ellipses drawn on there with yellow numbers counting the detected cells

    c.   Prints how many valid regions it found

    d.   Does not work well at all

13. Test_2_Print_Major_and_Minor

    a.   Same as Test_2 but exports table containing the cell number, area, major axis, minor axis, aspect ratio, and eccentricity in it

    b.   Still works pretty well

    c.   Not circling the correct cells, but using red ellipses as marks

    d.   Also pulls the major and minor axes lengths where Test_2 does not

14. Black_Background_Trial

    a.   DOES NOT WORK

    b.   Just a trial to experiment with turning the background black

    c.   Cells are the same intensity as the background, so the program has a lot of trouble different the cells from the background