

Image Analysis

The MATLAB script is designed to read all images of a specific format (.tif, .jpg, .png....) in a specified folder for automatic size and position analysis.

The script uses edge detection to find objects and then calculates the area of the objects it finds. Using the area of the pseudo-circular objects, it calculates the diameter of a circle of equivalent area.

The process is batched but requires some user inputs:

- i. It requires you to draw a line on the scale bar and specify the known length in nm
- ii. Crop the image to exclude the scale bar from the automatic search area

Things to modify before running:

- i. Set your input and output directory on Line 4 and 5

```
% Input and output directories  
inputDir = '/Users/arbot/Documents/MATLAB/Image Analysis/ImageCase'; % Replace with your folder path  
outputDir = '/Users/arbot/Documents/MATLAB/Image Analysis/ImageCase/results'; % Replace with your folder path
```

- ii. Specify the format of the images on line 13

```
% Get list of all .tif files in the input directory  
fileList = dir(fullfile(inputDir, '*.tif'));
```

- iii. Comment/Uncomment the properties you want exported between line 145 and 157

```

% Define output .txt file
% outputFile1 = fullfile(outputSubDir, 'exported_Area.txt');
% outputFile2 = fullfile(outputSubDir, 'exported_Centroids.txt');
outputFile3 = fullfile(outputSubDir, 'exported_Diameter_nm.txt');
outputFile4 = fullfile(outputSubDir, 'exported_Average_diameter.txt');
outputFile5 = fullfile(outputSubDir, 'exported_numObjects.txt');

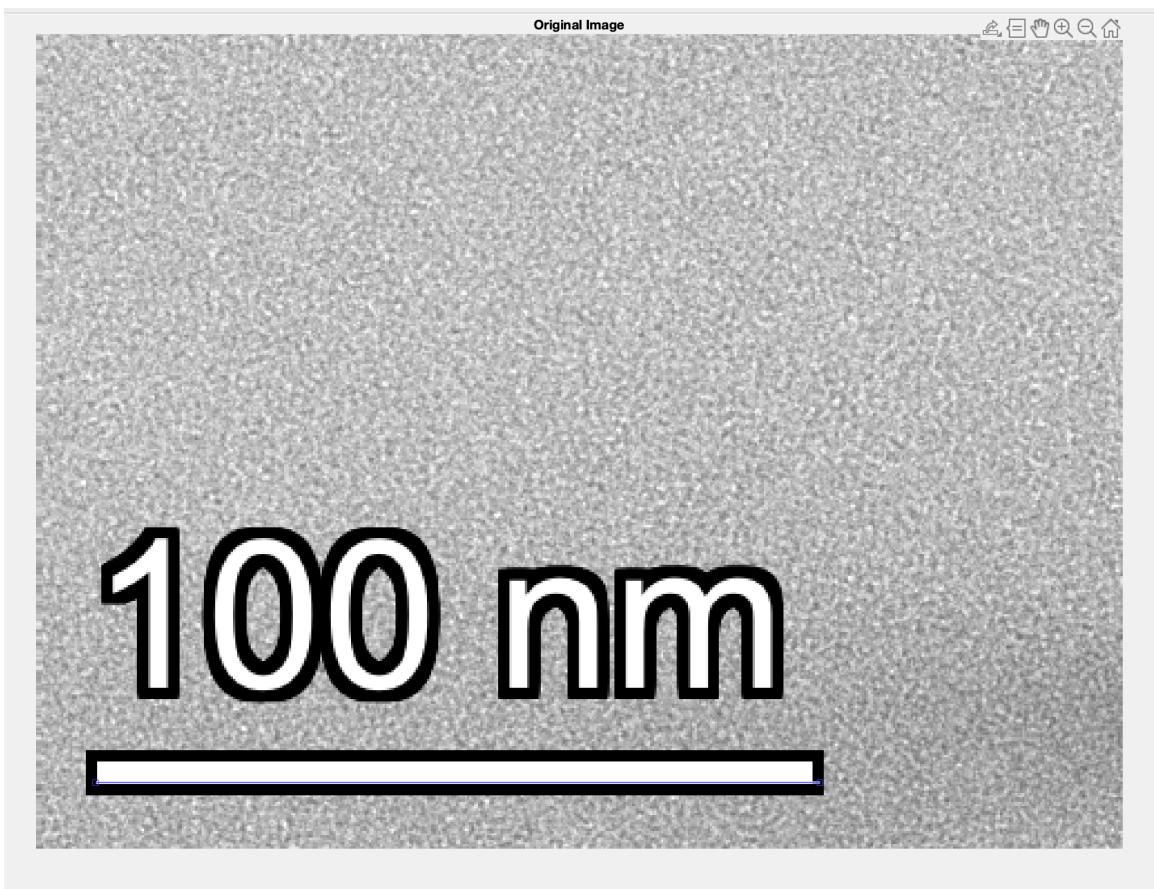
% Write data to .txt file
% writematrix(exportArea, outputFile1, 'Delimiter', '\t');
% writematrix(exportCentroids, outputFile2, 'Delimiter', '\t');
writematrix(exportDiamnm, outputFile3, 'Delimiter', '\t');
writematrix(exportAvgDiam, outputFile4, 'Delimiter', '\t');
writematrix(exportnumObj, outputFile5, 'Delimiter', '\t');

```

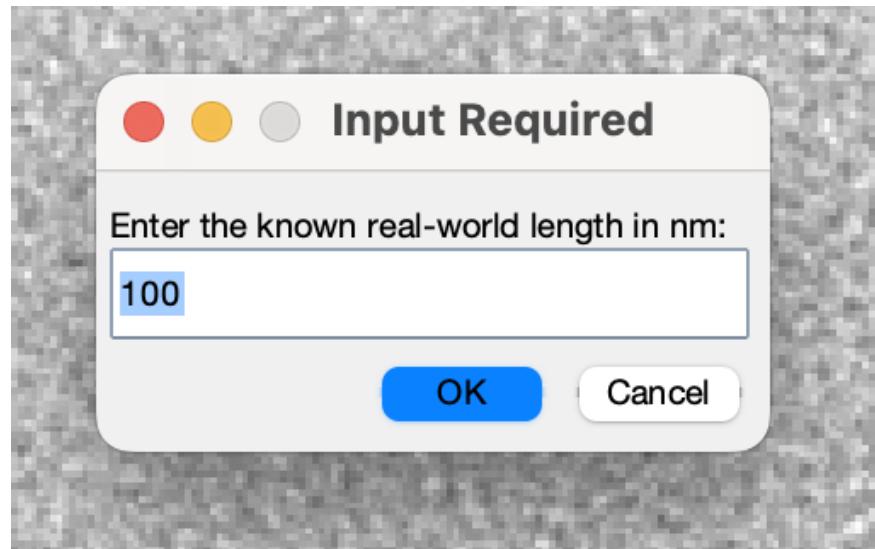
The program will automatically cycle through all the images and provide you the edges, masks and histogram of sizes along with text files of the properties you uncommented such as centroids, average diameter and areas.

Instructions:

- i. Once the modifications have been made, just run the script. It will show you your image, at this point make a line on the scale bar. You can zoom in to make sure the line is appropriate, to confirm double click on the line.

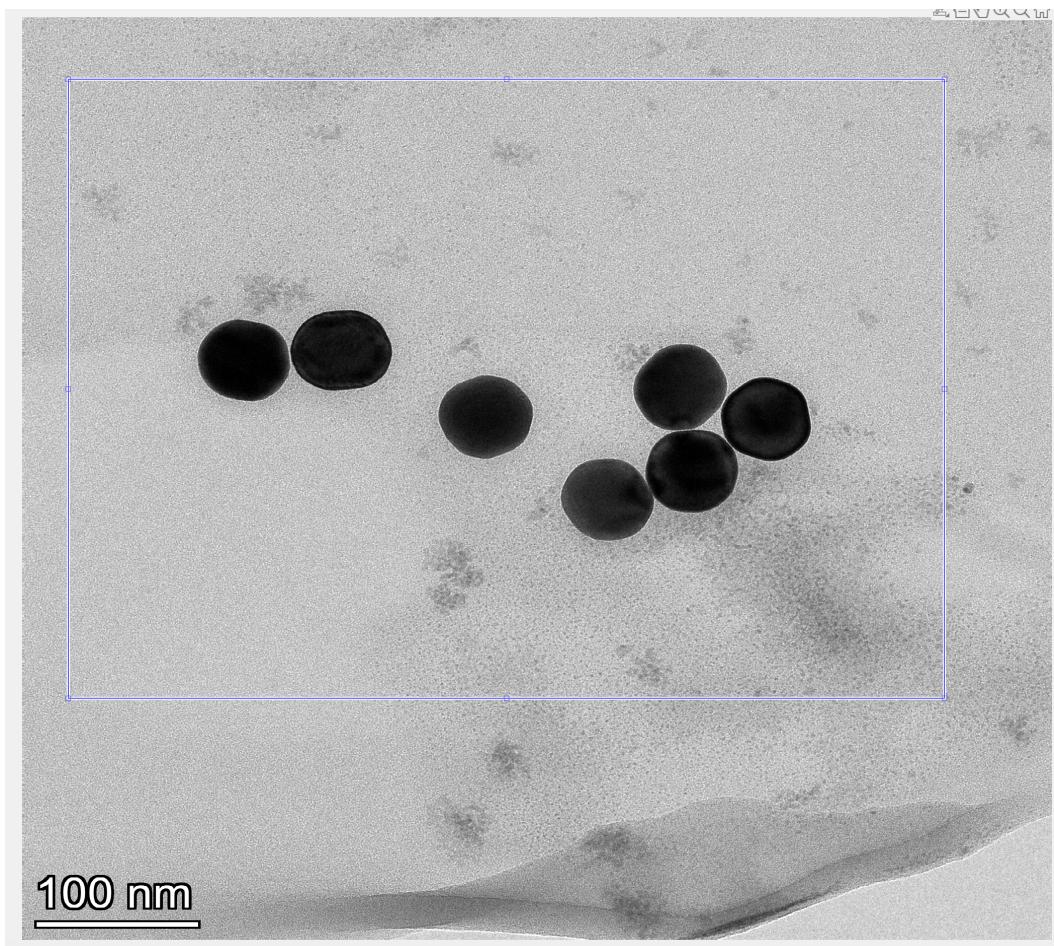


ii. Next it will ask you for known length, enter the length of the scalebar in **nm**



iii. It will flash you your original image again after pressing okay, now make a box to indicate region of interest (**without the scale bar**). Double click on the box

to confirm selection.



iv. Your results should be in the specified folder now.

This will also produce a list of particle diameters for all particles in the input directory along with a histogram of all particle sizes.

Tip: You can just create a matrix outside the For loop to store all properties and export them into one file for the entire folder if you want.