Lab 1: Bonus

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OBJECTIVE: The purpose of this lab exercise with MATLAB was to learn more advanced methods of utilizing MATLAB for image analysis, as well as to learn basic and useful functionalities such as live scripts.

METHODS: In part A of the lab, I used imtool with range specifications to display only the 3x3 pixels at the top left corner of the cells.jpg image.

Before converting the image to gray-scale, I adjusted the image using imreducehaze and imadjust functions to make the blue parts more visible. Then, the gray-scale image made using rgb2gray function was further filtered at cutoffs of intensity 20 and 150 to clearly visualize only the blue sections in the binary image. Using bwareaopen with area of 100 pixels, the binary image was further filtered to only contain the blue sections. Finally, the binary image was overlayed onto the original image using imfuse function with functionality of "blend".

In part 7 and 8 of the lab, I followed the directions almost exactly to get the wanted outcomes. For part 7, the equations and syntax were adjusted according to the needs of the variables that I set.

In part 9 of the lab, I followed the instructions on the video to make the green image of cells.jpg. The file Color_Segmentation.m isolates objects in the image by gray-scaling on each of the RGB plane, and then indicating where the objects are in the image. The functionality are similar to that of the Apps, in that the levels of RGB can be altered according to the need of the user.

For cprintf section of part 9, I used the input cprintf('Magenta', 'these texts are magenta') to output text with the color magenta. Then, I used the function input() to induce an input from user, and then utilized the input in cprintf() to get the desired output.

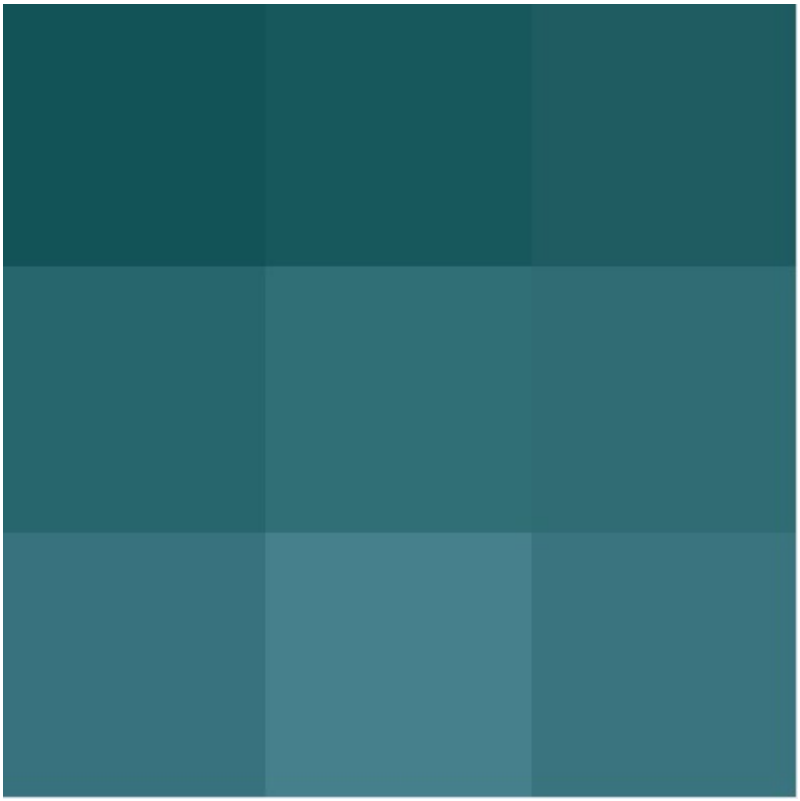
RESULTS: For part A, the RGB values for the 3x3 pixels are as follows:

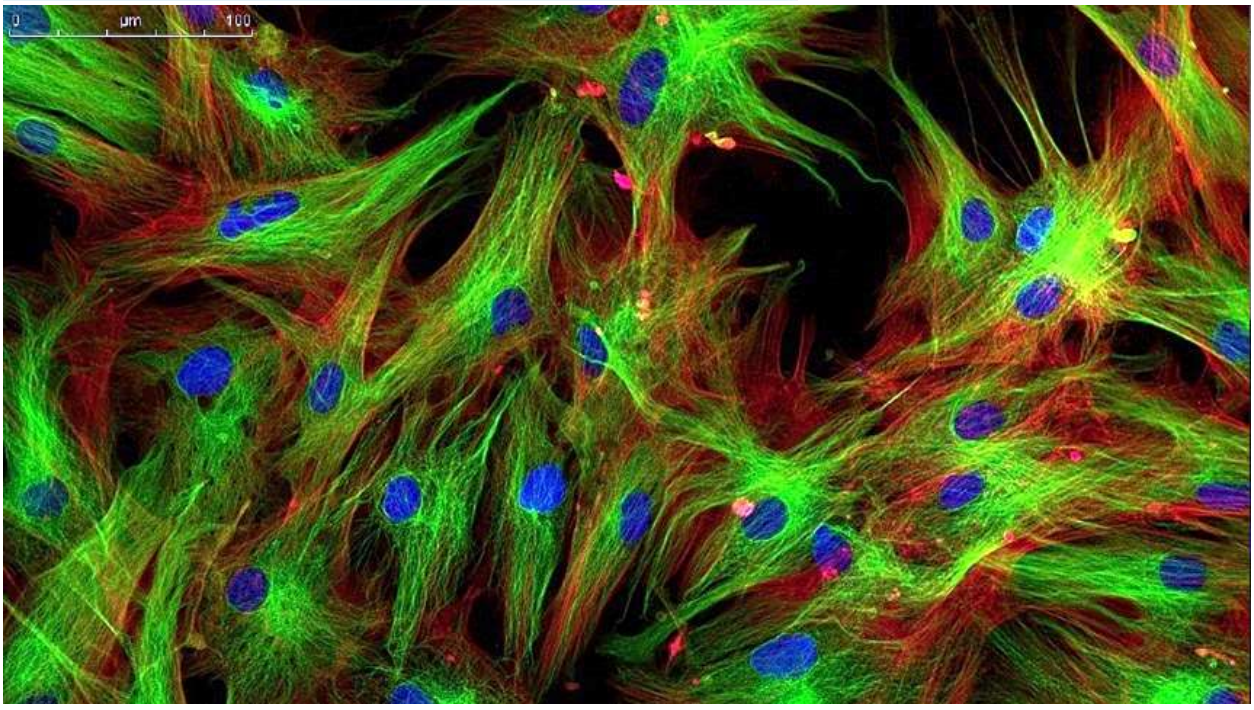
(1, 1) [18 83 87]	(2, 1) [23 88 92]	(3, 1) [31 92 97]
(1, 2) [39 102 109]	(2, 2) [48 111 118]	(3, 2) [48 108 116]
(1, 3) [56 114 126]	(2, 3) [70 128 140]	(3, 3) [58 116 127]

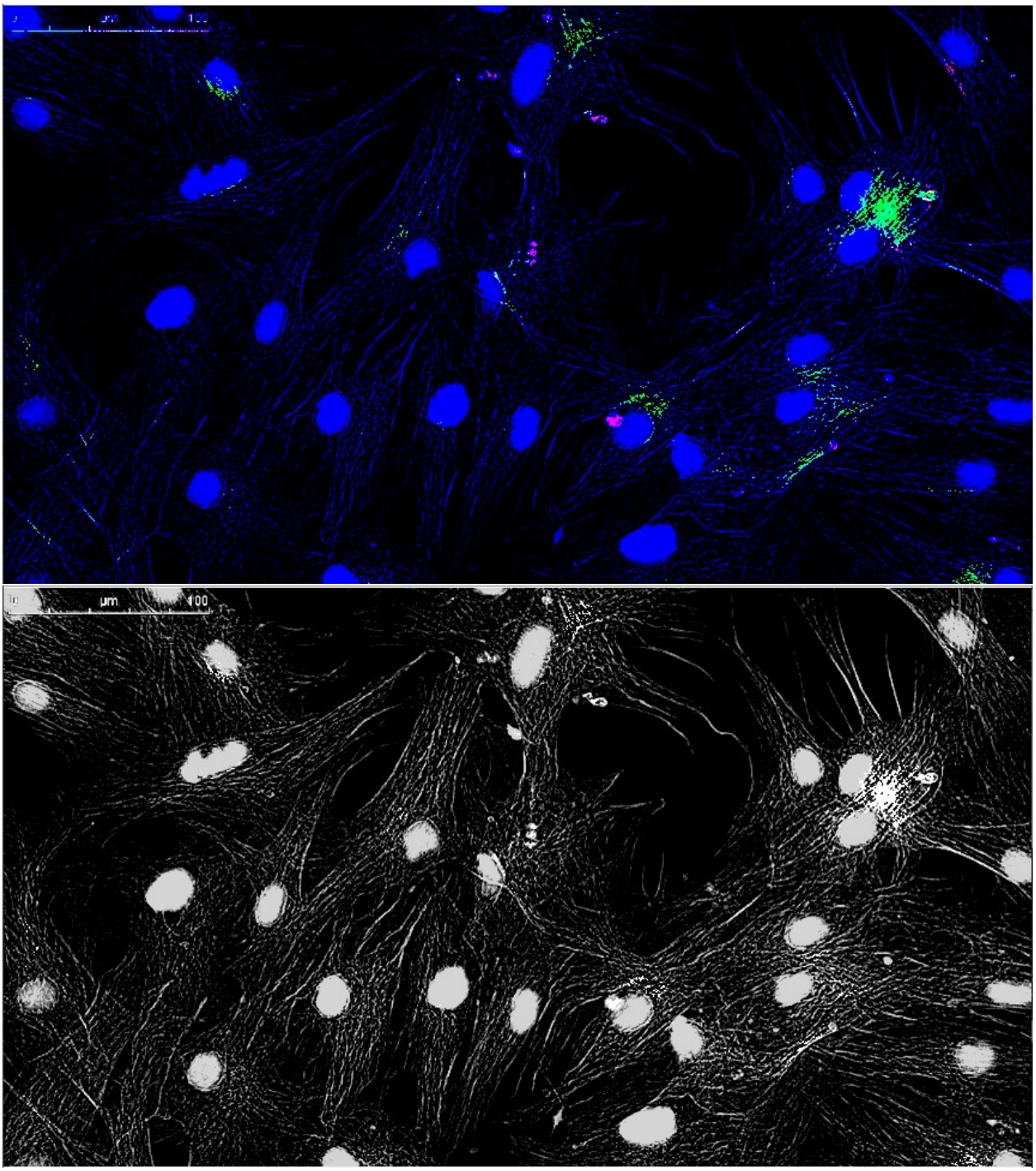
For part 8, the volume of sphere with r=15 turned out to be : `V = 1.4137e+04.`

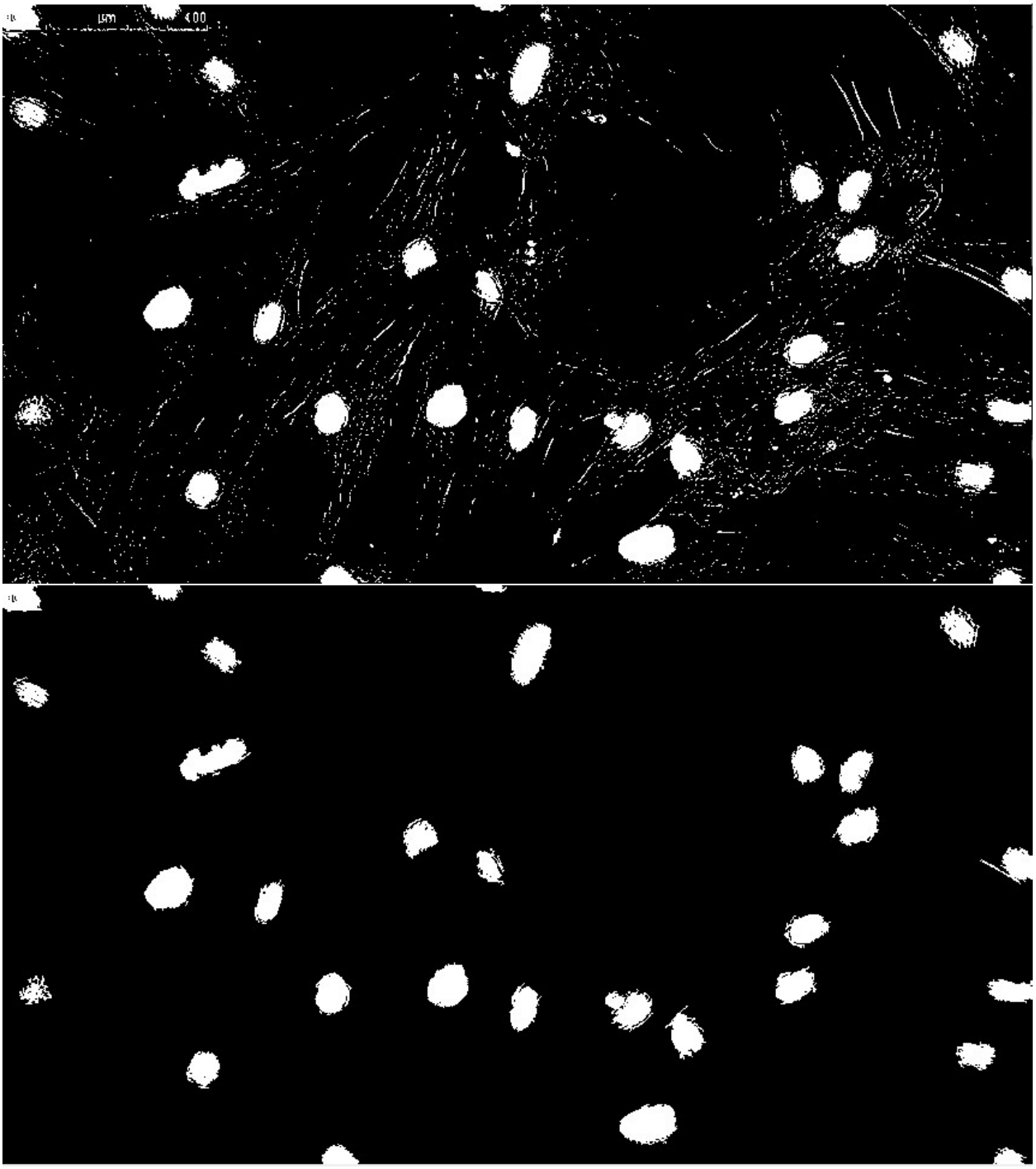
CONCLUSION: These exercises showed that MATLAB is capable of many different advanced works, not only in mathematical manipulation and graphical representations, but also in areas such as image analysis and manipulation.

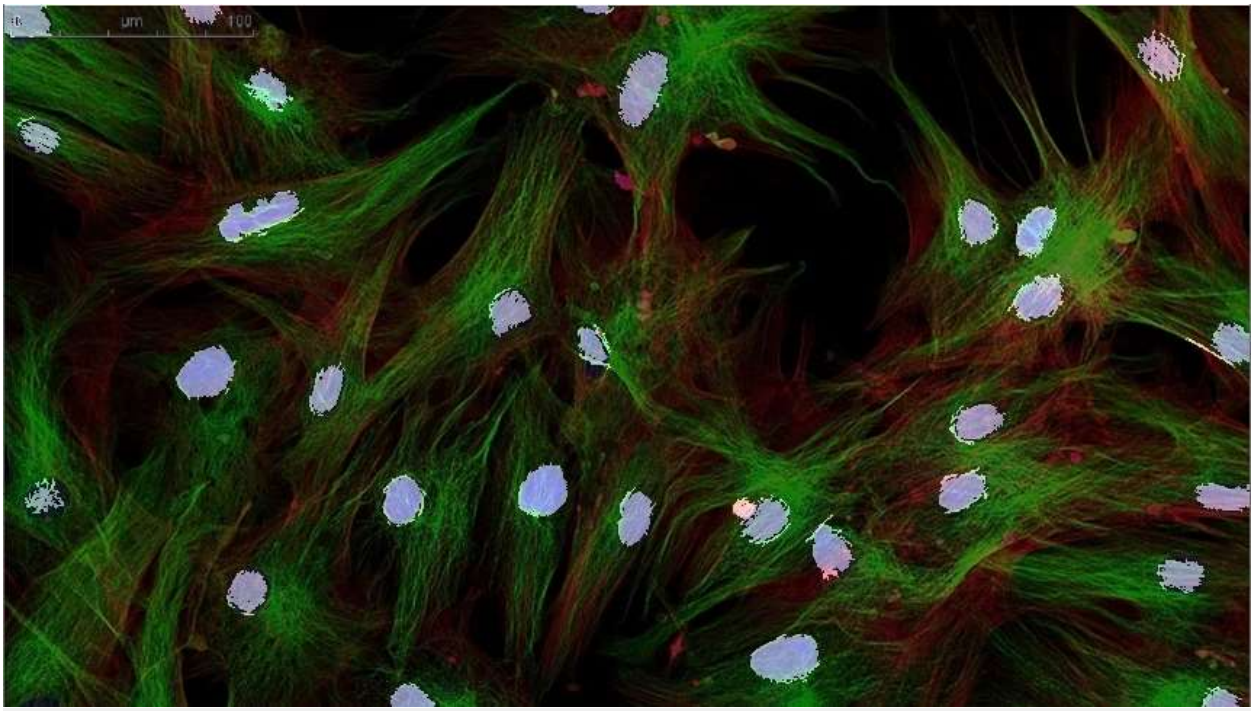
APPENDIX:

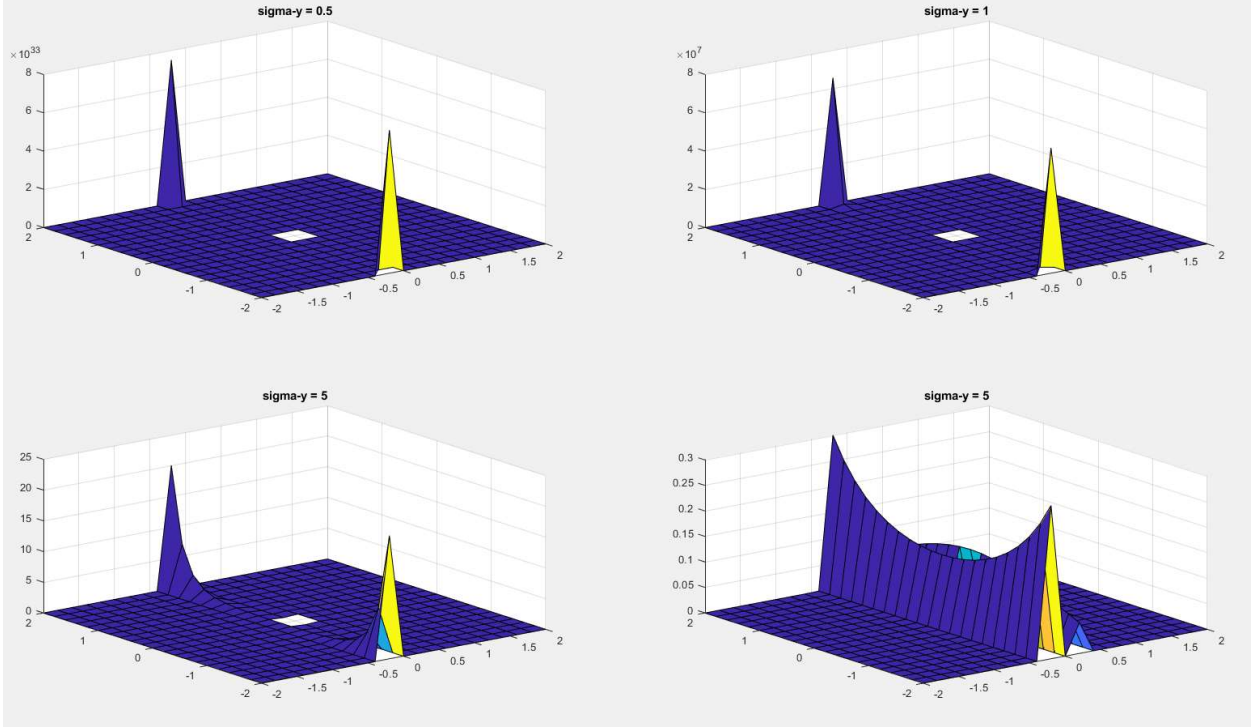


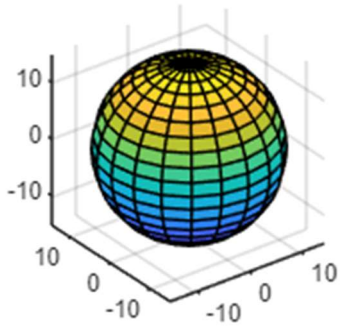



µm
100
µm
100


µm
4.00


um
100


sigma-y = 0.5
sigma-y = 1
sigma-y = 5
sigma-y = 5


10
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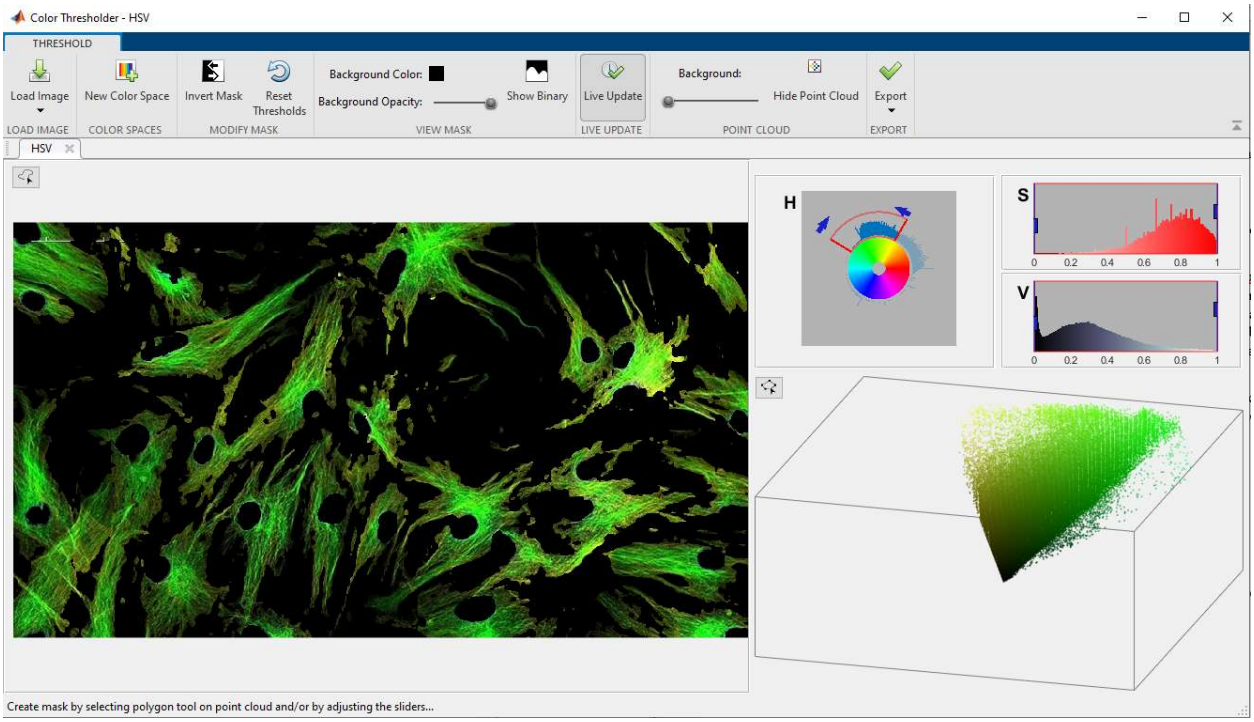
10


Color Thresholder - HSV
THRESHOLD
Load Image
New Color Space
Invert Mask
Reset Thresholds
Background Color:
Background Opacity:
Show Binary
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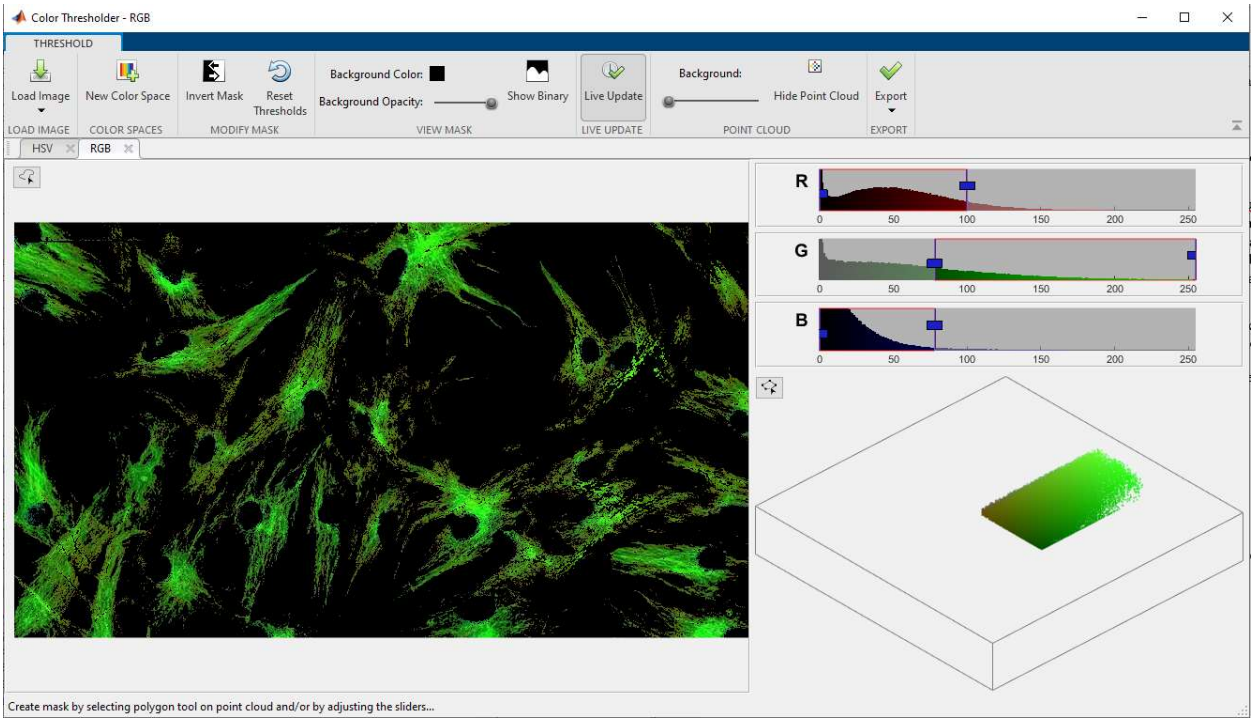
Create mask by selecting polygon tool on point cloud and/or by adjusting the sliders...


Color Thresholder - RGB
THRESHOLD
Load Image
New Color Space
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Background Color:
Background Opacity:
Show Binary
Live Update
Background:
Hide Point Cloud
Export
LOAD IMAGE
COLOR SPACES
MODIFY MASK
VIEW MASK
LIVE UPDATE
POINT CLOUD
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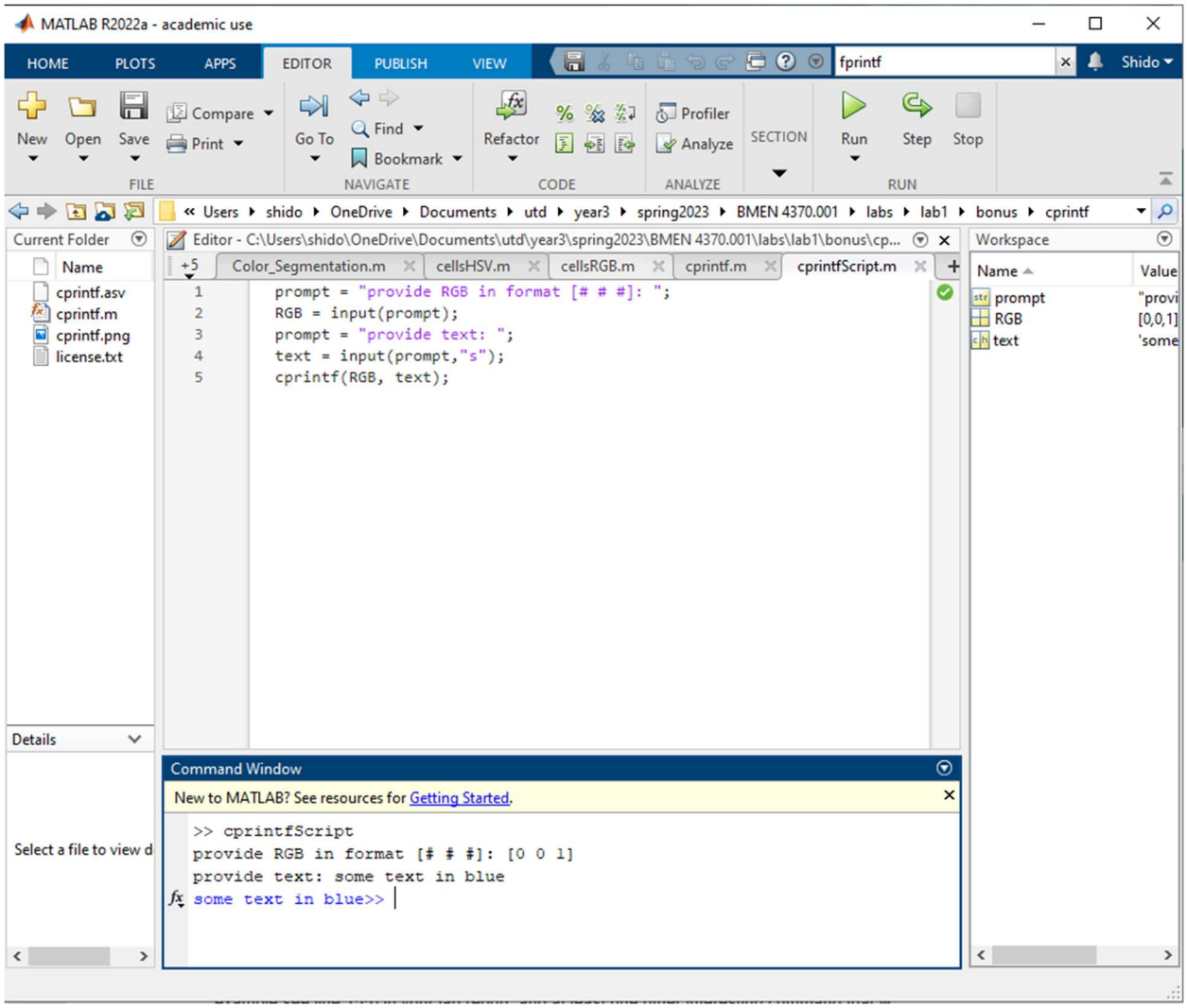
250
Create mask by selecting polygon tool on point cloud and/or by adjusting the sliders...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cellsHSV.m
cellsRGB.m
cprintf.m
cprintfScript.m
1 prompt = "provide RGB in format [# # #]: ";
2 RGB = input(prompt);
3 prompt = "provide text: ";
4 text = input(prompt,"s");
5 cprintf(RGB, text);
Workspace
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[0,0,1]
text
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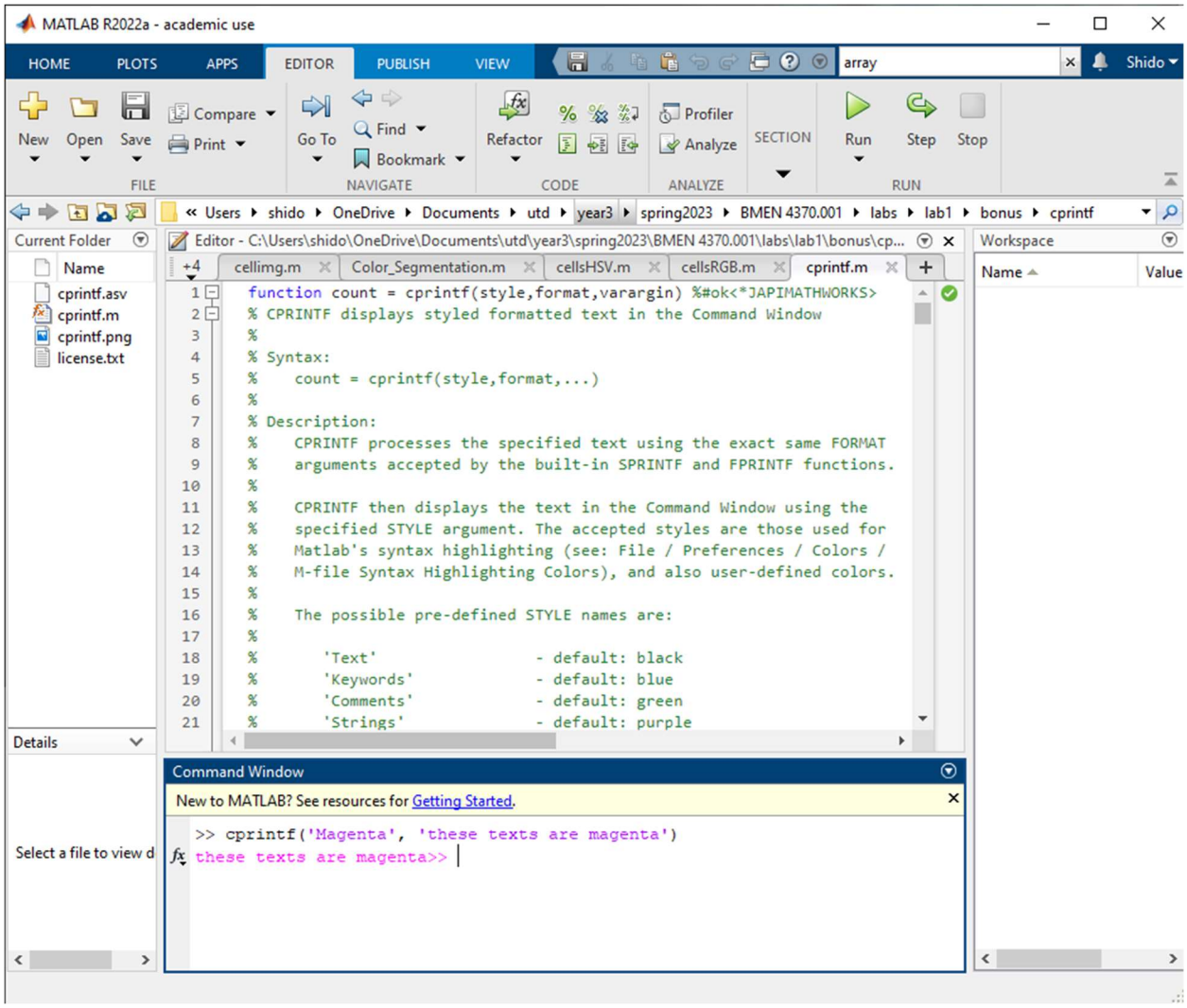
Command Window
New to MATLAB? See resources for Getting Started.
>> cprintfScript
provide RGB in format [# # #]: [0 0 1]
provide text: some text in blue
some text in blue>>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cellimg.m
Color_Segmentation.m
cellsHSV.m
cellsRGB.m
cprintf.m
1 function count = cprintf(style,format,varargin) %#ok<*JAPIMATHWORKS>
2 % CPRINTF displays styled formatted text in the Command Window
3 %
4 % Syntax:
5 % count = cprintf(style,format,...)
6 %
7 % Description:
8 % CPRINTF processes the specified text using the exact same FORMAT
9 % arguments accepted by the built-in SPRINTF and FPRINTF functions.
10 %
11 % CPRINTF then displays the text in the Command Window using the
12 % specified STYLE argument. The accepted styles are those used for
13 % Matlab's syntax highlighting (see: File / Preferences / Colors /
14 % M-file Syntax Highlighting Colors), and also user-defined colors.
15 %
16 % The possible pre-defined STYLE names are:
17 %
18 % 'Text' - default: black
19 % 'Keywords' - default: blue
20 % 'Comments' - default: green
21 % 'Strings' - default: purple
Workspace
Name
Value
Command Window
New to MATLAB? See resources for Getting Started.
>> cprintf('Magenta', 'these texts are magenta')
these texts are magenta>>