This library of Matlab code (“Track\_Vesicle”) tracks, centers and crops images of vesicles. Copyright (C) 2012, Cynthia A. Stanich, Aurelia R. Honerkamp-Smith, Pietro Cicuta, Matthew C. Blosser, and Chris S. Warth

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**Track\_vesicle**

function track\_vesicle(fileName, diskrad)

% This m-file is for tracking and centering a tif stack of vesicle images

%CENTER CROP CALLED AT END!!!! You need to run this as a function, but

%beforehand you need to input the folder and home. You can leave diskrad

%blank if you are unsure of the radius of the in-focus area of the vesicle.

%You will want to change the disk thickness depending on your bright ring

%around the in-focus area of the vesicle. See line 50

%Needs Avesiclemask2.m, center\_crop.m

%Program originally written by Aurelia R. Honerkamp-Smith and modified by Cynthia A. Stanich

%It includes a 12-line section written by Matthew Blosser that

% finds the radius of the in-focus area

FOLDER = ('C:\Program Files (x86)\MATLAB\R2007a Student\work\diffusion\Ostwald\Water\2-16-10\v2')%Where the movies are

HOME = ('C:\Program Files (x86)\MATLAB\R2007a Student\work'); %Where work files are

cd(FOLDER) %Change the directory to where the movies are

file = [fileName];

%%%THIS IS FOR TIFFS - It should not be required to change anything below this line

fileinfo=imfinfo(file);

moviesize=fileinfo.Width;

lengthmovie=max(size(fileinfo));

in=zeros(moviesize,moviesize,lengthmovie,'uint16');

for k=1:lengthmovie;

in(:,:,k)=imread(file,k);

end

%Have loaded in the movie. Now, take each frame and find the center of the vesicle.

%Choose a radius, then find the center.

figure(200)

firstone = in(:,:,1);

imshow(firstone)

hold on

%make starting guess

start = ginput(1); %this line lets you click on the first picture to choose the center.

if nargin < 2 %If you didn't know the radius of the in-focus area of the vesicle

%(which is almost always the case), then this will ask you to do a second click.

%Click the edge of the bright ring.

edge = ginput(1);

diskrad = ((start(1) - edge(1))^2 + (start(2) - edge(2))^2)^(1/2);

%Calculates the radius of the in-focus area of the vesicle.

end

for k=1:max(size(fileinfo))

clear s pic

pic = in(:,:,k);

s = size(pic);

s1 = double(pic);

%figure(11) %\*\*remove this figure to run faster\*\*

%imagesc(pic), axis square

%hold on

%%%%Start Matt Blosser's code that finds the radius of the in-focus area%%%%%%

diskwidth = 10;

vars(1) = start(1); %Your first click, center of vesicle

vars(2) = start(2); %second click, if needed, edge of vesicle.

if nargin == 1

vars(3) = diskrad;

testFcn = @(vars)Avesiclemask2(vars, s1, diskwidth); %Calls program written by Aurelia

fit = fminsearch(testFcn, vars);

else

testFcn = @(vars)maskFixedRad(vars, s1, diskrad, diskwidth);

fit(3) = diskrad;

fit = fminsearch(testFcn, vars);

end %End Matt's code

if nargin > 1

fit(3) = diskrad;

end

if (fit(1)<=0) | (fit(2) <= 0) | fit(1) >= s(1) | fit(2) >= s(2)

ERROR = 1

xxx %crash program if center is outside picture

end

figure(200)

plot(fit(1), fit(2), 'or', 'LineWidth', 3)

hold on

savefit(k,:) = fit;%round(fit); %Matt had the round function but you shouldn't use it.

picsize(k,:) = s;

k

start = fit;

% saverad(k)=diskrad;

end

save([ file '\_center.dat'], 'savefit', '-ascii', '-tabs', '-double'); %Saves the center coordinates

save([ file 'diskrad.dat'], 'savefit', '-ascii', '-tabs', '-double'); %Saves the radius per frame

 %clear savefit center picsize final

close all

figure (42)

plot(savefit(:,3))

cd(HOME)

center\_crop %calls the center\_crop file to create the centered and cropped movie file.

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