Instructions for measuring crimp angle and crimp length

1. choose folder for results
   to speed up the analysis you can modify the code by inputting the result folder manually

```
5      %choose folder to save results to
6 -    cur = pwd;
7 -    locat = uigetdir(cur,'choose folder for saving results');
8
9      %locat = 'put folder path here'
10     %for example 'C:\Users\samikaup\DIPONKOR crimp_angle\Results'
```

   just put the line 7 to comments with a % sign in front and take away the % sign from line 9 and assign your folder to the variable “locat”

2. Find out the pixel resolution for your measurements and input it to the code

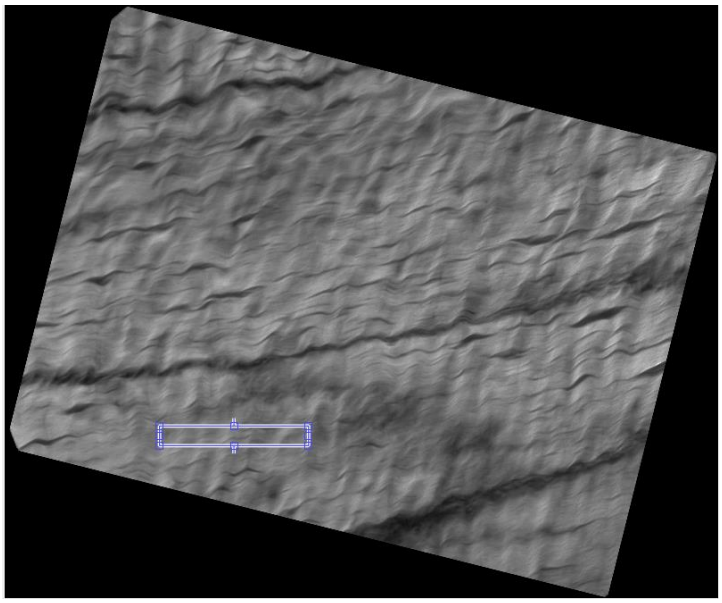
```
12     %give the pixel resolution of your images (how much one pixel is in micrometers)
13 -   res=1;
```

Run crimp_ang_analysis.m

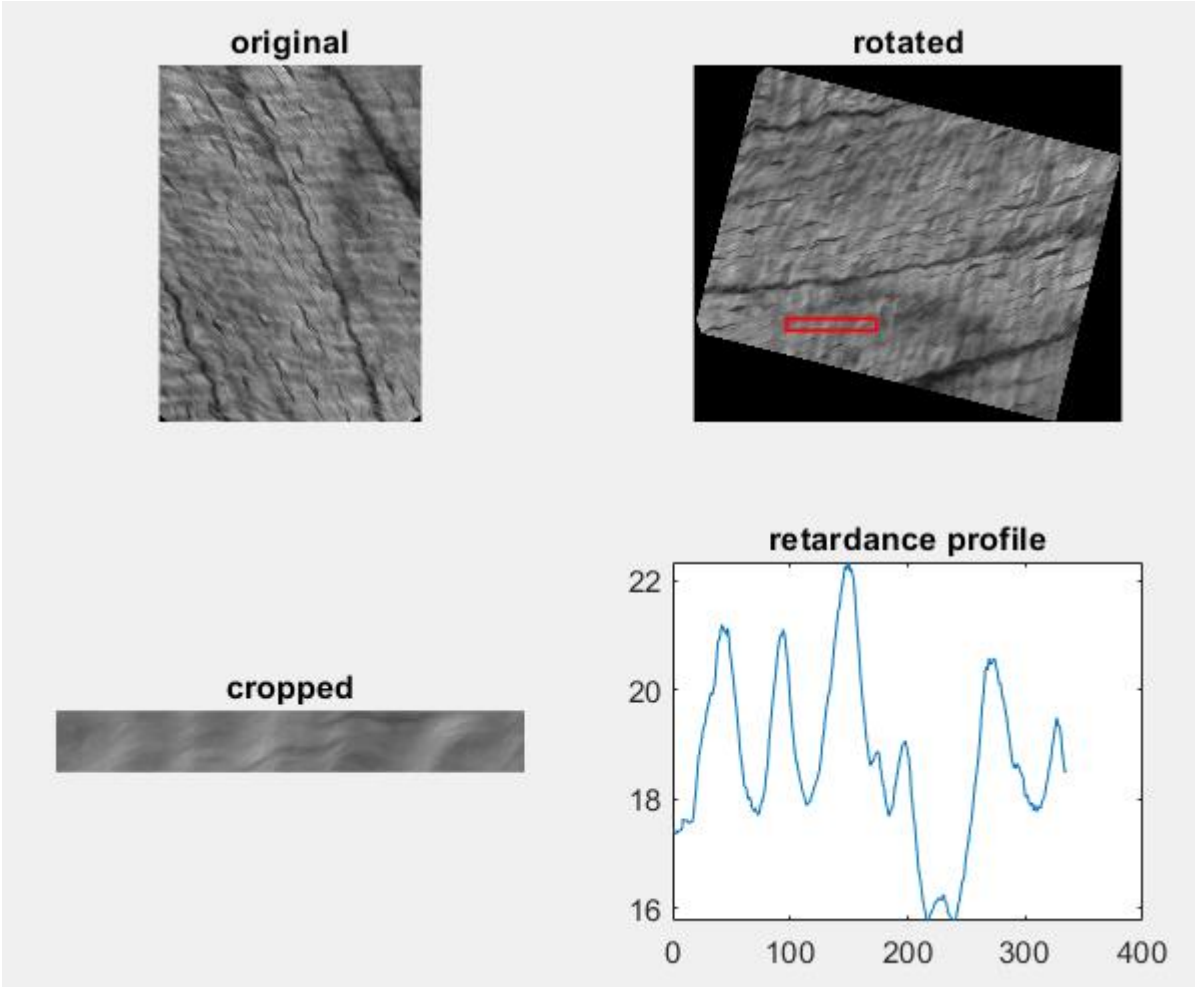
1. Choose sample to be analyzed
2. Rotate sample so that the collagen fiber orientation is horizontal (try to decide the analysis location in this phase, as the orientation is not uniform in the whole sample)
   Buttons for using rotation:

   9: rotate 5 degrees clockwise
   8: rotate 1 degree clockwise
   7: rotate 1 degree counter clockwise
   6: rotate 5 degrees counter clockwise
   u: increase upper limit of dynamic range (use if image is too bright)
   d: decrease upper limit of dynamic range (use if image is too dim)
   q: save this orientation

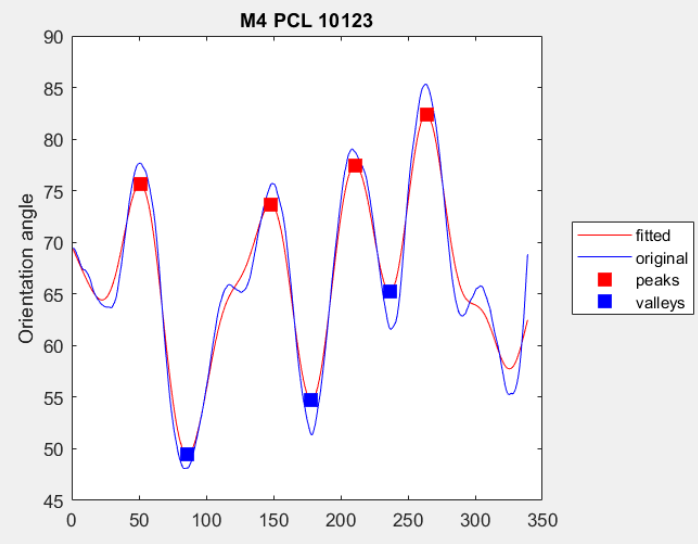
3. Choose analysis location from the sample (box is movable and the size can be changed)
   Crop from the box by right clicking the box and choosing “crop image”



4. Results will be calculated automatically and saved to the folder that you chose in the beginning



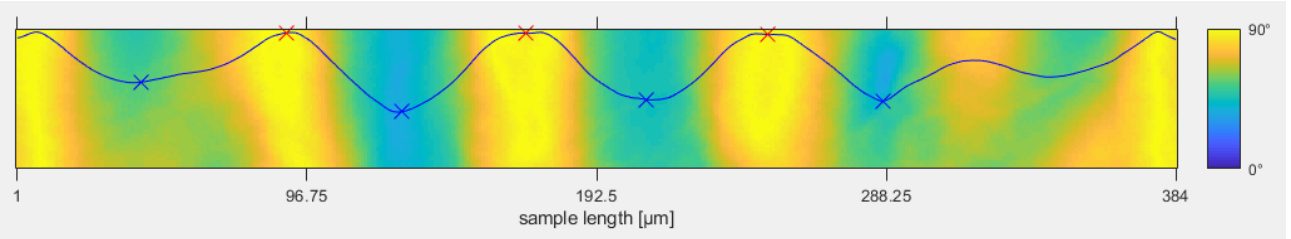
5. Check the images after measuring to know if your measurement makes sense (**this tool is not omnipotent**)



For example this graph shows that the measurement is reliable as the peaks and valleys are at the correct places.

The values are calculated from blue line while the peaks locations are detected from the smoothed "signal"

This image is the ultimate safety procedure (as you can see the fluctuation of angles are well defined by the blue line and the colormap from 0 degrees to 90 degrees). Also the high and low points are marked correctly with the red and blue crosses.



As a safety precaution: If you're not sure of the result, measure it from a different location. If you can't find a place where you get reliable results, MAKE A NOTE OF THE SAMPLE. This allows you to exclude samples with a possibly failed analysis when you do statistical tests.

Crimp angle and Crimp length are saved as a .csv text file. You can compile them after all the analyses are done

Good luck and motivation with your thesis!