Particle Tracker LabView Code

Wednesday, July 01, 2015 1:13 PM

- **Step 1**: Open the video file in ImageJ (*.avi)
- **Step 2**: Rotate the video such that the channel is horizontal.
- **Step 3**: Crop the video using a rectangle 1 pixel wide and as high as the channel where the laser is positioned.
- **Step 4**: Save the cropped video as image sequence (text).
- **Step 5**: Use the LabView code to analyze the images.
  - Set the interval at 20-25.
  - Set the Intensity threshold base on the normalized intensity plot.
  - Pixel/um is ~0.74 for 20x objective.

Code Versions:

V1	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement.exe>	First version including threshold and histogram.
V1.1	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.1\Cell Intensity Measurement.exe>	Loop version of V1 plus pixel/um added
V1.2	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.2\Cell Intensity Measurement.exe>	Added gating capabilities; by setting the gate center and half width, the percentage of events in the gate is shown.
V1.3	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.3\Cell Intensity Measurement.exe>	Gating parameters changed to gate center and width (used to be half width)
V1.4	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity	Gate bounds are now shown on the

V1.4	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.4\Cell Intensity Measurement.exe>	Gate bounds are now shown on the histogram as dotted red lined
V1.5	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.5\Cell Intensity Measurement.exe>	Added plot for intensity profile of each frame.
V1.5.1	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.5\Cell Intensity Measurement.exe>	Frame picker line moves to the center of the new range
V1.6	<file://C:\Users\mehranh\Documents\Results\Inertial Focusing\Cell Intensity Measurement 1.5\Cell Intensity Measurement.exe>	Added plot for intensity profile of each frame plus a Gaussian fit and peaks found by peakfind.
V1.7	•  Cell Intensity ...	• Removed white space at end of intensity data • Intensity data is normalized • Cell peaks are displayed on plot • Added histogram for cell arrival time delta
V1.7.1	 Cell Intensity ...	• Added support of 2D array files • FWHM of Gaussian fit reported (for visualization only)
V2.0	 Cell Intensity ...	• New tabbed interface • New normalization routine. Average frames w/o peaks • Gaussian fit identifies cells • Cell width histogram

V1.6 sample frames

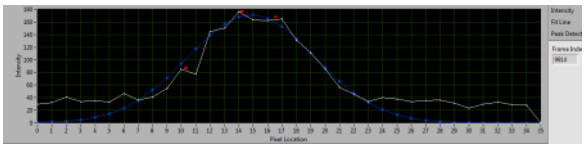
Wednesday, July 15, 2015 2:12 PM

CD4 2nd 4mL outlet 3b

txt file

1)

~11

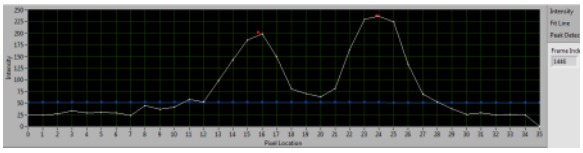


Size in pixels

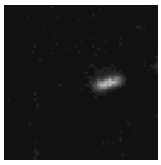
CD4 2nd 6mL outlet 5

2)

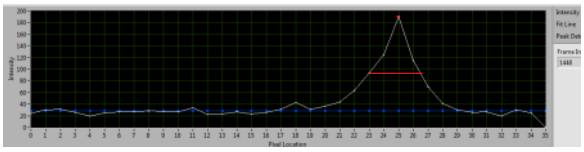
5,6



3)

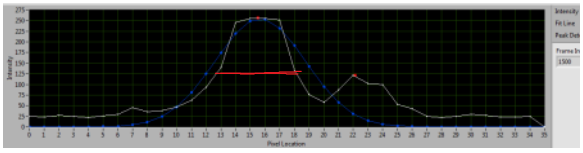


4

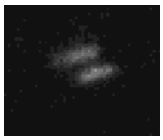


4)

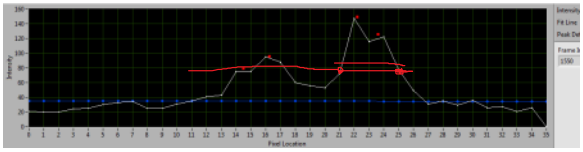
6



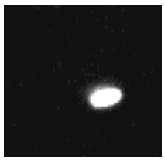
5)



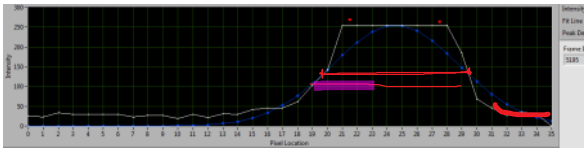
5,5



6)



10

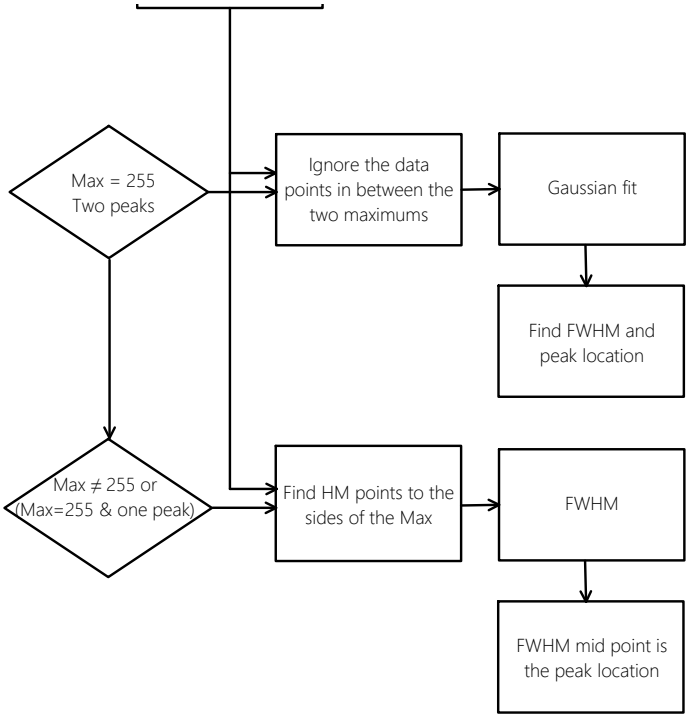


Strategy for next version:

- Calculate the baseline by averaging the minimum intensity, and the two ends of each file.
- For frames with "two peaks detected by peakfind" and "maximum value = 255" like example #6, a Gaussian fit is performed by ignoring the flat part of the profile. Then, the FWHM and location of the peak is extracted.
- For frames with "maximum value in less than 255" or "only one max value = 255" like example #4 and #6, the FWMH is calculated by marching to the sides of the peak down to the half magnitude. The location is also determined based on the midpoint of the Half Magnitude line.

Intensity fitting strategy

Find Baseline by averaging Min and first and last pixel intensities


Max = 255
Two peaks
Ignore the data points in between the two maximums
Gaussian fit
Find FWHM and peak location
Max ≠ 255 or (Max=255 & one peak)
Find HM points to the sides of the Max
FWHM
FWHM mid point is the peak location