**January 2018**

Operating the KLA P7 stylus profiler.

Overview

The KLA P-7 is a stylus contact profiler capable of 150mm scan lengths with ~10A resolution and ~20A noise floor. It has a multi- capacitor head that can dynamically adjust stylus force and sensitivity. It has a software controlled motorized stage with vacuum chuck which rides on a 12" optical flat. The custom data acquisition and analysis software allows for leveling, step height and measuring and exporting of data to ASCII txt file.
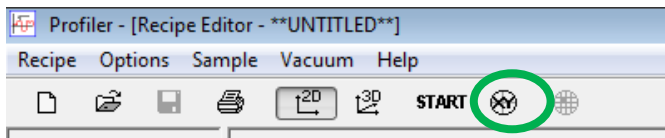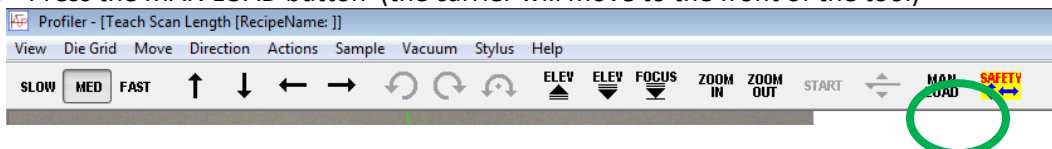
> Login: Operator
> Password: research

Preforming a Scan

1. Turn on the monitor / Enable in Coral

2. Double click the shortcut on the desktop.

Profiler 8.0

3. The software will open to the catalog page
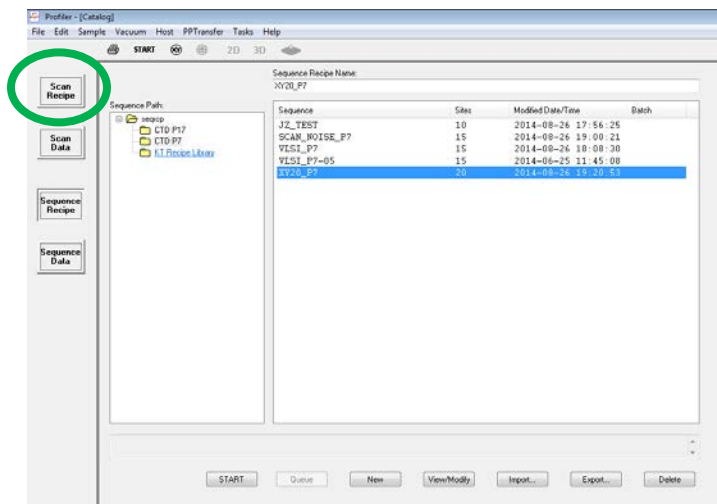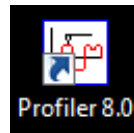
4. Press the scan recipe button

5. Choose one of your saved recipes or press new.

6. Switch into XY mode

7. Press the MAN LOAD button (the carrier will move to the front of the tool)

8. Open the door using the handle, it swings up

9. Place your sample on the center of the chuck, cover vacuum holes if possible.

** IT IS CRITICAL THAT THE SAMPLE BE EXACTLY IN THE CENTER OF THE CHUCK

** Take care not to drop anything into the tool, if this happens contact a staff member, do not attempt to remove it yourself.

10. If all five vacuum holes are covered turn on the stage vacuum switch. It is located on the left side of the door opening.

11. Close the door

12. Press the MAN LOAD button again, the stage will move such that the center is under the probe

13. Press the focus button (Green circle), the head will move down to the sample
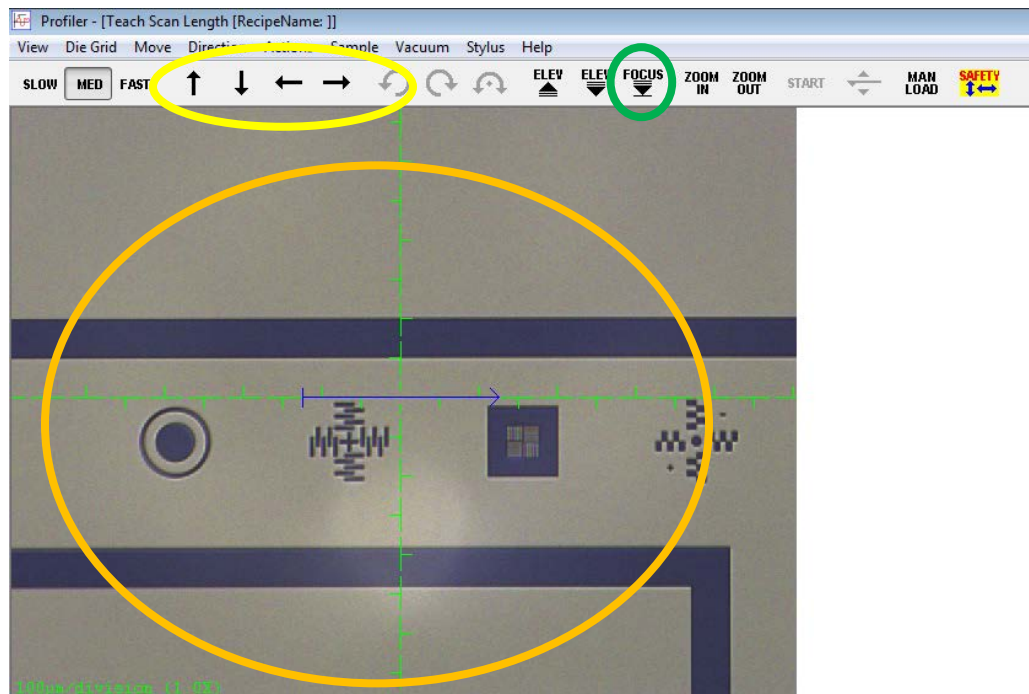
14. You may pan around your sample by pressing the arrow buttons (Yellow circle), or by clicking in the sample viewing area (Orange circle). Where you click, will become the center point of the cross hairs. You may define your scan length by clicking and dragging to the right.
15. Close out of x-y mode by pressing ok at the lower right corner of the screen which will return you to the scan recipe page.

16. Review and configure your scan parameters.

If you have any questions, please contact Sean at srinehar@purdue.edu

X Scan Size is the scan length, you can also specify the length by clicking and dragging on the sample image in XY mode. Be sure to consider the relationship between **data point interval**, **scan speed** and **sampling rate**.

**ALWAYS SCAN LEFT TO RIGHT. THIS PROTECTS THE STYLUS.

Scan time is calculated for you. If you are measuring a soft metal or polymer and scanning below 100 um/s please set the **Applied Force** to 1 mg. Metals and Semiconductors set **Applied Force** to 2 mg. Select the maximum vertical range for your sample.

You may also set parameters for a 3D scan by clicking the 3D button near the top of the screen. The only additional parameter is number of vertical traces.

Additional Scan Tips:
If you scan too fast you will miss out on some roughness data and might overshoot some step heights on trailing edge.

For short scans, 2mm and smaller, the general rule of thumb is to keep the scan time between 5 and 10 seconds. This is shown in the recipe and can also be determined by dividing the scan length by the scan speed.

The General Parameters and Roughness Waviness tabs can be used to determine slope, area, roughness, and other parameters from your scan Analysis.

17. Press the start button to begin your scan.
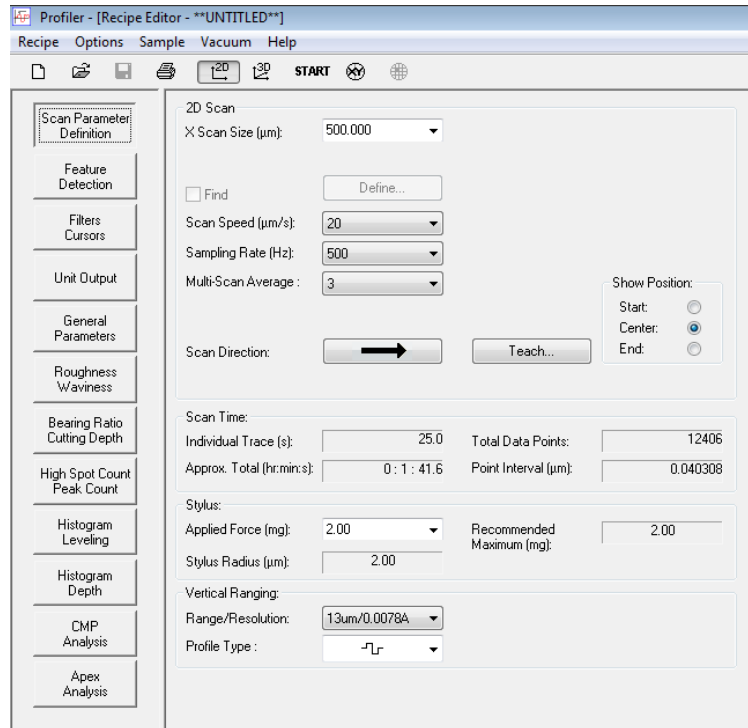
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Results Analysis

After the scan completes your data will display in the Analysis window.

You can level the data in three steps.
>   1. Press the LEVEL button
>   2. Drag and manipulate the Level cursors until they rest on even plans
>   3. Press the LEVEL button to save leveling data

You may measure your steps by moving the "Meas" cursors and looking at the step height measurement on the right.

Press Stats to view the General, Roughness, and Waviness parameters selected from the recipe editor. Press Calc to recalculate these for a different selection.
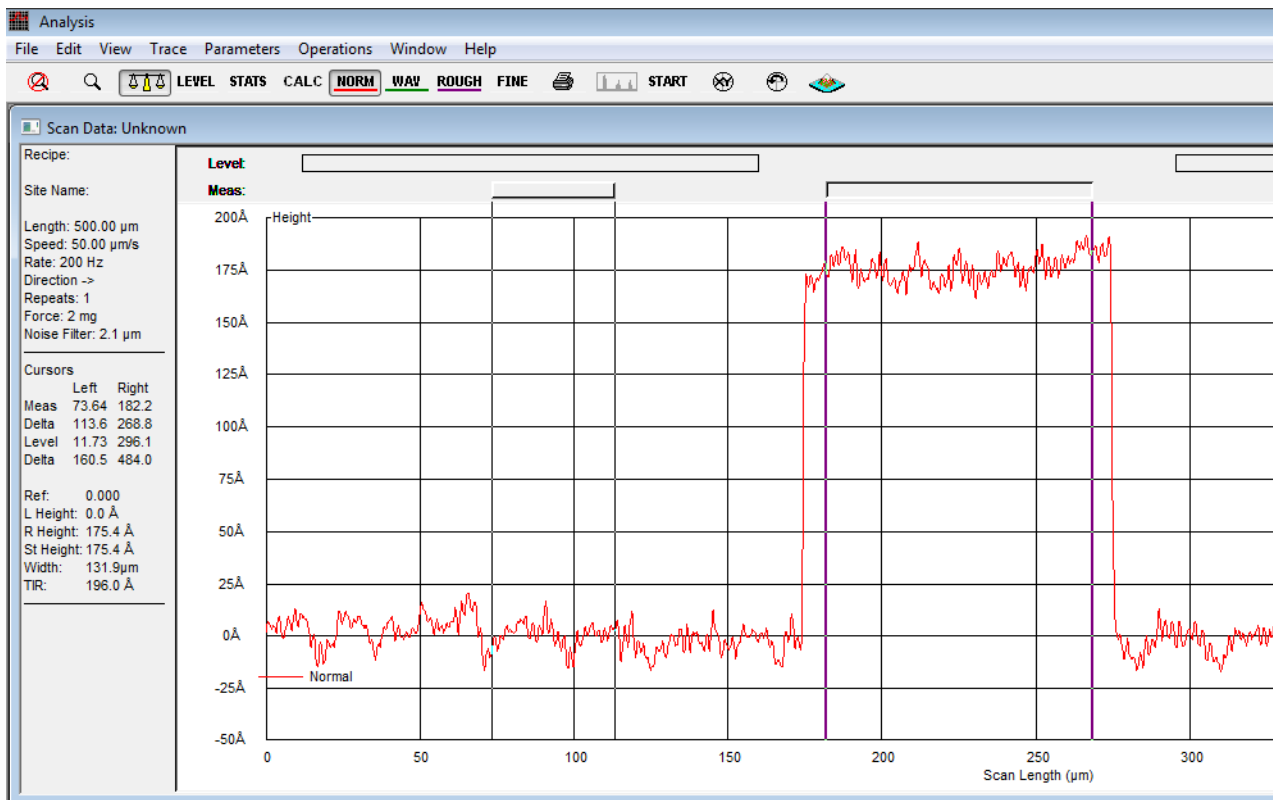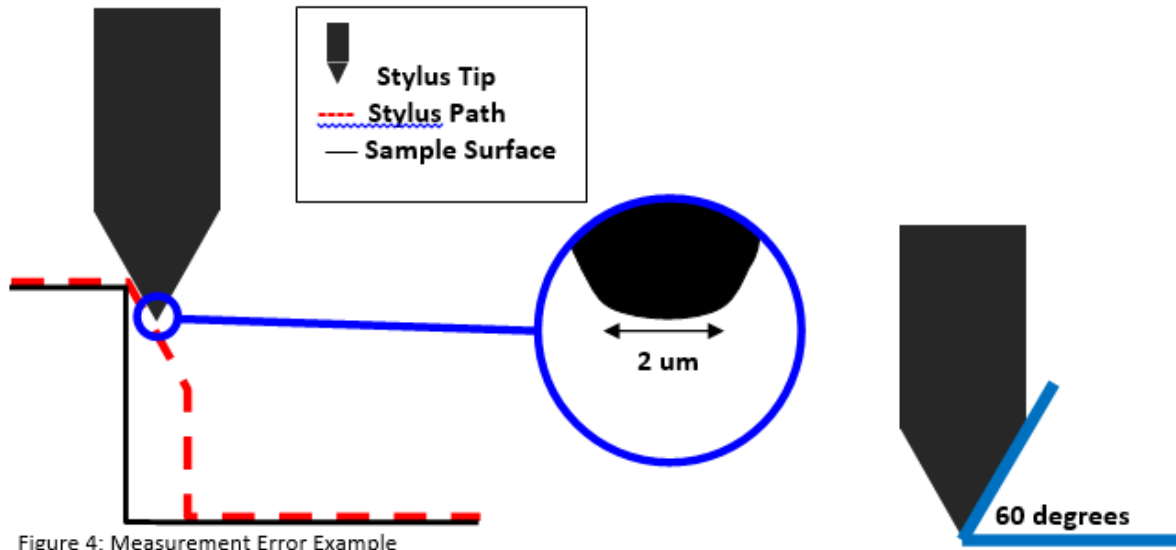

Press the Apex Analysis button to view your sample in Apex Analysis software. From there you can save your measurement as a plaintext file or jpg/png.

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System Limitations

Keep the 2 micron stylus radius and 60 degree stylus slow in mind when scanning, as this may lead to a loss of accuracy on narrow features and 90 degree sidewalls.

Figure 4: Measurement Error Example

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