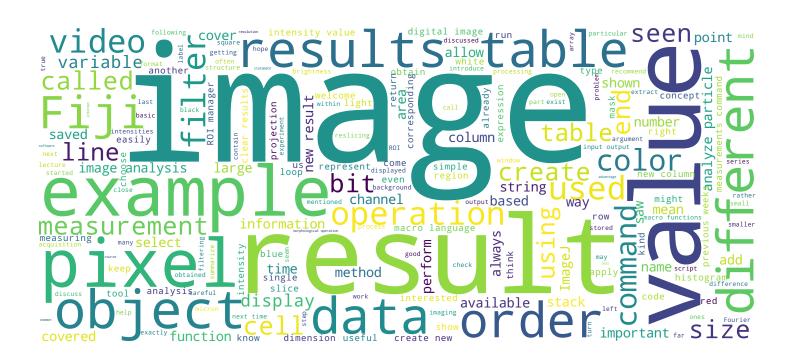# Results Tables

Image Processing & Analysis for Life Scientists

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Hi! And welcome to this video on results tables. We will cover how to select a measurement we want to display into our results tables. We will also see how to get results from a table. And how to build our own results columns using the macro language. Finally, we will see in which format results tables are stored when they are saved.

Notes

Summary

0m 05s

From Images to Data

Image
Filtered

Mask
Watershed

Object

Over the previous weeks, we have reached the point where we now have objects that represent what we're interested in measuring.
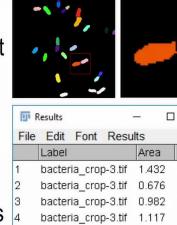
Notes

Summary

0m 25s

From Images to Data

Object

Measurements

	Label	Area
1	bacteria_crop-3.tif	1.432
2	bacteria_crop-3.tif	0.676
3	bacteria_crop-3.tif	0.982
4	bacteria_crop-3.tif	1.117
5	bacteria_crop-3.tif	0.604
6	bacteria_crop-3.tif	2.000
7	bacteria_crop-3.tif	1.396
8	bacteria_crop-3.tif	1.856

So, for example, in the case of bacteria here, say, we would be interested in measuring their size! So now we need to go to the extra steps and see how and where we can extract this information from these objects.

Notes

Summary
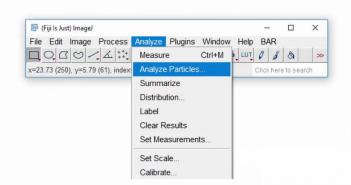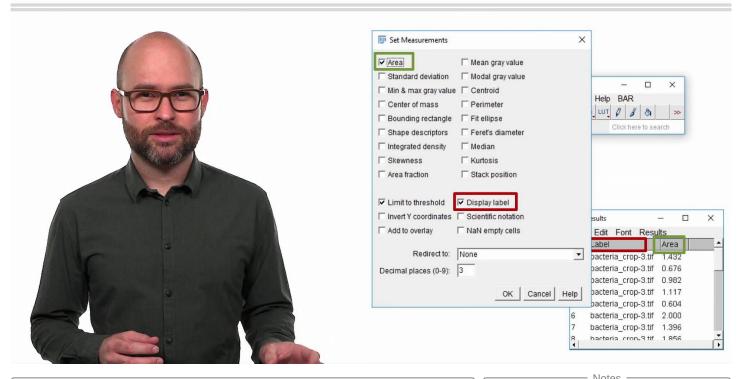
0m 32s

Setting Measurements

We saw the analyze particle tools, and the ROI manager in the previous weeks. And we saw that these can output results tables. We also mentioned how these are linked to the set measurements command, like the label and area here.

Notes

Summary

0m 46s

Activating the check boxes simply create new columns in the results table that will host all the measurements for us.

Notes
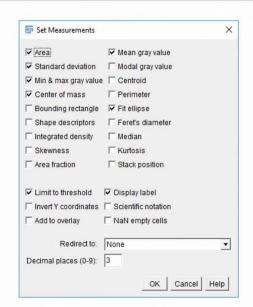
Summary

Setting Measurements

Note that if you already ran measurements, checking new boxes will not recompute the measurements. You're going to have to run either analyze particles or the ROI Manager measure command again in order to populate those columns.
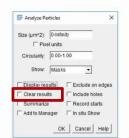
Summary

1m 07s

6.3. Results Tables
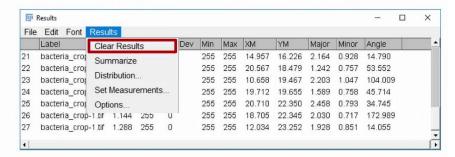
Managing Results

- If Results Table Exists
  - **Appends** to Results

  - Close or Clear Results to get new table

Analyze Particles

Size (µm^2): 0-Infinity
☐ Pixel units
Circularity: 0.00-1.00
Show: Masks

☐ Display results   ☐ Exclude on edges
☐ Clear results   ☐ Include holes
☐ Summarize   ☐ Record starts
☐ Add to Manager   ☐ In situ Show

OK   Cancel   Help

Results

File   Edit   Font   Results

	Label	Clear Results	Dev	Min	Max	XM	YM	Major	Minor	Angle
21	bacteria_cro	Summarize		255	255	14.957	16.226	2.164	0.928	14.790
22	bacteria_cro			255	255	20.567	18.479	1.242	0.757	53.552
23	bacteria_cro	Distribution...		255	255	10.658	19.467	2.203	1.047	104.009
24	bacteria_cro	Set Measurements...		255	255	19.712	19.655	1.589	0.758	45.714
25	bacteria_cro	Options...		255	255	20.710	22.350	2.458	0.793	34.745
26	bacteria_crop-1.tif	1.144	255	0	255	255	18.705	22.345	2.030	0.717	172.989
27	bacteria_crop-1.tif	1.288	255	0	255	255	12.034	23.252	1.928	0.851	14.055

Now, as a default, results in Fiji will always be appended at the end of an existing table. That is, new results will be creating new rows into the results table that is already opened. However you can use the clear results command from the analyze particles menu, or close the results table, or use clear results, if you need a fresh new empty table. Now what if we need more results or more data? Or what if we want to compute a new result based on some existing column?

Notes

Summary
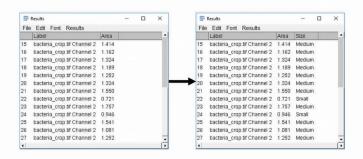
1m 22s

What if we Need More?

- **Macro Language Results Functions**
  - **Example**: Binning by size

```
value = getResult("Column Name", row);

setResult("Column Name", row, value);
```

For example, what if we want to classify bacteria into 3 categories: Small, medium and large based on how large their areas are? In this case, the macro language has a series of functions available that allows to navigate, modify, and create new results. These are all available in the image macro functions page. But the most important ones are 2 functions called Get Results and Set Results. Get results will turn the value of the column defined by the name, and at the selected row. Set results normally will add a value to a given column, at a given row, or create a new column if it doesn't exist yet. So if we take the results of the area column, and we choose a label based on this value (say small it it's smaller than 1 micron medium, if it's between 1 and 2 microns and large if it's above 2) we can create a new measurement and add it to the results table. You can see the marco code for this example at the end of the video.

Notes

Summary

1m 55s

- Fiji is not a Data Analysis Tool
  - Use your favorite software

However, we will not recommend you use Fiji for analyzing your data, or getting statistics. The sofware is useful for image analysis and for the extraction of results from images. Any kind of further analysis, specially statistical analysis, should be carried out in a specialized sofware, like Excell R Igor, just to name a few.
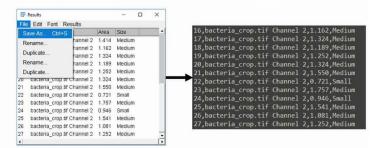
Notes

Summary

2m 58s

Saving Results

- **Saved as CSV Files**
  - **Can be easily imported into any software**

But for that, we need to be able to export the results from Fiji. So, this is very easily done via the file Saved as command. This will create a common seperated file wherever you choose. Most software packages can import CSV Files very easily.
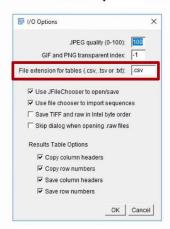
Notes

Summary

3m 19s

Saving Results

- **Saved as CSV Files**
  - **Can be easily imported into any software**
  - **Table Options:** *Edit > Options > Input/Output*

Now if you are not getting the same results as the examples that I've shown here, check the input output option of Fiji under the Edit option input output menu. Here you can select the extension for which you want the results tables to be saved. And whether the column names and the row numbers should be saved along side with your data.

3m 36s

Conclusion

- **How to Set Measurements**
  - Need to run measurement after setting

- **Getting/Setting Results**
  - getResult() setResult()

- **Saving Results**
  - Result Options

In this video, we've covered how to get measurements out of an image. We've seen that there is a little detail in which you have to be careful to re-run the measurements, if you select a new one from the set measurements command. We've also seen how to get and set results from column tables, which allows us to create our own custom results. And we've seen that results can be saved in a convenient CSV format. See you next time!

Notes

Summary

3m 58s