

# Física Experimental VI – 4300314

1º Semestre de 2017

Instituto de Física  
Universidade de São Paulo

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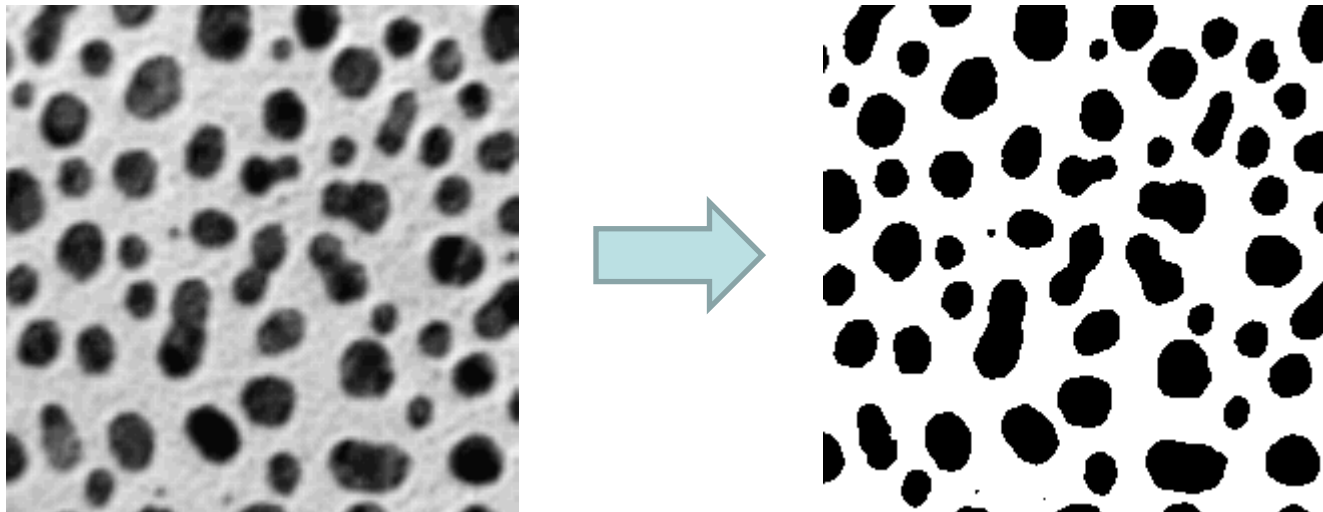
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## Operações Binárias

### Binary

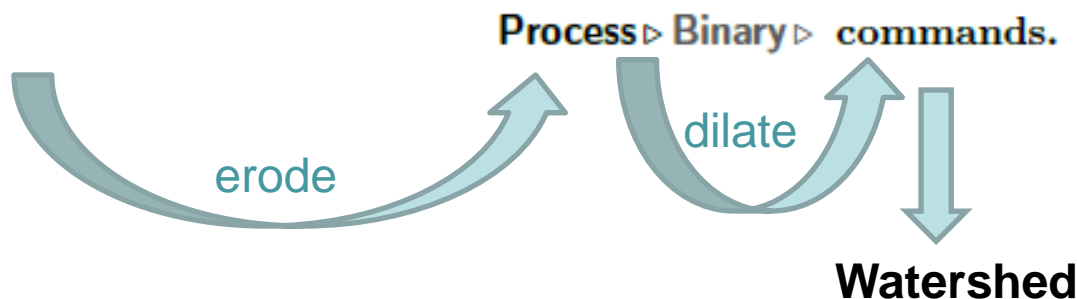
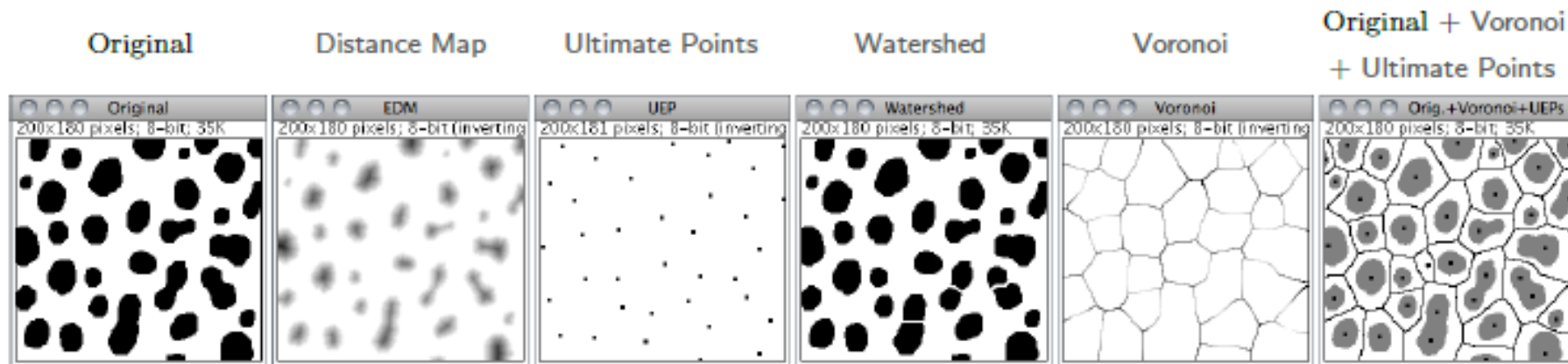
This submenu contains commands that create or process binary (black and white) images. They assume that objects are black and background is white unless Black Background is checked in the Process > Binary > Options. . .



Summary of morphological operators (Process > Binary > submenu).

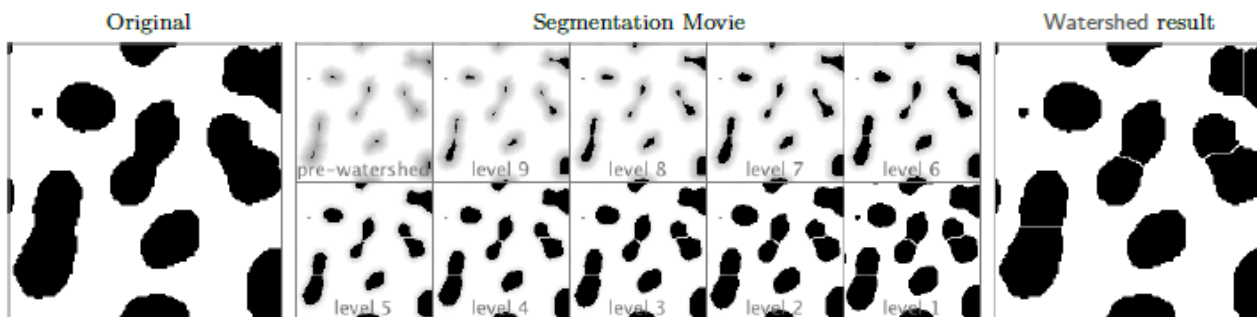
Original	Make Binary	Erode	Dilate	Open	Close	Outline	Skeletonize
<b>ImageJ</b>	<b>ImageJ</b>	ImageJ	<b>ImageJ</b>	ImageJ	<b>ImageJ</b>	ImageJ	ImageJ
Adjust > Threshold... [T]		Minimum... (grayscale)	Maximum... (grayscale)	Erode then Dilate	Dilate then Erode	1 pixel wide outline	1 pixel wide skeleton

# Comandos mais sofisticados



## Watershed

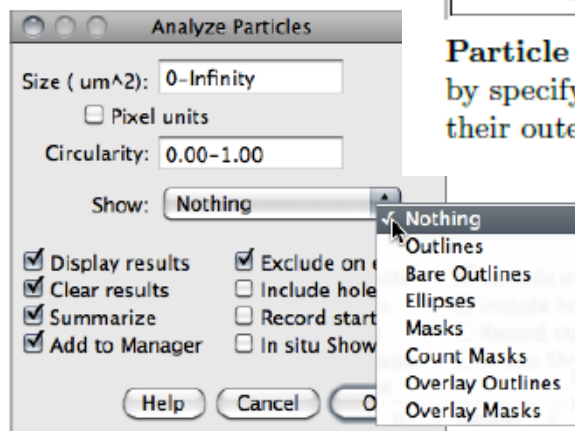
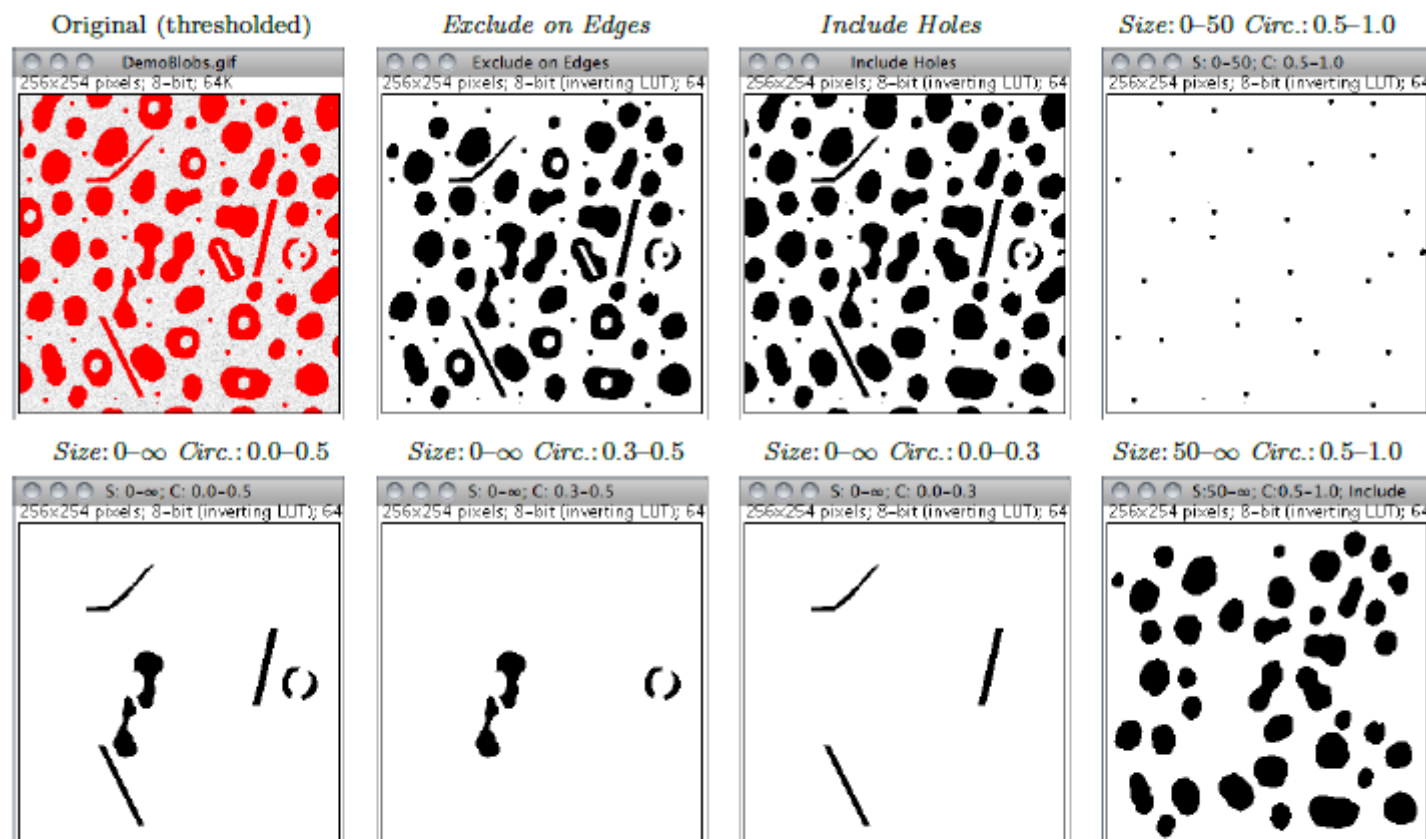
Watershed segmentation is a way of automatically separating or cutting apart particles that touch. It first calculates the Euclidian distance map (EDM) and finds the ultimate eroded points (UEPs). It then dilates each of the UEPs (the peaks or local maxima of the EDM) as far as possible – either until the edge of the particle is reached, or the edge touches a region of another (growing) UEP. Watershed segmentation works best for smooth convex objects that don't overlap too much.



Process > Binary > Watershed running in Debug mode.

# Menu: Analyze

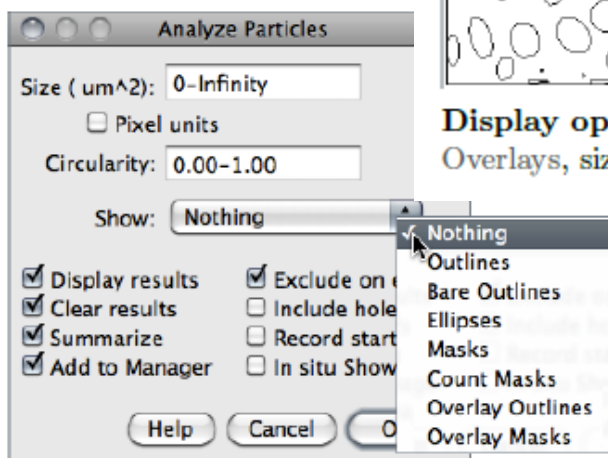
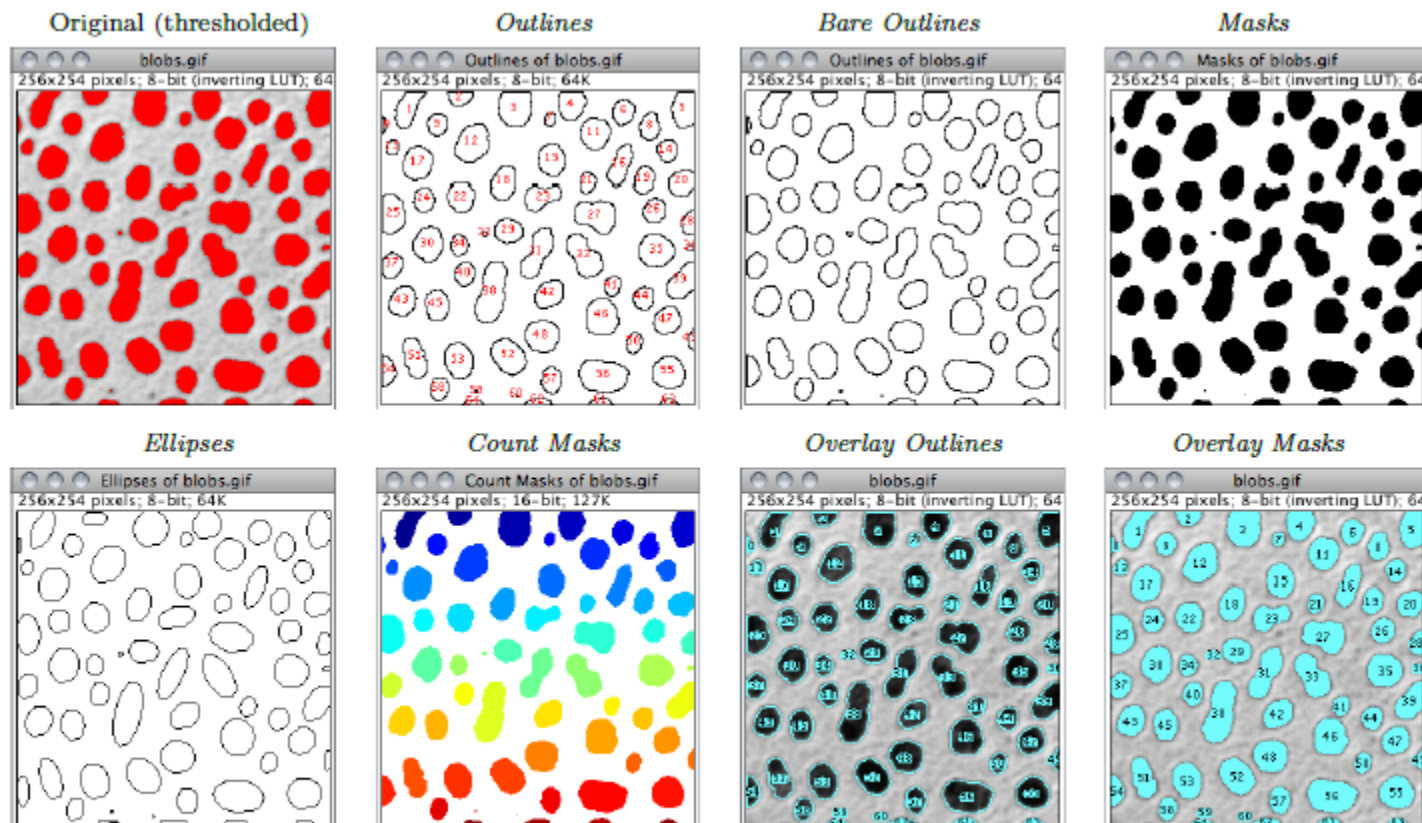
## > Analyze Particle



**Particle Analyzer (Analyze > Analyze Particles...).** Features of thresholded images can be extracted by specifying suitable *Size* and *Circularity* ranges and/or by choosing if particles should be traced by their outer edge or by flood filling (*Include Holes* checkbox).

# Menu: Analyze

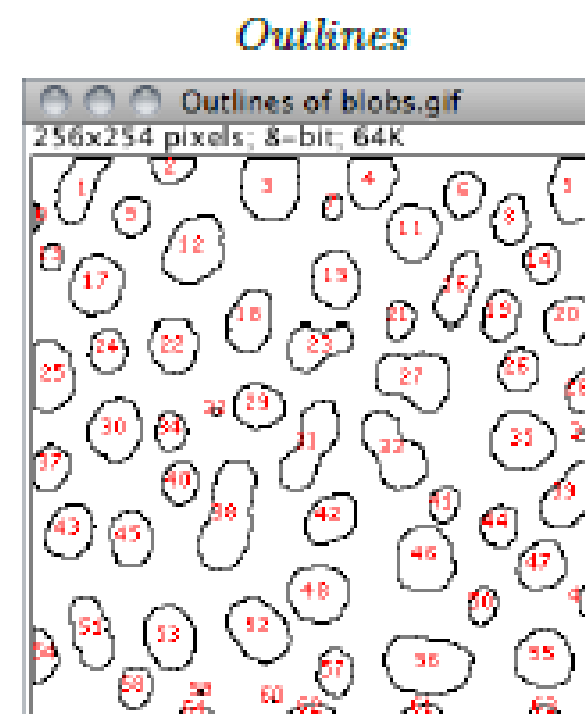
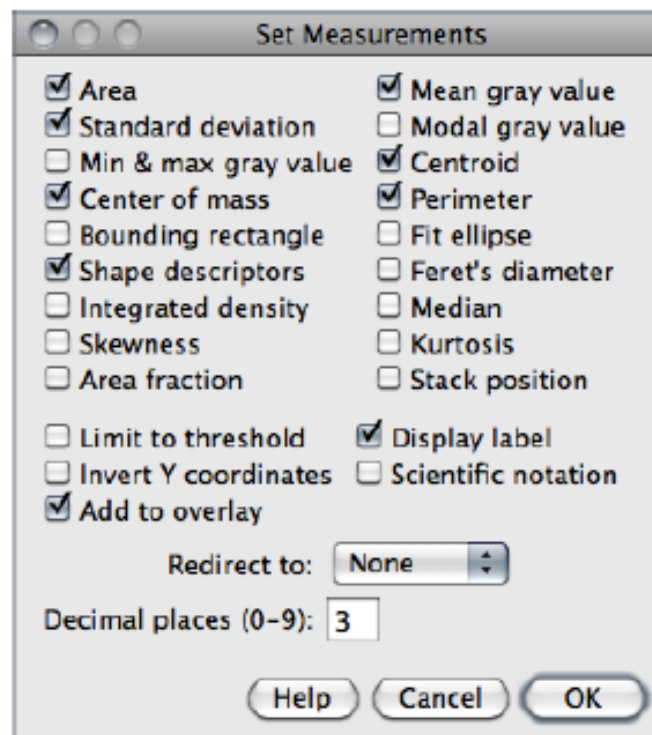
## > Analyze Particles



Display options of ParticleAnalyzer (Analyze>Analyze Particles...), IJ 1.44I. When displaying Overlays, size, color and background of text labels can be adjusted using Image>Overlay>Labels...

## Menu: Analyze

### > Set Measurements



### > Summarize

Results

	Label	Area	Mean	Mode	Min	Max	Perim.	Circ.	Feret	IntDen	Median	%Area
63	blobs.gif	5.300E1	1.884E2	1.360E2	1.280E2	2.480E2	3.556E1	5.268E-1	1.603E1	9.984E3	1.840E2	1.000E2
64	blobs.gif	4.900E1	1.729E2	1.760E2	1.280E2	2.240E2	3.673E1	4.565E-1	1.703E1	8.472E3	1.760E2	1.000E2
Mean		347.547	187.727	203.375	128	230.375	67.902	0.834	24.875	67786.250	193.500	100
SD		217.766	19.042	32.933	0	26.096	26.562	0.144	9.516	44012.250	23.111	0
Min		1	128	128	128	128	2.828	0.406	1.414	128	128	100
Max		902	219.915	248	128	248	132.225	1	52.202	178720	240	100

SEE ALSO: Analyze Particles..., Distribution...