

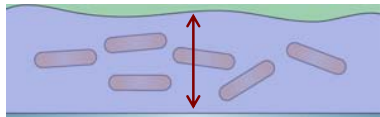

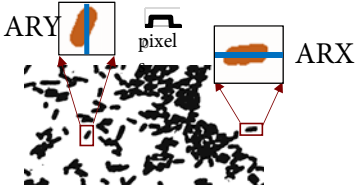

2D metrics/Areal

<u>Roughness</u> variation in intensity
<u>Skewness</u> measure of symmetry of the surface about the mean plane. Gives indication of the shape of the tail of the distribution of heights – imbalance of distribution
<u>Areal porosity:</u> number of voids/total number of pixels
<u>Fractal dimension:</u> The higher the fractal dimensional, the more irregular the perimeter of the object. The higher the degree of variability in the cluster boundary the higher the cluster dimension
<u>Perimeter</u> is the total number of pixels at the cluster boundary only pixels in contact with interstitial space are counted
<u>AVRL/AHRL</u> The average number of pixels representing clusters found consecutively in the image. Values of the expected dimensions of a cluster and are a measure of the average cluster size.
<u>ADD/MDD</u> - diffusion distance is the minimum distance from a cluster pixel to the nearest void pixel in an image. Average of the diffusion distances frame ach cluster pixel to the nearest void over all luster pixels in the image. Maximum diffusion distance is the distance from the most remote pixel in the cluster to the nearest void cluster.
<u>Euler number:</u> EN is defined as a total number of connected regions (objects) minus the number of holes in those objects. Measure of connectivity

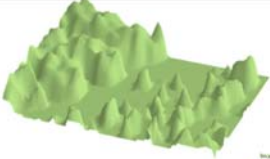

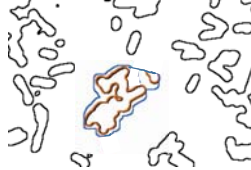

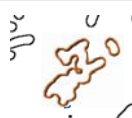
2D metrics/Texture

<u>Contrast</u> is the difference between the highest and the lowest values of a contiguous set of pixels. I It measures the amount of local variations present in the image.
<u>Correlation</u> measures linear dependency of grey levels of neighboring pixels, with values of 0 for uncorrelated (perfectly uniform image) and 1 for perfectly correlated pixels.
<u>Energy (Uniformity2, opposite of Entropy)</u> measures the homogeneity or orderliness of image. It detects disorders in textures. Energy is a measure of directionally repeating patterns of pixels and is sensitive to the orientation of the pixel clusters and the similarity of their shapes. Smaller energy values mean frequent and repeated patterns of pixel clusters, and a higher energy means a more homogeneous image structure with fewer repeated patterns for ore orderly images.
<u>Homogeneity</u> is a measure of statistical stationarity. This property relates directly to self-similarity and inverse of contrast. Homogeneity is a measure of spatially repeating patterns of pixels. It measures the similarity of the clusters, a higher homogeneity indicates a more homogeneous image structures.
<u>Entropy</u> measures degree of randomness. Inhomogeneous scenes have low entropy, while a homogeneous scene has a high entropy. Entropy may be a good predictor of structural deterioration and degradation. The entropy is large when the image is not texturally uniform. Complex textures and more heterogeneous images tend to have high entropy. Entropy is strongly, but inversely correlated to energy.

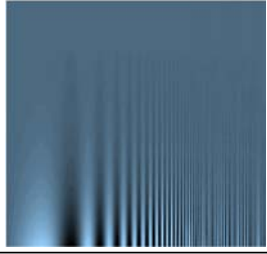
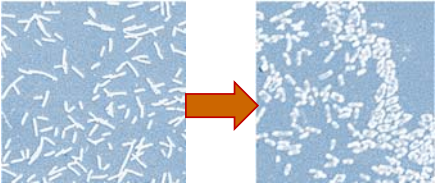
3D metrics/Areal/Volumetric

<p><u>Average thickness:</u></p> <p>The volume divided by the total surface area</p>	
<p><u>Roughness:</u></p> <p>variation in thickness</p>	
<p><u>ARX/ARY/ARZ</u></p> <p>- <i>run length</i> measures the number of consecutive pixels representing clusters in a given directions</p>	
<p><u>ADD</u></p> <p>- <i>diffusion distance</i> is the average distance from a cluster pixel to the nearest void pixel in an image.</p>	

3D metrics/Areal/Volumetric

<p><u>Volume:</u></p> <p>total volume</p>	
<p><u>Porosity:</u></p> <p>ratio of void volume to total volume</p>	
<p><u>Fractal dimension:</u></p> <p>- a measure of the roughness of the boundaries of clusters Irregularity of cluster surface.</p>	
<p><u>Euler 3d:</u></p> <p>- measure of connectivity</p>	
<p><u>Breadth -</u></p> <p>Mean width or mean breadth Integral of mean curvature</p>	

3D metrics/Texture

<p><u>Energy:</u></p> <ul style="list-style-type: none">-the homogeneity or orderliness of image.-detects disorders in textures.-smaller energy values - frequent and repeated patterns of pixel clusters-higher energy - more homogeneous image structure with fewer repeated patterns	
<p><u>Homogeneity:</u></p> <ul style="list-style-type: none">- a measure of spatially repeating patterns of pixels-measures the similarity of the clusters-decreases with an increasing number of clusters.	<p><u>Homogeneity decreases</u></p> 
<p><u>Entropy:</u></p> <ul style="list-style-type: none">-measures degree of randomness.-complex textures and more heterogeneous images - high entropy.-increases with growth of number of clusters	<p><u>Entropy increases</u></p> 