DiameterJ Output:

# Summaries Folder:

## XXXX\_Total Summary.csv

1. Super Pixel:  The mean fiber diameter as calculated using a super pixel determination.  A detailed explanation of how this algorithm  works can be found [here](http://imagej.net/DiameterJ#Super_Pixel_Diameter).
   1. This measurement is more accurate for global averages of fiber diameter where samples have extremely diverse fiber diameters.
2. Histogram Mean: The mean fiber diameter as calculated by fitting a Gaussian Curve to the radius data and finding the curve’s mean value.
   1. This measurement is more accurate for global averages of fiber diameter where samples **do not** have extremely diverse fiber diameters.
3. Histogram SD:  The standard deviation of the Gaussian fit of the radius histogram.
4. Histogram Mode: Most frequently occurring fiber diameter in the histogram.
5. Histogram Median:  Middle fiber diameter in the histogram.
6. Histogram Min Diam.:  The smallest fiber diameter measured.
7. Histogram Max Diam.:  The largest fiber diameter measured.
8. Histogram Integrated Density: The product of length of the fibers and the average radius.
9. Histogram Raw Integrated Density:  The sum of the radii at all pixels in the image or selection.
10. Diameter Skewness: The third order moment about the mean.
    1. Skewness combined with Kurtosis are good indicators of how normal your radius histogram is.  As a general rule, if both Skewness and Kurtosis are <1 your radius histogram can be considered normal.
11. Diameter Kurtosis: The fourth order moment about the mean.
    1. Kurtosis combined with Skewness are good indicators of how normal your radius histogram is.  As a general rule, if both Skewness and Kurtosis are <1 your radius histogram can be considered normal.
12. Fiber Length: The total length of the fiber centerlines in the segmented image.
13. Mean Pore Area: (Total number of black pixels counted in pores) / (Total number of pores in image)
14. Pore Area SD: The standard deviation of all pore areas measured
15. Min. Pore Area: The minimum pore area measured
16. Max. Pore Area:  The maximum pore area measured
17. Percent Porosity: (Total number of black pixels in image) / (Total pixels in image)
18. Number of Pores:  The total number of pores counted by DiameterJ.
19. # of Intersections: Total number of intersections in the image
20. Intersection Density (100x100px):  (Number of fiber overlaps)\*10000 / (Total pixels in image)
21. Char. Length: Mean length between fiber intersections/overlaps
22. SD Char. Length:  Standard deviation of fiber intersection/overlap lengths
23. Max Span Length: Maximum length between any two intersections/overlaps
24. Old Char. Length: (Total length of all fiber centerlines) / (# of fiber overlaps)

# Histograms Folder:

## XXXX\_Histogram.csv

1. Mean: Average Diameter from all measures found in the histogram
2. StdDev: Standard deviation from all measures found in the histogram
3. Mode: Most occurring diameter found in the histogram
4. IntDen: The product of Area and average radius
5. Median: Middle value in the histogram
6. Skew: The third order moment about the average radius
7. Kurt: The fourth order moment about the average radius
8. RawIntDen: The sum of the radii at all pixels in the image or selection
9. Radius Value: Radius length (in pixels)
10. Radius Count: Number of times the radius value occurred in the image. Also known as the frequency of occurrence and can also be interpreted as the length of fiber in an image that has a given radius.
    1. The radius or diameter histogram is constructed from the radius value (x-axis) and radius count (frequency of occurrence on y-axis)

## XXXX\_Intersections.csv

1. Skeleton ID
2. Calibrated branch length
3. 3D coordinates of the extremes of the branch (V1x,V1y, V1z and V2x, V2y, V2z)
4. The Euclidean distance between those extreme points. This value has proven to be a good indicator of the tortuosity of the 3D object when compared to the calibrated branch length.
5. The branches are sorted by decreasing length.
6. Also at the bottom of the table the average, SD, min and max of each metric is given.

## XXXX\_Pore Data.csv

1. Slice: Image name
2. Count: Total number of pores found in image that are not touching the side.
3. Area: Total number of black pixels in an image not in groups touching the sides
4. StdDev: 0 (individual pore measurements so no SD.
5. % Area: (Total number of black pixels) / (Total pixels in an image)
6. Major: The length of the primary axis of the best fitting ellipse for each pore.
7. Minor: The length of the secondary axis of the best fitting ellipse for each pore.
8. Angle: The angle between the primary axis and a line parallel to the X-axis of the image.
9. Circ.: 4π × [Area] / [Perimeter^2] with a value of 1.0 indicating a perfect circle. As the value approaches 0.0, it indicates an increasingly elongated shape. Values may not be valid for very small particles. Uses the heading Circ.
10. Skew: The third order moment about the mean – NaN because only one pore
11. Kurt: The fourth order moment about the mean – NaN because only one pore
12. AR: The aspect ratio of the particle’s fitted ellipse, i.e., [Major Axis] / [Minor Axis].
13. Round: 4 × [*Area*] / (*π* × [*Major* *axis*]2) or the inverse of *Aspect Ratio*.
14. Solidity: [*Area*] / [*Convex* *area*]

## XXXX\_Radius Histogram.tif

1. Image of the histogram of all fiber radii in the image.

# Diameter Analysis Images Folder

## XXXX\_Axial Thinning.tif

1. Image of the centerline as determined by the axial thinning algorithm

## XXXX\_Dilate.tif

1. Image of all centerlines counted in the histogram overlaid on the Euclidean distance transformed of the fibers fibers.
   1. Yellow lines are the locations where radii were counted
   2. Fibers are in greyscale as transformed by the Euclidean distance transform

## XXXX\_Orientation.tif

1. An image with the frequency of orientation of the centerline of all fibers. This is an output of OrientationJ and was not coded by me.

## XXXX\_Voronoi.tif

1. Image of all centerlines as determined by the Voronoi tessellation algorithm.