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## <u>Usage</u>

Step 1:

Import an image stack.

## Step 2:

Clean off any major blemishes from the stack.

## Step 3:

Run Export Point Cloud->Point Cloud. The user will be presented with a list of options:

- *Start slice, end slice* and *step size* allow the user to extract data from a subset of the stack. For large stacks these options make the amount of data more manageable.
- *Upper threshold* and *lower threshold* set the color range that will be extracted. The color range has only been tested on gray-scale images, so it may be necessary to gray-scale the stack first.
- *Starting point* and *ending point* are intended to allow the user to reduce the data being examined to a specific portion of the CT-Scan.
- Output surface points only ignores internal data points.
- *File type: This* drop-down menu allows the user to select the type of data file created. To export as a simple list of comma delimited Cartesian coordinates select 'txt'. To export a point cloud in a format compatible with Paraview select 'vtk'. When saving in 'txt' format, another dialog box will give the option of adding a custom header to the file.
- *Output as single file* produces individual files for each CT-Scan slice examined.
- *Append to file* adds the data collected to the end of an existing data file.

Save Point Cloud	Imagej Imagej Imagej Index
This plugin writes to a text file the XYZ coordinates of surface points determined by threshold color values. It scans from left to right beginning and ending at specified points.	The Lean Indige Process Project Program Windows Program Property Program Progr
The plugin is designed to work with greyscale images	Tursiops03-068.tif
Height 512 Depth: 299	
Start Slice:	
End Slice: 299	
Step Size: 1	
Lower Threshold: 0	
Upper Threshold: 500	
Starting X point: 67	
Starting Y point: 200	
Ending X point: 390	
Ending Y point: 300	
File Type txt 🖂	
Output surface points only	
Output as single file Append to file	
OK Cancel	

Figure 1. The Point Cloud plugin main menu.

## Step 4:

After choosing ok, a standard dialog box will appear to save the data file. Data saved as a txt file can be imported into Excel, Matlab, or Pro-E. The vtk option was specifically designed to work with Paraview, an open-source program that is readily available on the web and provides a suite of additional tools and filters. For example, a Delaunay 2D filter can produce a three-dimensional model capable of being saved in STL format. Custom mathematical models can be applied to the points through Paraview as well (see figures 4 and 5).



Figure 2. A point cloud of the fluke from a Common Dolphin (Delphinus delphis).



Figure 3. The end result: a flexible model created solely from CT-Scan data.



Figure 4,5: A mathematical model can be applied to the point cloud using Paraview.