Process Reference

Stack Processes

Align Canvas: Align two stacks' canvas. Expand the canvas of the first stack so the second one can be drawn onto it. If the 'change both stack' option is selected, then all the stacks are extended and made aligned with the axis of the reference system. Otherwise, the work store of the current stack is replaced with the projection of the other stack onto the extended canvas, keeping the resolution of the current stack.

Parameters

Change both stacks	Extend the non-active stacks canvas as well

Annihilate: Keep or fill a layer near the mesh

Parameters

Fill	Fill the layer with specified value, or keep the original data.
Fill Val	Value to fill the volume with.
Min Dist(µm)	Minimal distance from layer to mesh.
Max Dist(µm)	Maximal distance from layre to mesh

Apply Mask to Labels: Apply mask in work stack to labels in main stack, replacing work

Parameters

Invert	Invert
Threshold	Threshold

Apply Mask to Stack: Apply the work mask to the main replacing work

Parameters

Mode	Mode
Threshold	Threshold

Apply Separable Kernel: Kernel must have odd number of values

Parameters

X Kernel	X Kernel
Y Kernel	Y Kernel
Z Kernel	Z Kernel

Apply Transfer Function: Apply the transfer function to the stack (modifies voxel values).

Parameters

Red	Red
Green	Green
Blue	Blue
Alpha	Alpha

AutoTrim: Trim stack boundary box (BBox) to keep only non-empty part. A voxel is considered empty if its intensity is less or equal to the threshold.
Parameters

Threshold	Voxels below this threshold are considered empty.

Autoscale Stack: Scale the stack intensity to fill exactly the whole range.

Average: Average stack data with a square filter.
Parameters

X Radius	X Radius
Y Radius	Y Radius
Z Radius	Z Radius
Steps	Steps

Binarize: Transform the stack to binary (65535 or 0). All voxels with an intensity greater than the threshold to 65535, while to others are set to 0.
Parameters

Threshold	Voxels above this threshold will be assigned 1.

Blob Detect: Find and label blobs in an image
Parameters

Use watershed	Use watershed
Start Label	Start Label

Brighten Darken: Brighten or Darken stack. A value > 1 will brighten the stack, **Parameters**

Amount	Amount to multiply voxels

CImg Laplace Transform: CImg Laplace transform of stack

Change Voxel Size: Change the size of a voxel (i.e. doesn't change the data)
Parameters

X (µm)	X (µm)
Y (µm)	Y (µm)
Z (µm)	Z (µm)

Cimg Gaussian Blur: Cimg Gaussian Blur
Parameters

Radius	Radius

Clear Main Stack: Clear the main stack

Parameters

Fill value	Fill value

Clear Work Stack: Clear the work stack
Parameters

Fill value	Fill value

Clip Stack: Trim stack to clipping planes

Close by label: Morphological closure on a labeled stack
Parameters

X Radius	X Radius
Y Radius	Y Radius
Z Radius	Z Radius

Closing: Morphological closure (i.e. dilatation followed erosion) on stack
Parameters

X Radius	X Radius
Y Radius	Y Radius
Z Radius	Z Radius

Color Gradient: Compute color gradient in Z direction
Parameters

Z Divisor	Factor by which the gradient is divided by.

Combine Stacks: Combine the values of the main and work store onto the work store.
Parameters

Method	Method

Compute Volumes: Compute the volumes of the labels, i.e. the number of voxels multiplied by the vocel size.
Parameters

Filename	Filename

Consolidate Regions: Consilodate regions after watershed overseeding
Parameters

Threshold	Threshold
Min Voxels	Min Voxels

Consolidate Regions Normalized: Consolidate regions with normalization (slower)
Parameters

Tolerance	Tolerance

Copy Main to Work Stack: Copy Main to Work Stack

Copy Work to Main Stack: Copy Work to Main Stack

Delete Labels by Threshold: Delete Labels above/below voxel thresholds
Parameters

Min voxels	Min voxels
Max voxels	Max voxels

Dilate: Morphological dilation (max filter) on stack
Parameters

X Radius	X Radius
Y Radius	Y Radius
Z Radius	Z Radius
Auto-Resize	Auto-Resize

Edge Detect: Do a multipass edge detection in Z direction. Stack is turned into a mask (0 or fill value)
Parameters

Threshold	Values of signal that should not belong to surface.
Multiplier	Multiplicative factor for the threshold.
Adapt Factor	Adaptative factor for threshold.
Fill Value	Value to fill the mask with.

Erase at Border: Erase any labelled region touching the border of the image

Erode: Morphological erosion on stack
Parameters

X Radius	X Radius
Y Radius	Y Radius
Z Radius	Z Radius
Auto-Resize	Auto-Resize

Export: Export a stack into an image sequence.
Parameters

Filename	Filename
Store	Store
Format	Format
Generate Voxel Spacing	Generate Voxel Spacing
Stack number	Stack number

NbDigits	NbDigits

Fill Holes: Fill holes in stack. Use after Edge Detect.
Parameters

X Radius	X Radius of hole
Y Radius	Y Radius of hole
Threshold	Minimal signal value to fill the hole.
Fill Value	Filling value. Usually same as Edge Detect.

Fill Label: Replace a label with another one
Parameters

Filled label	Filled label
New label	New label

Fill Stack from 3D Mesh: Fill stack contained by labeled 3D mesh

Fill Stack from Mesh: Fill volume contained by closed mesh
Parameters

Fill Value	Fill Value

Gaussian Blur Stack: Blur the stack, radius = 3 x Sigma
Parameters

X Sigma (µm)	X Sigma (µm)
Y Sigma (µm)	Y Sigma (µm)
Z Sigma (µm)	Z Sigma (µm)

Import: Import stack from a series of images
Parameters

Stack	Stack
Store	Store
X Step	X Step
Y Step	Y Step
Z Step	Z Step
Brightness	Brightness
Profile File	Profile File

Invert: Invert the stack

Load Transform: Save the frame matrix (or transform if trans checked) from a file
Parameters

Filename	Filename

Local Maxima: Find local maxima and possibly number them

Parameters

X Radius (µm)	X Radius (µm)
Y Radius (µm)	Y Radius (µm)
Z Radius (µm)	Z Radius (µm)
Start Label	Start Label
Min Color	Min Color

Merge Stacks: Merge the main store of the current stack with the current store of the other one. The current stack will be aligned with the other before the stores being combines. The method argument is simply passed to the Combine_Stacks process.

Parameters

Method	Method

Normalize Stack: Normalize the stack

Parameters

X Radius (µm)	X Radius (µm) for the locality of normalization
Y Radius (µm)	Y Radius (µm) for the locality of normalization
Z Radius (µm)	Z Radius (µm) for the locality of normalization
X Sigma (µm)	X Sigma (µm) for pre-blur
Y Sigma (µm)	Y Sigma (µm) for pre-blur
Z Sigma (µm)	Z Sigma (µm) for pre-blur
Threshold	Threshold under which pixels are cleared considered as background
Blur factor	Relative contribution of blurred vs unblurred dilation

Open: Open a stack from a known 3D image format

Parameters

Filename	Filename
Store	Store
Stack number	Stack number

Open by label: Morphological opening on a labeled stack

Parameters

X Radius	X Radius
Y Radius	Y Radius
Z Radius	Z Radius

Opening: Morphological opening (i.e. erosion followed dilatation) on stack

Parameters

X Radius	X Radius
Y Radius	Y Radius

Z Radius	Z Radius

Relabel: Relabel a 3D stack to use consecutive labels. The cells are shuffled so each relabling will be different.

Parameters

StartLabel	StartLabel
Step	Step

Relabel From Mesh: Relabel a 3D stack reusing the same labels as in the stack. Unknown cells (i.e. cells in the stack, not in the mesh), can be either kept or deleted. If kept, they will be relabeled to not conflict with existing cells.

Parameters

Delete unknown	Delete unknown

Resize Canvas: Resize the stack to add or remove voxels. Make sure BBox is checked on before running.

Parameters

Relative	If true, X, Y and Z are given in percentage, if false in voxels.
Center	New canvas centered as the old one, or else use the bottom left corner as reference.
X	Canvas size for X direction, in percentage or voxels.
Y	Canvas size for Y direction, in percentage or voxels.
Z	Canvas size for Z direction, in percentage or voxels.

Reverse Axes: Reverse the direction of the selected axes. Press A-key to display the axis.

Parameters

X	X
Y	Y
Z	Z

Save: Save a stack into a known 3D image format

Parameters

Filename	Filename
Store	Store
Stack number	Stack number
Compression Level (0-9)	Compression Level (0-9)

Save Transform: Save the frame matrix (or transform if trans checked) to a file

Parameters

Filename	Filename

Scale Stack: Scale the stack.
Parameters

Percent	Percent
X	X
Y	Y
Z	Z

Sharpen Stack: Sharpen the stack, radius = 3 x Sigma
Parameters

X Sigma (µm)	X Sigma (µm)
Y Sigma (µm)	Y Sigma (µm)
Z Sigma (µm)	Z Sigma (µm)
Amount	Amount

Shift Stack: Shift both stores of the stack to within the canvas.
Parameters

Origin	Origin
X	X
Y	Y
Z	Z

Swap Bytes: Swap the bytes of the values in the stack.

Swap Main and Work Stacks: Swap the main and work data of the current stack.

Swap or Copy Stack 1 and 2: Copy or Swap Stack 1 and 2
Parameters

Store	Store
Action	Action

Trim Stack: Trim parts of stack which are not contained within closed mesh.

Trim high/low values: Clip the voxel intensities to the interval [Low Threshold, High Threshold].
Parameters

Low Threshold	Lower bound
High Threshold	Upper bound

Watershed3D: 3D Watershed on the current labeled stack.

Mesh Processes

3D Grab Labels: Grab labels from other mesh (3D meshes).
Parameters

Tolerance (µm)	Maximal distance between matching cells.

Auto-Seeding: Put a seed at local minima of mesh signal.
Parameters

Radius (µm)	Size of neighborhood used for search of local minima. Typically, the radius of smallest cells in the sample.

Auto-Segmentation: Auto-Segmentation of the mesh surface based on signal. Combines blurring, auto-seeding, label propagation by watershed and fusion of over-segmented cells.
Parameters

Update	Option to update mesh drawing while running processes.
Normalize	Option to normalize mesh signal before merging the cells. Most usefull in case of low contrast mesh signal.
Blur Cell Radius (µm)	Radius used for gaussian blur of mesh signal. In normal cases, should be equal to auto-seed radius.
Auto-Seed Radius (µm)	Radius used for auto-seeding the mesh, based on local minima of signal. Should be equal to radius of smallest cells.
Blur Borders Radius (µm)	Radius used for gaussian blur of signal on cell borders before watershed segmentation. Use small values (roughly, half the border width) to avoid border signal distortion.
Normalization Radius (µm)	Radius used for local normalization of signal. Roughly, radius of largest cells.
Border Distance (µm)	Half of the cell border width after blurring. Used for fusion of over-segmented cells.
Combine Threshold	Ratio of border signal over internal signal. If a borders between 2 cells have a ratio below the threshold, the cells are fused.

Cell Axis Clear: Remove any cell axis information from the current mesh.

Cell Axis Hide: Hide the cell axis on the current mesh.

Cell Axis Load: Load cell axis from a spreadsheet file.
Parameters

Type	Load PDG, Fibril Orientations or Curvature from a spreadsheet file.
Input File	Path to input file. If empty, a browser will open.

Cell Axis Save: Save PDG, Fibril Orientations or Curvature to a spreadsheet file.
Parameters

Output File	Path to output file

Check Correspondence: Find matching cell junctions between 2 meshes based on parent labeling. Both meshes are simplified with Make Cells to keep only the cell junctions and centers. SAVE your meshes before running!

Parameters

Erase margin cells	Take away the cells touching the mesh outer edge while converting to a cellular mesh.
Show correspondence	Draw connecting lines between corresponding junctions.

Clear Mesh Signal: Erase the signal on the mesh

Parameters

Value	Assign this signal value to the entire mesh.

Clear Parents: Clear mapping from parents to labels

Close Signal: Apply morphological dilation followed by erosion to mesh signal.

Parameters

Radius (µm)	Size of neighborhood used for dilation/erosion.

Combine Labels: Combine over-segmented regions, based on mesh signal.

Parameters

Border Distance (µm)	Half of the cell border width on the mesh.
Threshold	Ratio of border signal over internal signal. If a border between 2 cells has a ratio below the threshold, the cells are fused.

Compute Fibril Orientations: Compute principle orientations of lines in the mesh signal. Based on Boudaoud et al., 'FibrilTool, an ImageJ plug-in to quantify fibrillar structures in raw microscopy images', Nature Protocols 2014

Parameters

Border Size	Width of cell border that is not taken into account for the computation.
Minimum inner area ratio	Minimum ratio of inner area (whole cell - border) vs. total area needed for compuation.

Compute Growth Directions: Compute PDGs based on correspondence between junctions. Adapted from Goodall and Green, 'Quantitative Analysis of Surface Growth.'Botanical Gazette (1986) and Dumais and Kwiatkowska, 'Analysis of surface growth in shoot apices.'Plant Journal (2002)

Compute Tissue Curvature: Compute curvature based on simplified mesh (from Make Cells) for a neighborhood of given radius.

Parameters

Radius (µm)	Radius (µm)
Selected cell	Selected cell

Copy Parents to Labels: Copy parents to labels, and clear parent table.

Correct Parents: Take out non-existing labels from parent map.

Delete Edge: Delete edge between 2 selected vertices.

Delete Heat Range Labels: Delete labels with heat within a given range. The heat is given relative to the total range.

Parameters

Rescale	Redefine the lower/upper bounds of colormap to fit the range of values.
Delete cells	Delete vertices within a given range of the color map (Min Heat-Max Heat).
Min Heat	Lower bound of color value for which the cells will be deleted (empty for current min).
Max Heat	Upper bound of color value for which the cells will be deleted (empty for current max).

Delete Mesh Vertices by Valence: Delete mesh vertices that have valence within the specified range

Parameters

Start Valence	Start Valence
End Valence	End Valence

Delete Selection: Delete vertices selected in the current mesh, preserving cells.

Dilate Signal: Morphological dilation of signal on mesh.

Parameters

Radius (µm)	Size of neighborhood used for dilation.

Display Fibril Orientations: Display the orientations of fibrils on the image. Only the maximal direction (main orientation) is displayed as a vector.

Parameters

Heatmap	Display orientation strength (= MaxDirection/MinDirection - 1) as a colormap.
Line Color	Line Color
Line Width	Line Width
Line Scale	Length of the vectors = Scale * orientation strength.
Line Offset	Draw the vector ends a bit tilted up for proper display on surfaces.
Threshold	Minimal value of orientation strength required for drawing main direction.

Display Growth Directions: Display the principle growth directions

Parameters

Heatmap	Display stretch ratio values in max or min direction as a color map. stretch ratio = (length after/length before). No deformation means stretch ratio = 1.
Show Axis	Draw directions as vectors, scaled by strain. strain = (stretch ratio - 1). No

	deformation means strain = 0.
Color +	Color used for expansion (strain > 0)
Color -	Color used for shrinkage (strain
Line Width	Line Width
Line Scale	Length of the vectors = Scale * Strain.
Line Offset	Draw the vector ends a bit tilted up for proper display on surfaces.
Threshold	Minimal value of anisotropy (= stretchMax/StretchMin) required for drawing PDGs. Use a value above 1.

Display Tissue Curvature: Display curvature based on cellular mesh
Parameters

Heatmap	Display curvature values in max or min direction as a color map. Average: (CurvMax + CurvMin)/2, SignedAverageAbs: sign(CurvMax or CurvMin) x (abs(CurvMax) + abs(CurvMin))/2, Gaussian:(CurvMax x CurvMin), RootSumSquare: sqrt(CurvMax^2 + CurvMin^2), Anisotropy: (CurvMax / CurvMin).
Compare to 0	Center the color map on zero, if negtive values exist.
Heatmap percentile	Percentile of values used for color map upper-lower bounds.
Show Axis	Draw main curvature directions as vectors, scaled by 1/(curvature radius).
Color +	Color used for convex (curvature > 0)
Color -	Color used for concave (curvature
Line Width	Line width
Line Scale	Length of the vectors = Scale * 1/(curvature radius).
Line Offset	Draw the vector ends a bit tilted up for proper display on surfaces.
Threshold	Minimal value of curvature required for drawing the directions.

Erode Signal: Apply morphological erosion to mesh signal (opposite to Dilate Signal).
Parameters

Radius (µm)	Size of neighborhood used for erosion.

Export: Export a mesh into a known mesh format
Parameters

Filename	Filename
Kind	Kind
Transform	Transform
Mesh number	Mesh number

Extend by Connectivity: Extend the selection to connected regions

Extend to Whole Cells: Extend Selection to Whole Cells

Fix Corners: Fix labelling of cell corners.
Parameters

Auto segmentation?	Re-run watershed automatically at each turn.
Select bad vertices	Select remaining bad vertices at the end. Helps in deleting bad vertices that cannot be segmented properly.
Max iterations	Maximal number of turns.

Gaussian Blur: Apply Gaussian Blur to mesh signal
Parameters

Radius (µm)	Size of neighborhood used for Gaussian blur. The blur function standard deviation is given by sigma = radius/2.

Heat Map: Generate heat map for the current mesh
Parameters

Type	Area: signal/geometry on curved surfaces, Volume: for 3D only, Walls: quantify signal or geometry at cell borders.
Visualize	Geometry: cell areas or volume, Border signal: signal associated with cell borders, within a given distance (Border Size) Interior signal: total signal of a cell - border signal.
FileName	Path to output file.
ReportFields	Options to report the following fields in spreadsheet: Geometry, Signal, Border-Interior
Man. Range	Manually define the range of the color map.
Range Min	Color map lower bound.
Range Max	Color map upper bound.
Signal Avg	Option to normalize the signal by cell area or volume
Global Coord	Apply the rotation/translation of the stack to the cell center coordinates.
Polarity Type	Experimental option, attempt to determine cell signal polarity based on strength of signal on different walls. Cell Average: compare each wall signal to signal average, Wall/Min: compare wall signal to the weakest wall signal in the cell.
Change Map	Compare two meshes with each other (deformation or change in signal) .
Increasing	Increasing: the current mesh is the reference (T0), the other mesh is the changed state (T1), Decreasing: the other mesh is the reference (T0), the current mesh is the changed state (T1).
Diff Type	Ratio: area or signal in changed state(T1) / area or signal in reference (T0), Difference: area or signal in changed state(T1) - area or signal in reference (T0), Growth: (Ratio -1) / growth time.
Growth Time	Time interval between the two samples.
Border Size(µm)	Border Size(µm)

Heat Map Daughter Cells: Compute the heat map that shows how may daughter cells a parent cell has.

Import: Import a mesh from one of the known formats.
Parameters

Filename	Filename
Kind	Kind
Scale	Scale
Transform	Transform
Add	Add
Stack number	Stack number

Invert Selection: Invert the selection of the current mesh.

Keep Vertices: Mark vertices so that they can survive as lines and points. Also prevents labels changing.
Parameters

Keep	Keep

Label Selected Vertices: Label selected vertices with the same value, which can be a new label
Parameters

Label	Asign this label to all selected vertices.

Load: Load a mesh from one of the known formats.
Parameters

Filename	Filename
Transform	Transform
Add	Add
Stack number	Stack number

Load Heat Map: Load a heat map file and set the corresponding heat for each label
Parameters

Filename	Path to spreadsheat file.
Column	Column of the csv file to load for display. Label: cell labels, Value: original computed values (e.g. growth or signal), Heat: values scaled for visualization (always between 0-1).
Border size (µm)	Width of cell outline used for vizualization of 'wall' colormaps

Load Parents: Load map of labels to parents from a file
Parameters

Filename	Path to spreadsheet file.

Loop Subdivision: Subdivide the mesh uniformly using Loop subdivision.

Make Cells: Convert the segmented mesh into a 2D cellular mesh. The simplified mesh contains only vertices for cell centers and cell outlines
Parameters

Erase Margin Cells	Delete cells that touch the edge of the mesh.

Min Wall Length (µm)	Min length in between vertices within cell outlines.

Marching Cubes 3D: Extract 3D meshes with marching cubes
Parameters

Cube size (µm)	Size for the marching cubes.
Min Voxels	Minimal number of voxels for extracting surface.
Smooth Passes	Smooth Passes.
Label	Extract surface only for this label.

Marching Cubes Surface: Extract surface mesh with marching cubes. A threshold to 0 will interpret the image as binary.
Parameters

Cube size (µm)	Size for the marching cubes.
Threshold	Minimal signal used for surface extraction.

Merge Vertices: Merge selected vertices into one.

Mesh Cutting Surface: Make mesh from cutting surface

Normalize Signal: Normalize mesh signal locally.
Parameters

Radius (µm)	Size of neighborhood used for normalization.

Open Signal: Apply morphological erosion followed by dilation to mesh signal.
Parameters

Radius (µm)	Size of neighborhood used for erosion/dilation.

Project Mesh Curvature: Compute curvature at each node of the mesh, for a given neighborhood size. Curvature values are stored as signal.
Parameters

Output	Name of output file, if desired.
Type	Minimal = minCurv, Maximal = maxCurv, Gaussian = maxCurv * minCurv, SumSquare = maxCurv^2 + minCurv^2, Average = (maxCurv + minCurv)/2, SignedAverageAbs = sign(max or min) x (abs(maxCurv) + abs(minCurv))/2
Neighborhood (µm)	Neighborhood (µm)
AutoScale	Clip max and min signal range according to curvature distribution
Min Curv	Minimal curvature value displayed
Max Curv	Maximal curvature value displayed
Autoscale percentile	Auto-scale signal range based on curvature percentile

Project Signal: Project signal onto mesh, perpendicular to its curved surface.
Parameters

Use absolute	Use absolute values of signal, instead of normalizing it. Useful for signal quantification!
Min Dist (µm)	Distance (triangle-voxel) above which the signal is projected.
Max Dist (µm)	Maximal distance (triangle-voxel) used for signal projection.
Min Signal	Lower bound of signal value if 'Use absolute' is chosen
Max Signal	Upper bound of projected signal value.

Relabel: Relabel a mesh randomly to use consecutive labels.
Parameters

Label Start	Starting label.
Label Step	Increment step.

Relabel 3D Cells: Relabel 3D cells (connected regions). A start label of -1 is used to indicate continuing using current labels.
Parameters

Label start	Starting label. Use -1 to continue from last current label.
Label step	Increment step.

Rescale Heat Map: Change the range of the current heat map for display.
Parameters

Min	Lower bound (empty for current)
Max	Upper bound (empty for current)

Rescale Signal: Change the colorbar of the signal. If percentile is set to 0, it uses the minimum and maximum arguments.
Parameters

Zero as reference	If true, 0 will be used as a reference. If the signal is all positive (resp. negative), 0 will be added as a minimum (resp. maximum). If the signal is both positive and negative, 0 will be place at the center of the range
Percentile	Keep only this percentage of the signal to compute the range.
Minimum	If the percentile specified is 0, uses this as the minimum value for the range
Maximum	If the percentile specified is 0, uses this as the maximum value for the range

Reset: Reset a mesh, -1 for current.
Parameters

Mesh	Mesh

Reverse Mesh: Reverse orientation of the mesh

Save: Save a mesh into a known mesh format
Parameters

Filename	Filename
Transform	Transform
Mesh number	Mesh number

Save Heat Map: Save heat map to a file
Parameters

Filename	Path to spreadsheat file.

Save Parents: Save map of labels to parents labels to a file
Parameters

Filename	Path to spreadsheet file.

Scale Mesh: Scale Mesh, or a selected part of it. It is possible to specify a negative number, in which case the dimension will be mirrored. If either 1 or 3 axis are mirrored, then the whole mesh needs to be scaled, as these triangles will change orientation
Parameters

X Scale	X Scale
Y Scale	Y Scale
Z Scale	Z Scale

Segmentation Clear: Clean all mesh labels.

Select All: Select all vertices of the current mesh

Select Bad Normals: Select all vertices of the current mesh with bad normals (i.e. normals is not opf size 1)

Select Clip Region: Add vertices in clip region to selection.

Select Duplicate Cells: Select cells with duplicate labels.

Select Label: Add to or replace the selection with the vertices of a given label (0 for current label).
Parameters

Replace selection
Label (0 for current)

Select Labeled: Add to or replace the selection with the labeled vertices.
Parameters

Replace selection	Replace selection

Select Unlabeled: Add to or replace the selection with the unlabeled vertices.
Parameters

Replace selection	Replace selection

Set Signal: Set the signal for the whole mesh, or for the currently selected part of it.
Parameters

Value	New value for the signal
Rescale	If true, the signal bounds will be rescaled
Percentile	If rescaling, which percentile to use?
Use zero	If rescaling, should we use zero as reference?

Shrink Mesh: Displace each vertex towards the mesh center, perpendicular to the surface.
Parameters

Distance(µm)	Vertex displacement. If negtive, the mesh will expand.

Smooth Mesh: Average each vertex position based on its neighbors.
Parameters

Passes	Passes

Smooth Mesh Signal: Averages the signal of each node, based on its immediate neighbors.
Parameters

Passes	Number of smoothing iterations.

Subdivide: Subdivide the mesh unifromly

Subdivide Adaptive Near Borders: Subdivide triangles around cell borders
Parameters

Max Area(µm²)	Area threshold (in square microns) for subdivision, triangles smaller than this won't be subdivided
Border Dist(µm)	Distance (in microns) from cell borders that triangles will be subdivided

Subdivide Adaptive by Signal: Subdivide triangles depending on mesh signal. Triangle size is determined by a high and low area, which is interpolated based on the minimum and maximum signals
Parameters

Low Max Area(µm²)	Maximum area (square microns) for low instentity voxels
High Max Area(µm²)	Maximum area (square microns) for high instentity voxels

Subdivide with Bisection: Subdivide triangles area with bisection
Parameters

Max Area(µm²)	Max Area(µm²)

Transform Mesh: Apply an affine transformation to all vertices of a mesh
Parameters

translation (µm)
rotation axis
angle (degree)
scale

Unselect: Unselect the vertices of the current mesh

Unselect Label: Remove the vertices of a given label (0 for current label) from the selection.
Parameters

Label (0 for current)	Label (0 for current)

View: Modify how the current mesh is viewed. Useful for scripts.
Parameters

Show Surface	Draw mesh as a continuous surface.
Surface Type	Nrml: show projected signal, Labels: color triangles according to assigned labels, Parents: color triangles with parent labels, Heat: color triangles with computed heat map (e.g. growth)
Signal Type	Signal: show projected signal, Tex: Use 3D stack as texture, Img: Use 2D texture (height map).
Blend	Semi-transparent mesh, for example to superimpose to meshes or view the stack through the mesh.
Cull	Color the triangles (with signal or labels) only on the top of the mesh.
Show Mesh	Draw triangle edges and nodes
Mesh View	All: draw all triangles. Border: draw outside edge of the mesh only. Cells: draw cell outlines only. Selected: draw selected nodes only.
Show Lines	Show connecting lines between nodes in the mesh.
Show Points	Show mesh nodes.
Show Map	Mapping of text on the labels (e.g. label number)
Scale	Change scaling of mesh/stacks, independently in 3 directions (x,y,z). NB:
Transform	a stack saved with 'Scale' turned on will have a modified voxel size, while saved meshes are unaffected.
BBox	Apply rotation and translation to the mesh/stack.
Brightness	Display the bounding box (i.e. total size) of a stack.
Opacity	Brightness of signal, labels or heat

Watershed Segmentation: Propagate labels on mesh using the watershed algorithm.
Parameters

Steps	Number of propagation steps performed before updating display. Increase value to run faster.

Global Processes

JoinRegions Segmentation: Join Regions after 3D segmentation. Cells selected in the 3D cell mesh extracted from the stack will be merged and re-extracted.
Parameters

Cube Size	Cube Size for the Marching Cube process.

Load All: Load the data for all existing objects, using the filename and properties set in them.

Load View: Load a view file and set all the fields and interface. Does not load the data though.
Parameters

Filename	Filename

PCAnalysis: Compute the principle components of the image. If the threshold is -1, then all the values are used, as is. If 'Draw Result' is set to true, the current mesh will be erased and replaced with shapes representing the cells fit. 'Splan Correction' can be either a shape, a single value of a vector of 3 values, corresponding to the correction to apply for the eigen-values on all three directions.
Parameters

Output	File to write the output to
Span Correction	Span correction can be made using pre-computed formula for regular shapes, or a percentage of the PC.
Draw Result	Shape used to display the result
Threshold	If the stack is not labeled, a single volume is considered with all voxels of intensity greater than this threshold.
Shape Details	How finely to draw the shape (for cylinders or ellipsoids)

Reset All: Reset all stacks and meshes

Save All: Save all or part of the data currently loaded in MGX
Parameters

Type	'All' to save all the structures, keeping their current file names 'Defined' to specify in the 'Definition' argument what needs saving and how
Definition	A comma-separated list of fields, where each field is of the form KEY=VALUE The key must be one of: - 'MainStack' or 'WorkStack' followed by their user-visible id (i.e. 'MainStack1' for the first main stack) - 'Mesh' preceded optionally by 'Transformed', and followed by the mesh id (i.e. 'TransformedMesh1' for the second mesh, transformed) The mesh type is by default binary mesh but can be empty, 'Text', 'Cells' or 'MeshEdit'. Note that a mesh cannot be saved as a Keyence mesh. - 'View' for the view file. The value is the name of the file to save the designated item into.
Compression Level (0-9)	Compression level used for stacks.

Save Global Transform: Save the global alignment (transform) matrix from one stack to the other

into a file

Parameters

Filename	Filename

Save View: Save the view file for the current configuration.

Parameters

Filename	Filename

SetCurrentStack: Change the current stack and mesh. Needed for scripts.

Parameters

Store	Store
Stack id	Stack id

Snapshot: Take a snapshot of the current view

Parameters

Filename	Filename
Expand Frustum	Expand Frustum
Width	Width
Height	Height
Oversampling	Oversampling
Quality	Quality