LOBSTER Cheat Sheet

Initialize

>> cd('E:/LOBSTER') Note: change string by actual LOBSTER installation folder

>> init

Calling jobs

>> JobName (only work if located in current folder or LOBSTER_ROOT/Jobs folder)

Jobs can also be launched by opening *.m files and pressing green arrow in script editor

Calling journals

>> JENI;	Journal browser
>> JENI('Tissue_SegWaterTiles.jl');*	Specify journal
>> GENI('Tissue_SegWaterTiles.jl');	No image display
>> [InputFolder MaskFolder] = JENI('Tissue_SegWaterTiles.jl');	Retrieve folders
>> JENI('Tissue_SegWaterTiles.jl', InputFolder, MaskFolder);	Force folders
>> JENI('FISH_sptdet.jl','',{'*_C01*.tif','*_C02*.tif'});	Replace string
>> JENI('Tissue_SegWaterTiles.jl', InputFolder, N);**	Force In, local out

*if journal not located in Journals folder, specify path ('E:/MyJournals/Tissue_SegWaterTiles.jl').

**local output located at: InputFolder /.. / InputFolder(N) (N > 0)

InputFolder /.. /../ InputFolder(-N) (N < 0)

Measurements

>> IRMA(MaskFolder, ReportFolder, Meas, Dim, ZRatio);*	Simple call
>> ReportFolder = IRMA(MaskFolder, '.', Meas, Dim, ZRatio);	Retrieve folder
>> ReportFolder = IRMA(MaskFolder, N, Meas, Dim, ZRatio);**	Local out
>> IRMA(MaskFolder, ReportFolder, Meas, Dim, ZRatio, InputFolder, '*C01*.tif');	Int. meas.
>> IRMA(…, '*C01*.tif', '*C02*.tif');	Int. meas.
>> IRMA(MaskFolder2, '.', 'Objs', Dim, ZRatio, MaskFolder1, '*dst*');	Distance meas.

***Meas**: 'Objs', 'Spts', 'Skls', 'Trks' or 'Spst' ; **Dim**: 2 or 3 ; **ZRatio**: Z aspect ratio

**local output located at: MaskFolder /.. / MaskFolder(N) (N > 0)

MaskFolder /.. /../ MaskFolder(-N) (N < 0)

Note: ReportFolder can also be set to '' (none) or '.' (ROOT/Results/Reports/MaskFolder)

Exportation (IRMA)

>> IRMA(MaskFolder, '.', 'Objs', 3 , {ZRatio, Smp , '.'});*	3D Object surfaces (STL)
>> IRMA(MaskFolder, '.', 'Skls', 3 , {ZRatio, Stp, '.'});	3D Filament centerlines (SWC)
>> IRMA(MaskFolder, '.', 'Trks', 2, {ZRatio, '', '.'});**	2D tracks (SWC)

*__Smp__: mesh sampling ratio (0.1: low details – 1: full details)

**__Stp__: Network tracing step (pixels, typically in range 2 - 4)

Exportation (JOSE)

>> JOSE(InputFolder,'*C00*' ,ReportFolder,'Objs',ExportFolder,'IJ', Flags, '');*	SceneViewer
>> JOSE(InputFolder1, '*C00*', InputFolder2, '*C01*', ReportFolder1, 'Objs', ReportFolder2, 'Spts', ExportFolder, 'IJ', Flags, '');	SceneViewer
>> ColorCode = '(getResult("Area", ObjIdx) >= 250)+(getResult("Area",ObjIdx) >= 350)'; >> JOSE(InputFolder,'*_C00*',ReportFolder,'Objs',ExportFolder, 'IJ', Flags, ColorCode);	Boxes color-coding
>> JOSE(ReportFolder, 'Spts', ExportFolder, 'CellInsight', '', '');**	CellInsight

Flags: 3 digit 0/1 flags (Channel Step + FoldersIn + Time-lapse, e.g. 100)

*Displayed items in pairs: images/annotations folder + image filter/annotation type

**ExportFolder should be set to InputFolder for automatic annotation importation

__Note__: Except for last case, ExportFolder is typically set to ReportFolder

IA Server (JULI)

>> JULI(MonitoredFolder, PathToLogFile, 'user@gmail.com','password'); Launch server

Should be provided in job:

`Dstmail = 'youremail@youremailprovider.com';`

`AttachmentFolder:` typically set to ReportFolder, can be undefined for no attachment

Journal processing options (common to 2D/3D journals)

Rescale	>=1	Downscaling factor prior to processing (default = 1)
ExportDist	0	Do not export mask distance map (default)
	1	Export distance map (outside objects)
	2	Export distance map (inside objects)
		(Distance map: any pixel >1 is object)

Note: For 3D journals, distance map is computed on image **O** unless image **M** is defined.

Dilate	>=1	Integer**,** 2D dilate objects in mask (pix)

2D journals (.jl) specific processing options

MinLocalFocus	Do not process image if focus score smaller than this value
LocalFocusBlkSize	Block size (pix) used to compute local focus score
Min95Percentile	Minimum maximum intensity excluding 5% brightest pixels
MaxSatPixFract	Maximum fraction of saturated pixels

Following options are display only:

Lbl	0	Display binary mask overlay
	1	Display label mask overlay (colours)
Fill	-1	Original mask (no contouring, no dilation)
	0	Mask contour, apply dilation (default)
	1	Original mask + dilation

3D journals (.jls) specific processing options

Step Process only each **Step** images in stack (default = 1)

Offset Start at image **Offset** in stack (default = 0)

SaveOutput If set to 1, output variable **O** is saved to output folder (default = 0)

Brick Brick XY size, defining this variable enables brick mode

GuardBand Overlap in pixels between XY bricks to avoid border effects (default = 64 pix)

FoldersIn Set to 1 if input images are folders of 2D images (default = 0)

Following options are display only

NCols Sets number of random colours in palette for label masks (default = 16)

PointSize For 3D rendering, sets size of displayed points (default = 1)

RunProj If set >1, running local maximum intensity Z projection is performed (**RunProj** slices are locally projected). Ignored for 3D rendering (default = 1)

ZRatio For 3D rendering, Z slices to pixel size ratio (default = 1)

Shw Control input and output image stacks display (see below).

- **0** Display input and output images in two separate slice browsers
- **1** Overlay output **binary mask** over input image
- **2** Overlay output binary or label mask contours over input image
- **3** Overlay output label mask over input image (if binary mask detected, connected component analysis is performed to label objects)
- **4** Output volume rendering
- **5** Input volume rendering + output mask overlay as surface points mesh

Time-lapse journals (.jlm) specific processing options

Shw

- -1 No display
- 1 Display label mask overlaid on input image
- 2 Display only output image

Slice browser controls

Mask tick box	Show / hide mask overlay
Intensity	Mouse position and image intensity + mask values (lower left corner)
Contrast	Left click + move mouse up/down - left/right to adjust intensity display. Lower and higher clipping values are displayed as **L** (lower) and **W** (higher) and can also be user defined by clicking them.
Histogram	Tick histogram to view image histogram
ROIs	Intensity measurements can be performed by drawing ROIs with tools
Colours	Use drop down menu on the left of floppy disk to change image LUT
Zoom in/out	Press shift + left click + move mouse
Reset view	Use landscape button to reset view
Slice selection	Use slider on left side or mouse wheel to scroll though slices
Grid	Use tick box to display / hide grid
'x'	Resume processing
'r'	Launch 3D renderer (draw bounding box, adjust depth before with **z**)
'z'	Set number of slices used for local z projection
'm'	Toggle mask overlay

3D renderer controls

m	Show/hide point mesh overlay
c	Display min/max intensity value clipping dialog
space	Reset view
Close window	Resume processing

Seeds mask measurements ('Spts')

Centroid	X,Y(,Z) object position
MeanInt	Mean intensity

Skeletons mask measurements ('Skls')

sklvol	Number of pixels (voxels) of the skeleton
skllgth	Total skeleton (min 1 branch) length (XY pixel unit), Z ratio corrected
sklbrpts	Number of skeleton branch points
sklenpts	Number of skeleton end points
objvol	Volume of the segmentation mask prior to skeletonization (pix or vox), if found
imgvol	Image volume (pix or vox)
meanint	Mean intensity of skeleton voxels in intensity channel(s)
histint	Histogram (bins centred on [1:16]) of skeleton voxels in intensity channel(s)

Objects mask measurements ('Objs')

Area	Object area/volume
Centroid	X,Y(,Z) position
Bounding Box	X,Y(,Z) position of top upper left corner + width, height(,depth)
MeanInt	Average intensity inside object in intensity channel(s)
NonNullPix	Number of non-null pixel inside object in intensity channel(s)

Moving Objects mask ('Trks')

Area	Object area/volume at each time point
Centroid	X,Y,(Z) object position at each time point
MeanInt	Average intensity inside object in intensity channel(s) at each time point

Dual mask measurements (IRMA third argument: 'Spst')

Ovl	2nd numeric value of 5th IRMA argument: {ZRatio, Ovl, ''}
Dice	Dice coefficient between both masks
Dice_ovl	Dice coefficient between both masks after dilation by **Ovl** pixels
F_{rnd}	Expected fraction of co-localized pixels (uniform distribution in free regions)
F_{obs}	Observed fraction of co-localized pixels
P_{obs}	Probability of observation for uniform distribution in free regions
alpha	Co-localization probability factor: P(r+|g+) / P(r+|g-)
beta	Exclusion probability factor: P(r-|g+) / P(r-|g-)
FN	False negative: count of objects present in channel A and not in channel B
FP	False positive: count of objects present in channel B and not in channel A
TP	True positive: count of objects present in both channels
clustA	Objects A area divided by number of objects A after mask dilation
custB	Objects B area divided by number of objects B after mask dilation

Notes:

Low P_{obs} (e.g < 1%) hint toward co-localization or exclusion since in both cases the observation will deviate from the free distribution scenario. To conclude on co-localization or exclusion, one should compare **F_{obs}** to **P_{obs}**.

Masks grayscale levels

Object mask (8-bit image)

0	background
255	foreground

Object label mask (16-bit image)

0	background
1-65535	object label

Seed mask (8-bit image)

0	background
100	optional mask (spot segmentation)
200	plain seeds (1 pixel markers)
220-250	classified seeds

Skeleton mask (8-bit image)

0	background
100	optional mask (filament segmentation)
200	skeleton (1 pixel central axis)
220	skeleton end point
250	skeleton branch point