



# License agreement

## Welcome

LIFEx is an easy-to-use freeware enabling calculation of 1) a broad range of radiomic features: conventional, textural, shape features from PET, MR, US and CT images 2) Cerebral Blood Volume, Mean Transit Time and Cerebral Blood Flow maps from dynamic susceptibility contrast-enhanced MR , 3) total metabolically active volume from PET images.

**The software package LIFEx is not a medical product.**

This software is not intended to be used for medical diagnosis and/or patient management. The software may be used exclusively for scientific research purpose and neither for commercial nor curative purposes. This program is provided "as is" without warranty of any kind. Any usage of the results or images of the LIFEx package is at your own risk and liability.

Click on "Accept" to start using LIFEx.

# LIFEx is user friendly and assists users !



Help is available in the main interface

**User Guides**

- User guide (pdf)
- License (pdf)
- How to draw regions (pdf)
- How to open & view images (pdf)
- Support online (html)
- License (mp4)
- Loading CT RS (mp4)

**Interface shortcuts**

Generic action with tools selected:  
Shift + action : dispatch action on all frames

**Image Interactions**

- Ctrl + LMB moving the view
- Ctrl + Wheel (up or down) adjust the zoom level
- Shift + LMB growing/reduce ROI by 1 unit value
- Shift + Ctrl + LMB growing/reduce ROI by 10 unit value
- Shift + Wheel (up or down) change size of ROI

**Menus**

- File: New, Open, Save, Close, Copy, Paste, Undo, Redo, Print, Exit
- Basic: Move, Translate, Rotate, Scale, Crop, Zoom, Pan, Reset
- Reformat: Flip, Rotate, Crop, Crop to fit, Crop to size, Crop to shape, Crop to color, Crop to intensity, Crop to edge, Crop to gradient, Crop to curvature, Crop to Laplacian, Crop to Hough, Crop to Sobel, Crop to Canny, Crop to Prewitt, Crop to Gabor, Crop to SIFT, Crop to SURF, Crop to ORB, Crop to FAST, Crop to BRIEF, Crop to LBP, Crop to LTP, Crop to LTPv2, Crop to LTPv3, Crop to LTPv4, Crop to LTPv5, Crop to LTPv6, Crop to LTPv7, Crop to LTPv8, Crop to LTPv9, Crop to LTPv10, Crop to LTPv11, Crop to LTPv12, Crop to LTPv13, Crop to LTPv14, Crop to LTPv15, Crop to LTPv16, Crop to LTPv17, Crop to LTPv18, Crop to LTPv19, Crop to LTPv20
- Morphology: Dilate, Erode, Open, Close, Fill, Fill holes, Fill inside, Fill outside, Fill between, Fill between ROI, Fill between ROI and edge, Fill between ROI and color, Fill between ROI and intensity, Fill between ROI and gradient, Fill between ROI and curvature, Fill between ROI and Laplacian, Fill between ROI and Hough, Fill between ROI and Sobel, Fill between ROI and Canny, Fill between ROI and Prewitt, Fill between ROI and Gabor, Fill between ROI and SIFT, Fill between ROI and SURF, Fill between ROI and ORB, Fill between ROI and FAST, Fill between ROI and BRIEF, Fill between ROI and LBP, Fill between ROI and LTP, Fill between ROI and LTPv2, Fill between ROI and LTPv3, Fill between ROI and LTPv4, Fill between ROI and LTPv5, Fill between ROI and LTPv6, Fill between ROI and LTPv7, Fill between ROI and LTPv8, Fill between ROI and LTPv9, Fill between ROI and LTPv10, Fill between ROI and LTPv11, Fill between ROI and LTPv12, Fill between ROI and LTPv13, Fill between ROI and LTPv14, Fill between ROI and LTPv15, Fill between ROI and LTPv16, Fill between ROI and LTPv17, Fill between ROI and LTPv18, Fill between ROI and LTPv19, Fill between ROI and LTPv20
- Measure: Measure, Measure ROI, Measure ROI edge, Measure ROI gradient, Measure ROI curvature, Measure ROI Laplacian, Measure ROI Hough, Measure ROI Sobel, Measure ROI Canny, Measure ROI Prewitt, Measure ROI Gabor, Measure ROI SIFT, Measure ROI SURF, Measure ROI ORB, Measure ROI FAST, Measure ROI BRIEF, Measure ROI LBP, Measure ROI LTP, Measure ROI LTPv2, Measure ROI LTPv3, Measure ROI LTPv4, Measure ROI LTPv5, Measure ROI LTPv6, Measure ROI LTPv7, Measure ROI LTPv8, Measure ROI LTPv9, Measure ROI LTPv10, Measure ROI LTPv11, Measure ROI LTPv12, Measure ROI LTPv13, Measure ROI LTPv14, Measure ROI LTPv15, Measure ROI LTPv16, Measure ROI LTPv17, Measure ROI LTPv18, Measure ROI LTPv19, Measure ROI LTPv20
- Edit: Crop, Crop to fit, Crop to size, Crop to shape, Crop to color, Crop to intensity, Crop to edge, Crop to gradient, Crop to curvature, Crop to Laplacian, Crop to Hough, Crop to Sobel, Crop to Canny, Crop to Prewitt, Crop to Gabor, Crop to SIFT, Crop to SURF, Crop to ORB, Crop to FAST, Crop to BRIEF, Crop to LBP, Crop to LTP, Crop to LTPv2, Crop to LTPv3, Crop to LTPv4, Crop to LTPv5, Crop to LTPv6, Crop to LTPv7, Crop to LTPv8, Crop to LTPv9, Crop to LTPv10, Crop to LTPv11, Crop to LTPv12, Crop to LTPv13, Crop to LTPv14, Crop to LTPv15, Crop to LTPv16, Crop to LTPv17, Crop to LTPv18, Crop to LTPv19, Crop to LTPv20
- Threshold: Threshold, Threshold ROI, Threshold ROI edge, Threshold ROI gradient, Threshold ROI curvature, Threshold ROI Laplacian, Threshold ROI Hough, Threshold ROI Sobel, Threshold ROI Canny, Threshold ROI Prewitt, Threshold ROI Gabor, Threshold ROI SIFT, Threshold ROI SURF, Threshold ROI ORB, Threshold ROI FAST, Threshold ROI BRIEF, Threshold ROI LBP, Threshold ROI LTP, Threshold ROI LTPv2, Threshold ROI LTPv3, Threshold ROI LTPv4, Threshold ROI LTPv5, Threshold ROI LTPv6, Threshold ROI LTPv7, Threshold ROI LTPv8, Threshold ROI LTPv9, Threshold ROI LTPv10, Threshold ROI LTPv11, Threshold ROI LTPv12, Threshold ROI LTPv13, Threshold ROI LTPv14, Threshold ROI LTPv15, Threshold ROI LTPv16, Threshold ROI LTPv17, Threshold ROI LTPv18, Threshold ROI LTPv19, Threshold ROI LTPv20
- Adaptive: Adaptive, Adaptive ROI, Adaptive ROI edge, Adaptive ROI gradient, Adaptive ROI curvature, Adaptive ROI Laplacian, Adaptive ROI Hough, Adaptive ROI Sobel, Adaptive ROI Canny, Adaptive ROI Prewitt, Adaptive ROI Gabor, Adaptive ROI SIFT, Adaptive ROI SURF, Adaptive ROI ORB, Adaptive ROI FAST, Adaptive ROI BRIEF, Adaptive ROI LBP, Adaptive ROI LTP, Adaptive ROI LTPv2, Adaptive ROI LTPv3, Adaptive ROI LTPv4, Adaptive ROI LTPv5, Adaptive ROI LTPv6, Adaptive ROI LTPv7, Adaptive ROI LTPv8, Adaptive ROI LTPv9, Adaptive ROI LTPv10, Adaptive ROI LTPv11, Adaptive ROI LTPv12, Adaptive ROI LTPv13, Adaptive ROI LTPv14, Adaptive ROI LTPv15, Adaptive ROI LTPv16, Adaptive ROI LTPv17, Adaptive ROI LTPv18, Adaptive ROI LTPv19, Adaptive ROI LTPv20

**Color Palettes**

- MONOCHROME1\_MONOCHROME1\_PAlettes
- MONOCHROME2\_MONOCHROME2\_PAlettes
- RAINBOW\_RAINBOW\_PAlettes
- RAINBOW\_INVERSE\_RAINBOW\_INVERSE\_PAlettes
- RAINBOW\_NEW\_RAINBOW\_NEW\_PAlettes
- RAINBOW\_NEW\_INVERSE\_RAINBOW\_NEW\_INVERSE\_PAlettes
- HEAT\_HEAT\_PAlettes
- HEAT\_INVERSE\_HEAT\_INVERSE\_PAlettes

**One Frame:**

- MMB adjust the window/leveling (W/L)
- action: change W/L on this frame
- Shift + action: dispatch W/L on all frames
- Change color palette only on this frame

**A: no transparency**

**B: transparency is a function of luminescence**

**C: only the lowest voxel value (bottom of the colormap) is transparent**

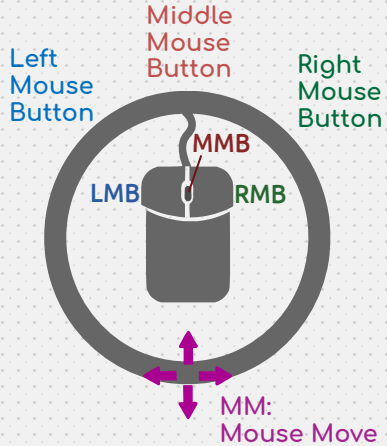


# Interface shortcuts

Generic action using tool icons:

**Shift** + action : dispatch action on all frames

## Mouse acronyms



## Image Interactions

**MMB + MM**  
adjust the window/levelling

the slices move one by one  
**Wheel** (up or down) or

**Mouse Button** **Ctrl + LMB + MM**  
moving the view

**Ctrl + Wheel** (up or down)  
adjust the zoom level

## ROI Interactions

**LMB**  
selected ROI

**Shift + LMB + MM**  
move ROI

**Shift + LMB**  
grow/reduce ROI by 1 unit value

**Shift + LMB + (MM)**  
draw ROI

**Shift + Wheel** (up or down)  
change size of ROI

**Shift + Ctrl + LMB**  
grow/reduce ROI by 10 unit values

**Shift + RMB + (MM)**  
delete ROI



**Conditions of use of LIFEx:** LIFEx is not intended for a clinical use. It is a research tool offered to the scientific community. The interpretation of the results is left to the judgment of the users. The use of LIFEx in any communication, be it oral or written, should explicitly mention the software as follows: LIFEx, www.lifexsoft.org, Property of CEA.

# Color Palettes

**LIFEx**  
soft  
Local Image Feature  
Extraction

Image GUI:



Change color palette on all frames

One Frame:



Change color palette on this frame only

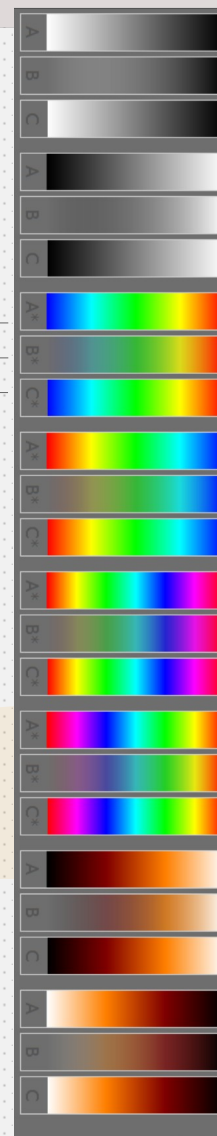


**MMB + MM**  
adjust the window/levelling (W/L)

**Shift + MMB + MM**  
dispatch W/L on all frames

**LMB + MM**  
change W/L on this frame

**Shift + LMB + MM**  
dispatch W/L on all frames



MONOCHROME1  
MONOCHROME1\_PVALUES  
MONOCHROME1\_PVALUES0

MONOCHROME2  
MONOCHROME2\_PVALUES  
MONOCHROME2\_PVALUES0

RAINBOW  
RAINBOW\_PVALUES  
RAINBOW\_PVALUES0

RAINBOW\_INVERSE  
RAINBOW\_INVERSE\_PVALUES  
RAINBOW\_INVERSE\_PVALUES0

RAINBOW\_NEW  
RAINBOW\_NEW\_PVALUES  
RAINBOW\_NEW\_PVALUES0

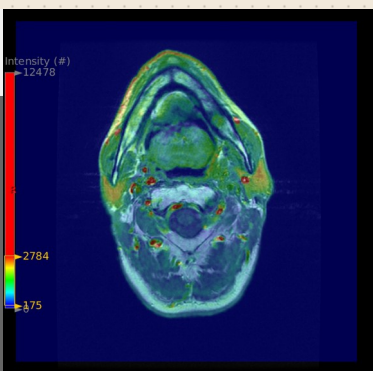
RAINBOW\_NEW\_INVERSE  
RAINBOW\_NEW\_INVERSE\_PVALUES  
RAINBOW\_NEW\_INVERSE\_PVALUES0

HEAT  
HEAT\_PVALUES  
HEAT\_PVALUES0

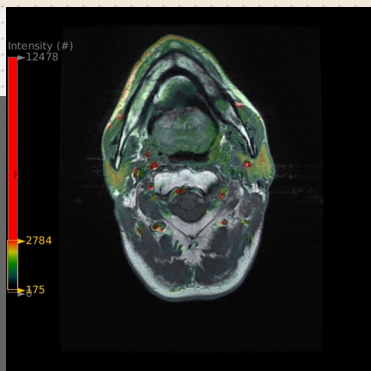
HEAT\_INVERSE  
HEAT\_INVERSE\_PVALUES  
HEAT\_INVERSE\_PVALUES0

Names of color palette  
(for script links)

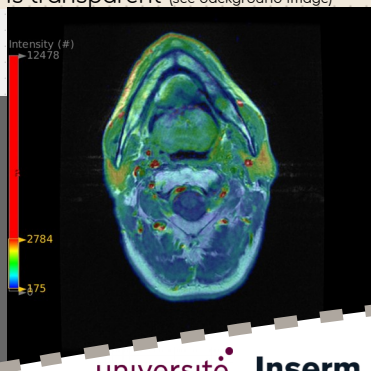
**A:** no transparency  
(see background image)



**B:** transparency is a function of luminescence



**C:** only the lowest voxel value (bottom of the colormap) is transparent (see background image)



universit  Paris-Saclay

Inserm

UNIVERSIT  PARIS-SUD

LITO

CNRS

cea



Download this page



Download the soft

Conditions of use of LIFEx: LIFEx is not intended for a clinical use. It is a research tool offered to the scientific community. The interpretation of the results is left to the judgment of the users. The use of LIFEx in any communication, be it oral or written, should explicitly mention the software as follows: LIFEx, www.lifexsoft.org, Property of CEA.



### Tools

File	Basic	Reformat	Morphology
<b>New</b> Create new ROI	<b>Move</b> Translate selected ROI	<b>Ring</b> Dilatation to the outer edges (vx, sp)	<b>Close</b> Close action
<b>Click</b> Click & draw	<b>Copy</b> Copy of selected ROI	<b>KeepOne</b> Split ROI and keep only the biggest one	<b>Fill3D</b> Create a new ROI by 3D filling from another ROI
<b>Click40</b> Click & draw and threshold 40%	<b>FlipAP</b> Flip Anterior-Posterior	<b>Split</b> Split ROI into multiple layers	<b>Dilate</b> Dilate ROI (vx, sp)
<b>Load</b> Load ROI file	<b>FlipRL</b> Flip Right-Left	<b>Union</b> Union of all visible ROI	<b>Erode</b> Erode ROI (vx, sp)
<b>Dispose</b> Dispose selected ROI	<b>FlipIS</b> Flip Inferior-Superior	<b>Subtract</b> Subtract of two visible ROI	<b>Interpolation</b> interpolate slice between two ROI not joined (only on axial) <b>Intersection</b> Intersection between ROIs joined

### Measure

- Max**  
Locate maximum value of selected ROI
- Angle**  
Angle node 2D
- Dist**  
Distance node 2D
- Cluster Stat**  
get cluster statistics pointed by crosshair

### Edit

3D	2D
<b>Circle3D</b> Draw circle 3D	<b>Circle2D</b> Draw circle 2D
<b>Snake3D</b> 3D snake algorithm	<b>Snake2D</b> 2D snake algorithm
<b>Pencil3D</b> Draw with pencil 3D	<b>Pencil2D</b> Draw with pencil 2D

**ROI tools**

Applied to one ROI:

- Tools**
  - New
- Measure**
  - Max
- Edit**
  - Circle3D
- Threshold**
  - n

Applied to all ROI:

- Tools**
  - Hide

### Tools

Basic	Advanced	Display
<b>SaveAllInOne</b> Save all ROI on single file	<b>Histo</b> Histogram of values in ROI with open eyes	<b>Show</b> Show all ROI
<b>SaveAllInAll</b> Save all ROI on many files	<b>Curve</b> (Time)(Activity) Curve of ROI with open eyes	<b>Hide</b> Hide all ROI
<b>Delete ROI</b> Delete all files (permanently delete)	<b>Labelling</b> Quick Labelling of ROI	<b>Invert</b> Invert all eyes
<b>Dispose</b> Dispose all ROI	<b>Quarter</b> Quarter division	<b>Sort</b> Sorting of ROI
		<b>Border/Fill</b> Display border /fill of all ROI

### Threshold

Basic	Peak	Adaptative
<b>n</b> Relative / absolute threshold on active ROI	<b>Peak.5cc</b> SUVPeak (diameter of 0.5cm) in selected ROI	<b>ROI from W/L</b> ROI Creation from window/leveling contrast
<b>n%</b> Threshold at n% of max value	<b>Peak.1cc</b> SUVPeak (diameter of 1cm) in selected ROI	<b>Nestle</b> Nestle ROI
<b>40%</b> Threshold at 40% of max value		<b>Contrast</b> Contrast Based Method
<b>70%</b> Threshold at 70% of max value		

