

OCTExplorer 5.0.0 (beta) User Manual

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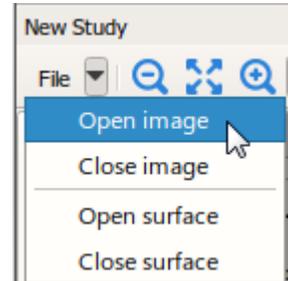
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- For commercial use, please contact Kimberly A. Glynn (kimberly-a-glynn@uiowa.edu).

Installation

- 64-bit Microsoft Windows 7 or 10
 - Extract downloaded OCTExplorer.zip and run OCTExplorer.exe
- Apple Mac OS X (tested on 10.13.1 High Sierra)
 - Mount downloaded OCTExplorer.dmg
 - Copy OCTExplorer.app to hard drive and run it
- Memory usage varies w.r.t. OCT scan size
 - **6 GB** of RAM for non-cystic Zeiss OCT scans (200 x 1024 x 200 voxels)
 - **20 GB** of RAM for cystic Zeiss OCT scans (200 x 1024 x 200 voxels)

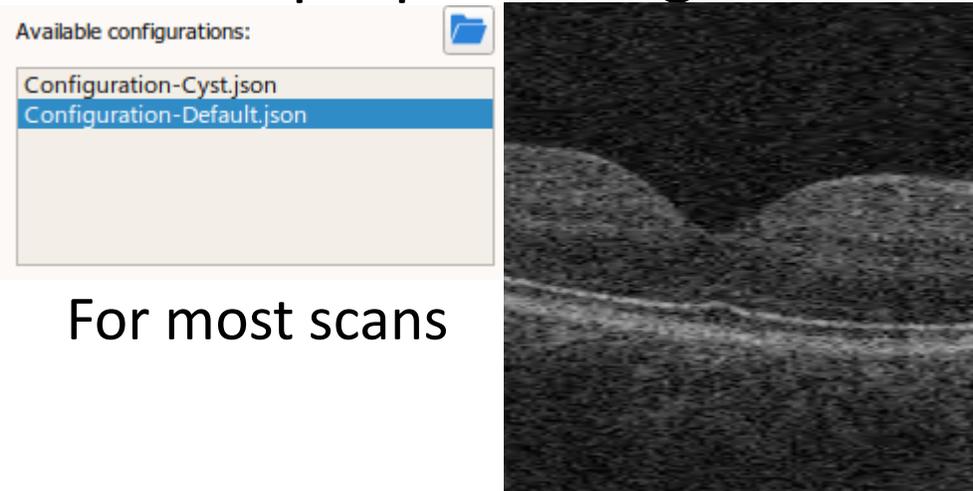
Open an OCT Scan

- Drag and drop file of OCT scan to OCTExplorer or use [File]—[Open image]
- After image is opened, surface xml file can be opened via drag and drop or [File]—[Open surface]
- Supported scanner manufactures and file extensions
 - Carl Zeiss Meditec Inc.: *.img exported from Zeiss-provided research browser
 - Topcon: *.fds
 - Heidelberg Engineering: *.vol converted from *.E2E file by Heidelberg's conversion tool
 - Optovue Inc: *.OCT
 - Bioptigen Inc: *.OCT
 - Optos plc: *.dicom
 - Canon Inc.: *.ScanParameters.dat
 - Standard MetalImage: *.mhd, *.mha
 - Standard Analyze 7.5: *.hdr
 - Standard NIfTI: *.nii, *.nii.gz

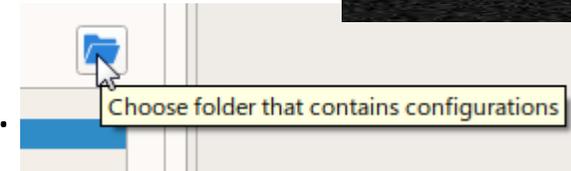


Pre-segmentation

- Choose proper configuration



- Can choose where to load configurations from.

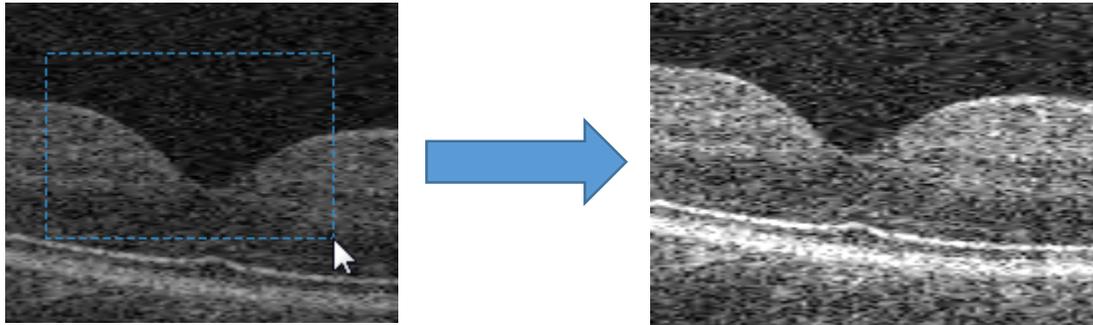


- Click *Next* to start pre-segmentation

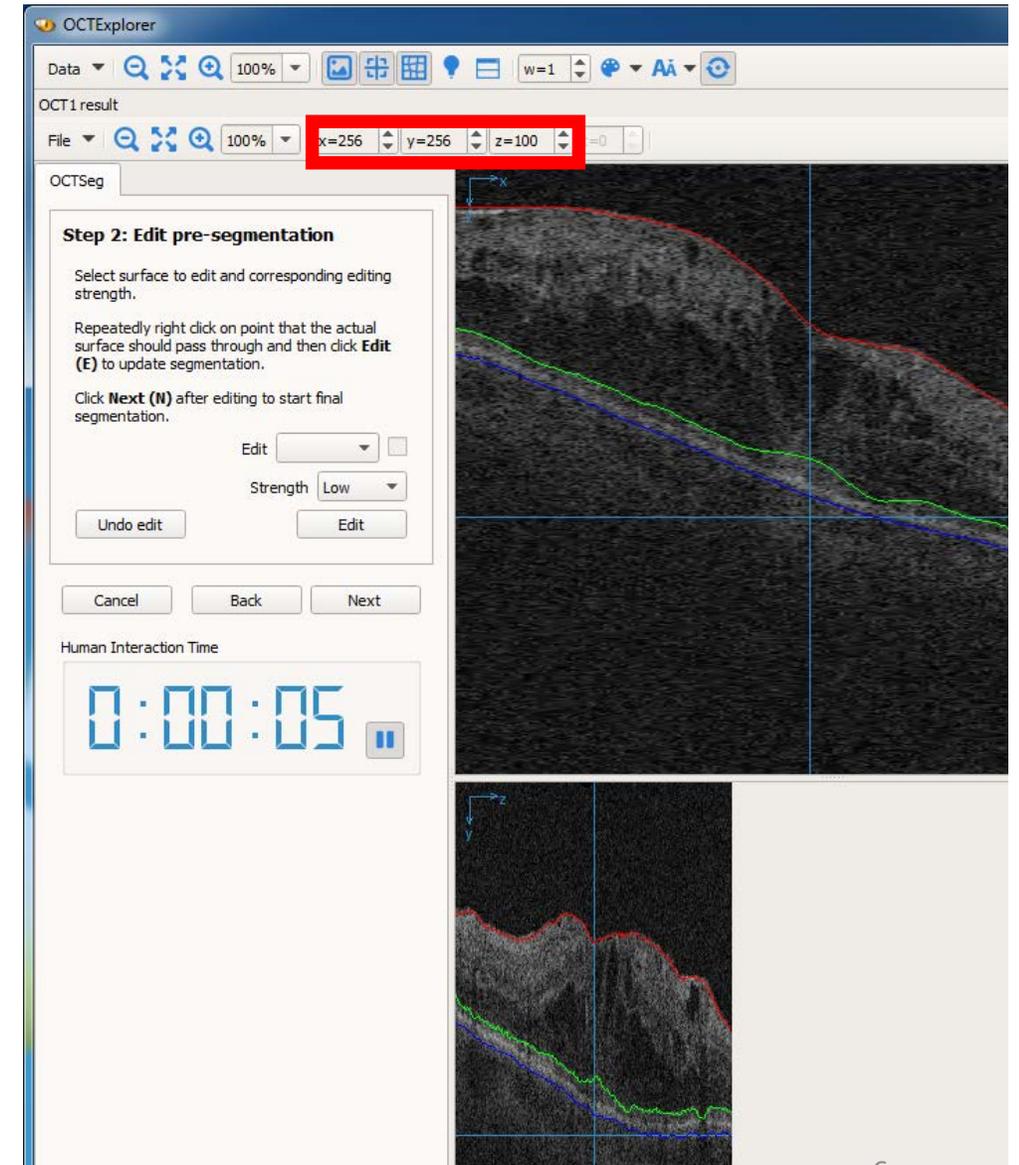
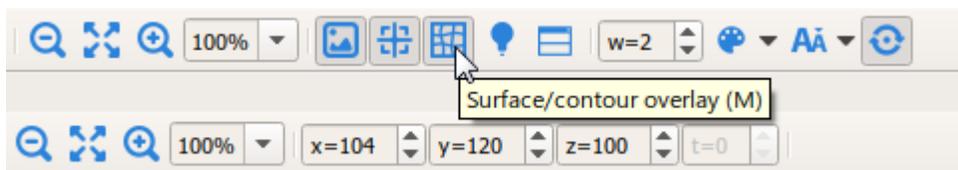
- Identify 3 surfaces that divide image into inner and outer retinal volumes for final segmentation

Review Segmentation Result

- Change crosshair location with
 - Left mouse click, mouse wheel, or its (x,y,z) location
- Adjust brightness and contrast
 - Draw ROI with Ctrl + left mouse drag
 - Voxels within ROI will be shown with full gray level range (0—255)

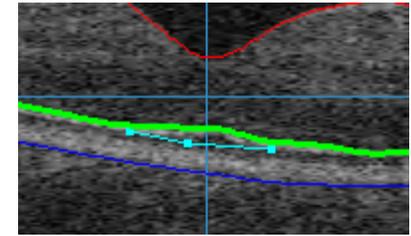
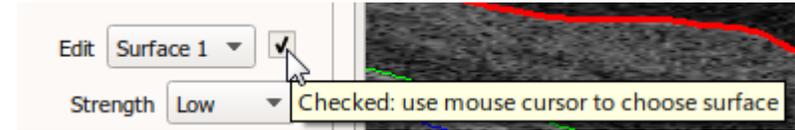


- Hover mouse cursor on toolbar icons to see tips about more visualization tools



Edit Segmentation Result

- Select surface to edit
 - Use combo box, or move mouse cursor and left click on highlighted surface
 - Selected surface will be highlighted (thicker lines)
- Draw a nudge line with right clicks
 - Use *Esc* key to remove last drawn nudge point
- Select editing strength – how hard the algorithm will try to make the edited surface pass through the nudge line
- Click *Edit* to modify surface
 - Note: The nudge line can affect multiple surfaces on multiple slices
- Human interaction time
 - The program uses a timer, which can be paused, to keep record of time spent in surface editing



Edit Segmentation Result

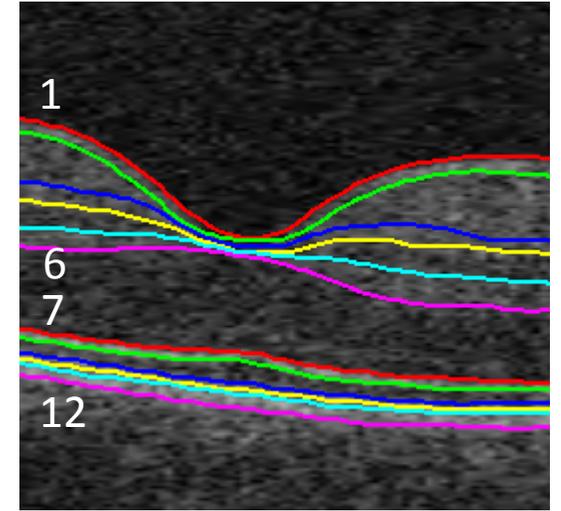
- Surfaces of final segmentation results are smoothed along x direction
 - Can choose different smoothing strength 
- Click *Back* from *Edit final segmentation* step will
 - Re-run the pre-segmentation
 - Apply existing nudge lines for pre-segmentation editing
- Click *Back* from *Edit pre-segmentation* step or click *Cancel* will
 - Go back to the first step
 - Existing nudge lines will be automatically applied when its corresponding segmentation is re-run
 - Whether the same configuration is used is NOT checked

Retina Surface Names

1. ILM (ILM)
2. RNFL-GCL (RNFL-GCL)
3. GCL-IPL (GCL-IPL)
4. IPL-INL (IPL-INL)
5. INL-OPL (INL-OPL)
6. OPL-Henle fiber layer (OPL-HFL)
7. Boundary of myoid and ellipsoid of inner segments (BMEIS)
8. IS/OS junction (IS/OSJ)
9. Inner boundary of OPR (IB_OPR)
OPR: Outer segment PR/RPE complex
10. Outer boundary of OPR (OB_OPR)
11. Inner boundary of RPE (IB_RPE)
12. Outer boundary of RPE (OB_RPE)

Retina Layer Names

- 1–2: RNFL
- 2–3: GCL
- 3–4: IPL
- 4–5: INL
- 5–6: OPL
- 6–7: ONL
- 7–8: IS/OS
- 8–9: Outer segment
- 9–10: OPR
- 10–11: Subretinal virtual space
- 11–12: RPE
- 1–12: Total retina

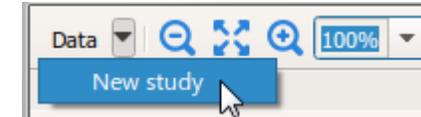


Output Files

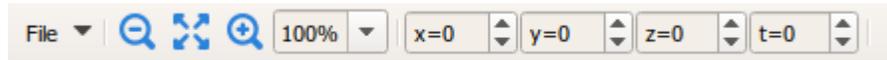
- Created in the same folder as OCT scan file xxx.*
 - Surfaces
 - xxx_Surfaces_Retina-JEI-Pre.xml: for pre-segmentation
 - xxx_Surfaces_Retina-JEI-Final.xml: for final segmentation
 - Can be loaded into OCTExplorer 3.8.0 for layer thickness analysis
 - Nudge lines
 - xxx_NudgeLines_Retina-JEI-Pre.xml: for pre-segmentation
 - xxx_NudgeLines_Retina-JEI-Final.xml: for final segmentation
 - Human interaction time (in second)
 - xxx_Time_Retina-JEI-Pre.txt: for pre-segmentation
 - xxx_Time_Retina-JEI-Final.txt: for final segmentation

Advanced Feature: multiple studies

- Can compare images or surfaces of multiple datasets side-by-side
- Use [Data]—[New study] to create a new study
- Top toolbar controls all opened studies



- Study-specific toolbar only controls its associated study



- Crosshairs on all opened studies can be synchronized

