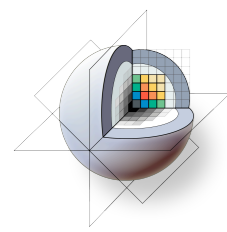


# 3D Slicer: A Free, Open Source and Extensible Platform For Medical Image Analysis and Visualization

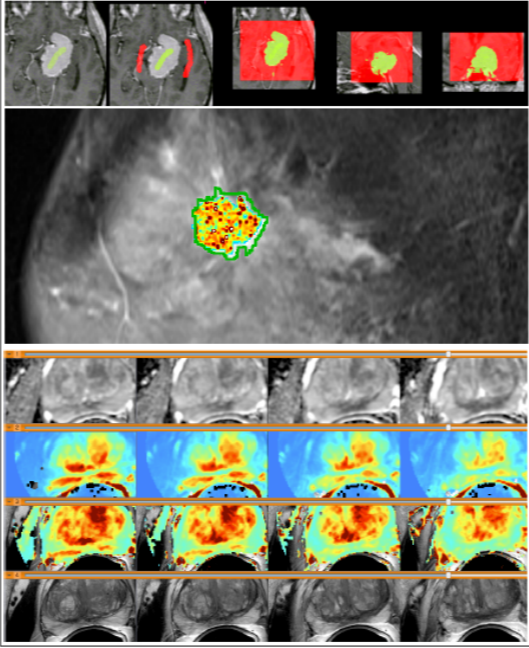
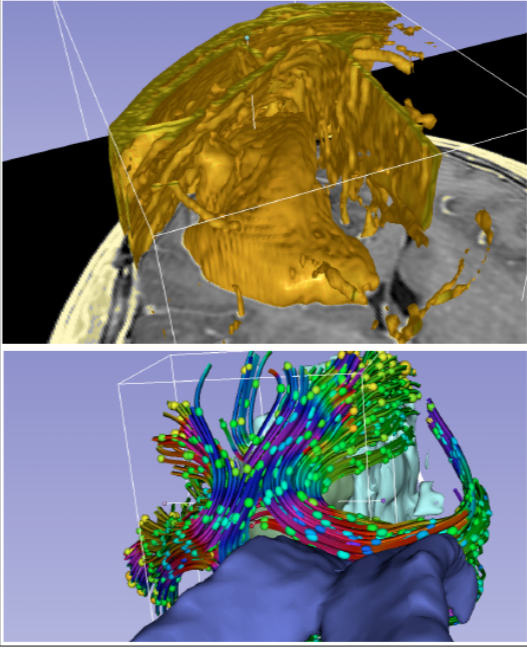
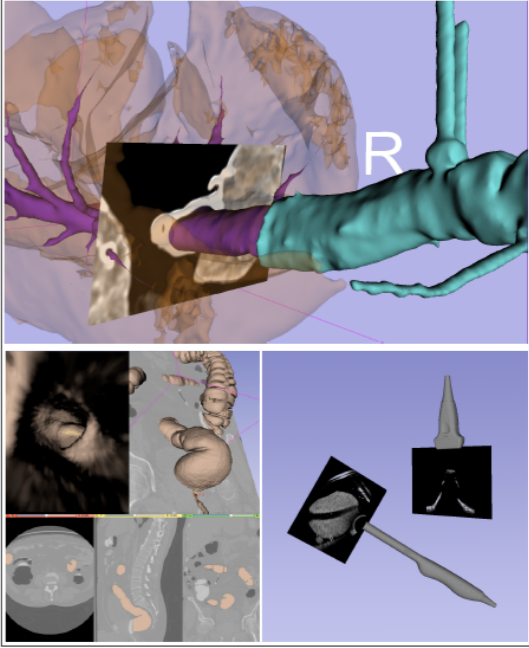
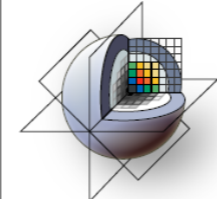
Sonia Pujol, Ph.D., Steve Pieper, Ph.D., Andriy Fedorov, Ph.D., Ron Kikinis, M.D.

Surgical Planning Laboratory, Brigham and Women's Hospital  
Harvard Medical School

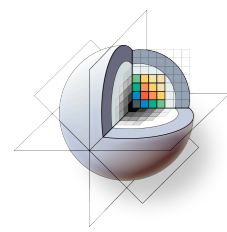


# 3D Slicer: An overview

3D Slicer is a multi-platform, **free and open source** software package for **visualization** and **medical image computing**.

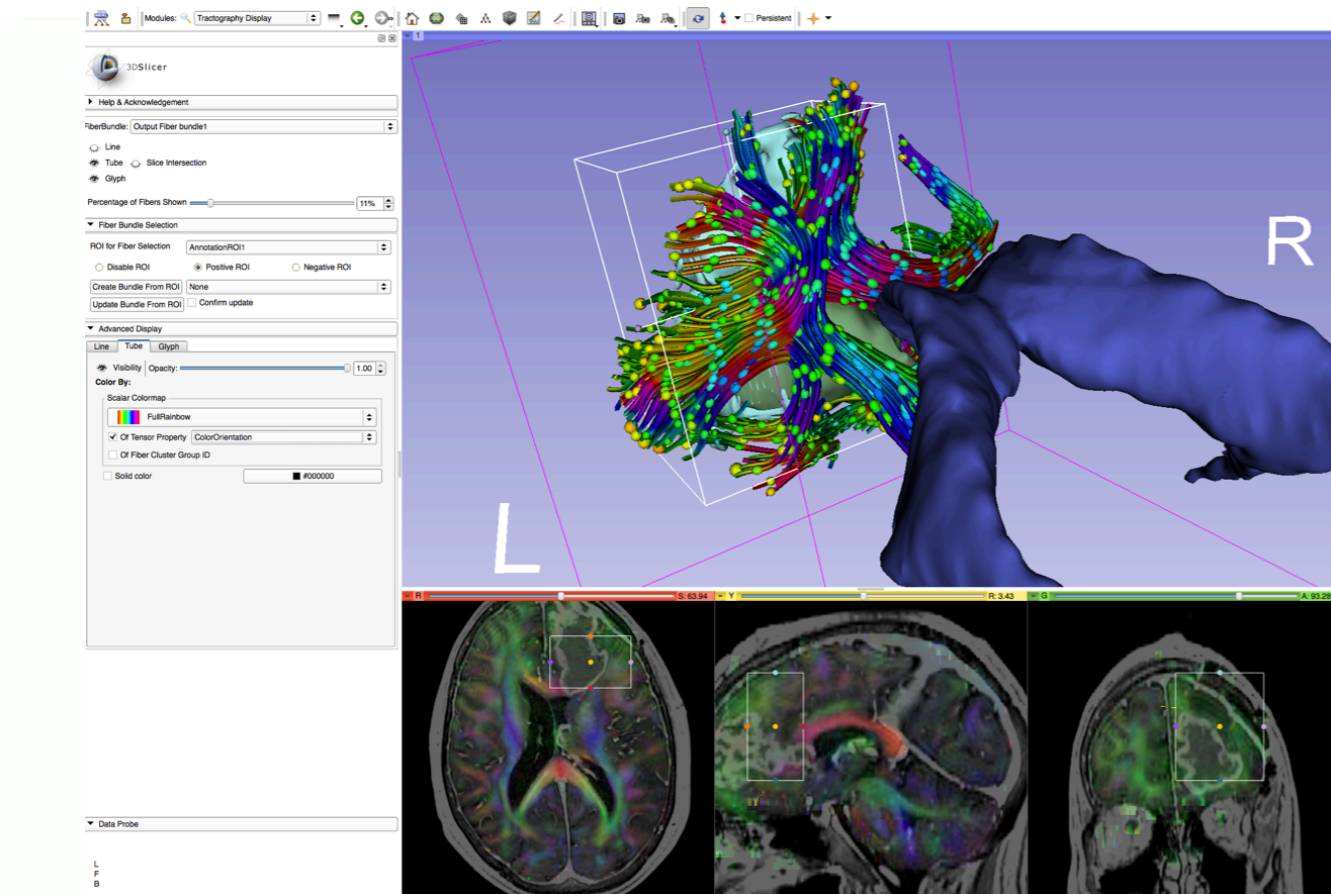
<i>Powerful processing.</i>	<i>Streamlined interface.</i>	<i>Extensible platform.</i>
		
 <b>3D Slicer</b> <i>version 4.0</i>	<i>www.slicer.org</i>	

[www.slicer.org](http://www.slicer.org)



# 3D Slicer: An overview

The software platform is **community created** for the purpose of subject specific medical image analysis and visualization. Slicer includes support for:



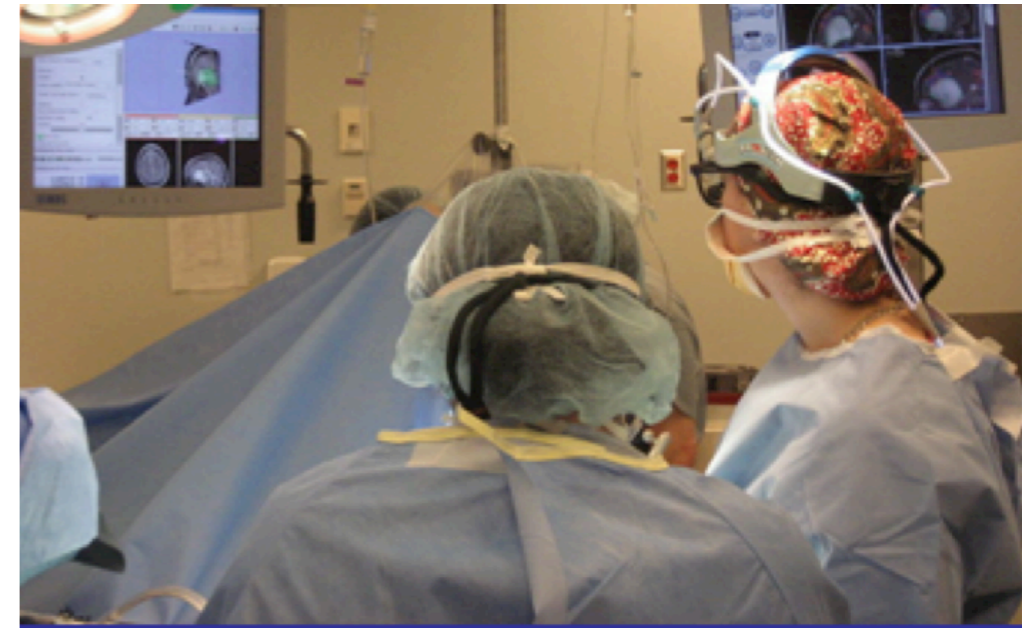
Using an ROI to crop streamlines from a whole brain tractography. The streamlines display color by orientation, the ellipsoids are displaying fractional anisotropy.

- Multi-modality imaging including, MRI, CT, US, nuclear medicine, and microscopy
- Multi-organ from head to toe
- Bidirectional interface for devices and scanners
- Expandable and interfaced to multiple toolkits

# Translational research

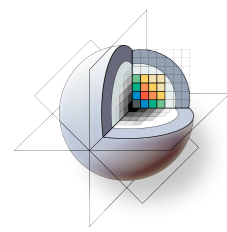


An **open-source environment** for software developers



An **end-user application** for clinical investigators and scientists

3D Slicer: an open-source platform for ***translating*** innovative algorithms into clinical research applications



# 3D Slicer: An overview



## Types of users:

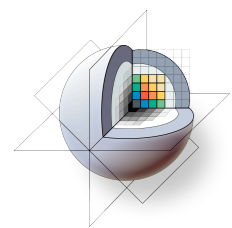
**Algorithm researchers** (who work within 3DSlicer's development environment and with associated toolkits)

**Biomedical engineers** (who rely on 3DSlicer's interactive environment and scripting capabilities)

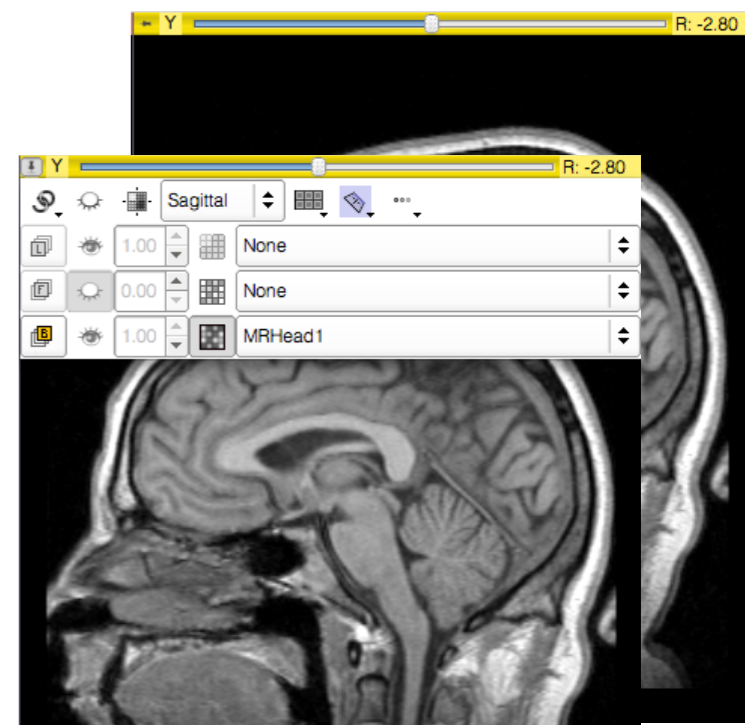
**Application scientists** (who use 3DSlicer as a desktop application and turnkey system)

## Core use scenarios:

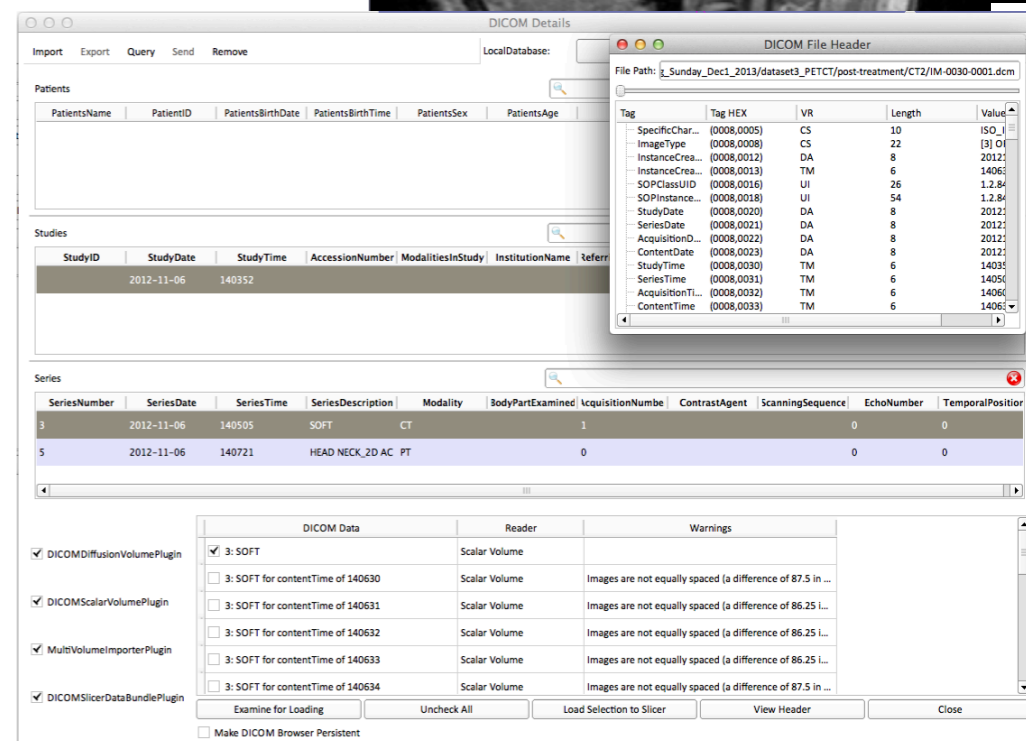
- Longitudinal and multi-channel dataset analysis
- Individual and group analysis
- Real-time control and tracking in the operating theater
- Neurosurgical planning and guidance



# 3D Slicer: What's different in 4.3?



- Qt-based GUI
- Streamlined user- and developer-level interfaces
- Improved DICOM support
- 64-bit support for all platforms





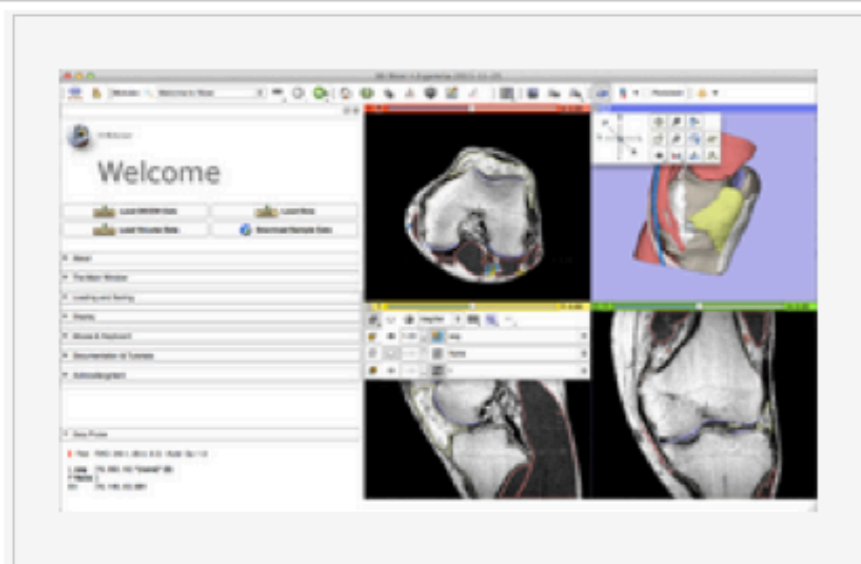
# 3D Slicer: What has not changed?

---

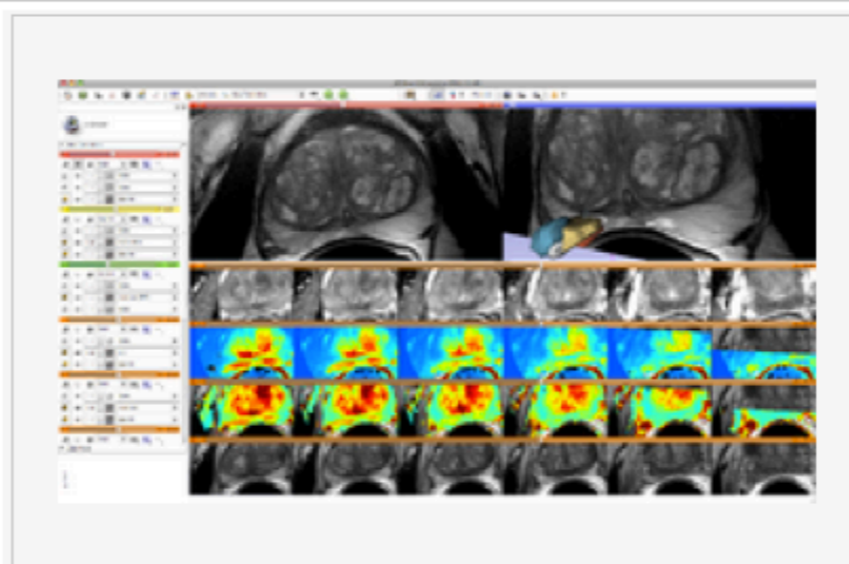
- **Free Open Source Software**
  - Free to use both in academic and commercial projects
- **NA-MIC Kit foundation** tools and robust software development practices
- **Cross-platform portability:** Win / Mac / Linux
- **Support** of user and developer communities



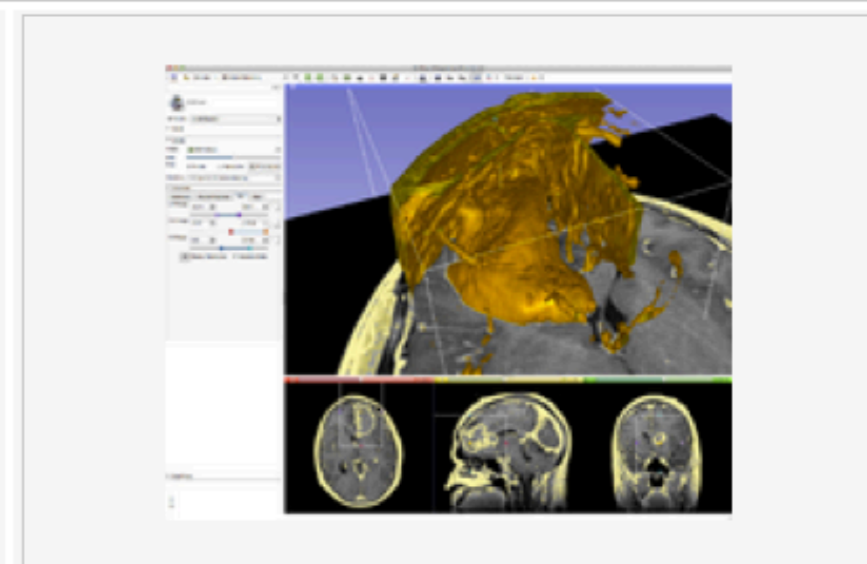
# 3D Slicer: Version 4 Highlights



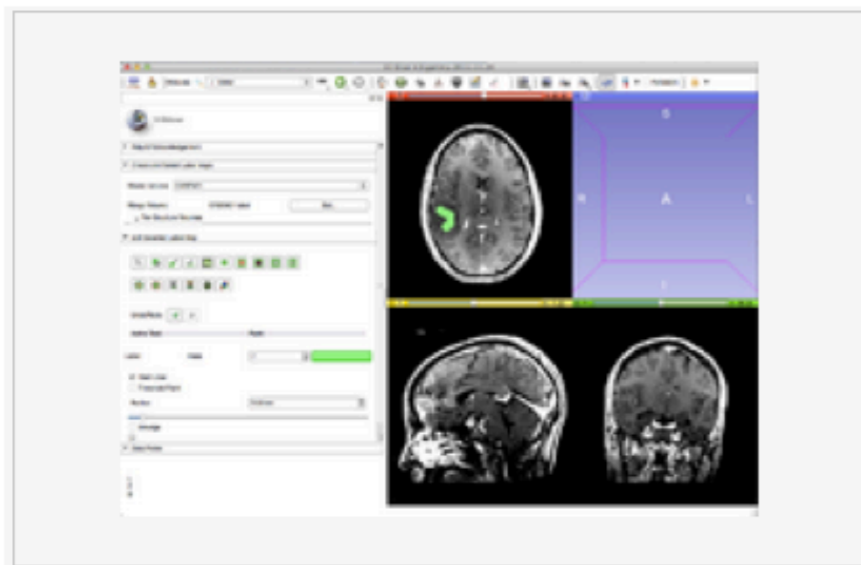
Main GUI



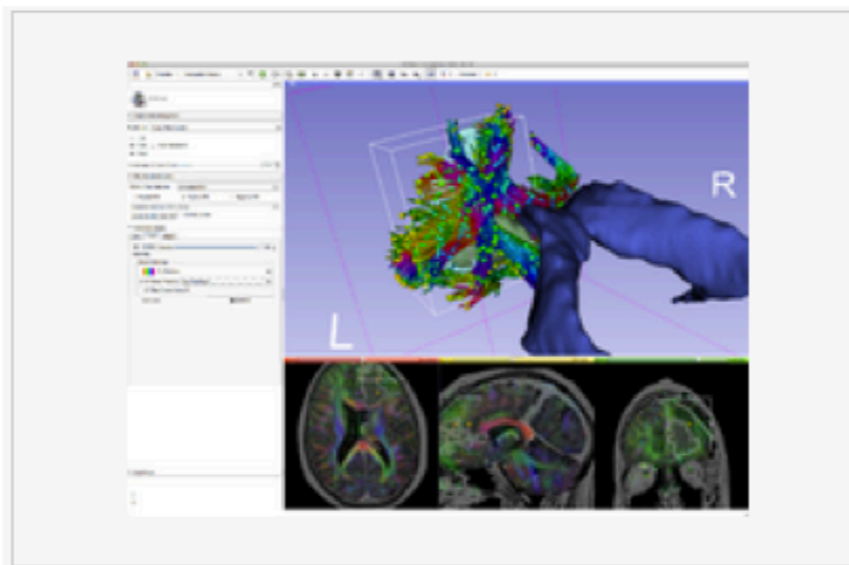
Layouts



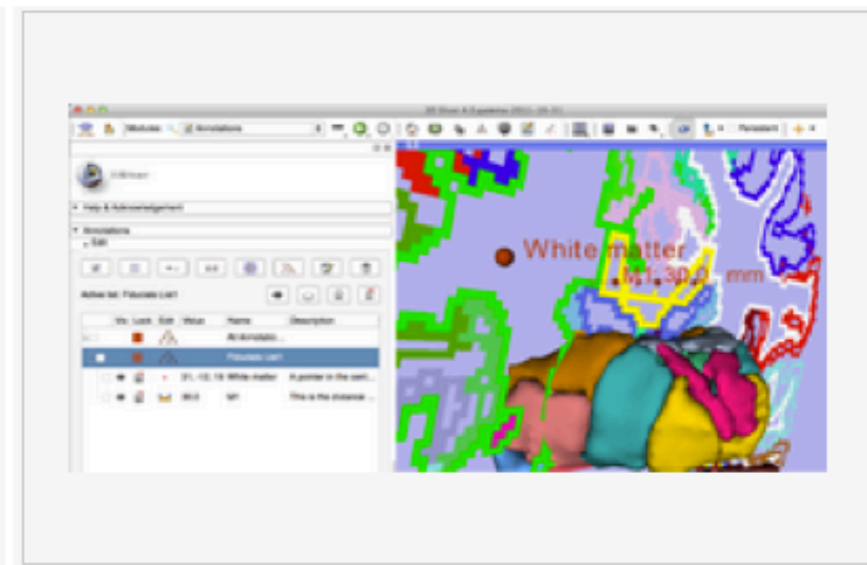
Volume Rendering



Editor

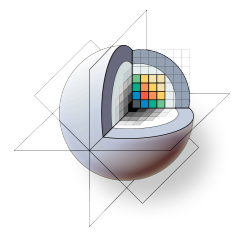


Diffusion: Fiber Display

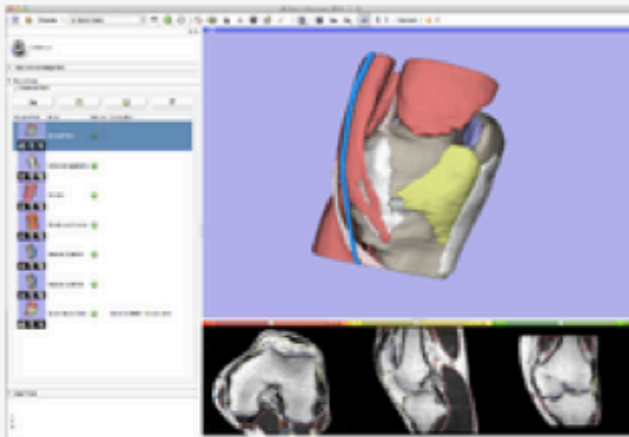


Annotations

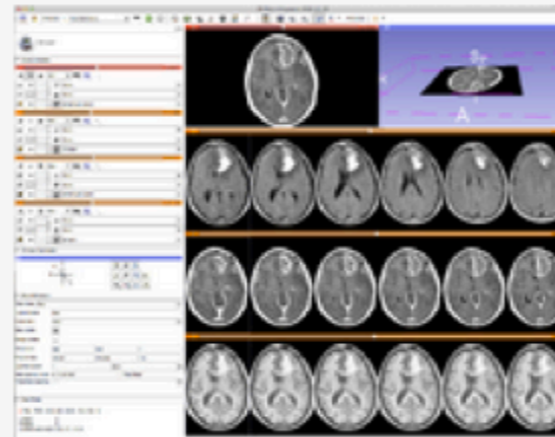




# 3D Slicer: Version 4 Highlights



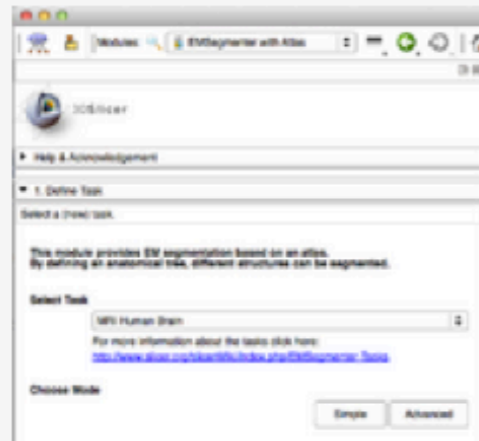
Sceneviews



View controllers



Volume module



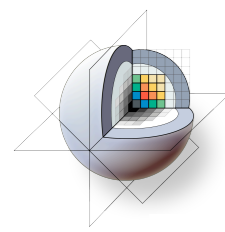
EM segmenter



Slicer welcome module



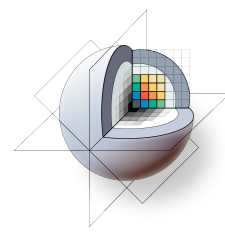
Data probe



# 3D Slicer: File Formats

Format	File Name Extensions	Read	Write	
<b>Scenes</b>				
MRML (Medical Reality Markup Language File)	.mrml	yes	yes	MRML file
MRB (Medical Reality Bundle)	.mrb, .zip	yes	yes (.mrb extension only)	MRB is a t including :
<b>Raster Images</b> <i>this includes 2D and 3D images, and more complicated types such as DWI or DTI</i>				
DICOM <a href="#">↗</a>	.dcm ...	yes <sup>[1]</sup>	no <sup>[2]</sup>	DICOM, D
NRRD <a href="#">↗</a>	.nrrd, .nhdr	yes	yes	
MetalImage <a href="#">↗</a>	.mhd, .mha	yes	yes	
VTK <a href="#">↗</a>	.vtk	yes	yes	
Analyze <a href="#">↗</a>	.hdr, .img, .img.gz	yes	yes	
NIFTI <a href="#">↗</a>	.nia, .nii, .nii.gz	yes	yes	
BMP	.bmp	yes	yes	
BioRad	.pic	yes	yes	
Brains2	.mask	yes	yes	
GIPL	.gipl, .gipl.gz	yes	yes	
JPEG	.jpg, .jpeg	yes	yes	
LSM	.lsm	yes	yes	
PNG	.png	yes	yes	
Stimulate	.spr	yes	yes	
TIFF	.tif, .tiff	yes	yes	
MGH-NMR	.mgz	yes	yes	
MRC <a href="#">↗</a> Electron Density	.mrc, .rec	yes	yes	
<b>Models</b>				
VTK Polygonal Data <a href="#">↗</a>	.vtk	yes	yes	
VTK XML Polygonal Data <a href="#">↗</a>	.vtp	yes	yes	
STL	.stl	yes	yes	
OBJ	.obj	yes	no	
Others (to be tested)	.g, .byu, .orig, .inflated, .sphere, .white, .smoothwm, .pial	yes	no	
<b>Fiducials</b>				
CSV	.fcsv	yes	yes	
Text	.txt	yes	yes	
<b>Transforms</b>				
Transform <a href="#">↗</a>	.tfm, .mat	yes	yes	
Text	.txt	yes	yes	
<b>Transfer Functions</b>				
Volume Rendering properties	.vp	yes	yes	
Text	.txt	yes	yes	
<b>Lookup tables</b>				
Text	.txt, .ctbl	yes	yes	
<b>Double Arrays</b>				
CSV	.csv	yes	yes	

Slicer supports multiple images file formats including DICOM



# 3D Slicer: DICOM Networking

DICOM Details

Import Export Query Send Remove LocalDatabase: [ ]

Patients

PatientsName	PatientID	PatientsBirthDate	PatientsBirthTime	PatientsSex	PatientsAge
--------------	-----------	-------------------	-------------------	-------------	-------------

Studies

StudyID	StudyDate	StudyTime	AccessionNumber	ModalitiesInStudy	InstitutionName	Referr
	2012-11-06	140352				

Series

SeriesNumber	SeriesDate	SeriesTime	SeriesDescription	Modality	BodyPartExamined	AcquisitionNumbe	ContrastAgent	ScanningSequence	EchoNumber	TemporalPositior
3	2012-11-06	140505	SOFT	CT		1		0	0	
5	2012-11-06	140721	HEAD NECK_2D AC PT			0		0	0	

DICOM File Header

File Path: z\_Sunday\_Dec1\_2013/dataset3\_PETCT/post-treatment/CT2/IM-0030-0001.dcm

Tag	Tag HEX	VR	Length	Value
SpecificChar...	(0008,0005)	CS	10	ISO_1
ImageType	(0008,0008)	CS	22	[3] O
InstanceCrea...	(0008,0012)	DA	8	20121
InstanceCrea...	(0008,0013)	TM	6	14063
SOPClassUID	(0008,0016)	UI	26	1.2.84
SOPInstance...	(0008,0018)	UI	54	1.2.84
StudyDate	(0008,0020)	DA	8	20121
SeriesDate	(0008,0021)	DA	8	20121
AcquisitionD...	(0008,0022)	DA	8	20121
ContentDate	(0008,0023)	DA	8	20121
StudyTime	(0008,0030)	TM	6	14035
SeriesTime	(0008,0031)	TM	6	14050
AcquisitionTi...	(0008,0032)	TM	6	14060
ContentTime	(0008,0033)	TM	6	14063

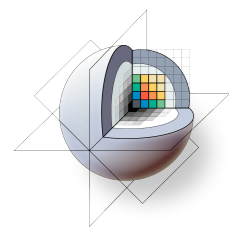
Series

DICOM Data	Reader	Warnings
<input checked="" type="checkbox"/> 3: SOFT	Scalar Volume	
<input type="checkbox"/> 3: SOFT for contentTime of 140630	Scalar Volume	Images are not equally spaced (a difference of 87.5 in ...
<input type="checkbox"/> 3: SOFT for contentTime of 140631	Scalar Volume	Images are not equally spaced (a difference of 86.25 i...
<input type="checkbox"/> 3: SOFT for contentTime of 140632	Scalar Volume	Images are not equally spaced (a difference of 86.25 i...
<input type="checkbox"/> 3: SOFT for contentTime of 140633	Scalar Volume	Images are not equally spaced (a difference of 86.25 i...
<input type="checkbox"/> 3: SOFT for contentTime of 140634	Scalar Volume	Images are not equally spaced (a difference of 87.5 in ...

DICOMDiffusionVolumePlugin  
 DICOMScalarVolumePlugin  
 MultiVolumeImporterPlugin  
 DICOMSlicerDataBundlePlugin

Make DICOM Browser Persistent

Examine for Loading Uncheck All Load Selection to Slicer View Header Close



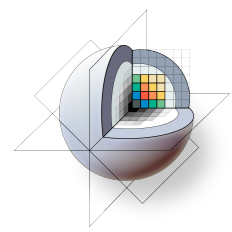
# 3D Slicer: Extension Manager

 DataStore Charles Marion, Jean-B... ★★★★★ (0) INSTALL	 DTIAtlasBuilder Adrien Kaiser (UNC) ★★★★★ (0) INSTALL	 SlicerRT Csaba Pinter (PerkLab... ★★★★★ (0) INSTALL	 VMTKSlicerExtension Daniel Haehn (Boston ... ★★★★★ (0) INSTALL	 XNATSlicer Sunil Kumar (Washingt... ★★★★★ (0) INSTALL	 WindowLevelEffect Andrey Fedorov (SPL), ... ★★★★★ (0) INSTALL	 SwissSkullStripper Bill Lorensen (Noware)... ★★★★★ (0) INSTALL	 VisualLine Laurent Chauvin (BWH) ★★★★★ (0) INSTALL	 UKFTractography Yogesh Rath (yogesh@... ★★★★★ (0) INSTALL
 TransformVisualizer Franklin King (PerkLab... ★★★★★ (0) INSTALL	 TrackerStabilizer Laurent Chauvin (BWH)... ★★★★★ (0) INSTALL	 PerkTutor Tamas Ungi, Matthew ... ★★★★★ (0) INSTALL	 Reporting Andrey Fedorov (SPL), ... ★★★★★ (0) INSTALL	 ThingiverseBrowser Nigel Goh (UWA) ★★★★★ (0) INSTALL	 SobolevSegmenter Arie Nakhmani (UAB), ... ★★★★★ (0) INSTALL	 SkullStripper Xiaodong Tao (GE) ★★★★★ (0) INSTALL	 SlicerToKiwiExporter Jean-Christophe Fillon... ★★★★★ (0) INSTALL	 SegmentationAidedR... Yi Gao (BWH/UAB), Lia... ★★★★★ (0) INSTALL
 PortPlacement Andinet Enquobahrie (... ★★★★★ (0) INSTALL	 PkModeling Yingxuan Zhu (GE), Jim... ★★★★★ (0) INSTALL	 LongitudinalPETCT Paul Mercea (Universit... ★★★★★ (0) INSTALL	 PathPlanner Laurent Chauvin (BWH) ★★★★★ (0) INSTALL	 PlusRemote Franklin King (PerkLab... ★★★★★ (0) INSTALL	 ModelClip Jun LIN, Xiaojun CHEN ★★★★★ (0) INSTALL	 MatlabBridge Andras Lasso (PerkLab... ★★★★★ (0) INSTALL	 FiberViewerLight Francois Budin (UNC) ★★★★★ (0) INSTALL	 DTIProcess Francois Budin (UNC) ★★★★★ (0) INSTALL
 LASEgmenter Liangjia Zhu (UAB), Yi G... ★★★★★ (0) INSTALL	 LAScarSegmenter Liangjia Zhu (UAB), Yi G... ★★★★★ (0) INSTALL	 KSlice Ivan Kolesov (GT), Pete... ★★★★★ (0) INSTALL	 IASEM Bradley Lowekamp ★★★★★ (0) INSTALL	 Cardiac_MRI_Toolkit Alan Morris (CARMA), ... ★★★★★ (0) INSTALL	 ABC Marcel Prastawa (Unive... ★★★★★ (0) INSTALL	 FacetedVisualizer Harini Veeraraghavan ... ★★★★★ (0) INSTALL	 ErodeDilateLabel Junichi Tokuda (Brigha... ★★★★★ (0) INSTALL	 AirwaySegmentation Pietro Nardelli (Univers... ★★★★★ (0) INSTALL

3D Slicer supports plug-ins called Slicer extensions available from the Extension Manager

Allows end-users to select extensions useful to them, without having to download the entire extension archive.

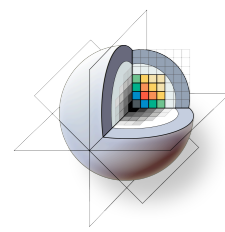
Built Nightly with Slicer



# 3D Slicer: What extensions afford...

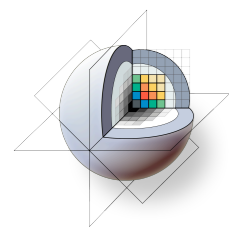
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- Keep the base package “lean and mean”
- Modules have individual identity
  - Per-module web site, svn, downloads, mailing lists, wiki...
- Users can customize their own subset of tools
- Easy to download compatible extensions
  - Analogous to Firefox extensions
  - Integrate extension builds into developer/nightly/release processs
- NITRC Supplement to NA-MIC providing additional infrastructure (Neuroimaging Informatics Tools and Resources Clearinghouse)
  - NITRC can host neuroimaging projects (gforge implementation)

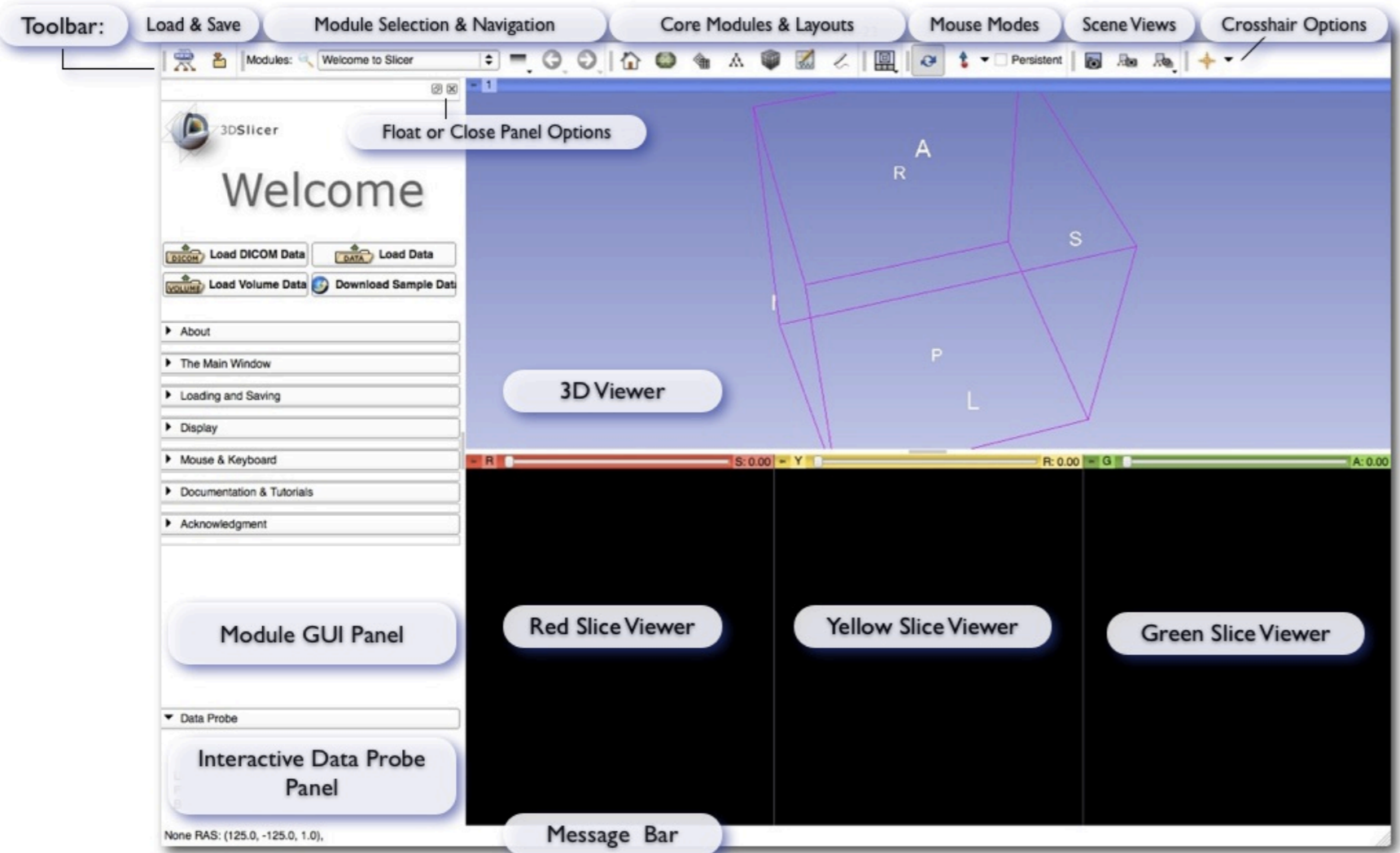


# 3D Slicer: Integration options

Slicer Libs	<ul style="list-style-type: none"><li>• ModuleDescriptionParser</li><li>• GenerateCLP</li><li>• vtkITK</li><li>• MRML</li></ul>	Non-slicer specific support libraries
Slicer Base	<ul style="list-style-type: none"><li>• Application logic</li><li>• Widgets</li></ul>	Common infrastructure for Slicer applications
Built in modules	<ul style="list-style-type: none"><li>• Slice viewers</li><li>• Models</li><li>• Fiducials</li><li>• Transforms</li></ul>	Full access to Slicer internals
Loadable modules	<ul style="list-style-type: none"><li>• Query Atlas</li><li>• QDEC</li><li>• Volume rendering</li><li>• ChangeTracker</li><li>• EMSegment</li></ul>	Full access to Slicer internals
Scripted modules	<ul style="list-style-type: none"><li>• Editor</li><li>• Teem Two Tensor Tractography</li><li>• VMTK</li></ul>	Limited access to Slicer internals
Command line modules	<ul style="list-style-type: none"><li>• Registration</li></ul>	Restricted access to Slicer internals
Daemon	<ul style="list-style-type: none"><li>• OpenIGTLink</li><li>• Stochastic Tractography</li></ul>	Access to MRML



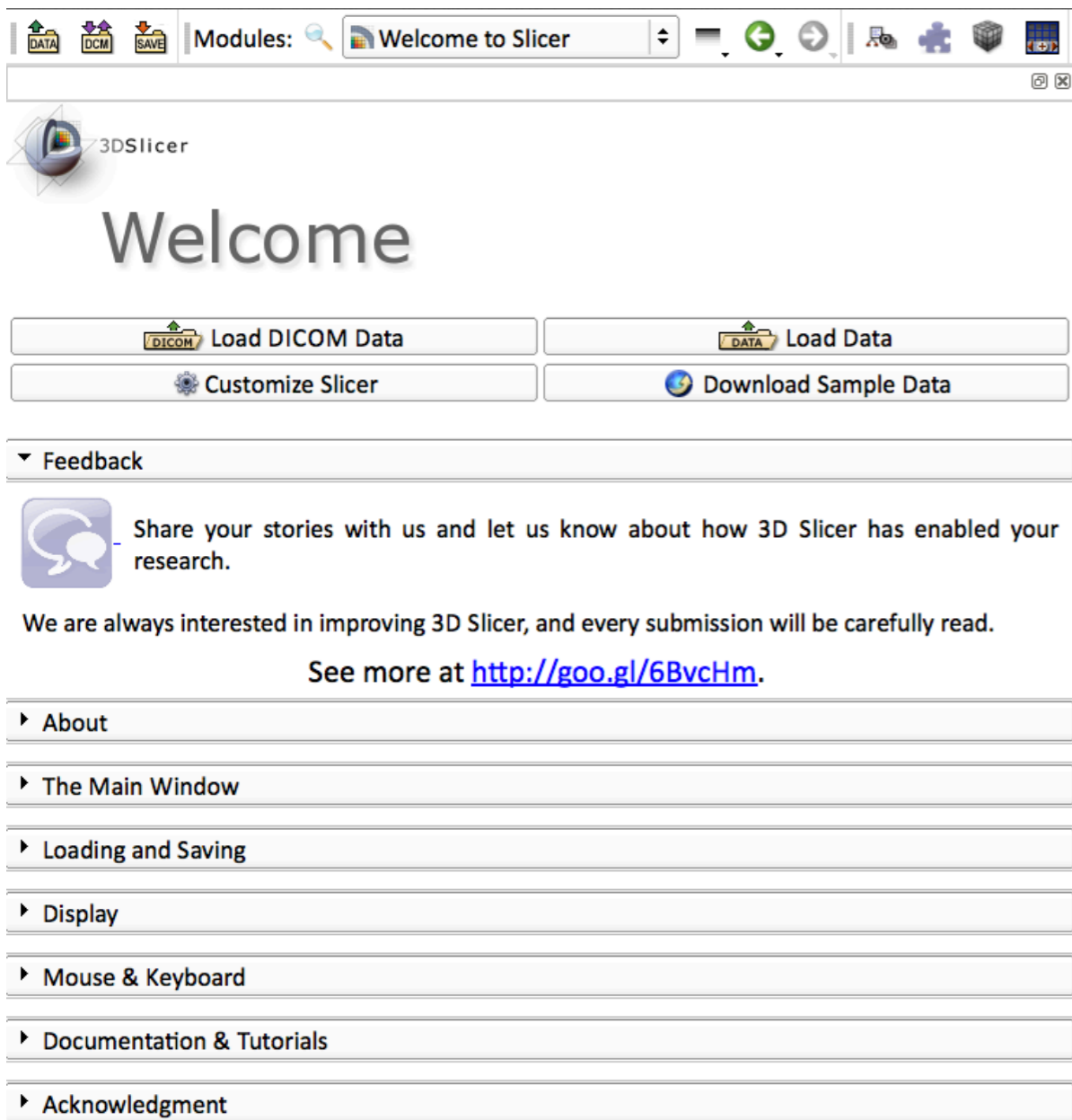
# 3D Slicer: Application Interface



## User-centered design:

- User guidance and feedback incorporated into design process where possible
- Qt-based thin GUI layer
- Presentation layer independent of application logic & state
- Architecture supports scripting (Python) and command-line use

# 3D Slicer: Quick Start for New Users

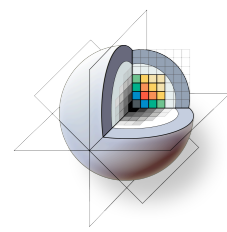


## Greetings and guidance from **Slicer's Welcome Module**

### **Default start-up module for new users:**

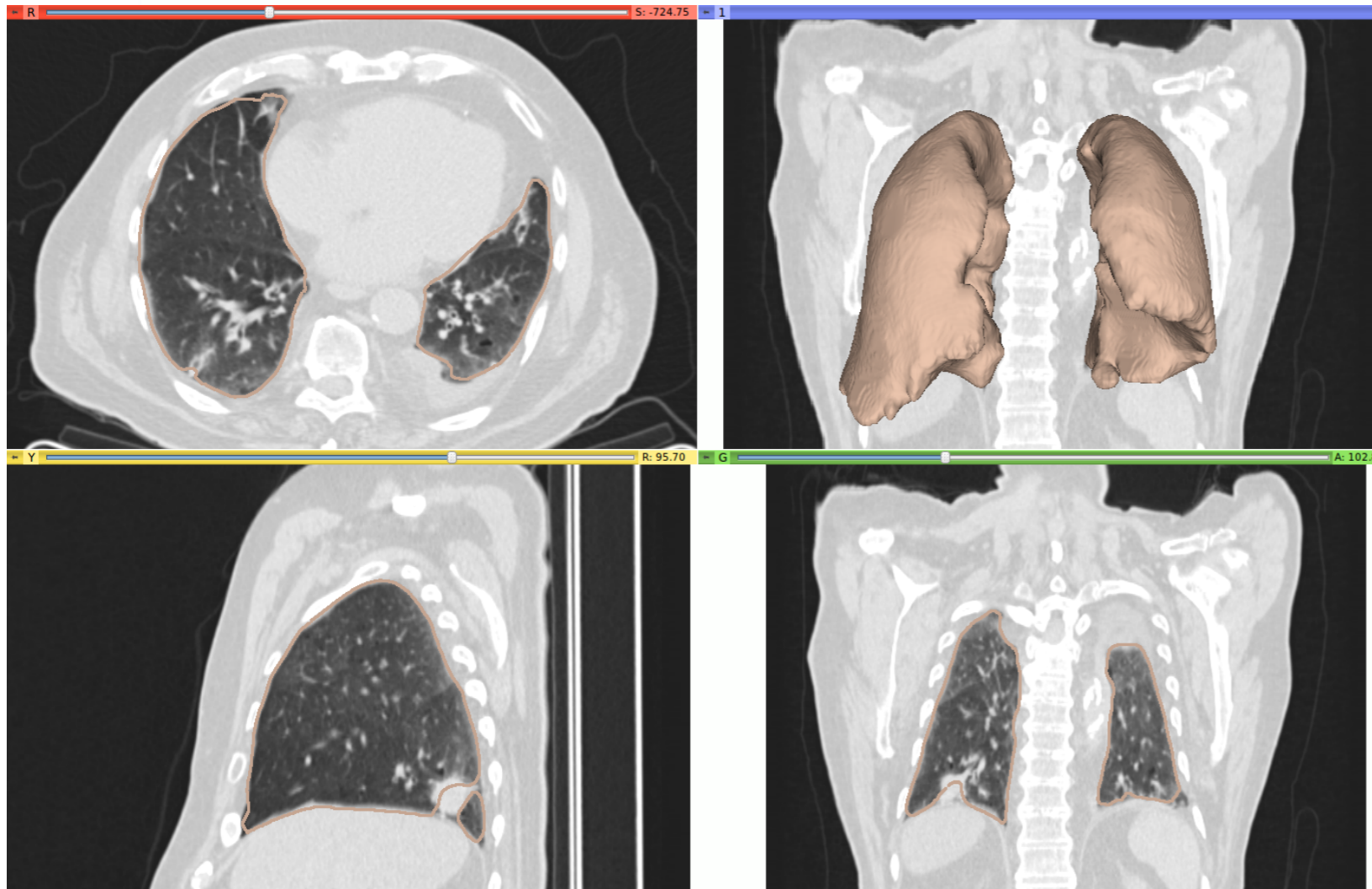
- Brief friendly overview of the application interface
- Describes core modules
- Describes basic data loading and saving
- Provides tips for adjusting data display
- Describes how to change layouts
- Points users to more detailed resources
- and more...





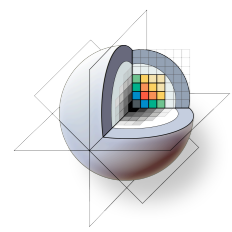
# 3D Slicer: Segmentation Tools

**Segmentation** is required for defining features of interest in imaging data for quantification and analysis.



3D Slicer has a variety of interactive and automated segmentation methods:



















- Editor Module for manual contouring and editing
- region growing and level sets
- graph cuts with gesture support
- EM-segmentation
- hierarchical brain segmentation for morphological studies



# 3D Slicer: Interactive Editor

## Tools for manual segmentation & model building

Tools include:

-  Paint
-  Erase
-  Draw
-  Rectangle
-  Level Tracing
-  Change Label
-  Identify Islands
-  Remove Islands
-  Save Island
-  Identify Island
-  Erode
-  Dilate
-  Model Maker
-  Fast Marching
-  GrowCutSegmentation
-  WandEffect
-  WatershedFromMarkerEffect
-  Undo / Redo

Help & Acknowledgement



Create and Select Label Maps

Master Volume: BaselineVolume

Merge Volume: BaselineVolume-label Set...

Per-Structure Volumes


Add Structure Split Merge Volume



Number	Color	Name	Label Volum	Order
1		tissue	BaselineVo...	
2		bone	BaselineVo...	

Delete Structures Merge All Merge And Build

Replace Models

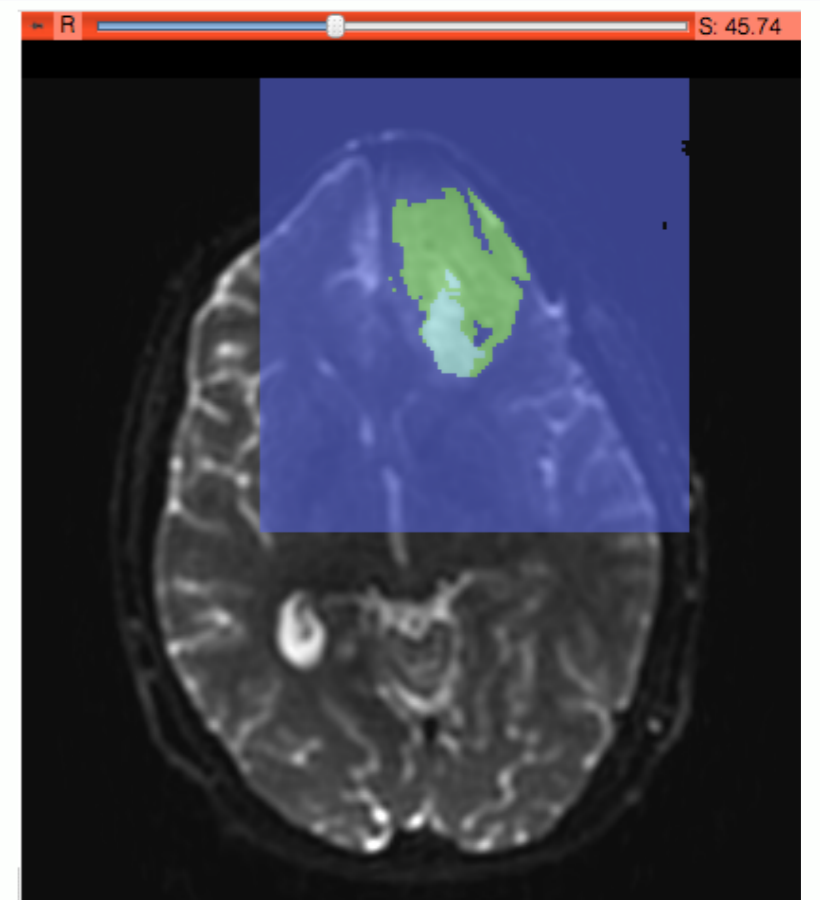
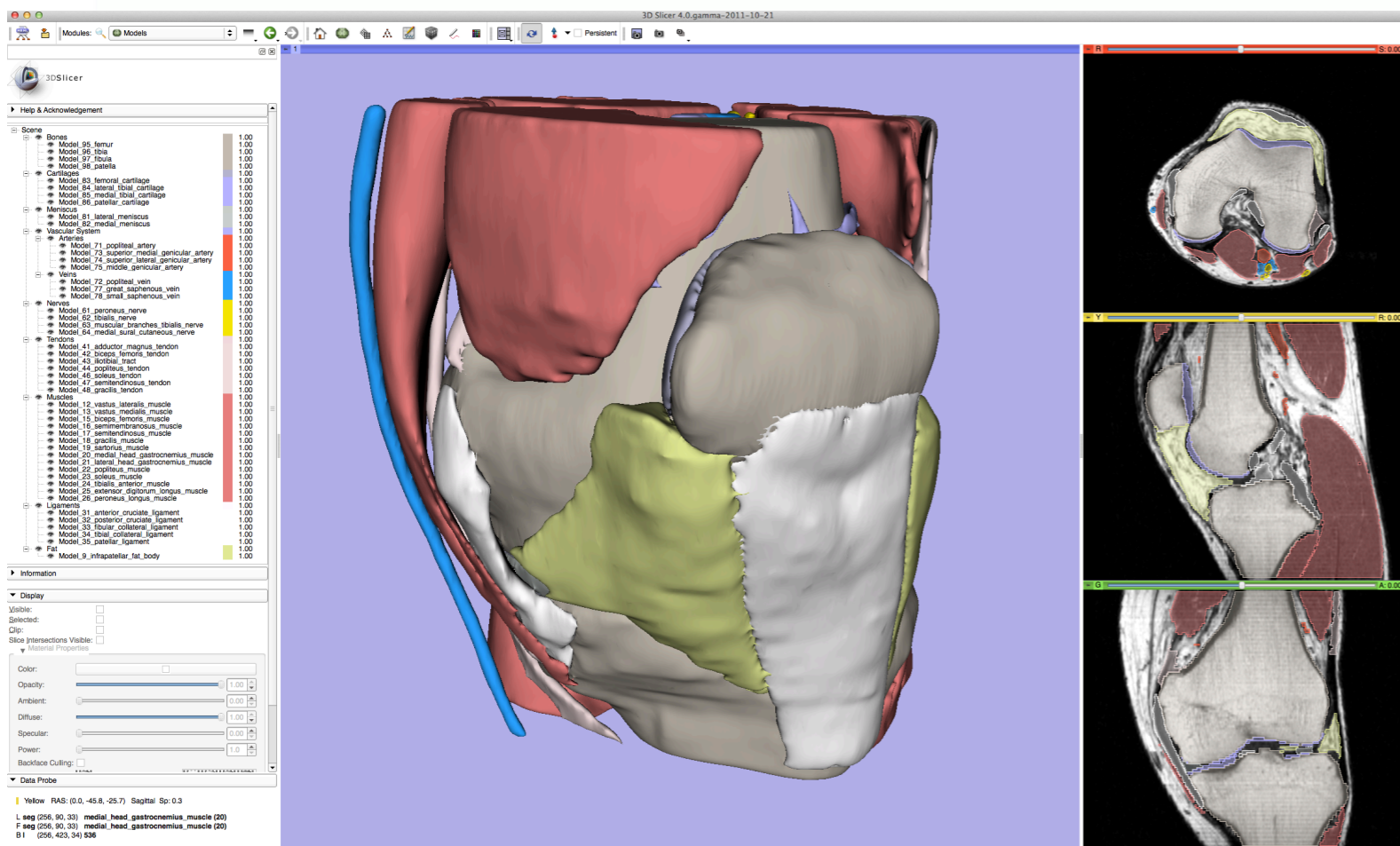
Edit Selected Label Map

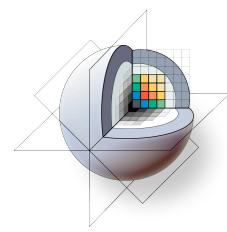


Undo/Redo:  

# 3D Slicer: Interactive Editor

Tools for manual and automated segmentation, 3D model building



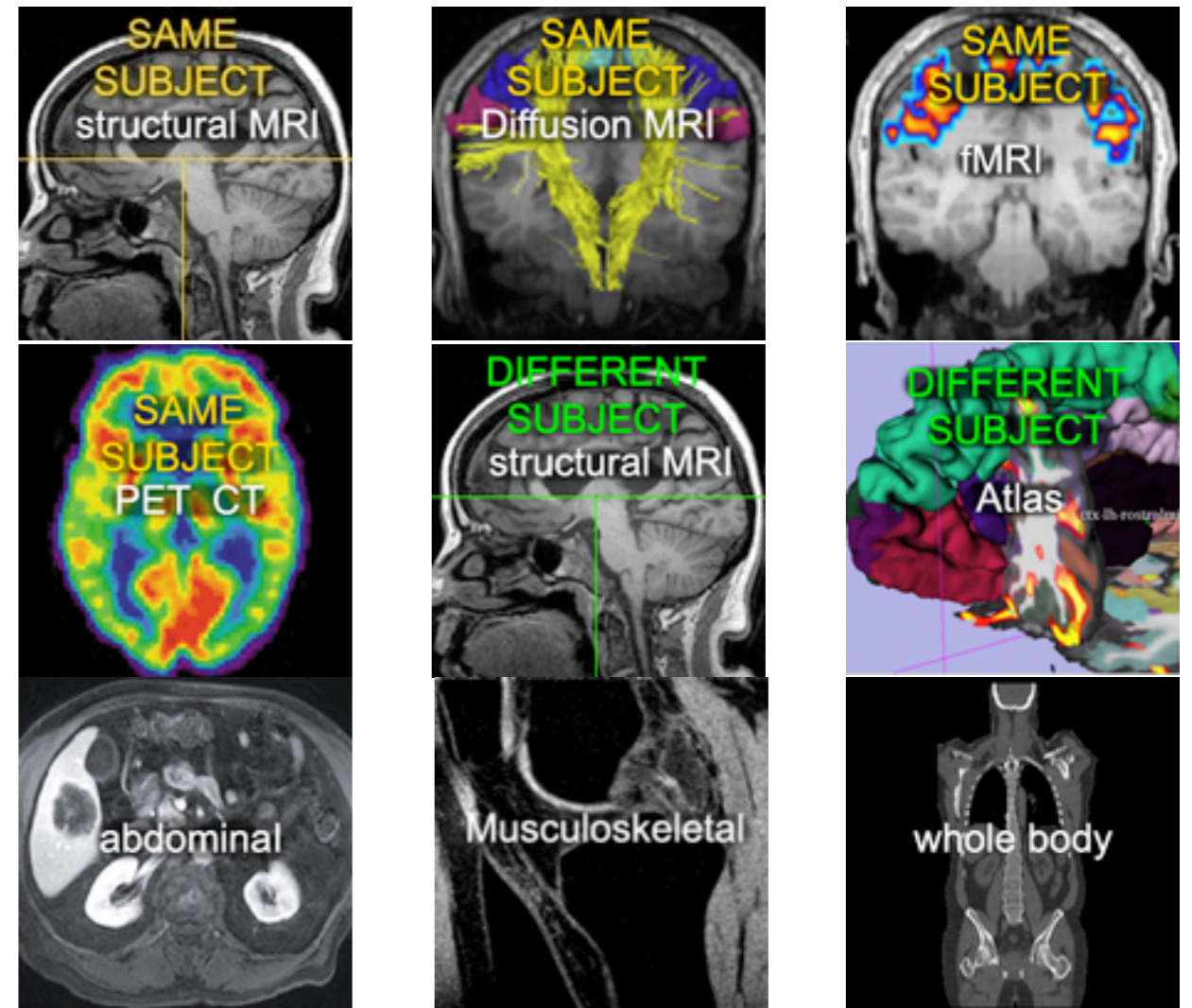


# 3D Slicer: Registration Tools

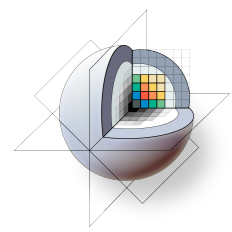
Slicer also provides a variety of **registration methods** and **resources** to support versatile applications:

- Deformation models: rigid, affine, non-rigid, fluid
- Algorithm types: fiducial-, surface-, intensity-based
- Image types: scalar, vector, tensor

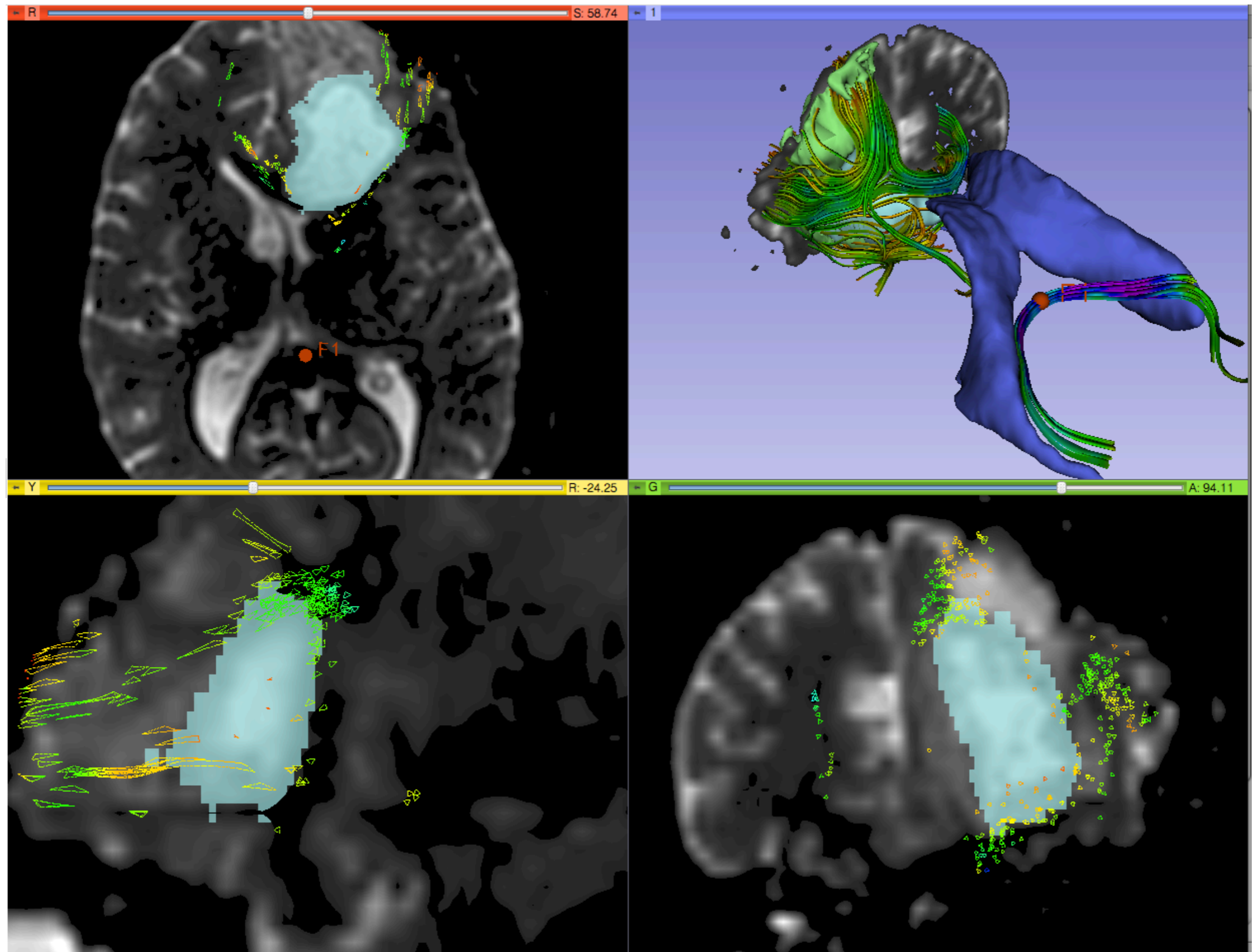
Resource: find an extensive collection of Slicer registration cases and recipes at:

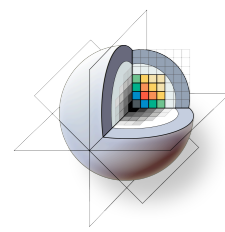


[www.slicer.org/slicerWiki/index.php/Slicer3:Registration](http://www.slicer.org/slicerWiki/index.php/Slicer3:Registration)



# 3D Slicer: Tractography Tools

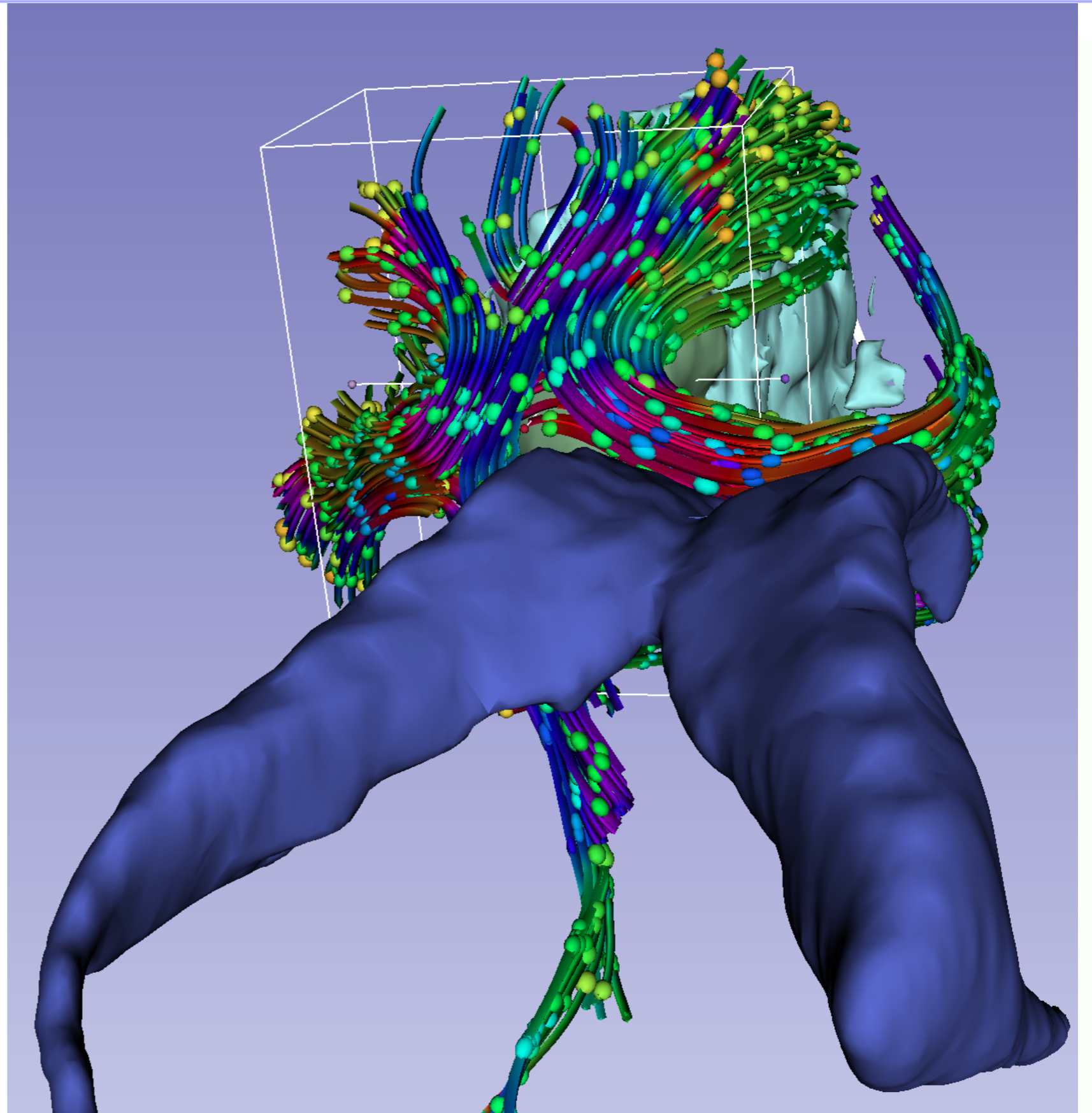




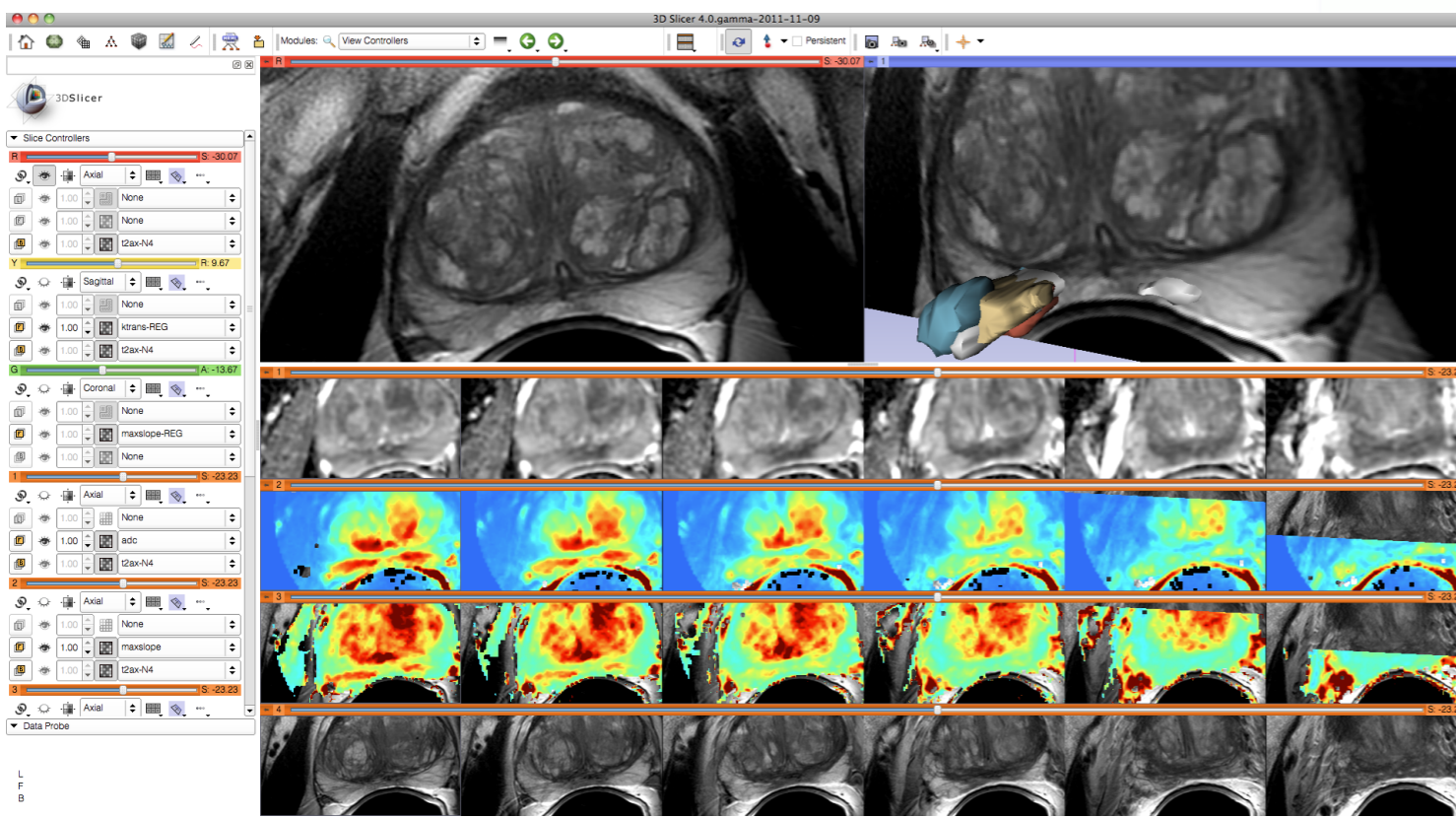
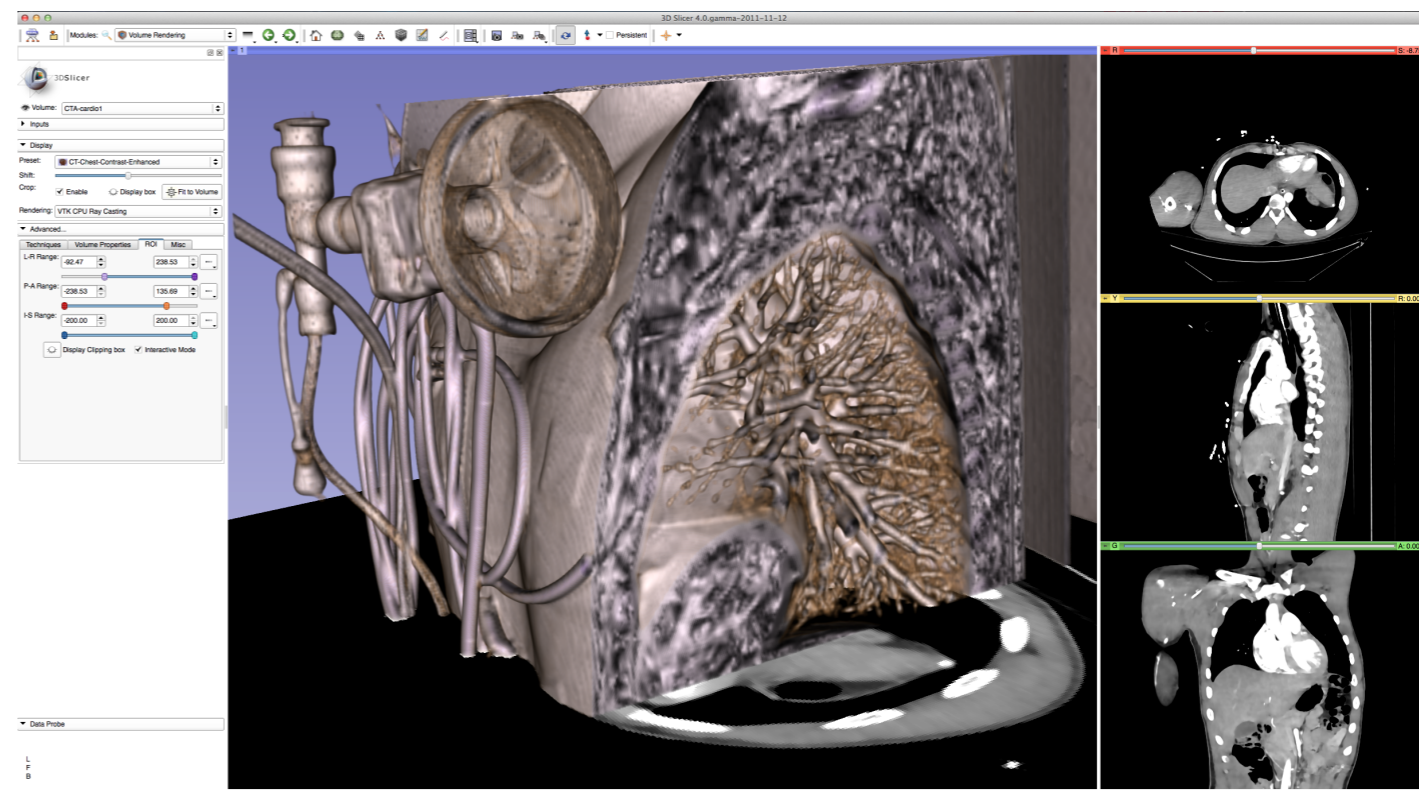
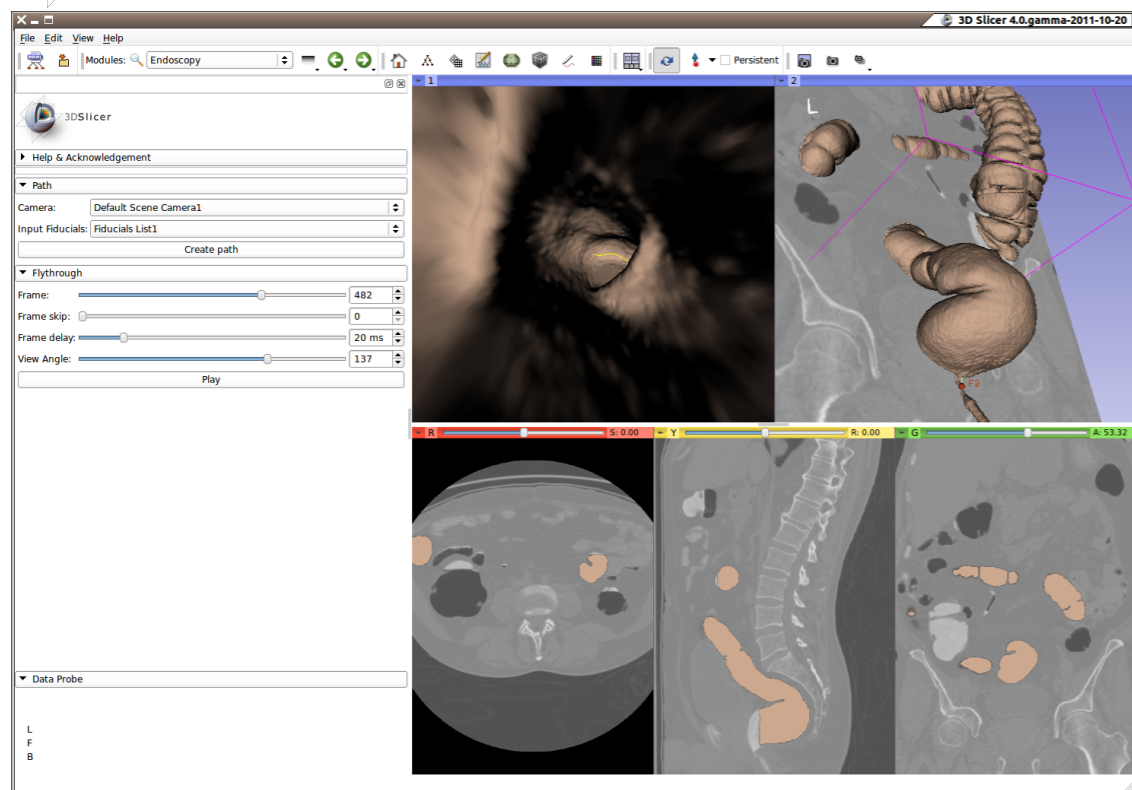
# 3D Slicer: Tractography Tools

Seeding tracks from:

- Labels (segmentations)
- fiducial markers (points)  
or ROIs – interactive  
seeding
- 3D models

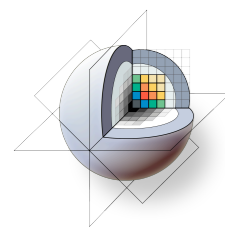


# 3D Slicer: Layouts



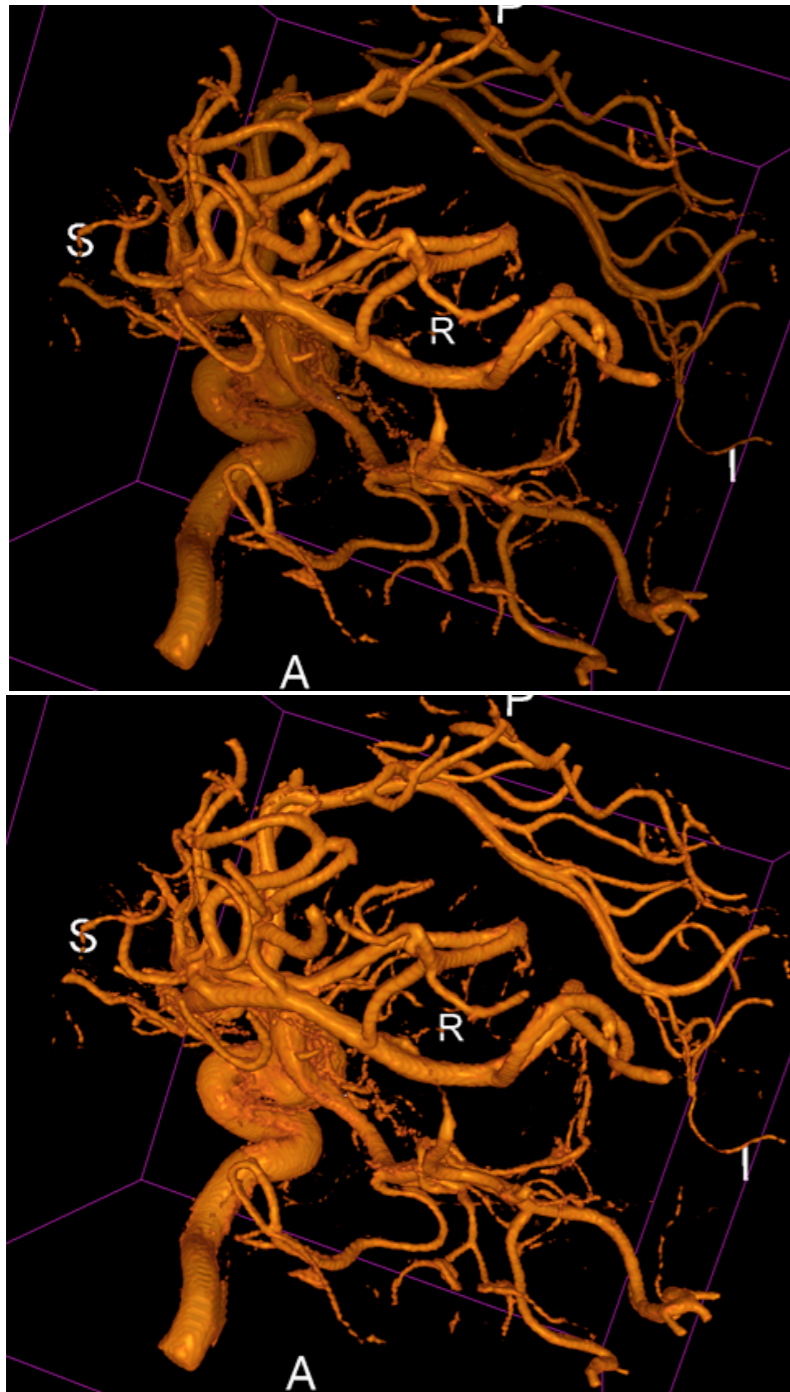
A variety of **standard and specialized layouts** are available including:

- Lightbox view
- Wide-screen layouts
- Study comparison view
- Dual 3D view
- Large slice viewer
- and others...



# 3D Slicer: Volume Rendering

## Rendering Methods



### VTK CPU Ray Casting

- Uses the CPU for volume rendering,
- is parallelized and can take advantage of multi-core capabilities.
- Uses level-of-detail approach where low resolution is rendered while moving, and high resolution is rendered once motion ceases.
- Allows zbuffer compositing with texture map cross sections and non-transparent triangulated surface model.

### VTK GPU Ray Casting

- Uses GPU accelerated ray caster.
- Allows z-buffer compositing with non-transparent polygon models only.
- This is currently working on Linux and Win32, but not on Mac

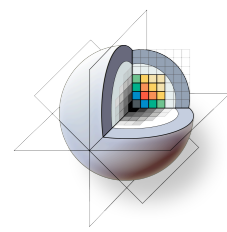
### VTK OpenGL 3D Texture Mapping

- Uses texture mapping approach to volume rendering
- compared to the two render methods above, it has slightly lower performance and slightly coarser appearance.

### NCI GPU Ray Casting

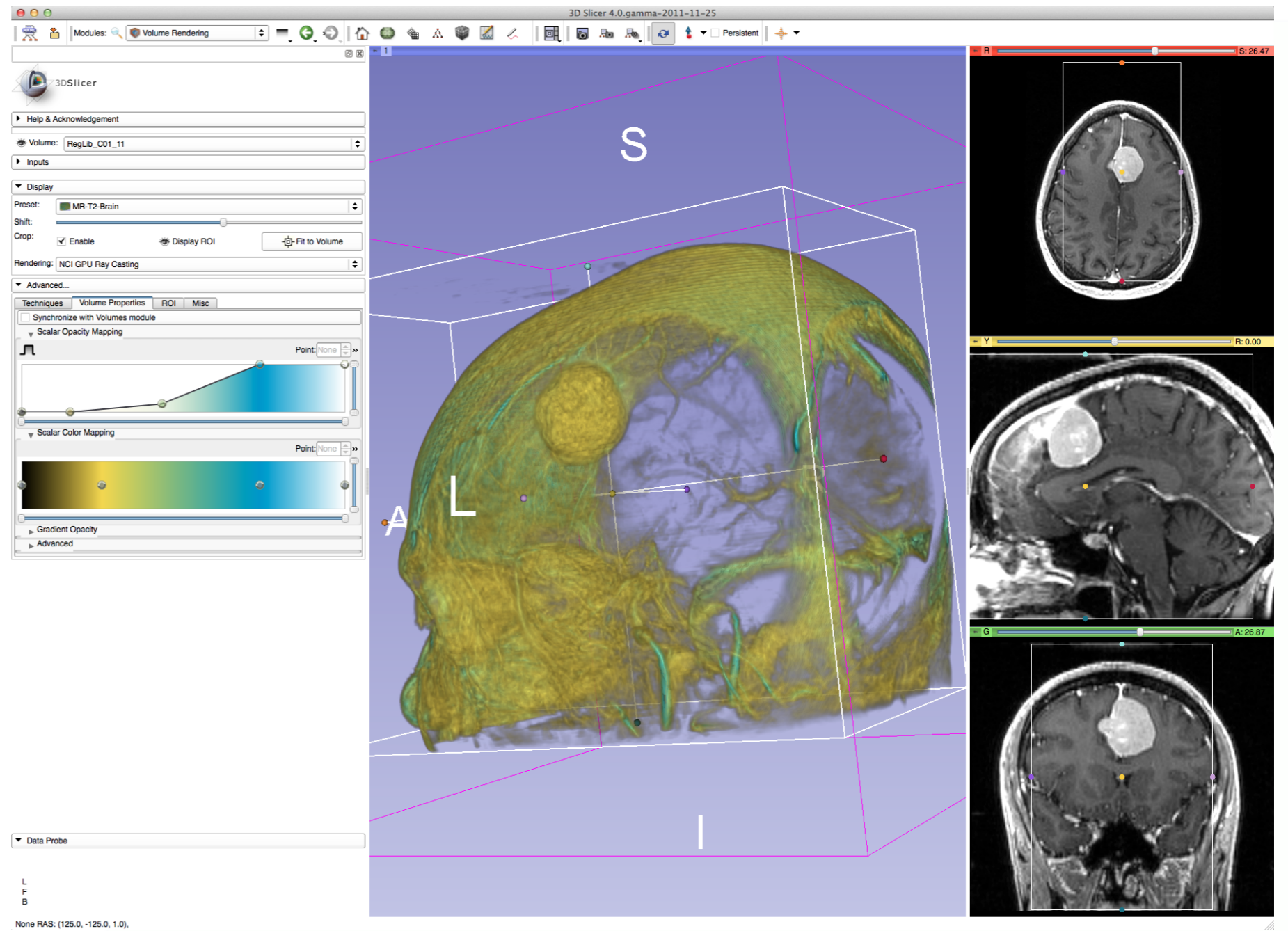
- This is a GLSL-based ray caster with several experimental mapping techniques.
- No z-buffer compositing with polygon models.
- Good performance and quality.
- No hardware restrictions on this method



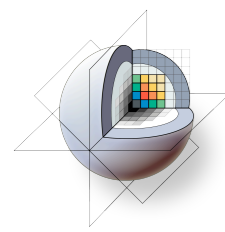


# 3D Slicer: Volume Rendering

Grayscale and labelmap volumes can be volume rendered, with interactive region of interest definition.



Dedicated GPUs with dedicated GPU memory are recommended for GPU accelerated methods.



# 3D Slicer: Markups

3D Slicer 4.2.0

Modules:

3DSlicer

▶ Help & Acknowledgement

▶ Display Properties

▼ Add and Modify Markups

+

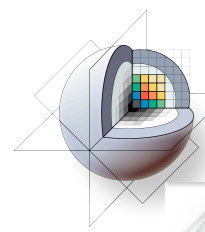
Markup List:     Use List Name

	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Name	Description	X	Y	Z
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P1		2.363400	10.852828	63.128404
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P2		28.527000	76.338000	65.746185

▼ Data Probe

L  
F  
B

3D View:



# 3D Slicer: Dice Coefficient



Help & Acknowledgement

Parameters

Number of label maps: 4

Dice  
 Sensitivity (STAPLE)  
 Specificity (STAPLE)

Label Maps

LabelMap 1: MRHead-label\_1  
LabelMap 2: None  
LabelMap 3: MRHead-label\_2  
LabelMap 4: MRHead-label

Compute

Results

	1	2	3	4
1	0.399		0.399	1
2				
3	0.399		0.399	0.399

Statistics

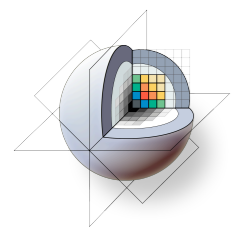
Average  
 Standard Deviation  
 Min  
 Max

Compute

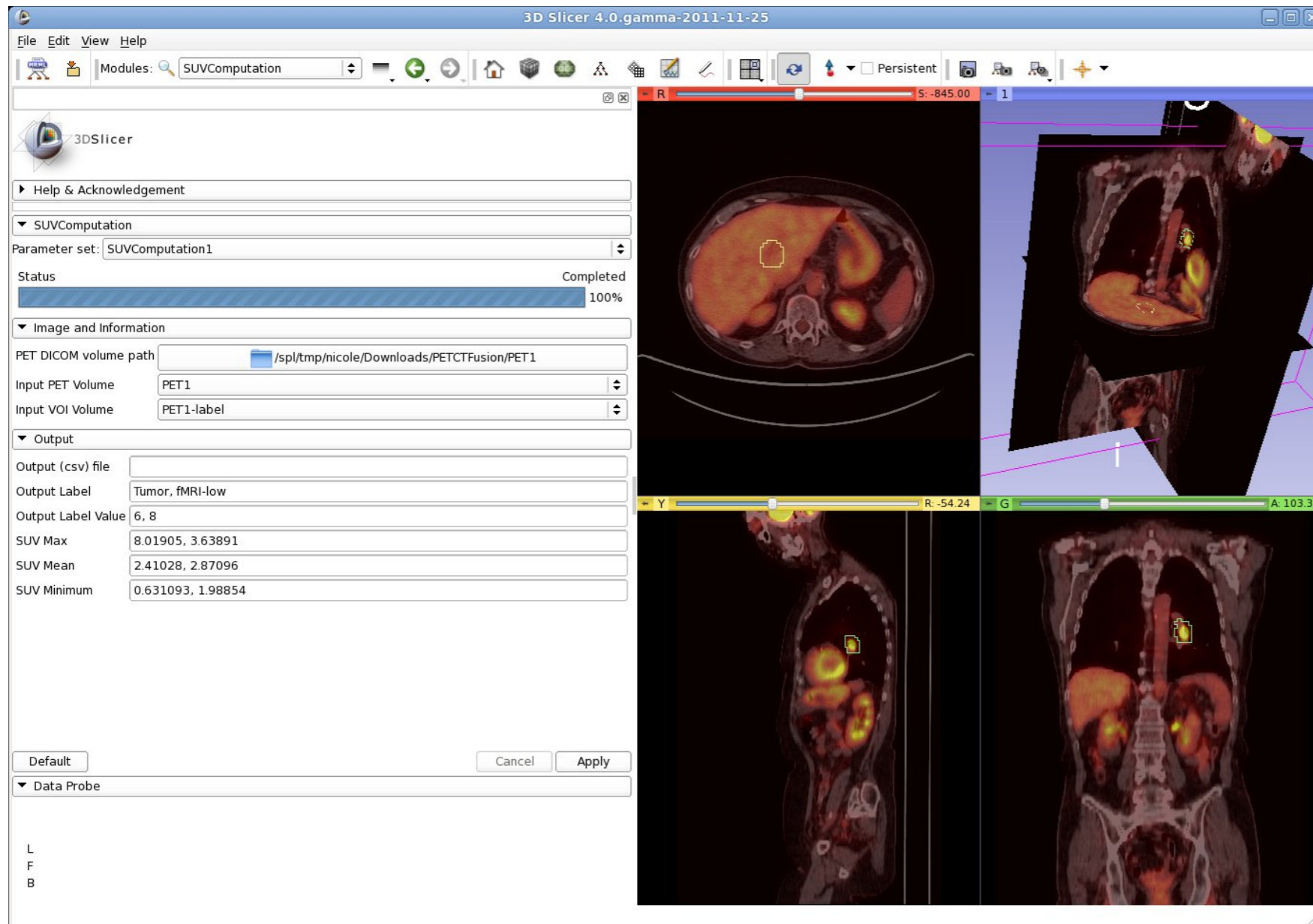
	1	2	3	4
Average	0.700		0.399	0.700
StdDev	0.301			0.301
Min	0.399		0.399	0.399

The DiceComputation module computes Dice Similarity Coefficient of overlap to quantitatively compare several **registered** segmented volumes.





# 3D Slicer: PET/CT SUV computation

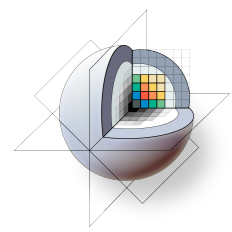


- Combined visualization of **structural** and colored **functional** images

- VOIs defined in Slicer's Editor Module

- extracted DICOM study parameters used in computation

- Computation of Standardized Uptake Value (based on patient body weight) per VOI.



# 3D Slicer: PkModeling

▼ PkModeling

Parameter set: PkModeling

▼ PkModeling Parameters

T1 Blood Value: 1600.00

T1 Tissue Value: 1597.00

Relativity Value: 0.0039

Hematocrit Value: 0.4

AUC Time Interval Value: 90.00

Compute fpv (3-parameter model)

▼ IO

Input 4D Image: BC10-Visit1

AIF Mask Image: None

Prescribed AIF: BC10-Visit1-AIF

Output Ktrans image: Output Ktrans image

Output ve image: Output ve image

Output fpv image: Output fpv image

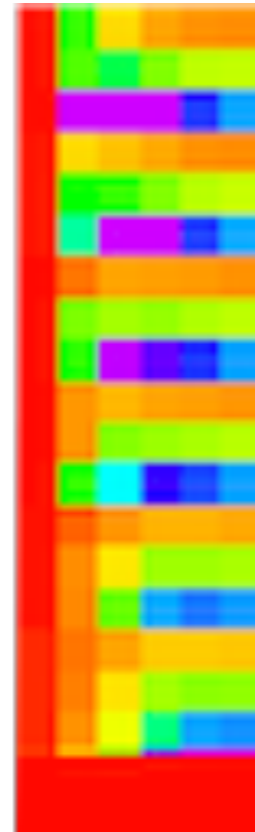
Output maximum slope image: None

Output AUC image: Output AUC image

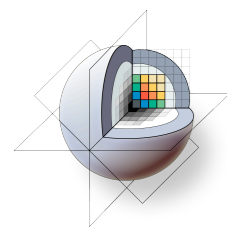
▼ Advanced options

Output R-squared goodness of fit image: Output R-squared ...ness of fit image

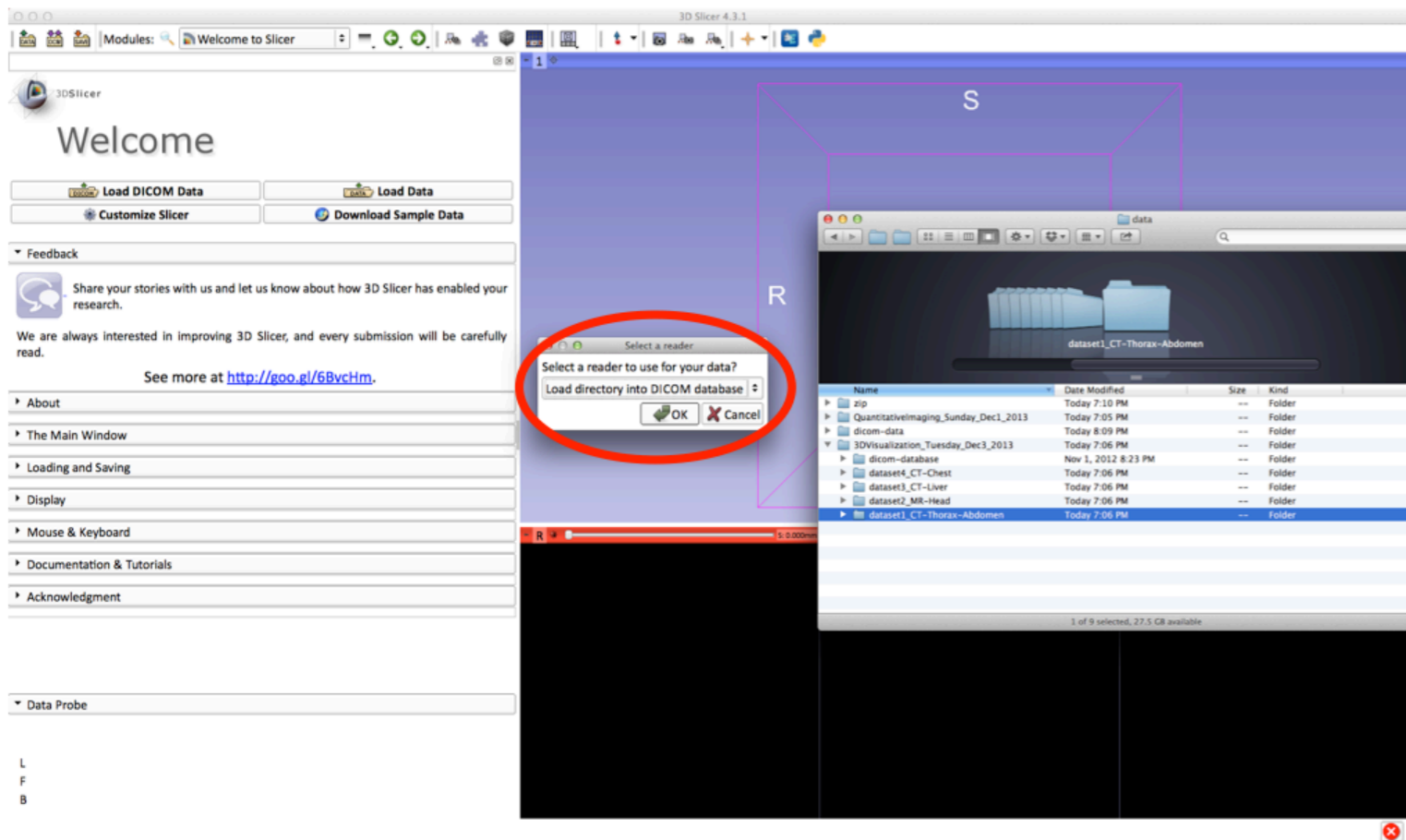
ROI Mask Image: BC10-Visit1-ROI



PkModeling (Pharmacokinetics Modeling) calculates quantitative parameters from Dynamic Contrast Enhanced DCE-MRI images.

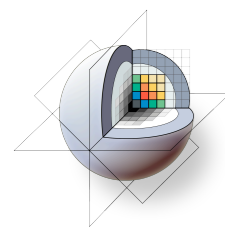


# 3D Slicer: Drag and Drop

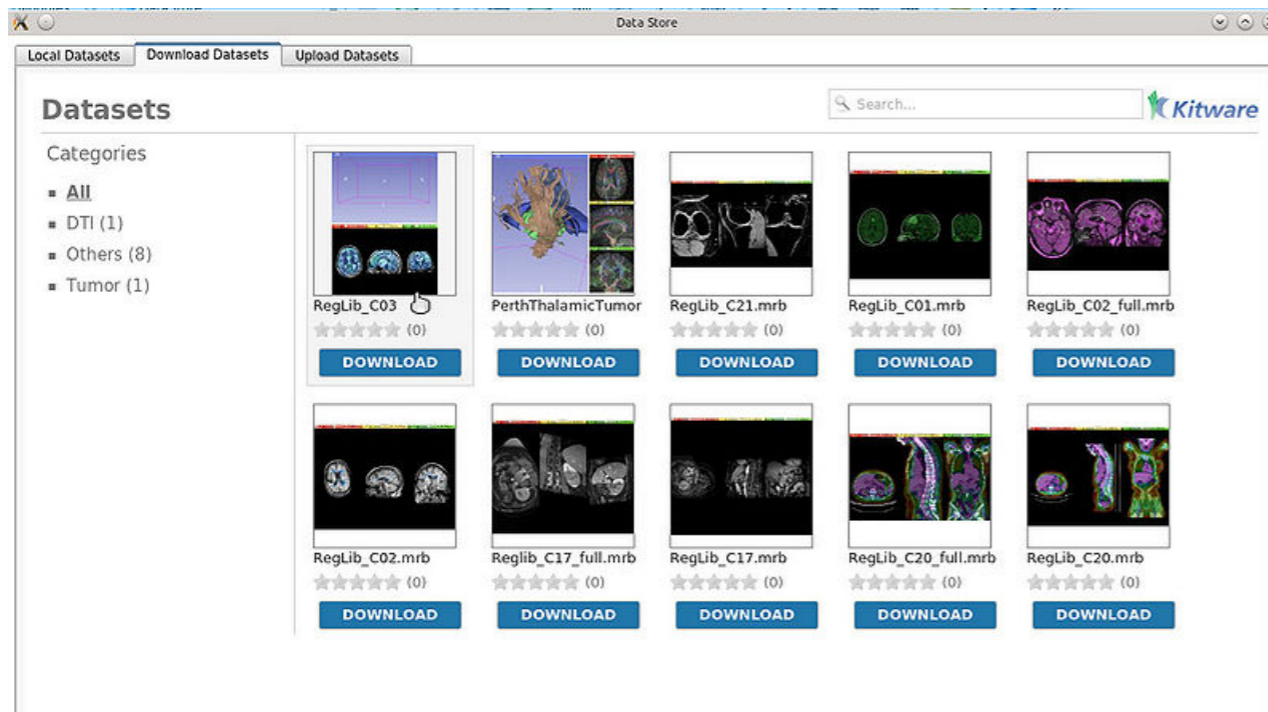


**Drag & Drop** multiple files (e.g. data, scenes, mrb files etc.) and folders on the application will bring up the Add Data dialogue with the corresponding documents

A Medical Reality Bundle (Mrb) file is an archive file that contains a mrml scene file and all data for loading into Slicer4.

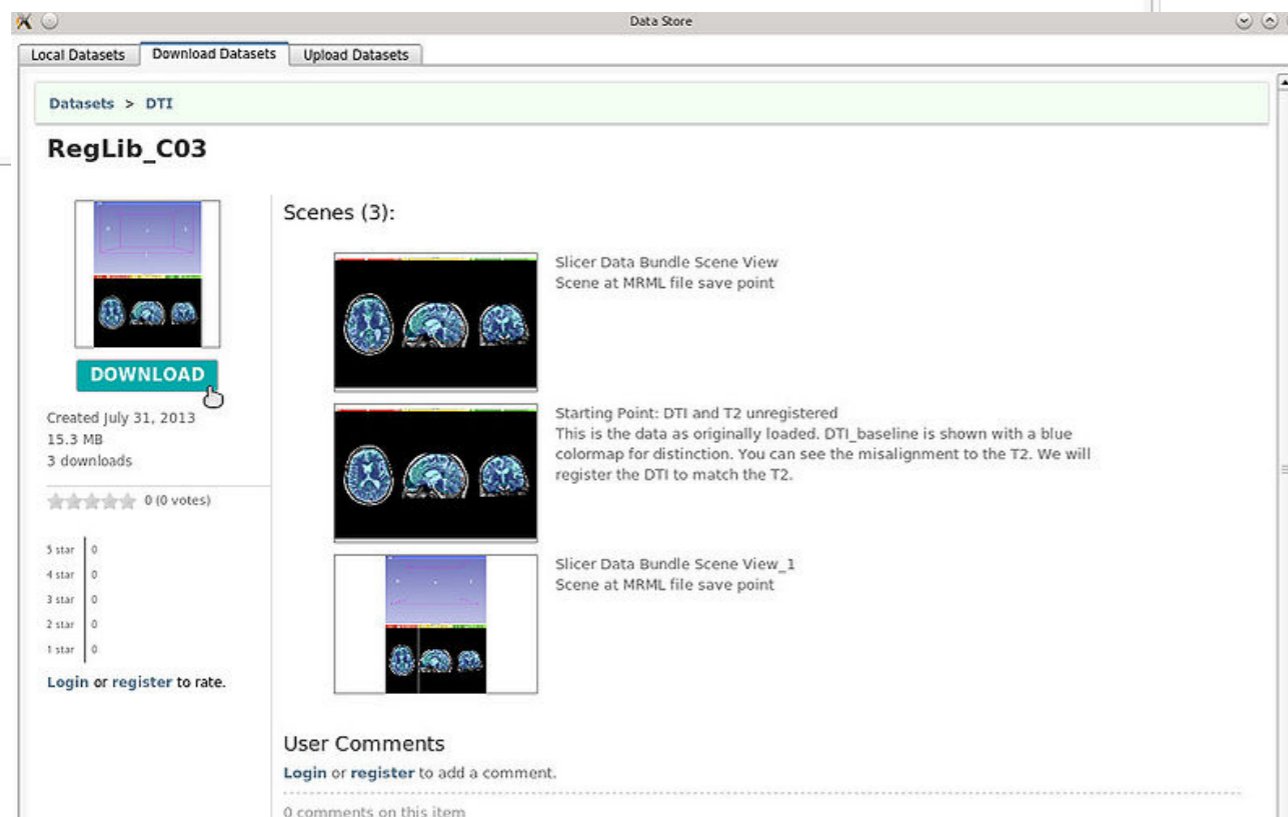


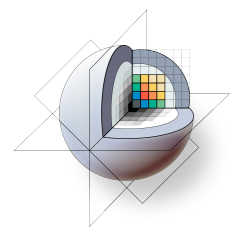
# 3D Slicer: DataStore



The Data Store extension allows an user to easily upload and download dataset files.

- Browse and search datasets in a remote database
- Download, Review and comment the datasets
- Upload new datasets





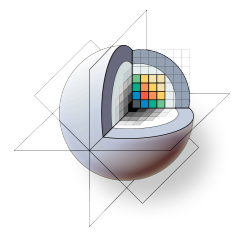
# 3D Slicer: Image-Guided Therapy

---

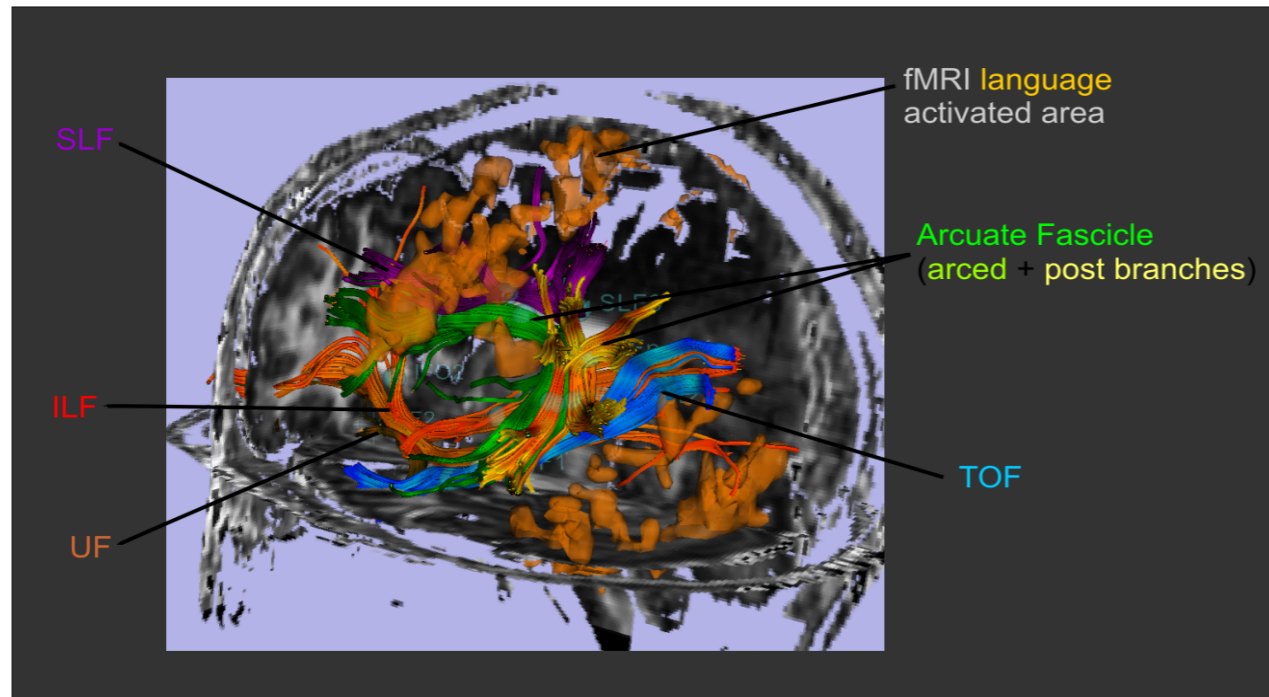
3D Slicer has been used in clinical research, with IRB clinical protocols appropriately created and managed.

In **image-guided therapy** (IGT) research, Slicer is frequently used to construct and visualize collections of MRI data that are available pre- and intra-operatively, and to display the tracked spatial position of surgical instruments.





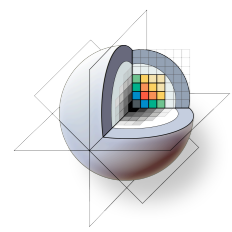
# 3D Slicer: Image-Guided Therapy



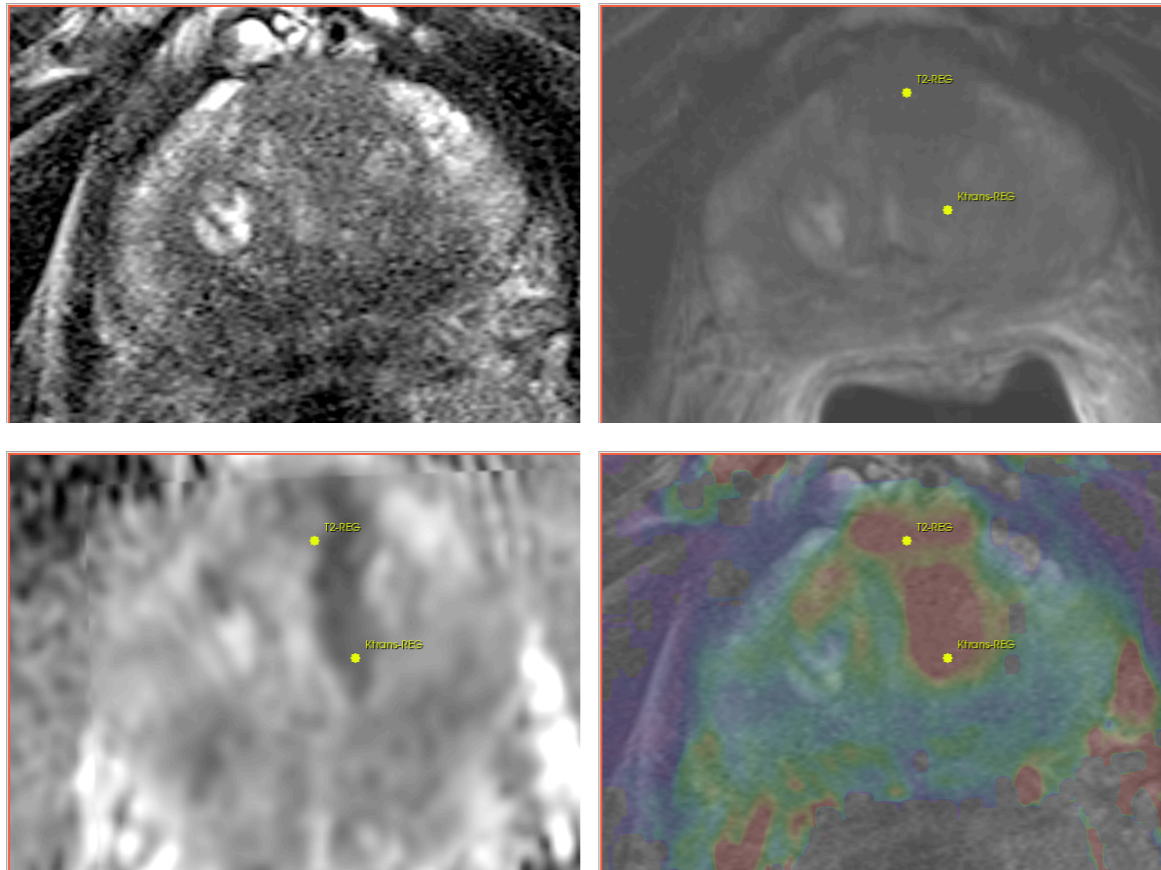
3D Slicer has been used extensively for brain tumor resection planning and guidance during surgery.

Integration of 3D Slicer with the surgical navigation BrainLab system allows **to track surgical instruments in real-time**, and transfer the position to 3D Slicer.

This project is a joint collaboration between BWH, Yale University and BrainLab.



# 3D Slicer: Image-Guided Therapy

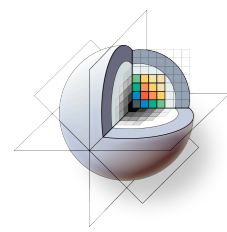


Targeted MRI guided prostate cancer biopsy attempts to improve the biopsy precision while reducing the number of tissue samples that need to be collected.

This is achieved by first using diagnostic multi-parametric MRI to highlight the suspicious areas. The biopsy procedure takes place in the MR bore.

3D Slicer is used for MRI visualization and fusion, target planning, deformable registration, and needle trajectory planning.

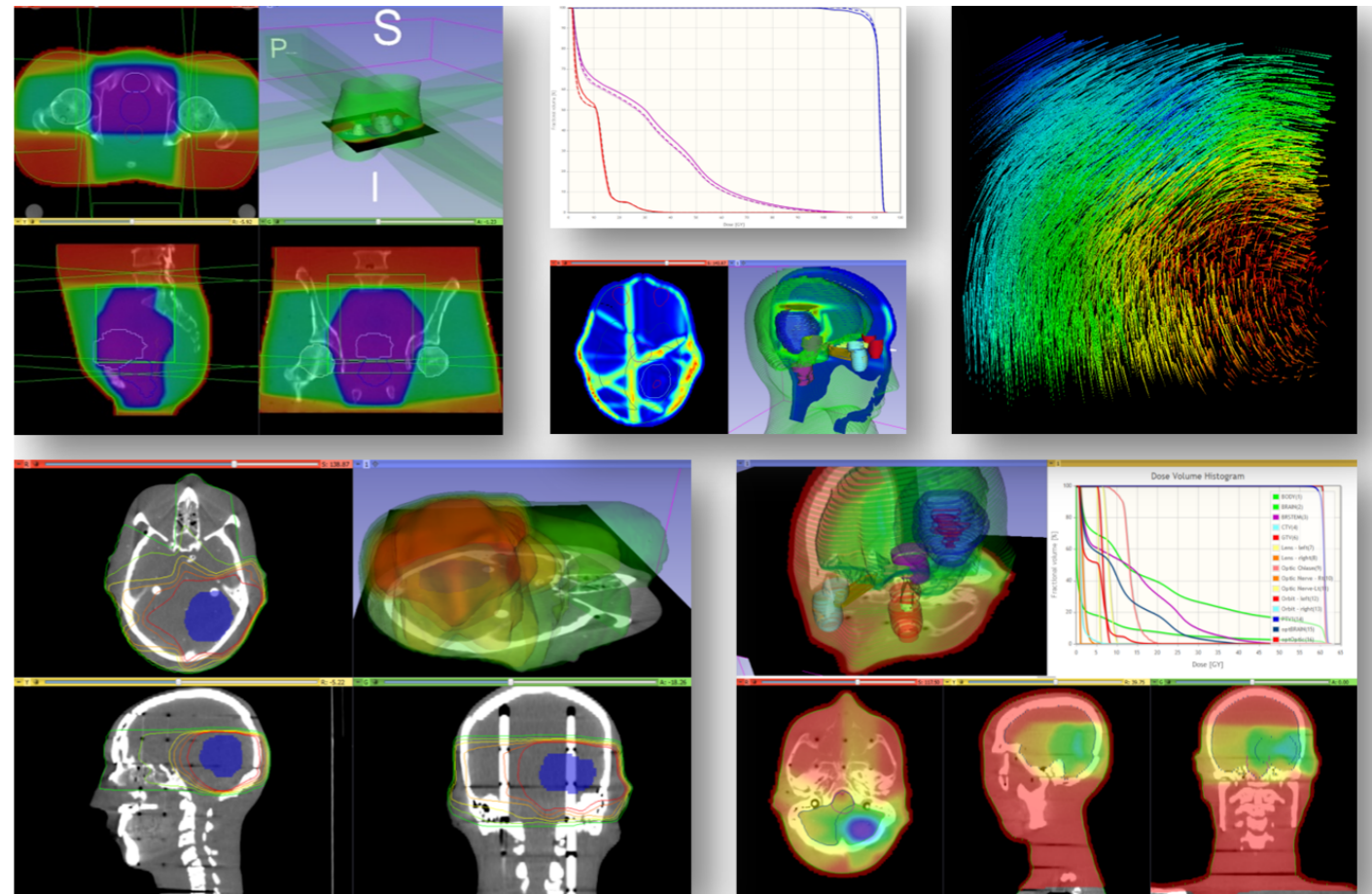
Deformable registration is used to fuse the diagnostic image data to the intra-procedural configuration of the gland.



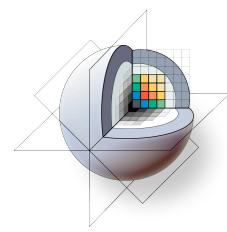
# SlicerRT: Radiation Therapy

## Features

- DICOM-RT import
- RT-specific analysis:
  - Dose Accumulation
  - Dose Comparison (gamma)
  - Isodose contours / surfaces
  - Contour Comparison
  - Contour Morphology
- Plastimatch
  - BSpline registration
  - Landwarp registration



- Overview paper: Csaba Pinter, Andras Lasso, An Wang, David Jaffray, and Gabor Fichtinger, "SlicerRT: Radiation therapy research toolkit for 3D Slicer", Med. Phys. 39 (10), October 2012
- Project homepage: <https://www.assembla.com/spaces/slicerrt/>
- Contact: Andras Lasso ([lasso@cs.queensu.ca](mailto:lasso@cs.queensu.ca))

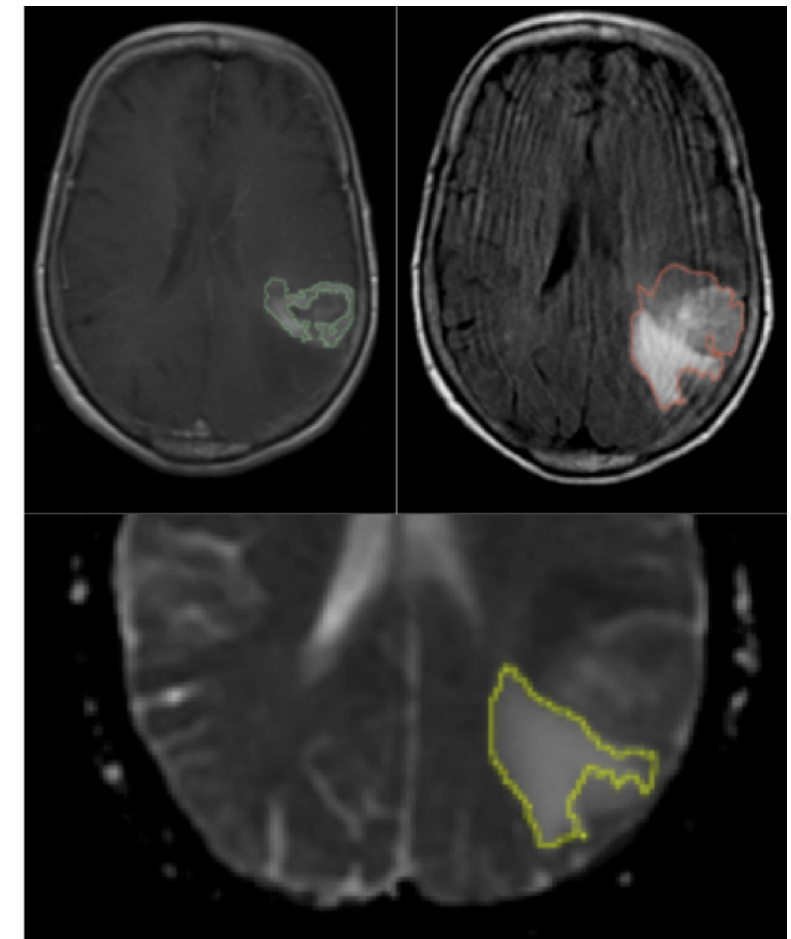
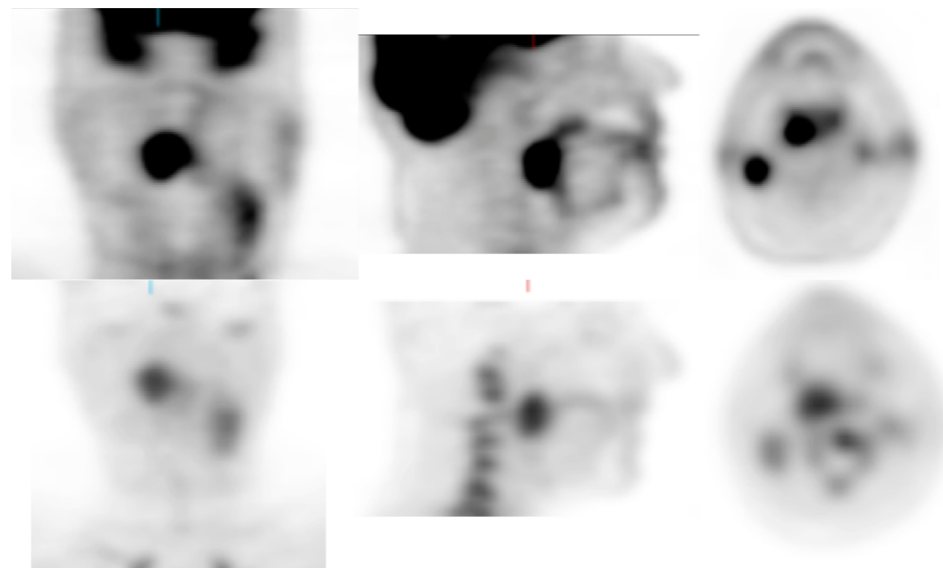
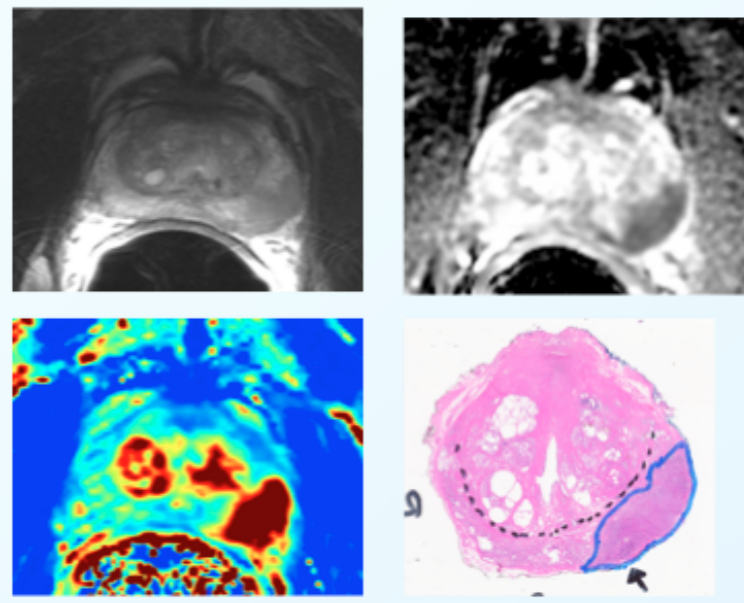


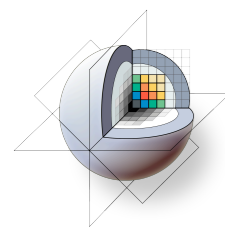
# 3D Slicer and QIN



<http://qiicr.org> U01 CA180918

- Quantitative Image Informatics for Cancer Research (QIICR)
- Support the needs of the active project in NCI Quantitative Imaging Network (QIN):
  - processing workflows, data and tool sharing
  - brain cancer (MGH)
  - head and neck cancer (U. of Iowa)
  - prostate cancer (BWH)
- Investigate the use of DICOM for results sharing
  - longitudinal and multi-modality analysis
  - segmentation and registration results
  - structured reporting and custom templates





# 3D Slicer: Get the software

<http://www.slicer.org>



**3DSlicer**  
Version 4.0

A multi-platform, **free and open source** software package for **visualization** and **medical image computing**

Download

Tutorials

Reference

Feedback

## Slicer Wiki

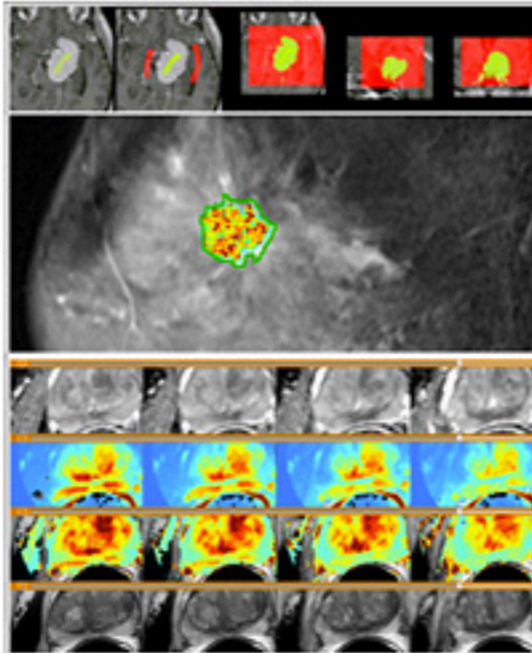
### About Slicer

- ▶ Introduction
- ▶ Acknowledgments
- ▶ Contact Us

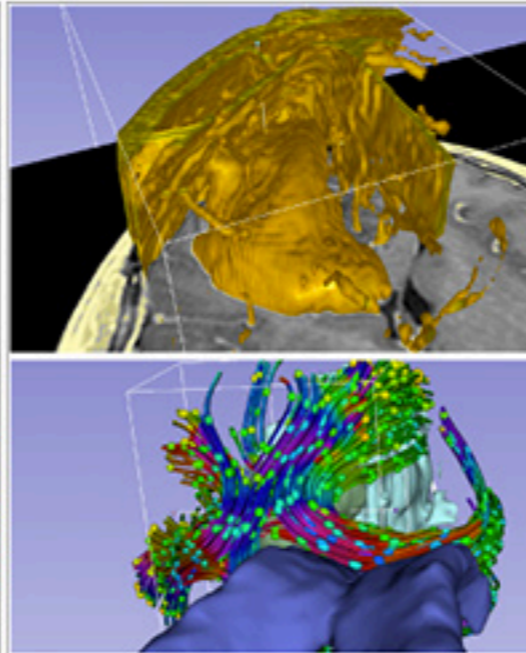
### Resources

- ▶ Download
- ▶ For Users
- ▶ For Developers
- ▶ Commercial Use
- ▶ NCIA
- ▶ Publication DB
- ▶ Image Gallery
- ▶ Slicer Community
- ▶ Source Code
- ▶ Licensing
- ▶ Mailing Lists
- ▶ Web Archive

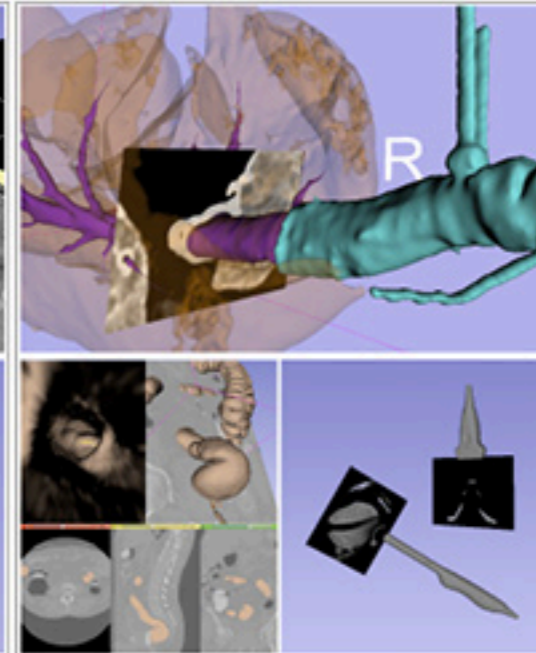
### Powerful processing.



### Streamlined interface.

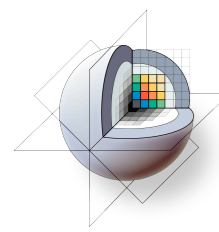


### Extensible platform.



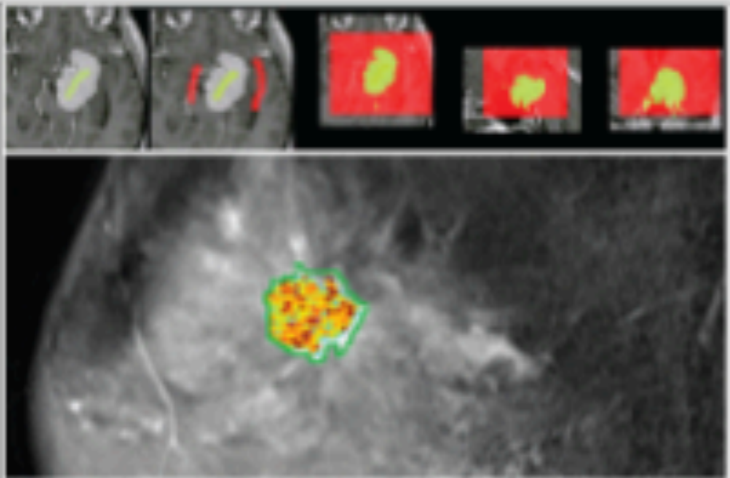
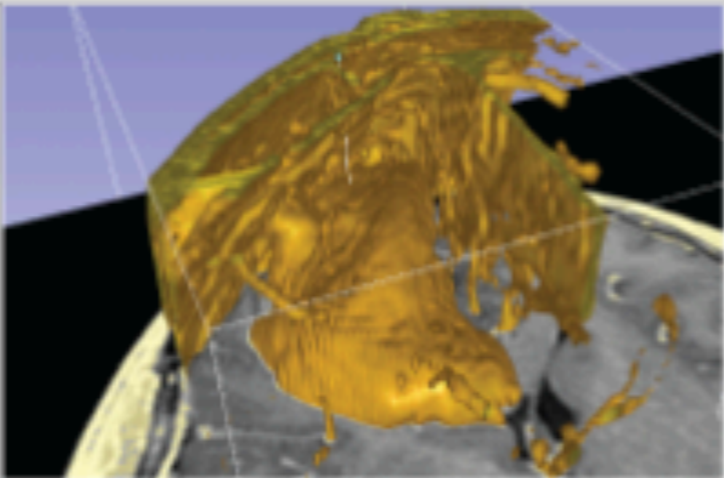
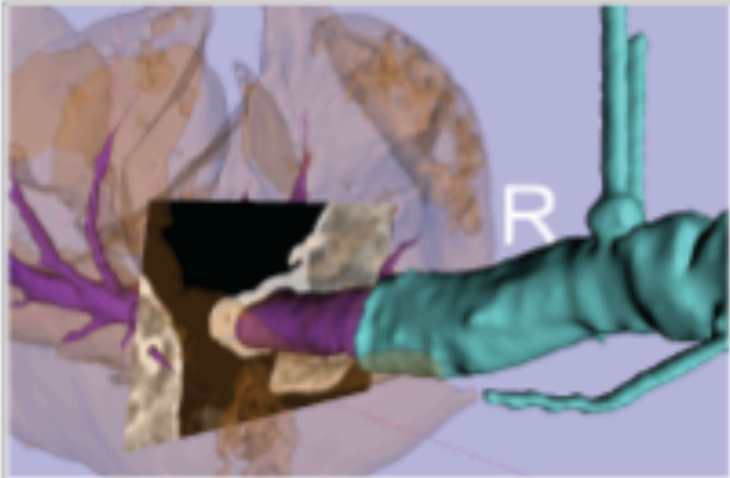
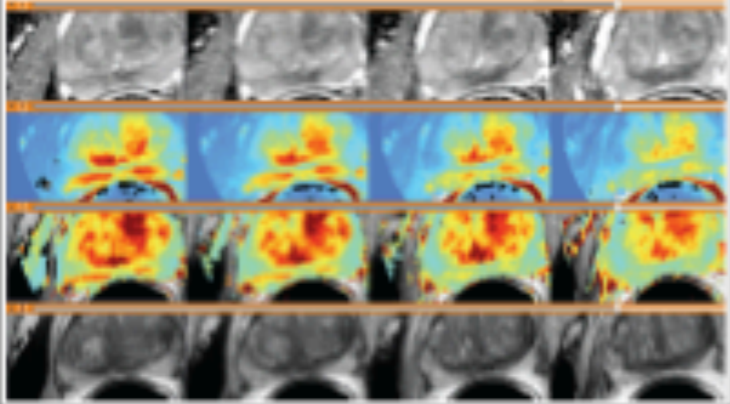
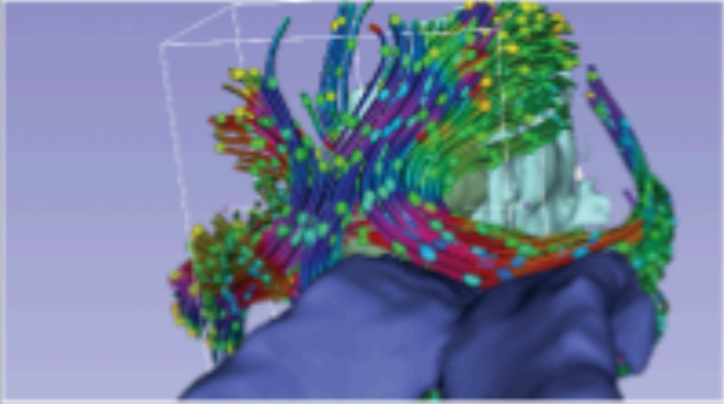
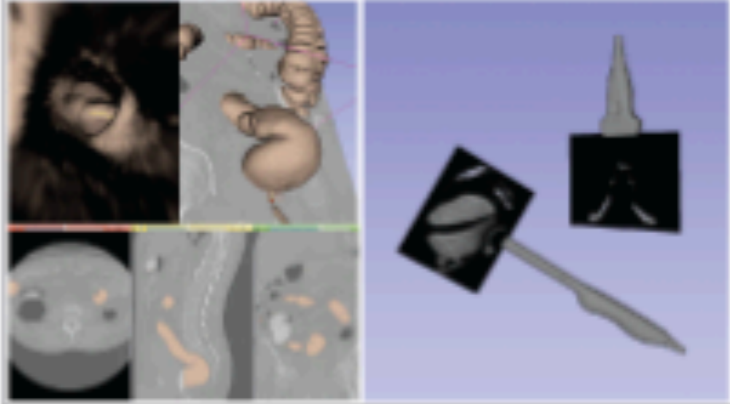

**3D Slicer** version 4.0

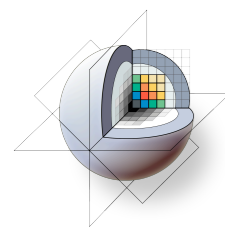
[www.slicer.org](http://www.slicer.org)



# 3D Slicer: Find Tutorials & More

<http://www.slicer.org>

<i>Powerful processing.</i>	<i>Streamlined interface.</i>	<i>Extensible platform.</i>
		
		
 <h1>3D Slicer</h1> <p>version 4</p>		<p><a href="http://www.slicer.org">www.slicer.org</a></p>

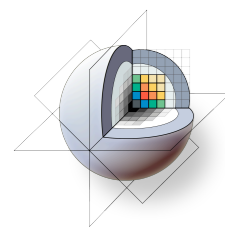


# 3D Slicer: Attend a workshop

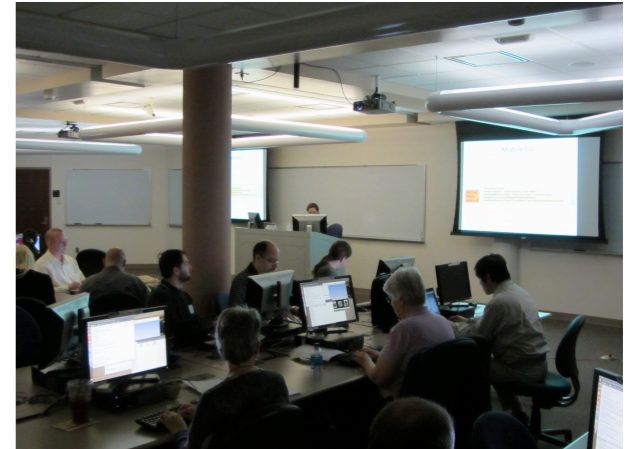


1. HST.583 Life Cycle of Medical Imaging Lab, Harvard-MIT Division of Health Science and Technology (Sept.10)
2. MICCAI DTI Tractography Challenge, Nice, France, (Oct.1<sup>st</sup>)
3. 3D Visualization of DICOM images for Radiology Applications, Hands-on course, RSNA 2012, Chicago (Nov.28)
4. Quantitative Medical Imaging for Research and Practice, Hands-on course, RSNA 2013, Chicago, (Nov.25)
5. 3D Slicer Booth, Quantitative Imaging Reading Room, RSNA 2012, Chicago (Nov.25-30)
6. HST.583 Diffusion Tensor Imaging Lab, Harvard-MIT Division of Health Science and Technology (Dec.3)
7. 3D Slicer Hands-on workshop, Psychiatry Neuroimaging Lab, Boston, MA (Dec.10)
8. DTI Hands-on course, SPIE 2013, San Diego, Ca (Feb.5)
9. 3D Slicer demos, IMAGINE session, European Congress of Radiology, ECR 2013, Vienna, Austria (March 7-11)
10. Imaging in Neuroscience hands-on course, Harvard Catalyst 3D Slicer hands-on workshop, Tokyo, Japan (April 9)
11. 3D Slicer hands-on workshop, Iwate, Japan (April 10)
12. 3D Slicer invited lecture, AAPM New England Chapter Summer meeting, Portsmouth, NH (May 31)
13. 3D Slicer Hands-on workshop, BWH, Boston, (June 14)
14. Image-Guided Therapy Workshop, CARS 2013, Heidelberg, Germany (June 30)
15. BRAINSCamp hands-on workshop, Iowa City (August 1<sup>st</sup>)
16. MICCAI 2013 DTI Tractography Challenge, Nagoya, Japan  
MICCAI 2013 CTK Programming Tutorial, Nagoya, Japan
17. 3D Slicer Neurosurgery workshop, PLA General Hospital, Beijing, China (Sept.29)
18. 3D Visualization of DICOM images for Radiology Applications, Hands-on course, RSNA 2013, Chicago (Dec.1)
19. 3D Slicer Booth, Quantitative Imaging Reading Room, RSNA 2013, Chicago (Dec.1-6)
20. Quantitative Medical Imaging for Research and Practice, Hands-on course, RSNA 2013, Chicago, (Dec.3)

<http://wiki.na-mic.org/Wiki/index.php/Training:Slicer>  
<http://wiki.na-mic.org/Wiki/index.php/Events>



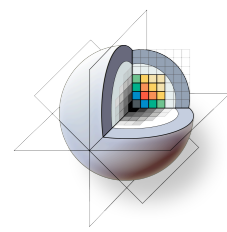
# 3D Slicer: Attend a workshop



<http://wiki.na-mic.org/Wiki/index.php/Training:Slicer>

<http://wiki.na-mic.org/Wiki/index.php/Events>





# Slicer Hands-on courses at RSNA 2013

---

## **3D Visualization of DICOM images for Radiological Applications.** *Tuesday. Dec.3, 12:30 pm -2 pm (SCD401)*

Sonia Pujol, Ph.D.,  
Surgical Planning Laboratory, Harvard Medical School, Brigham & Women's Hospital, Boston MA.

Ron Kikinis, M.D.  
Surgical Planning Laboratory, Harvard Medical School, Brigham & Women's Hospital, Boston MA.

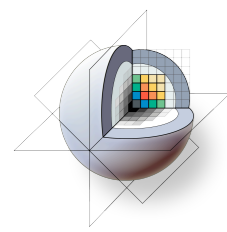
Kitt Shaffer, M.D. Ph.D., Boston University School of Medicine, Boston Medical Center, Boston, MA.

## **Quantitative Medical Imaging for Clinical Research and Practice.** *Sunday. Dec. 1, 11:00 am - 12:30 pm (SCD401)*

Sonia Pujol, Ph.D., Department of Radiology, Brigham & Women's Hospital,  
Boston MA.

Katarzyna J. Macura MD, PhD, The Johns Hopkins Medical Institutions,  
Baltimore, MD.

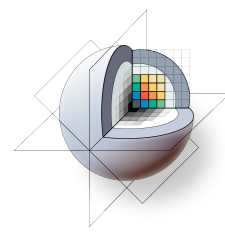
Ron Kikinis, M.D.  
Surgical Planning Laboratory, Harvard Medical School, Brigham & Women's Hospital, Boston MA.



# 3D Slicer: Information for Developers

[www.slicer.org/pages/DeveloperOrientation](http://www.slicer.org/pages/DeveloperOrientation)

<b>Slicer 3.x</b> (Current development version)	
Slicer Developer Documentation	<a href="#">Development Project Homepage, Execution Model Documentation and Building a Slicer 3 Module GUI</a>
Build Instructions	<a href="#">Slicer 3 Build Instructions</a>
Coding Considerations	<a href="#">Slicer 3 Coding Style and Slicer 3 Interface Design</a>
SVN Source Code Repository Browsing	<a href="#">View VC</a>
API	<a href="#">Slicer 3 Doxygen Source Documentation,</a>
Slicer 3 SVN Repository and SVN Instructions	<a href="#">svn Repository and Introduction to Slicer 3 svn</a>
Dashboard	<a href="#">Slicer 3 Dashboard</a>
Bug Tracker	<a href="#">Slicer 3 Bug Tracker</a>
Visual Blog	<a href="#">Visual Blog</a>
Developer Discussion	<a href="#">Developer's Mailing List</a>
Module Execution Documentation	<a href="#">Execution Model and Adapting Slicer to Large Scale Experiments</a>



# 3D Slicer: Acknowledgements

## Major Sponsors & Contributors

