ITK-SNAP 3.x Training Class Final Program
Smilow Center for Translational Research, SCTR 09-146 A/B
University of Pennsylvania, Philadelphia, PA
8:30 am to 4:30 pm
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Organized by the Penn Image Computing and Science Laboratory

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Overview. ITK-SNAP is a free, open-source software tool for interactive segmentation of 3D image volumes. It is used by thousands of researchers to label structures of interest in different imaging modalities, including MRI, CT, 3D ultrasound, and others. It includes both manual and automatic segmentation functionality, and it designed to be easy to learn and use. Since 2006, ITK-SNAP has has contributed to over 1000 publications, spanning a wide range of biomedical applications and imaging modalities.

Objectives. The class is aimed at both novice and experienced ITK-SNAP users. Attendees who complete the morning session will be able to use ITK-SNAP autonomously to perform common operations, such as image viewing, manual segmentation and semi-automatic segmentation. Attendees of the afternoon session will be able to develop image data processing and analysis workflows that integrate ITK-SNAP and the companion Convert3D 3D image processing tool. To meet these objectives, the training session will combine presentations by ITK-SNAP experts with guided exercises. Attendees must bring their own laptop to the session.

Website. http://www.itksnap.org/pmwiki/pmwiki.php?n=Main.Training

Start Time	Duration	Topic	Presenter
8:30 AM	10	**General Introduction and Logistics** * what is ITK-SNAP? * materials and handouts * plan for the day	Paul Yushkevich
8:40 AM	20	**Session 1: Installing ITK-SNAP and C3D** * walk through installing on Windows, MacOS and Linux * quickly go over the contents of the data folder	Paul Yushkevich
9:00 AM	20	**Break** * during the break, help users install	
9:20 AM	20	**Session 2: Theory: Working with 3D Medical Images** * how ITK-SNAP represents images * how segmentations are represented * types of layers in ITK-SNAP * file formats and meta-data	Paul Yushkevich
9:40 AM	60	**Session 3: Hands on Image Navigation (Follow-Along Session)** * loading a NIFTI format grayscale image * cursor positioning, looking up coordinates * different zoom modes (linked zoom, specifying zoom level) * contrast adjustment, color map * loading a segmentation image * volumes and statistics * using workspaces * small exercise to reinforce material	Paul Yushkevich
10:40 AM	15	**Break**	

Start Time	Duration	Topic	Presenter
10:55 AM	65	**Session 4: Manual Segmentation (Lecture + Exercise)** ***** polygons: drawing, editing, pasting, undo, etc. ***** advantages of tracing in three slice planes ***** adding and modifying labels ***** paint brush: plain and adaptive ***** undo and redo ***** label selection and label editor ***** practical exercise: hippocampal subfields in a postmortem MRI. Exercise will reinforce above skills, as well as loading and saving segmentations, computing volumes.	John Pluta
12:00 PM	60	**Lunch (on your own)**	
1:00 PM	45	**Session 5: Working with Multiple Imaging Modalities** * working with image overlays * layer inspector, component selection * yoking between ITK-SNAP sessions * working with DICOM datasets	Sandhitsu Das
1:45 PM	25	**Session 6: Automatic Segmentation: Theory** * intuitive, hands-on explanation of automatic segmentation concepts * active contour evolving according to forces * speed images generated by thresholding and edge detection * automatic merging of contours * what sorts of problems does this segmentation work for?	Alison Pouch
2:10 PM	30	**Session 7: Automatic Segmentation: Practice** * hands-on exercise to segment 4D ultrasound data * experiment with parameter tuning * perform supervised classification in multi-modality MRI	Alison Pouch
2:40 PM	15	**Break**	
2:55 PM	30	**Session 8: 3D Navigation and Editing** * manipulating segmentation in 3D with cut-plane tools * exercise: users will be provided with initialization and speed images for automatic segmentation of the ventricles; will run automatic segmentation, then split the ventricles into left, right and third ventricle.	John Woo
3:25 PM	60	**Session 9: Convert3D Basics (Interleaves Lecture and Exercises)** ***** image arithmetic, basic image processing ***** slicing, stacking, resampling, transformations, cropping, etc. ***** analyzing and comparing segmentations, computing overlaps ***** batch application of ITK-SNAP automatic segmentation	Philip Cook
4:25 PM	5	**Wrap-Up**	Paul Yushkevich
4:30 PM		**Dismissal**	