3D MORPHOMETRICS AND IMAGE ANALYSIS WORKSHOP

Location: Online as a Zoom Meeting (with breakout sessions).
Course Dates: August 17-21, 2020
Course Website: https://SlicerMorph.github.io/2020_Summer_Workshop
Application deadline: July 18st, 2020 (11:59 PDT)
Online Application URL: https://forms.gle/xYz1BfGPcijqeSZj9
Admission notification: August 1st, 2020

Target Audience: Course is directed for graduate students, post-docs and junior faculty who are interested in conducting quantitative research into organismal form and function using 3D imaging. It is also appropriate for more established researchers who are looking for open-source alternatives to the proprietary pipelines they have been using. We anticipate more applicants than we can accommodate. Applicants whose host institution lack such curriculum and/or resources might be given preference.

Course Contents and Structure: Due to change to online format, with shortened hours course will prioritize hands-on contents and computer labs over formal didactics. Labs will cover all aspects of conducting specimen-based research using 3D imaging. Practical topics (e.g., image processing and segmentation, visualization) will be taught using the open-source **3D-Slicer** visualization suite and the **SlicerMorph morphometrics toolkit** (statistical shape analysis) Additional lab topics include using 3D specimen repositories to obtain data, tools and methods for collaboration and reproducible research, introduction to data analysis through R/Python. Course material will be focused on volumetric (e.g., CT or microCT) 3D datasets, but will be equally applicable to data from 3D surface scanners. Tentative syllabus can be found in the next page.

Expectations from attendees: Each attendee should have a recent (last two years) laptop running Windows, Mac or Linux OSes (no netbooks or tablets). More information about computer requirements and how to obtain the course software can be found at here.

Logistics: Selected applicants will be notified by August 1st. Due to demand and limited number of participants we can accommodate online, we will prioritize applicants who can attend the whole session. Each day will start at 9.30 (PDT) and end around 2p (PDT) with a 20 minute break sometime in between sessions.

Course Fees: There is no course registration fee. This workshop and SlicerMorph project are supported by a collaborative research grant from the National Science Foundation Advances in Biological Informatics program (ABI-1759637, Adam Summers & Murat Maga).

Contact information: If you have any questions, please contact us at SlicerMorph@outlook.com and one of our course directors will respond to your inquiry.

Ready to apply? Submit your application. Please be prepared to give a short description of your research background, your career goals as they apply to this workshop, and a working email address. Email is the primary means we will be contacting you, so please make sure to enter correctly.

All times indicated are Seattle time (Pacific Daylight Saving), which is 7h behind UTC.

	8/17	8/18	8/19	8/20	8/21

9:30-11:30	**Introduction**
	Maga
	
	GETTING STARTED WITH SLICER & SLICERMORPH
	• Navigating UI, extension catalogue, Data and Subject Hierarchy,
	• Sample Data module, loading data
		Imaging Concepts
		Rolfe
		
		3D VISUALIZATION
		• Volume Rendering
		• Lighting
		• Animations
		• Measurements
		  ○ Landmarks
		  ○ Lines
		  ○ Angles
		  ○ Planes
		  ○ Curves
			GMM #1
			Maga
			
			SLICERMORPH
			• Review Measurements
			• Review Sample Data
			• GPA in SlicerMorph
			• Superimposition
			• Plots Outputs
			• PCA Visualization
				SLICERMORPH (cont'ed)
				• Semi-landmarking
				  ○ Curve-based
				  ○ Patch-based
				• Template-based auto-landmarking
				• Importing data in R
				
				Breakout sessions for semi-LMs and template-based landmarking.
					Setting up a lab
					Maga
					
					ODDS and ENDS
					○ Landmark Registration
					○ Calculating model to model distance and heatmaps
					○ Flatting curved structures
					○ Importing raw data
					○ Finding support and using forum

11:30-11:50	Break	Break	Break	Break	Break
11:50-2:00	**GETTING STARTED WITH SLICER & SLICERMORPH** • Volumes • ImageStacks • MorphoSourceImport • Models • DICOMBrowser • CropVolume • Transforms • Saving data • Customization	**SEGMENTATION** • Image Geometry • Mask vs LabelMap vs Segmentation • Segment Editor and Segmentation tools • Split/Mask Volume • SegmentEndoCranium • Segment Statistics • Exporting/Importing Segmentations • Pointers to segmentation recipes • Customizing .slicerrc.py for shortcuts and keystrokes	**SLICERMORPH (cont'ed)** Breakout sessions for GPA tutorial and collect your own data. **GMM #2 Semi-LMs** Rolfe	**SLICERMORPH (cont'ed)** **GMM #3: Auto3DGM** Boyer/Shan Lecture, demo and breakout sessions	Q&A and Breakout sessions