

## How-To: Creating a 3D Reconstruction of Your Patient's CT Scan <sup>[1]</sup>

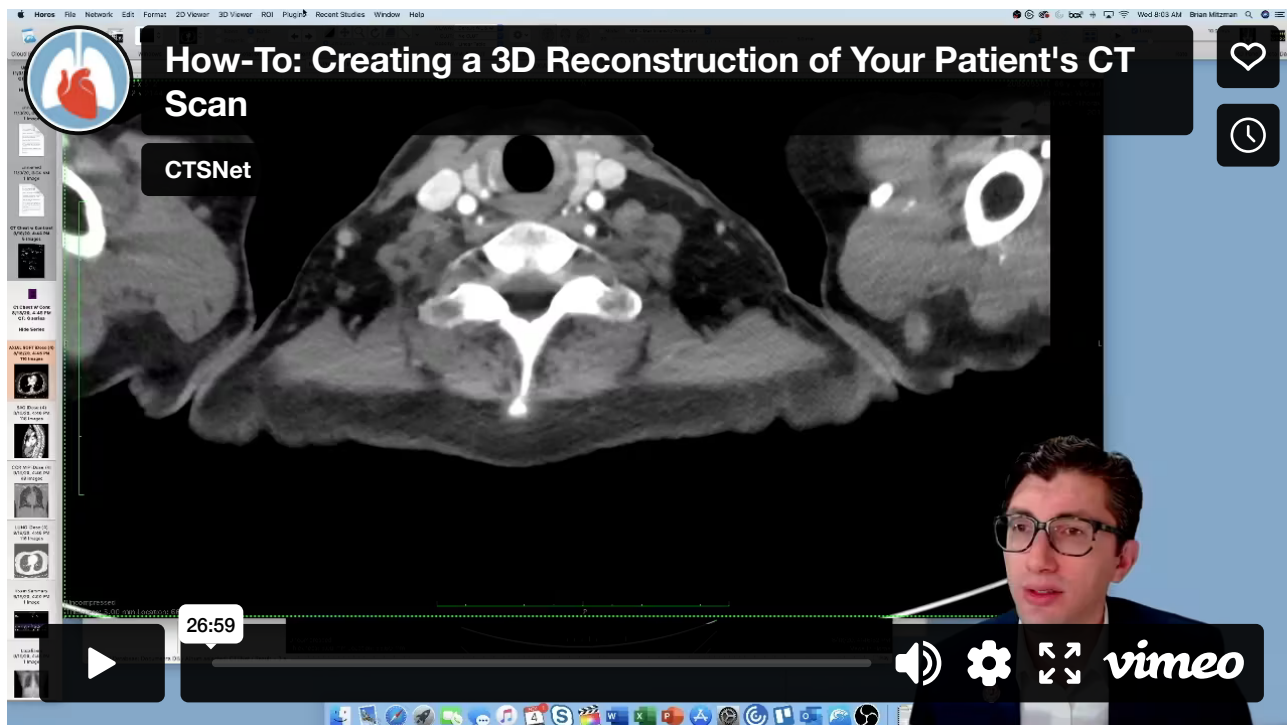
Submitted by [erobinson](#) <sup>[2]</sup> on Mon, 2020-11-23 15:15

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Over the last 20 years, there has been an exponential growth in technological capabilities in medicine. The quality of imaging and diagnostic tools has increased drastically. Advanced imaging and reconstruction of CT scans is now routinely utilized in many surgical specialties, and in cardiothoracic surgery specifically, it is commonly utilized in structural heart programs. Adoption of this technology has been slow in general thoracic surgery, mainly due to the cost of software and time necessary to create the reconstruction. While one can still provide excellent care without the use of 3D modeling, it has enormous potential for both teaching and operative planning.



There are three main uses for advanced visualization in general thoracic surgery:

- 1) Resident Teaching – at the early training levels, 3D reconstructions are an excellent teaching modality to enhance the learning environment of students, residents, and fellows.
- 2) Patient Education – using a 3D reconstruction to describe a patient’s tumor and operative plan enhances the office visit, increases patient satisfaction, and ensures that the patient truly understands the extent of their disease process.
- 3) Operative Planning – while many general thoracic surgery cases do not require a 3D reconstruction for planning purposes, these visualizations are specifically helpful for both complex tumors (Pancoast, chest wall invasion, re-do surgery) and localization of small lung nodules.

In this tutorial, Brian Mitzman demonstrates the basic skillset required to utilize free 3D modeling software and create your own reconstructions. Once you become proficient, the average time to create a basic 3D reconstruction is less than 10 minutes. The software used in this video is called Horos (<https://horosproject.org> [3]). It is an open source medical image viewer with advanced post-processing capabilities. This tutorial is broken into several sections:

- 1) Why utilize 3D reconstructions?
- 2) Hardware Requirements
- 3) Software Packages
- 4) Step-by-Step Examples
  - a. Basic Mediastinal Mass Reconstruction
  - b. Advanced Mediastinal Mass Reconstruction
  - c. Lung Reconstruction with Multiple Nodules

There are numerous advanced tools that can be used once you have mastered this initial skill set, including precise Region Of Interest (ROI) editing with a brush, 16 bit Color Look-Up Table (CLUT) optimization for shading, and layering multiple transparent ROI. More advanced tutorials will be released in the future.

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## References

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