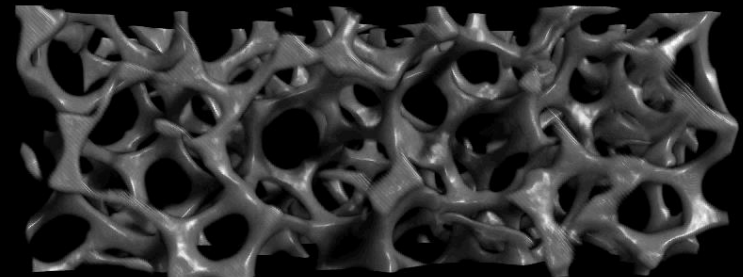# Tips and Tricks for making images and movies
Method note 87

What you will learn from this presentation

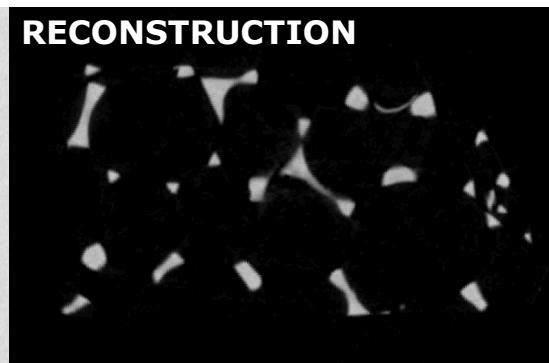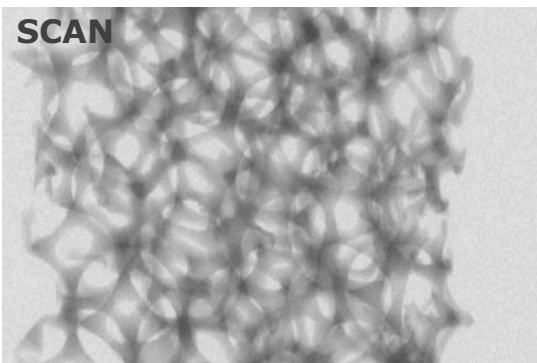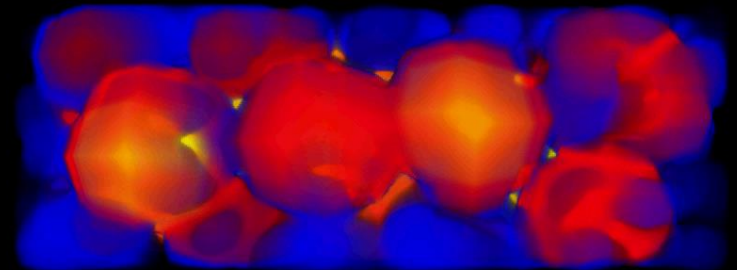How to make movies as in the following slide

Pore size distribution of an Aluminum foam

Calculation of a structure separation distribution

VISUALISATION

SCAN

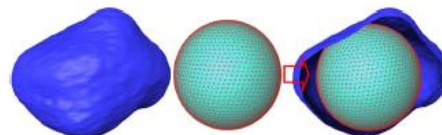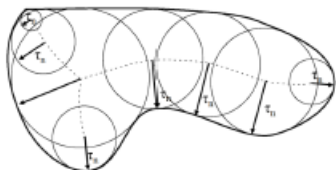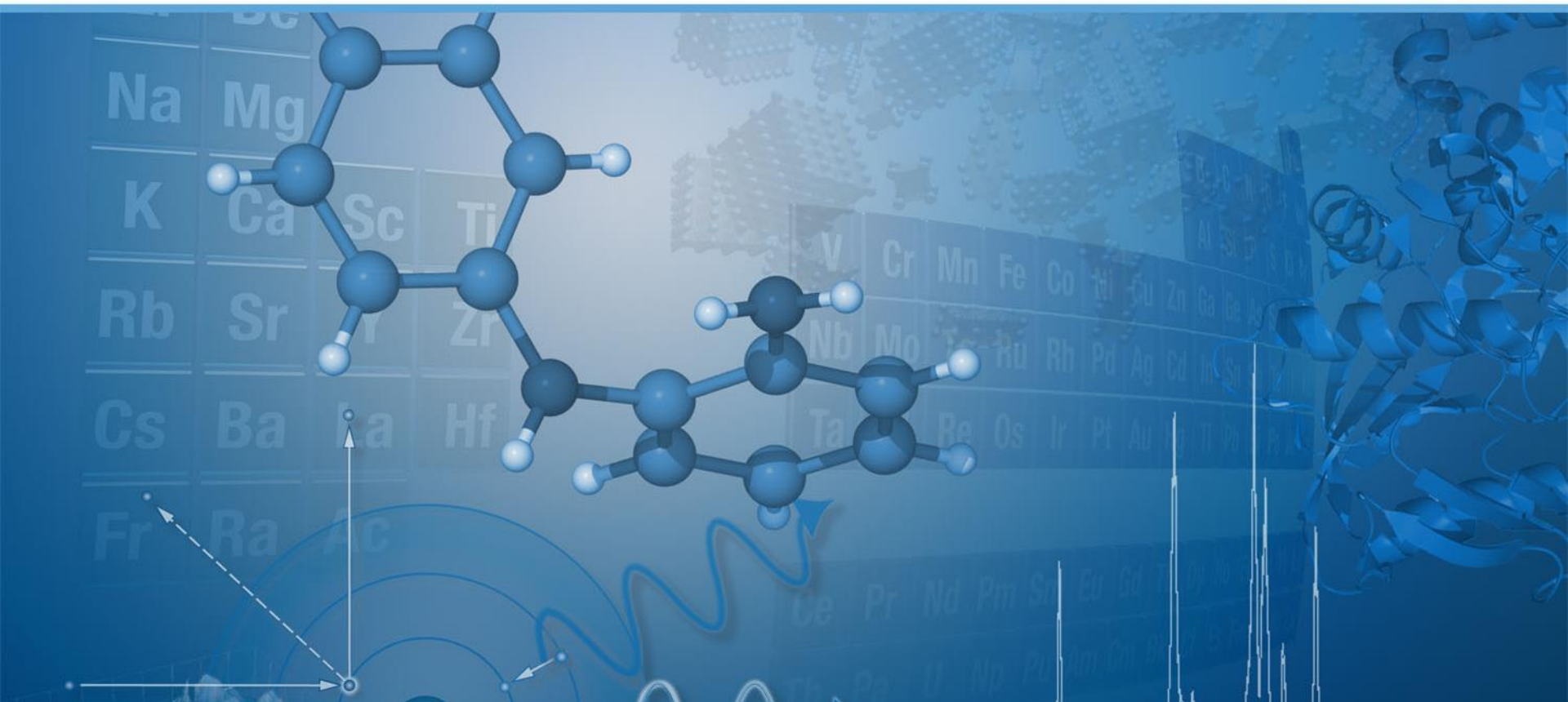**RECONSTRUCTION**

ANALYSIS

Skeletonization   +   sphere fitting procedure

Tips and tricks for your images and movies

- 1. Projections
  - Image of your scan
  - Movies of your scan
- 2. Reconstructions
  - Image of your reconstruction
  - Movie of your reconstruction
- 3. 3D Image
  - CTVox
  - CTVol
- 4. 3D Movie
- 5. Embedding a movie in powerpoint
- 6. How to reproduce the opening slide of this powerpoint
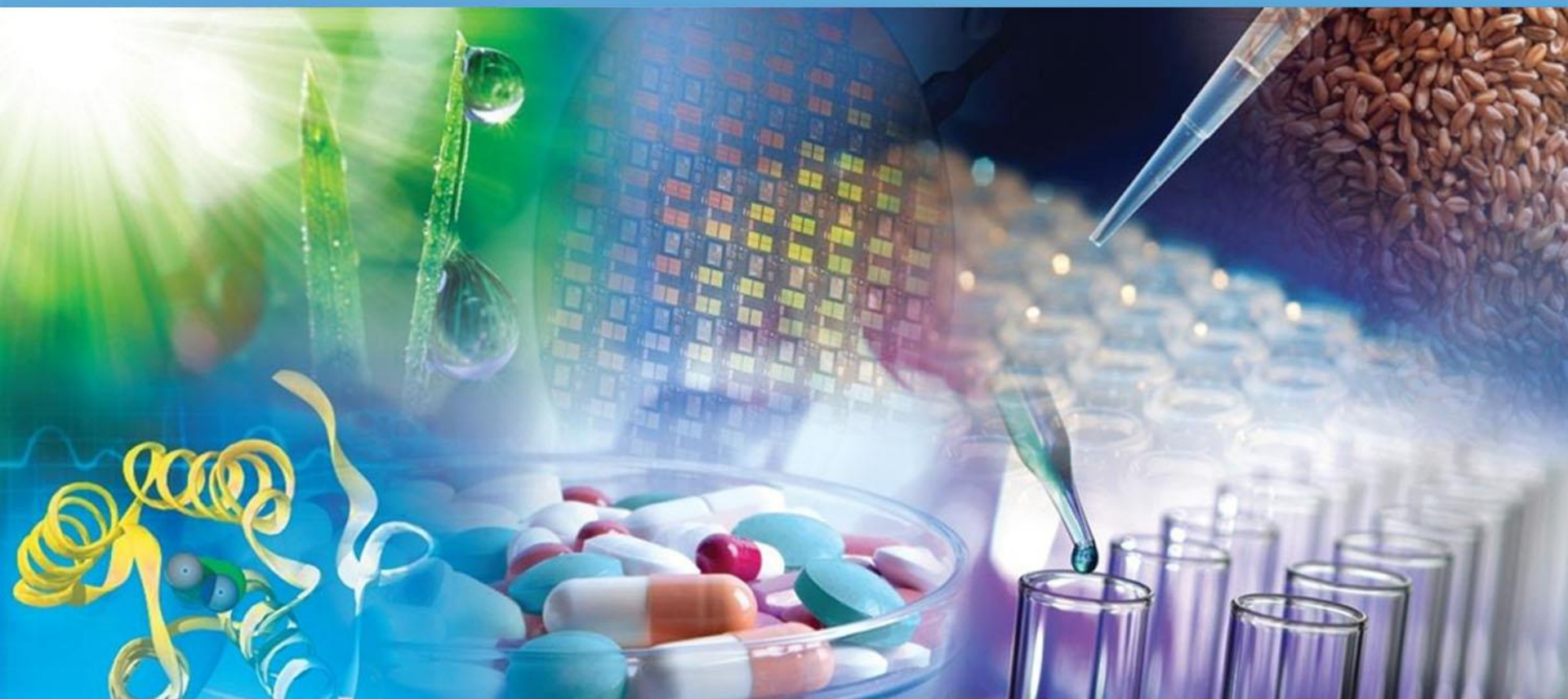
1. Projections
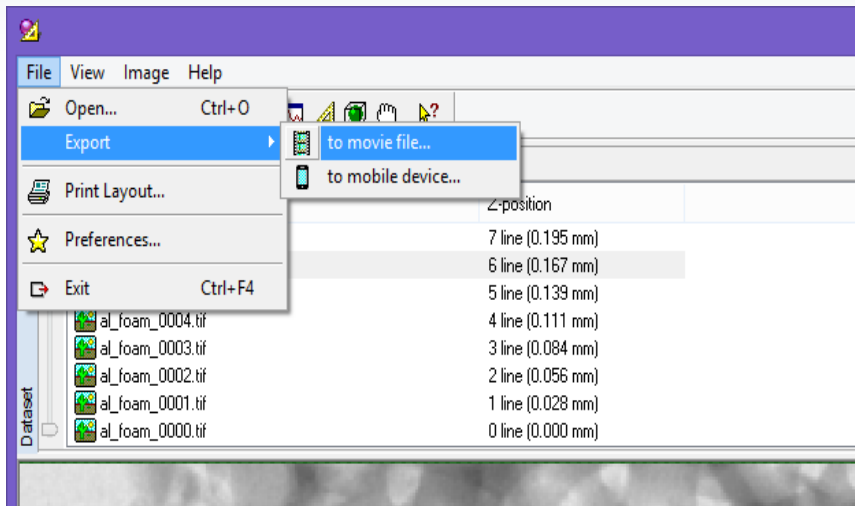
Image of the projection

- After a successful scan and reconstruction, the projection data is often removed to save storage space. You can still include a projection image in your presentation by using the '_spr.bmp' file. Every dataset should have one such shadow projection file and it can be found in the same folder. Below you can see an example of a microchip, where the projection image is helpful when looking at one reconstructed crossection.

Microchip
SkyScan 1173
130kV, brass filter
17µm pixelsize

Shadow projection image and reconstructed crossection of a microchip.

Movie of the projection images

Open the projection images in CTAn. It will ask for a conversion of the 16-bit projection images to 8-bit. You can choose to leave the settings unchanged and click OK. The rotation of the object during the scan can now be simulated by sequentially adding all the projection images into a movie file. To this end, choose File > Export > to movie file.

This will save your movie as an *.avi file under the desired name and location. For compression of the video it is recommended to choose 'Microsoft Video 1' with a compression quality of 100%, as shown in the printscreen on the right.
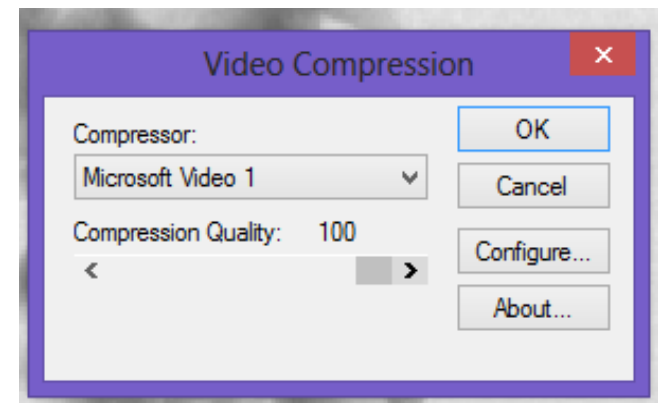
How to make it faster?

Movie of the projection images

Long scans often result in very slow movies. The trick here is to skip several rotation steps in NRecon under Actions>Resize/Copy dataset. Choose 1 as a 'Projection resize factor' to maintain the original resolution of the projection images. Choose any applicable value as an 'Angular resize factor'. This factor will resize the rotation step. For example, a factor of 4 will reduce a dataset of 1000 projections to a dataset of 250 projections.
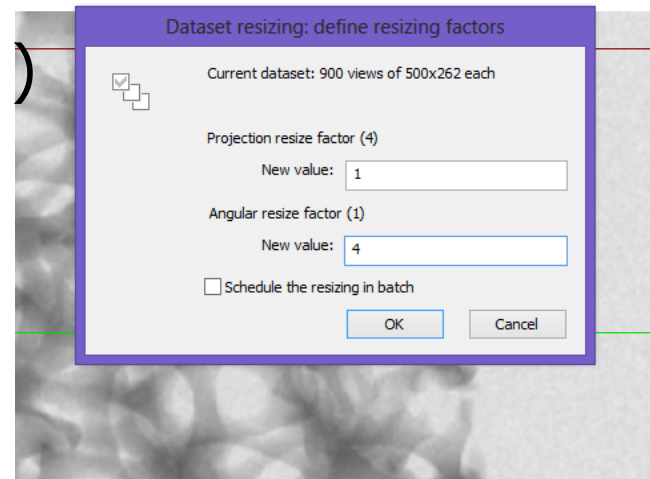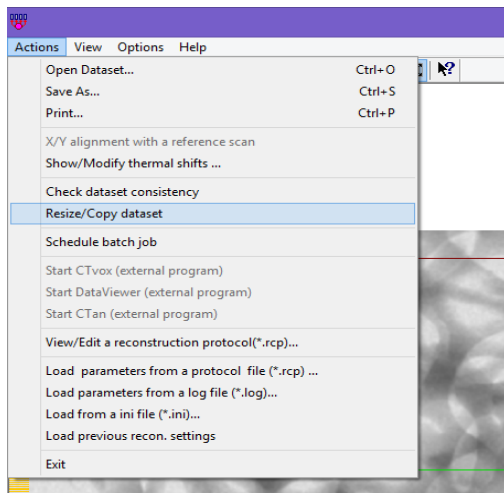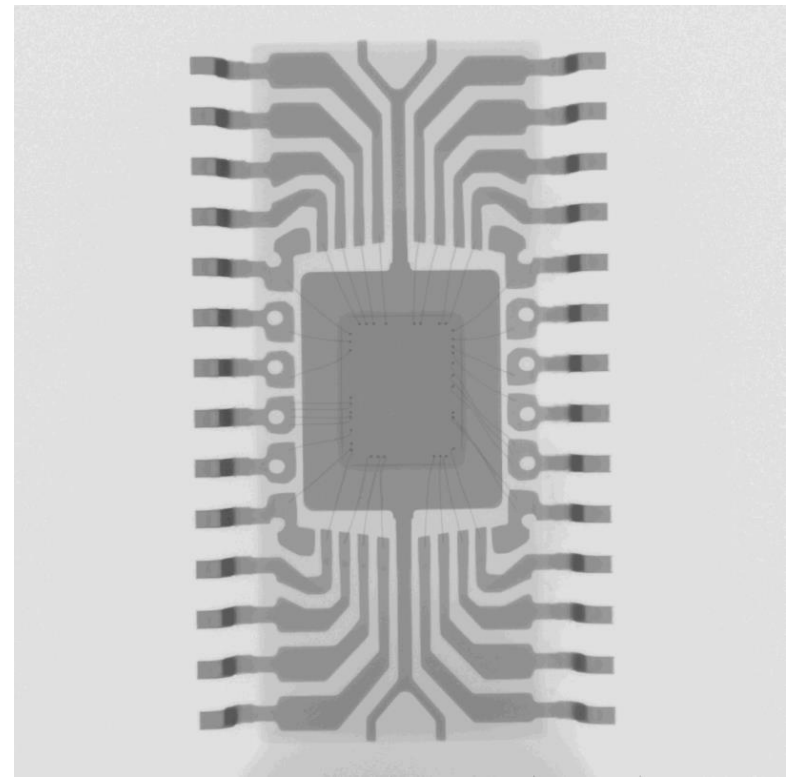

Save it as a new dataset, which can now be used in CTAn for movie generation as described above. Your new movie will now be 4 (or whichever value was chosen) times faster.

Movie of the projection images

Microchip, scanned on SkyScan 1173 at 17µm using 130kV with a brass filter
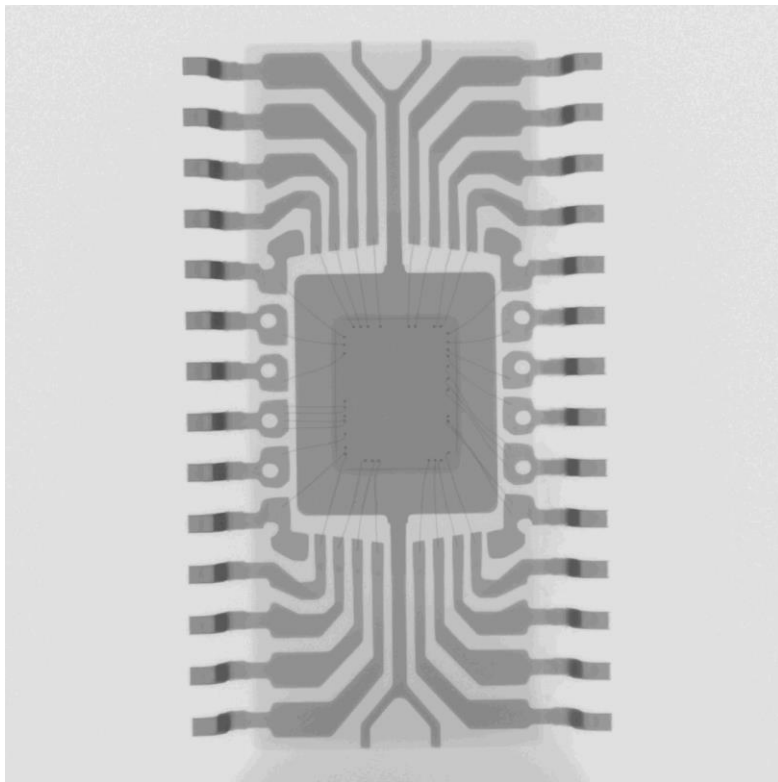
Original movie
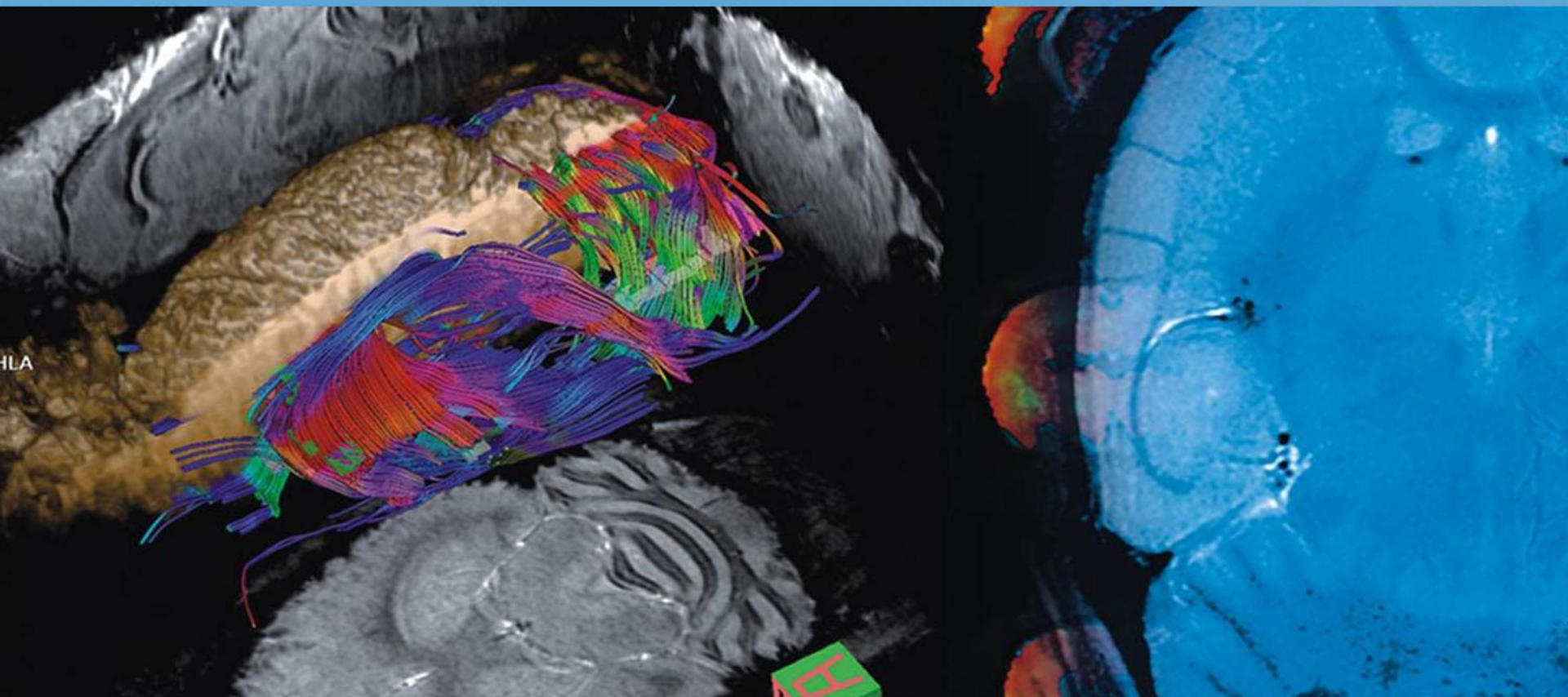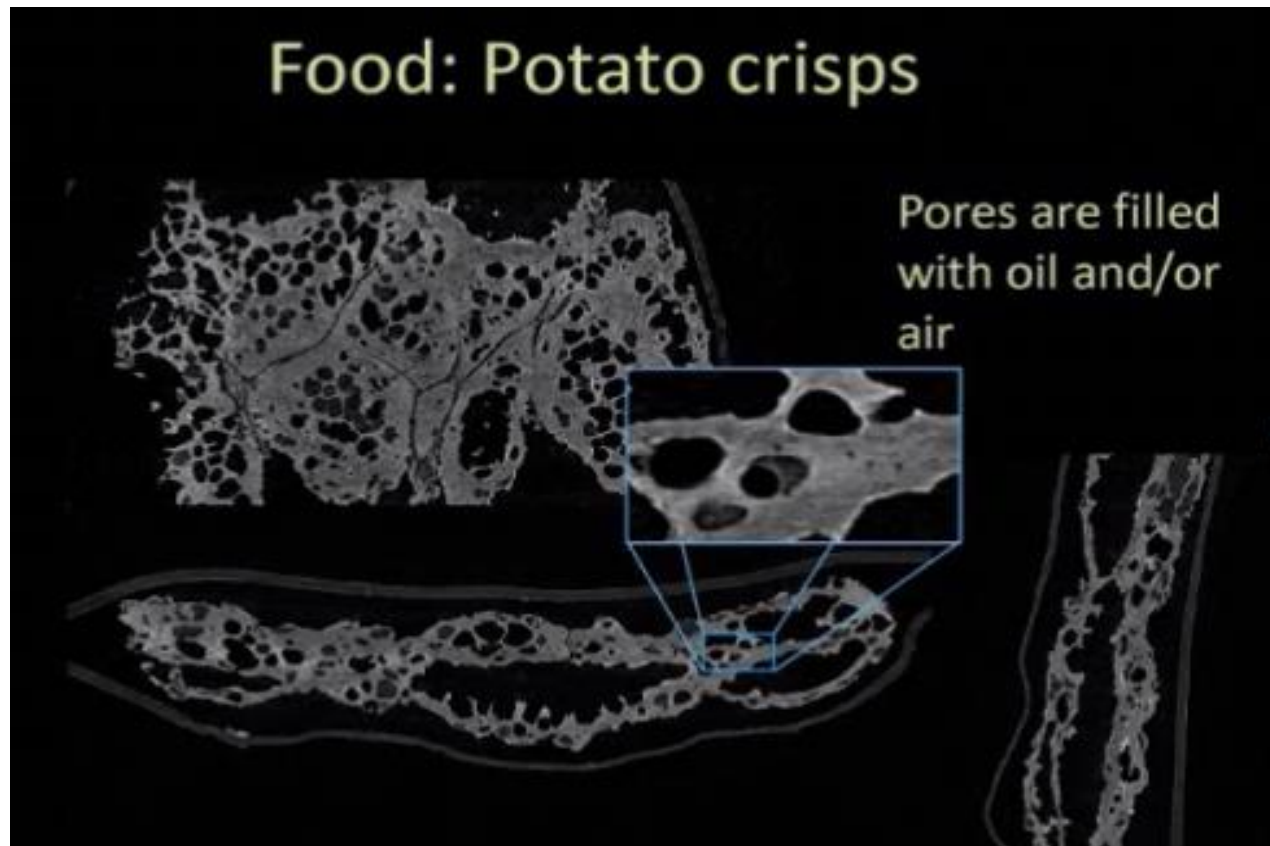

Angular resizing by factor 5

2. Reconstructions

Image of your reconstructions

- A feature might be quite small with respect to the image that you are showing. Show an insert at a higher magnification to clearly illustrate this.

Movie of your reconstructions

- Dataviewer allows to scroll through the dataset in a convenient way, and it is often desireable to turn this into a movie for live presentations. To this end, open the reconstructed images in CTAn and and 'export' the images 'to a movie file', again using the Microsoft Video 1 decoder with an image quality of 100%. Your video will sequentially add all the crossections, making it look like scrolling through the dataset.
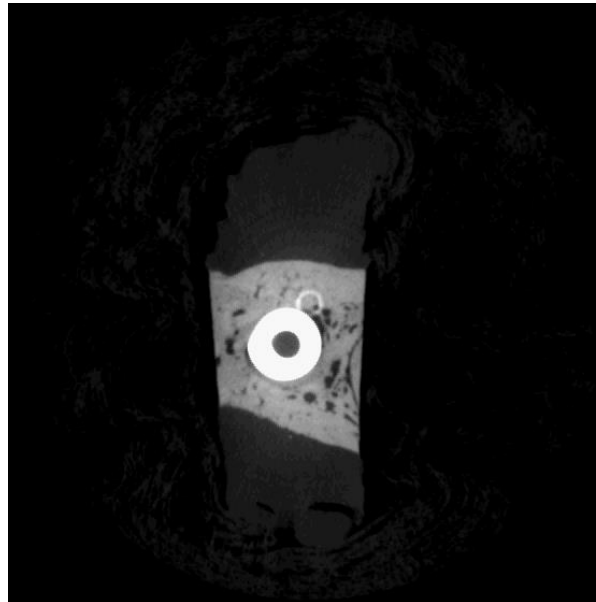

Mandible
SkyScan 1173
130kV, Brass filter 57µm
pixelsize

How to make it faster?

Movie of your reconstructions

- Too slow? You can skip several crossections in NRecon by choosing a larger stepsize (e.g. 5) and reconstructing the dataset again. This method allows you to reduce the number of crossections while maintaining the original resolution of the images.

Mandible
SkyScan 1173

slow

fast
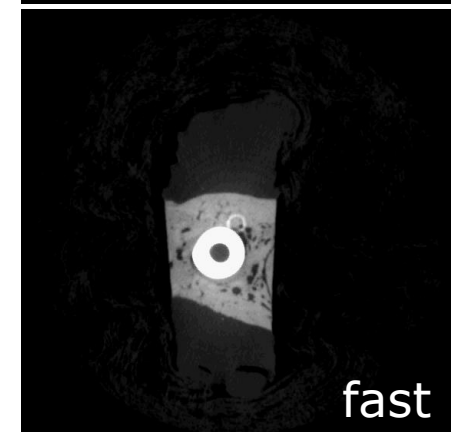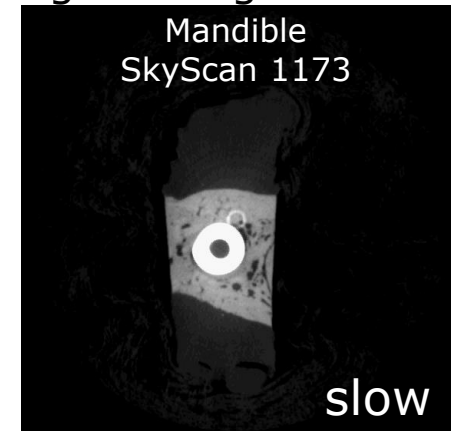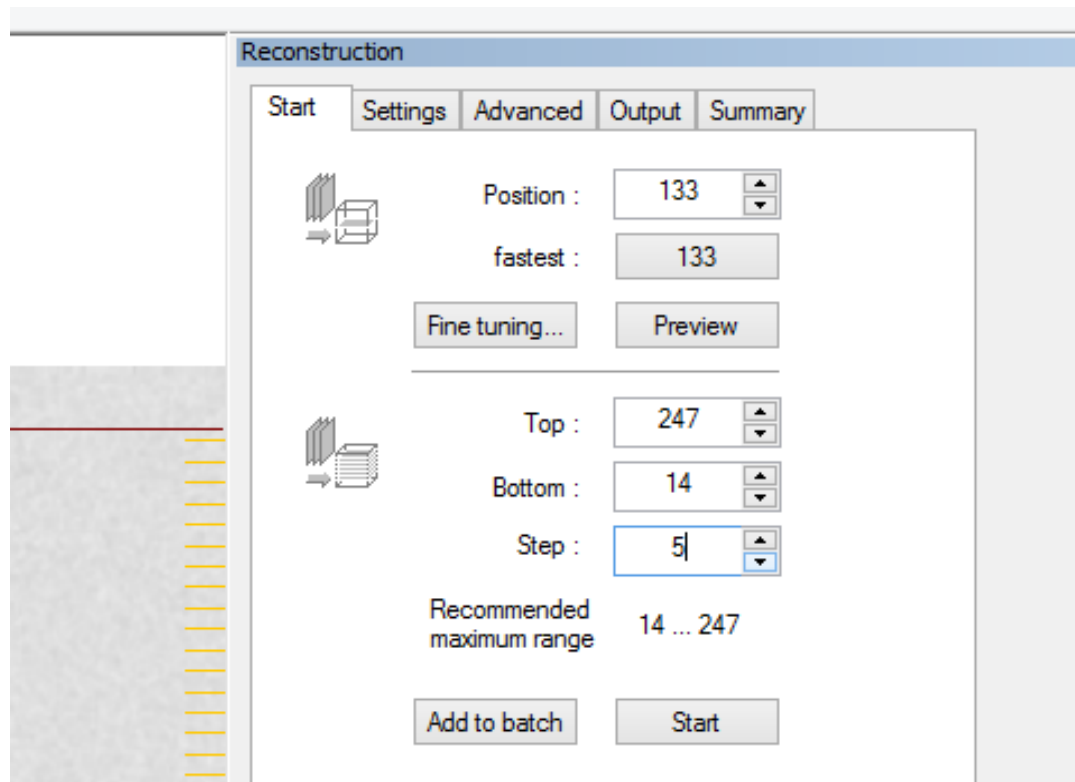
Movie of your reconstructions

- Alternatively, you can downsize the data in Dataviewer as well. When choosing to resize the data, by default Dataviewer will also skips an applicable number of crossections (while also reducing the size in x/y). However, it also allows the option to average in 3D. The new dataset can now be used in CTAn to generate the movie.
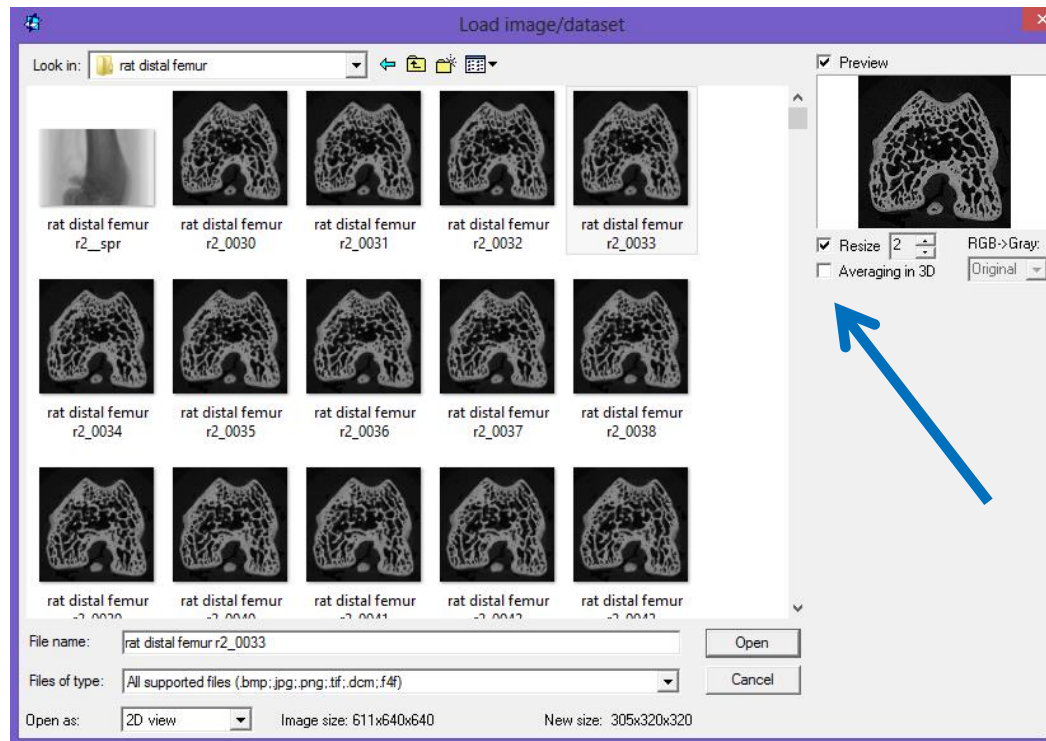
3. 3D images

- Firstly, try to decide for yourself what you want to show. The answer to this question will help you decide whether you can use CTVox for it or need to address CTVol. CTVox will be used when color relates to density, or to load the color-coded images (for size distribution or fibre orientation) exported from CTAn. CTVol allows to load different surface renderings to assign a color to a different morphometric parameter (e.g. open/closed pore network). Quickstart guides are downloadable from our website for both software packages.

- Previous academy newsletters addressed visualisation techniques in CTVol and CTVox in more detail.

- Here we want to provide some tips to get quick results. They are also applicable in CTVol.

Tips and tricks for CTVox

- Firstly, reduce the noise slightly by suppressing the left (low dense) side of the opacity function, which overlays the image histogram in the background.
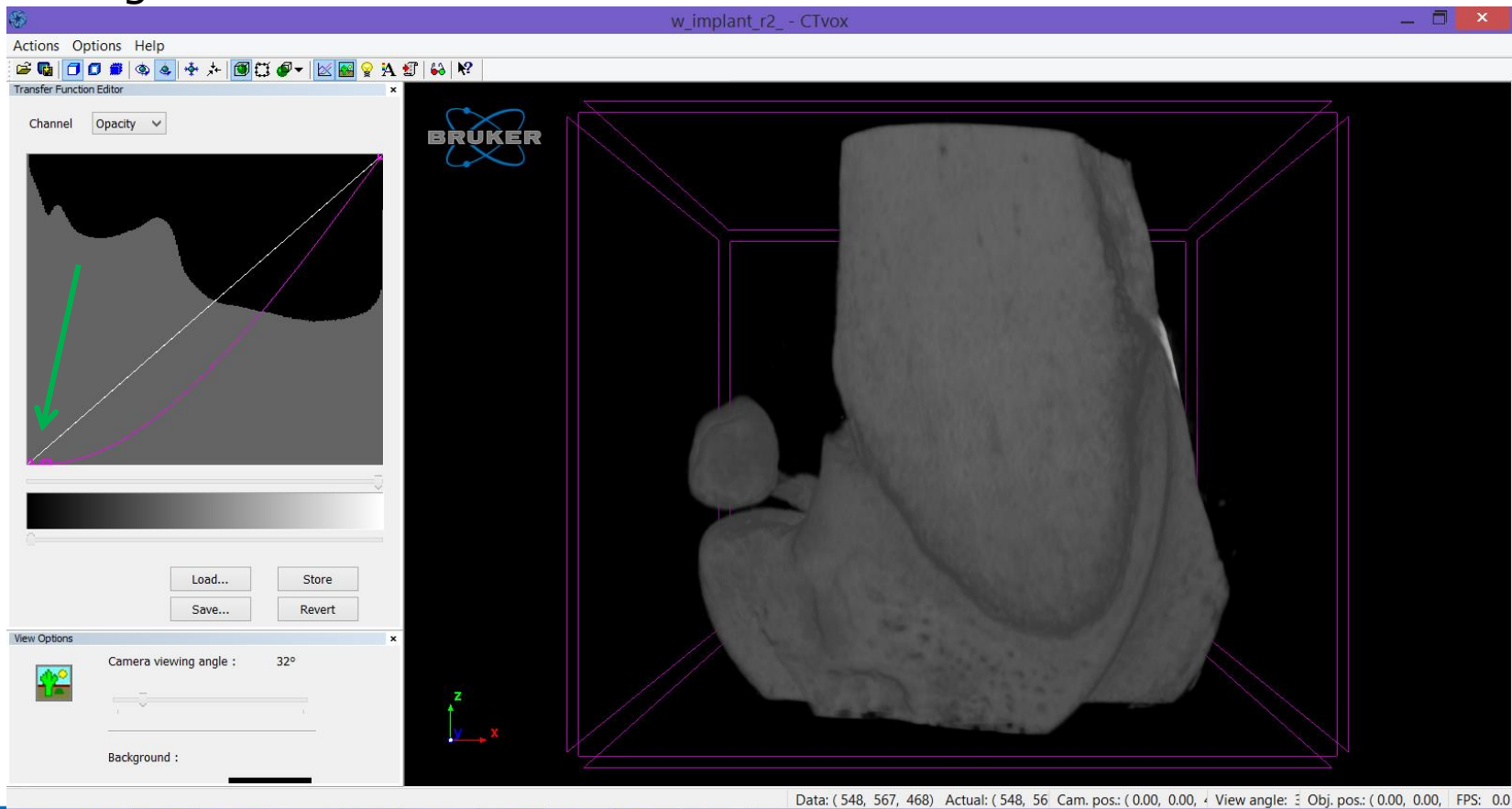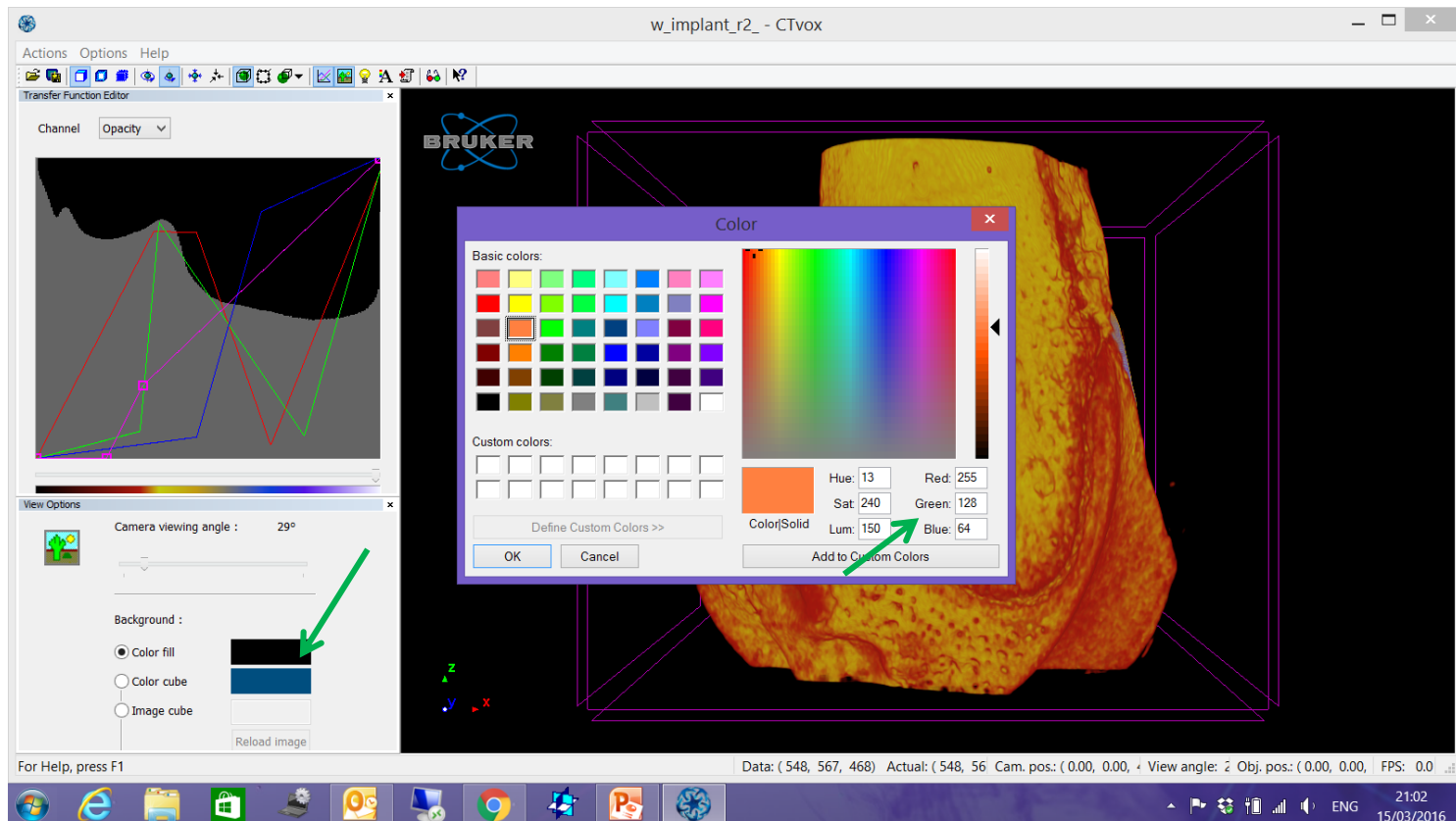
Tips and tricks for CTVox

- Color can be added by playing with the RGB-channels of this function. The eventual color in the image will be a combination of all channels, as shown in the color bar below the histogram.
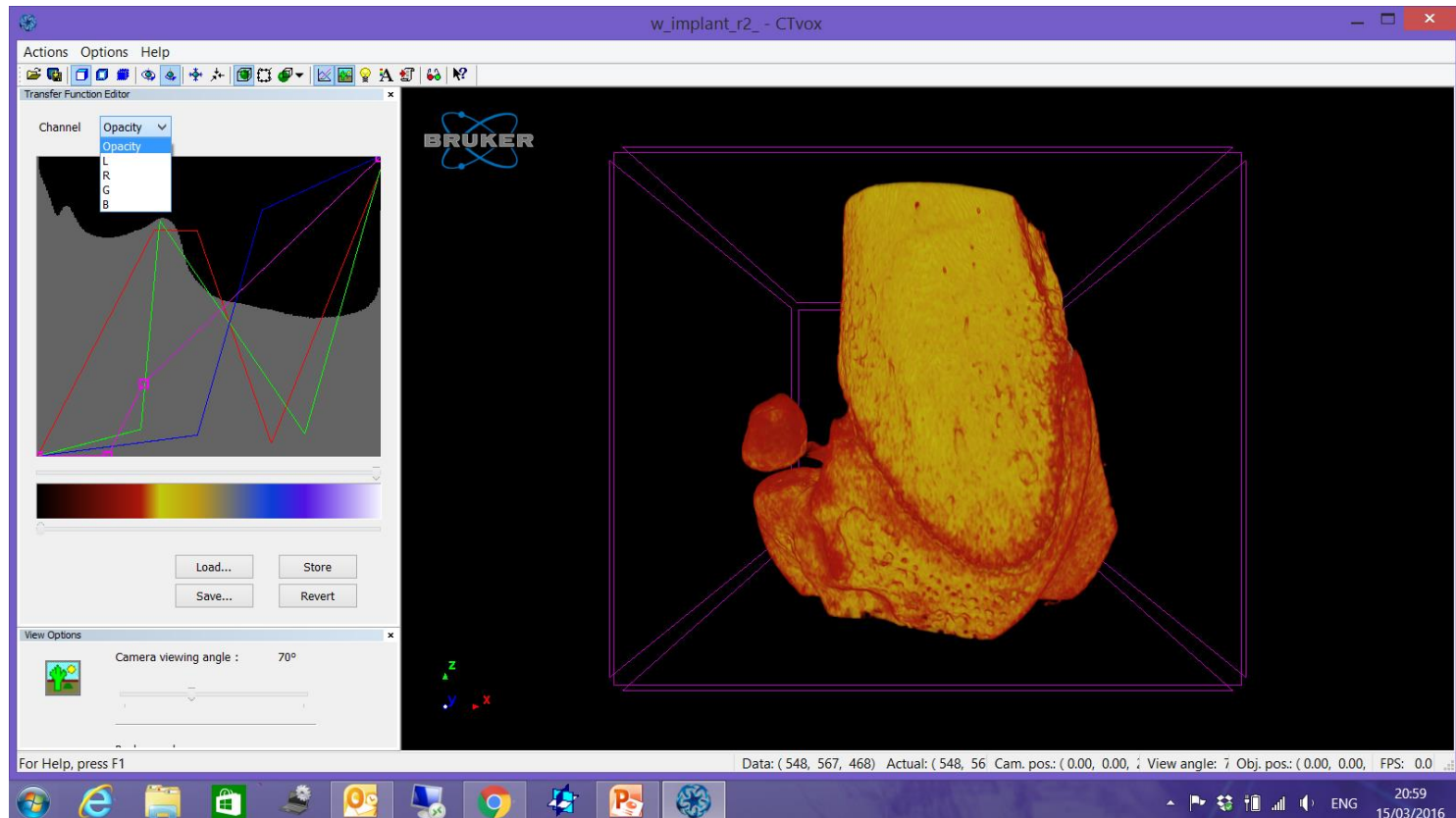
Tips and tricks for CTVox

- To identify the RGB combination for your desired color, you can open the 'color fill' in the 'view options' window. A popup will appear which displays the RGB-code for each selected color (on an 8-bit scale, so from 0 to 255. For example, orange is a combination of 100% Red, 50% green and 25% blue.
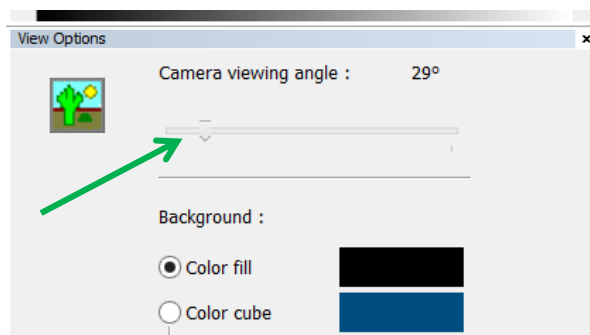
Tips and tricks for CTVox
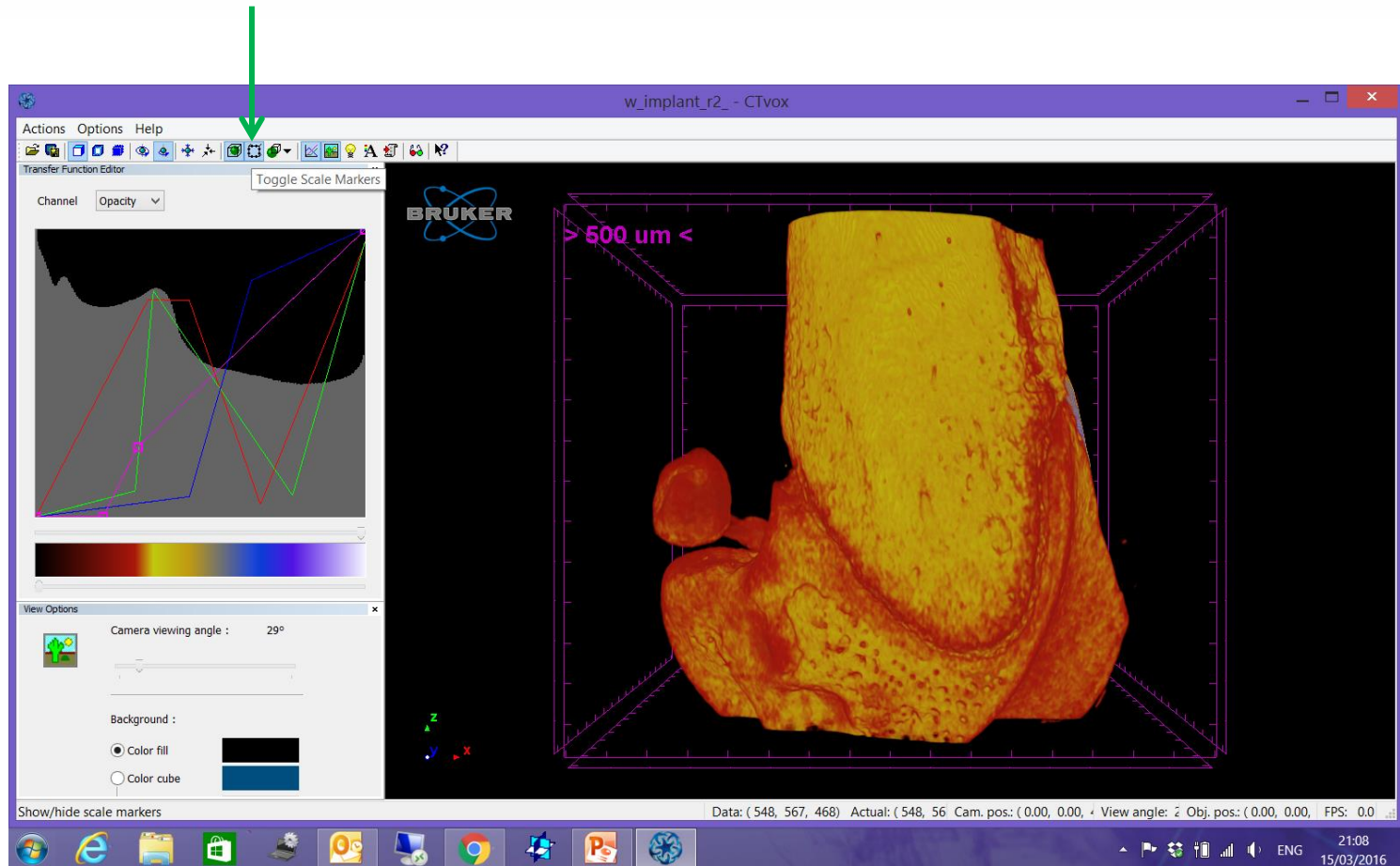
- Center the sample and the camera:

- Camera angle: an angle <30° will show the least deformation. Higher values tend to create an artistic though less realistic 'frog eye' perspective.
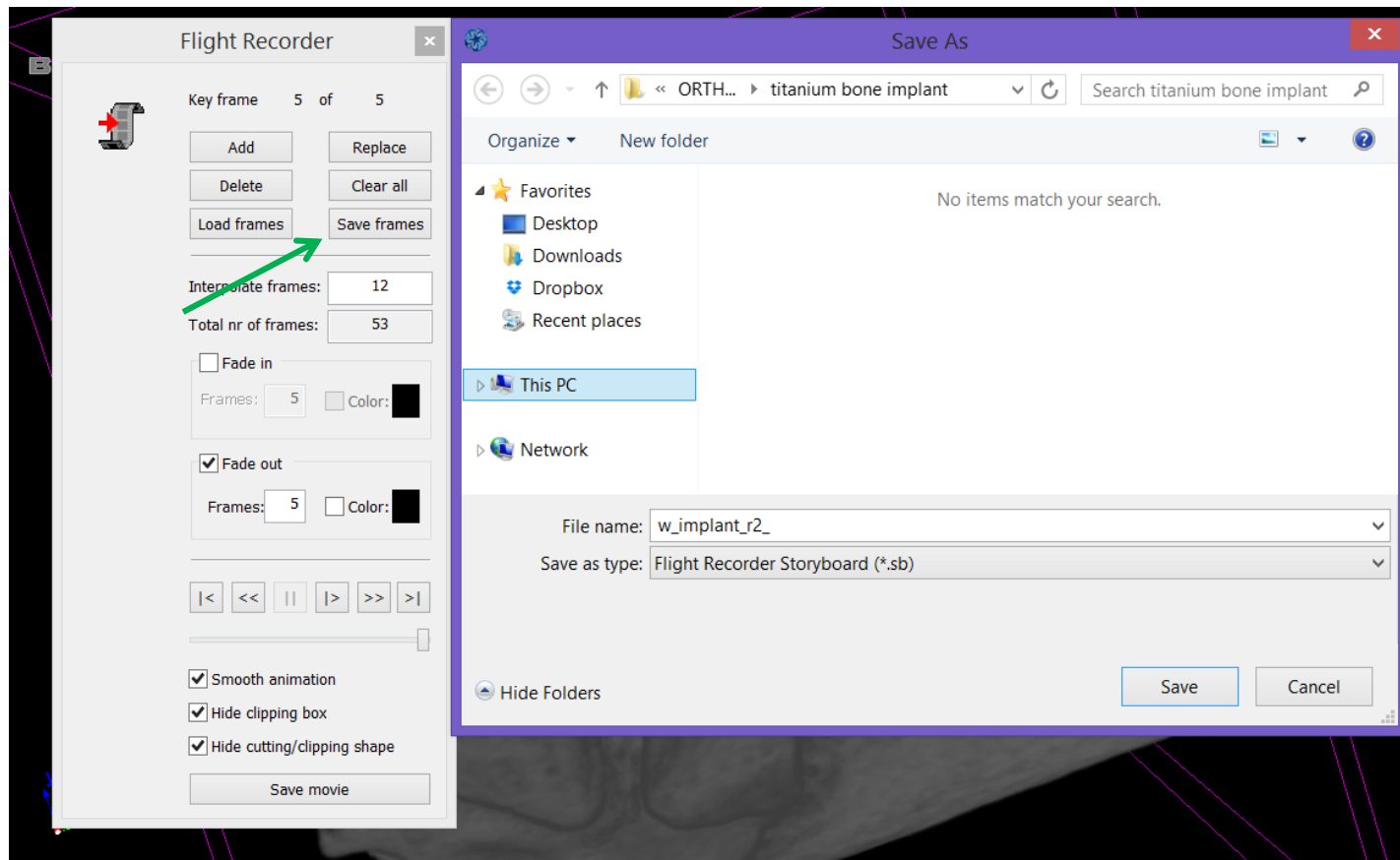
Tips and tricks for CTVox

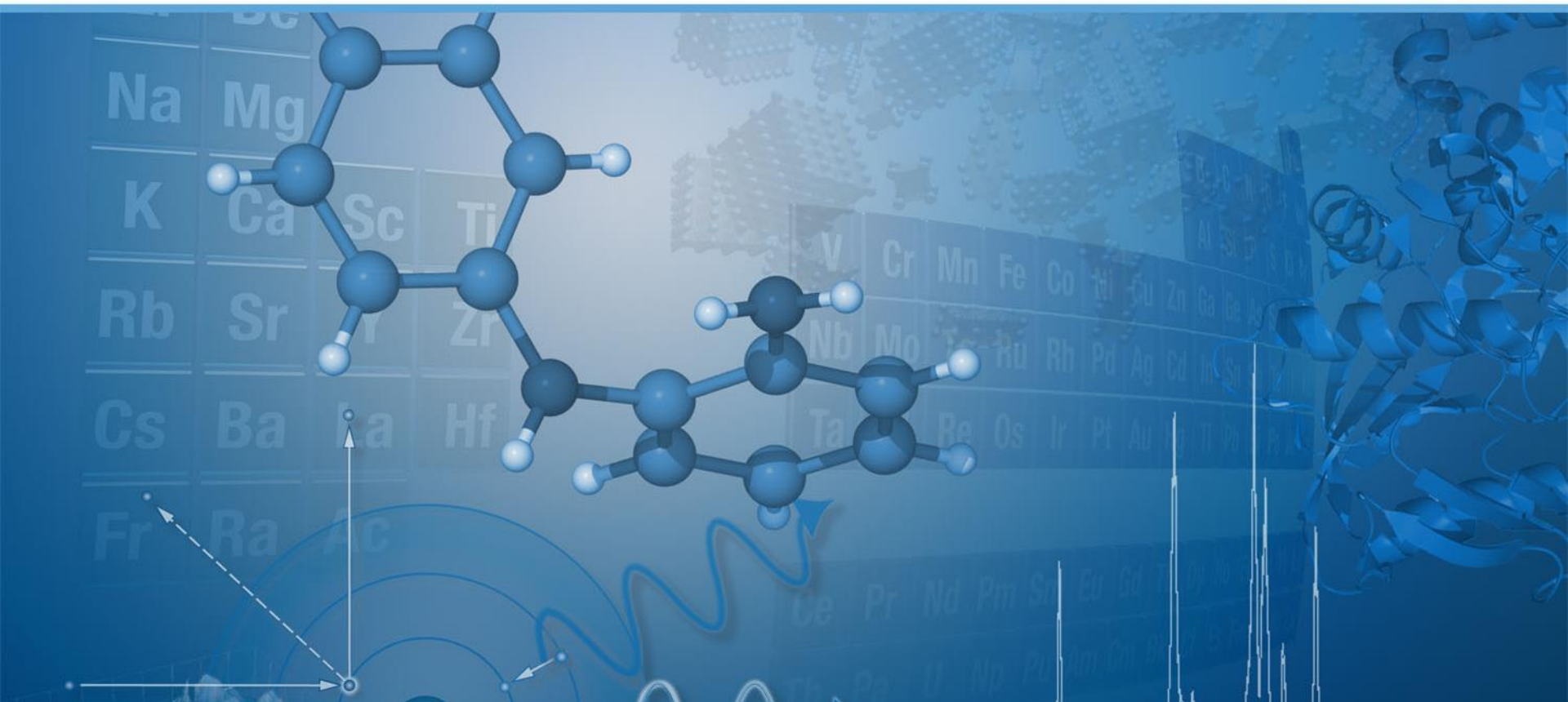- Tick marks can be added to the clipping box, if desirable.

Tips and tricks for CTVox

- Use the storyboard to save a collection of image positions and reload them on a different dataset.
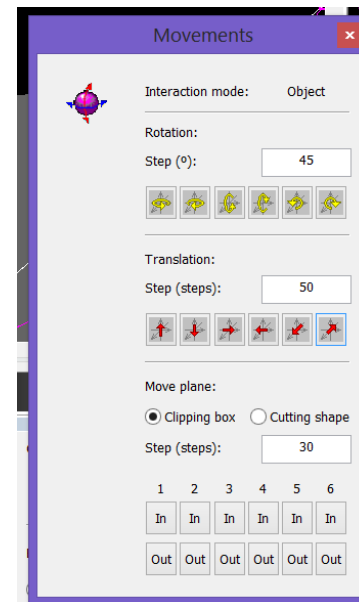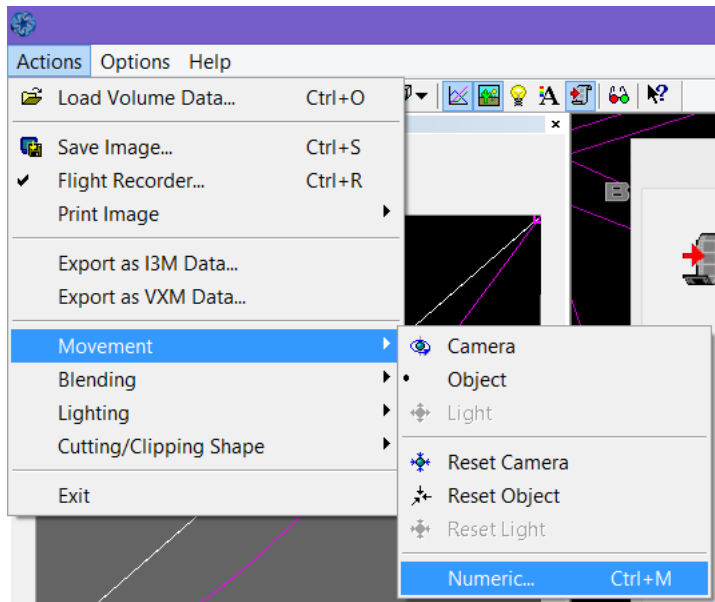
4. 3D movies

Tips and tricks for CTVox

- The flight recorder allows to turn your image into a movie: Two positions can be added. Clicking the play button will make a movie by calculating the frames in between these two positions by interpolation.

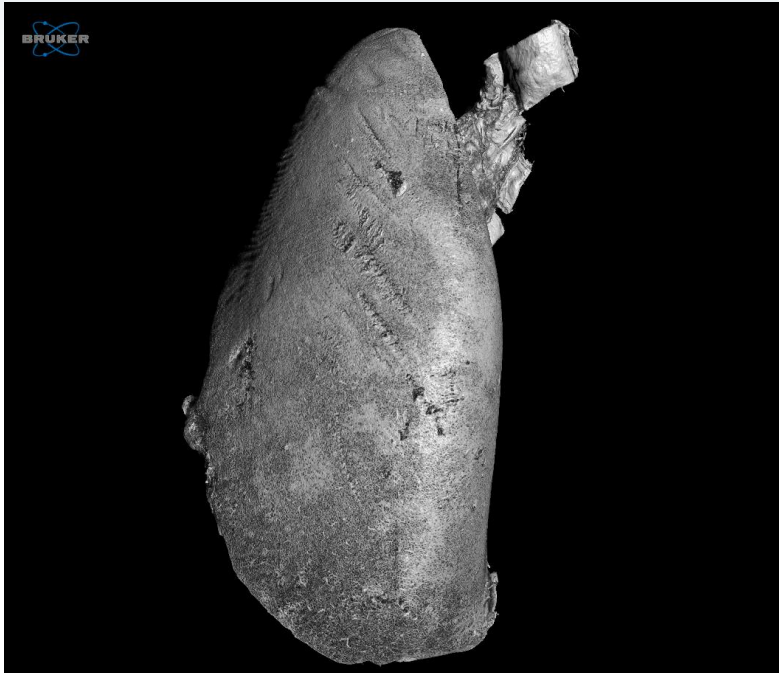- For smooth movies, movements can be adjusted numerically.

Tips and tricks for CTVox

- If the movie will be playing continuously, it is advisable to avoid abrupt transitions by applying one of the following tips
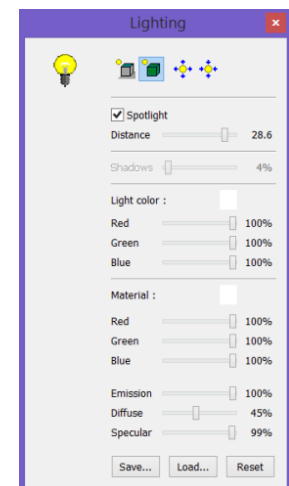 - make the last frame an exact copy of your first
 - fade out
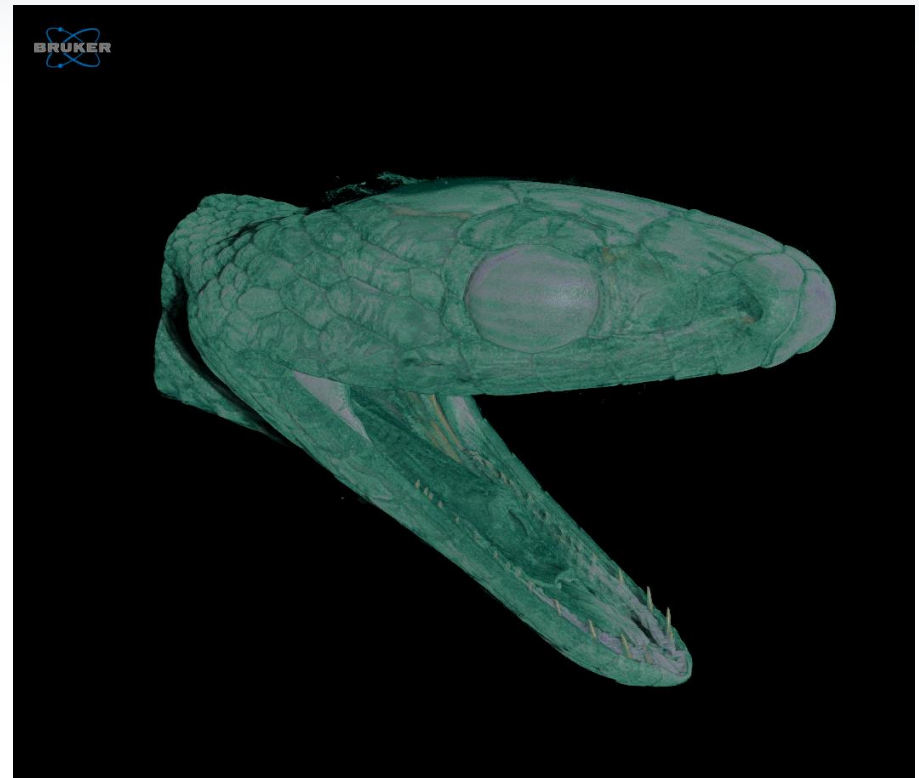
Tips and tricks for CTVox

- Remember that not only the position can be adjusted between two frames, but also the transfer function to add transition of colours or to hide/emphasize certain densities

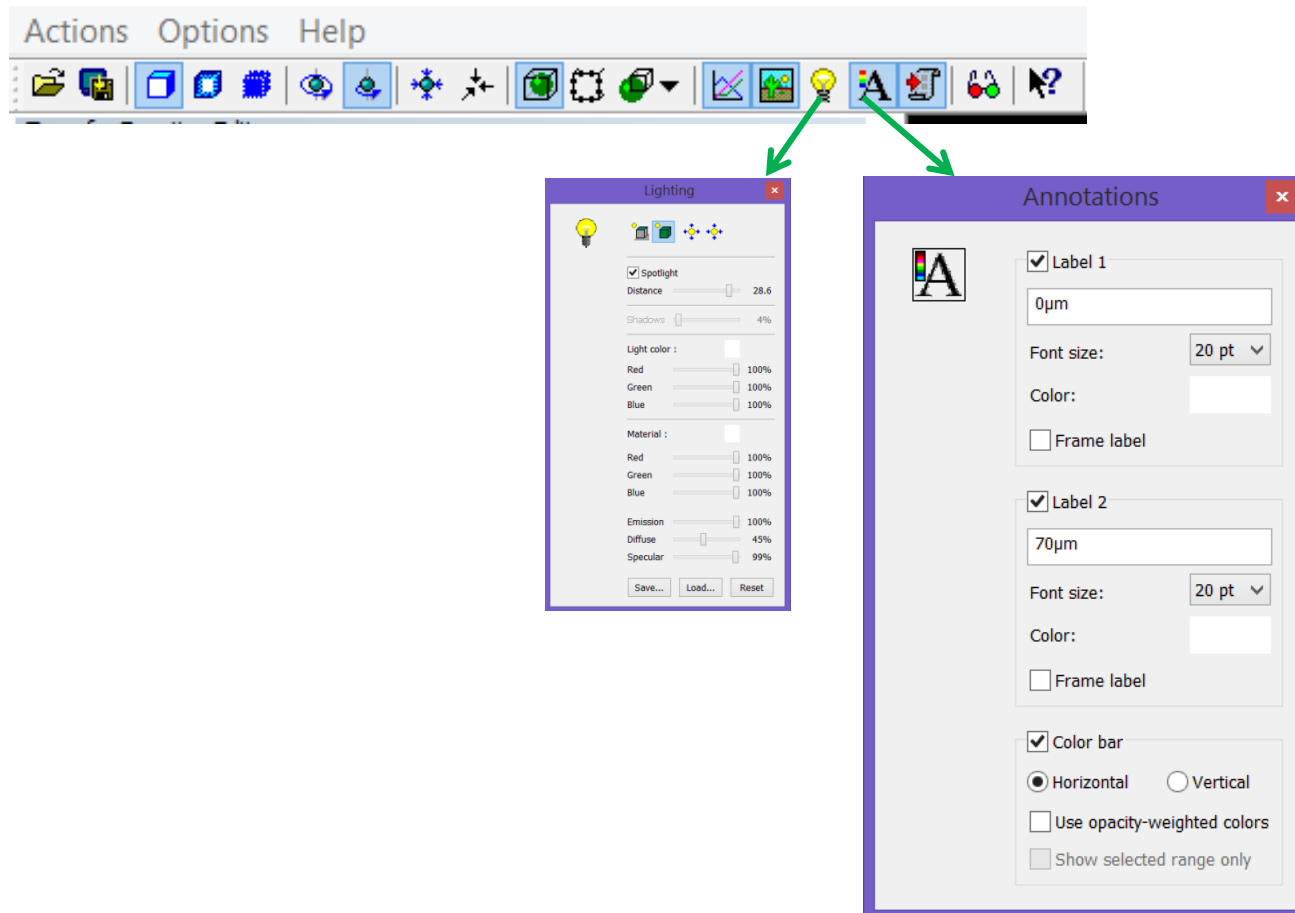- Additional lighting options, shadows and material properties can be added

Tips and tricks for CTVox

- When saving the movie, choose compressor 'Microsoft Video 1' with a quality of 100%
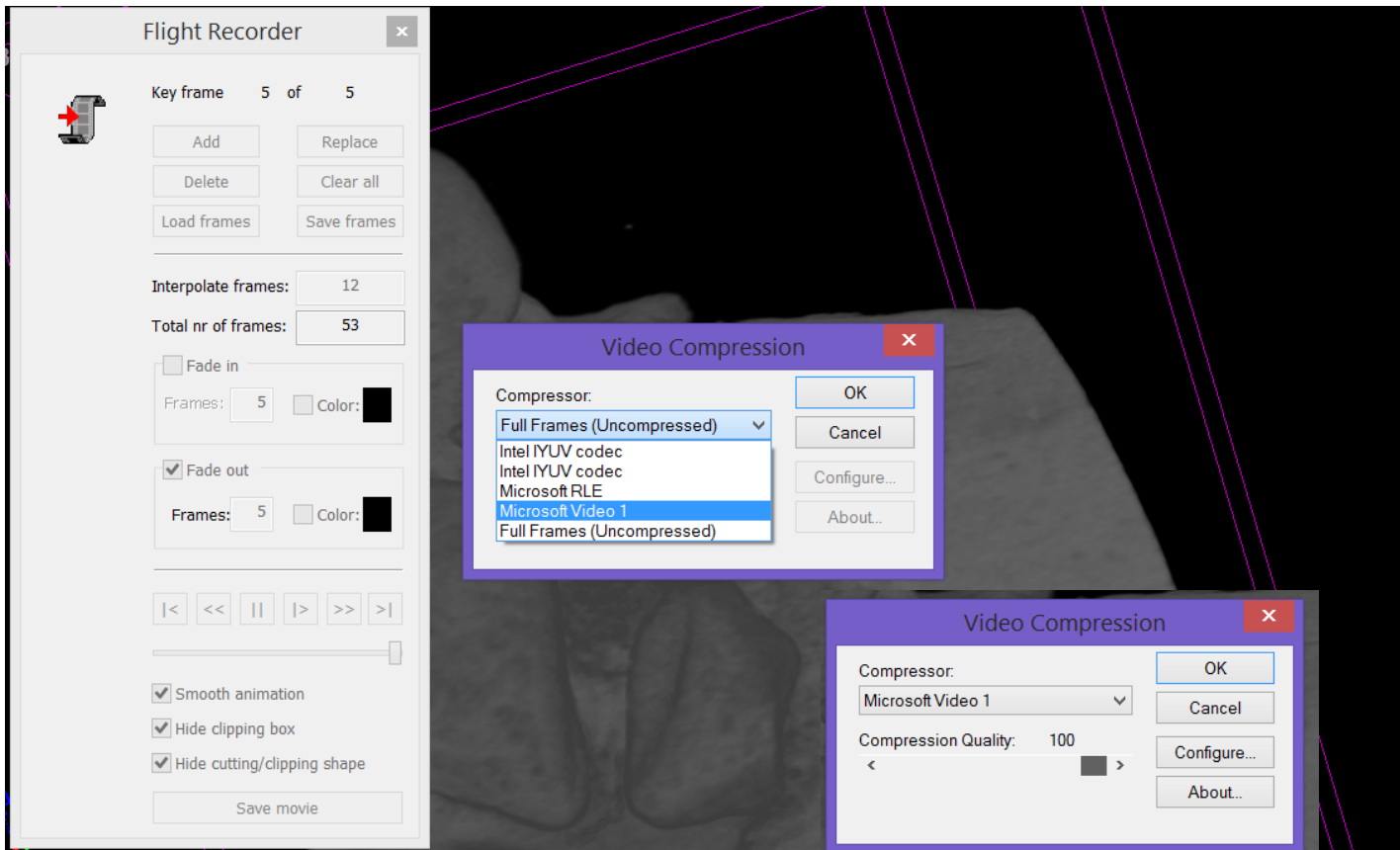
Tips and tricks for CTVox

- Additional lighting options, shadows and material properties can be added, as well as color bars and scale bars

Tips and tricks for CTVox

- Use Windows movie maker or other software to add music and special effects.

Sarah Faulwetter, Hellenic Centre for Marine Research, Greece, bivalve, movie contest, Bruker microCT Usermeeting 2012
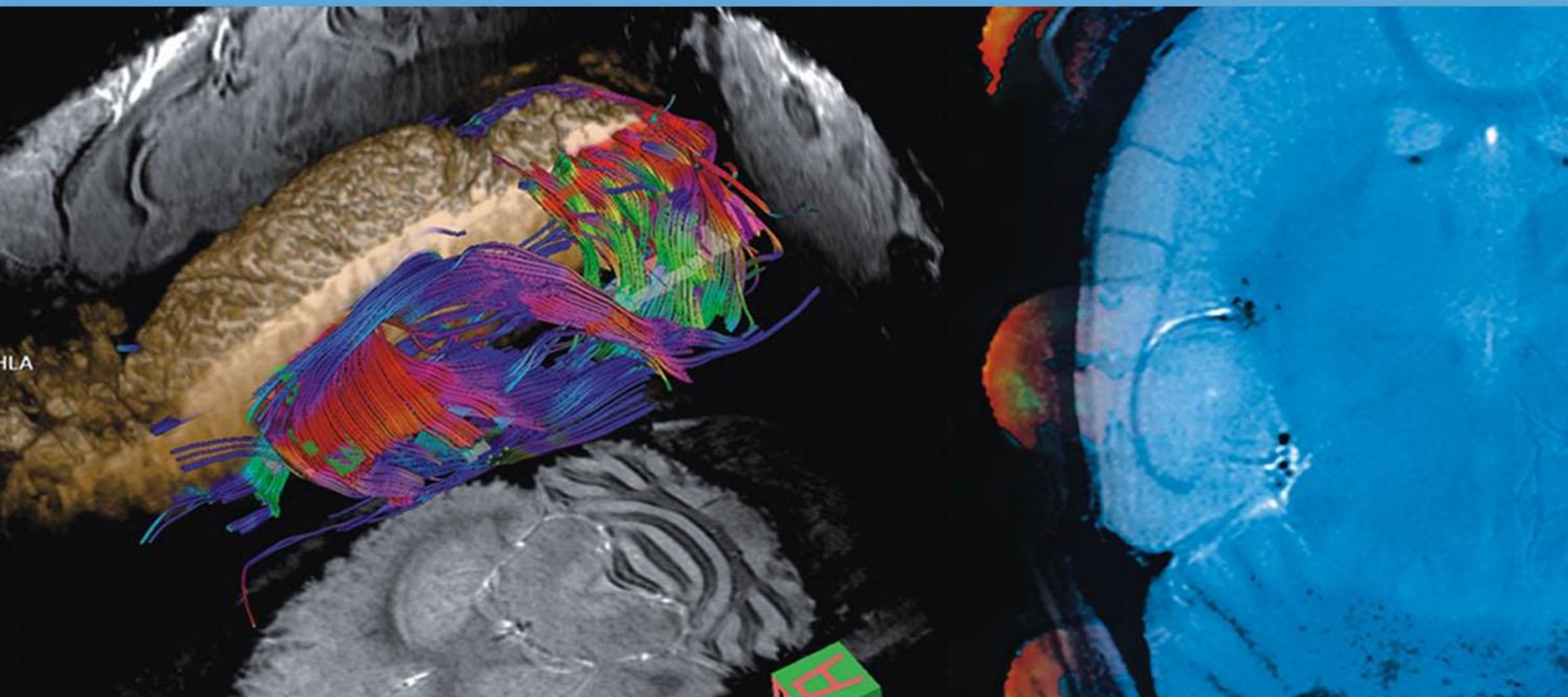
Tips and tricks for CTVox

- Save the transfer function (.tf) and the storyboard (.sb)
- You can now reload them on a similar sample for simultaneously displaying movies
- Datasets coming from different scans need coregistration through Dataviewer to align them.
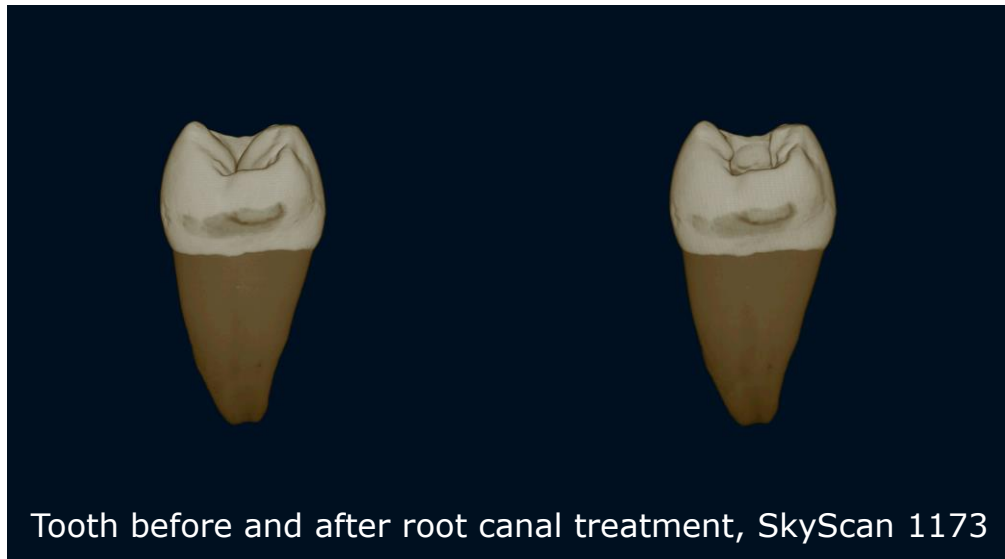

Tooth before and after root canal treatment, SkyScan 1173

5. Embedding movies in a powerpoint

- To insert your video in Powerpoint, go to 'Insert', 'Video', 'Video from File', and then browse to the location of your movie, select the file and click OK. Unlike in older versions, movies are now embedded in Powerpoint, which makes it easier to copy and move presentation files without corrupting the movies in it. For this reason, it might take some time to actually insert the movie. You will see a progress bar on the screen.
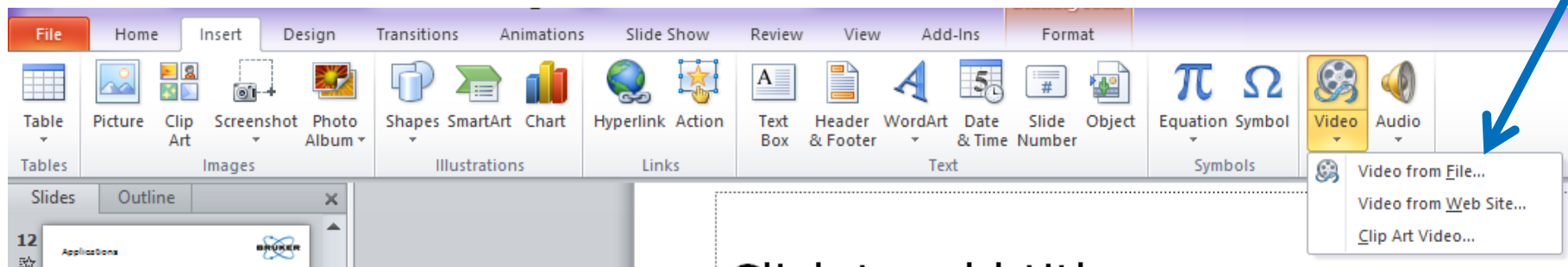
- Once the video file is inserted, it might be displayed very small, so some resizing might be applicable first. When clicking on the video, two options are added to the menu bar: 'Format' and 'Playback'. In the 'Playback' menu, you can choose to start your video automatically as the slide begins. Tick the box 'Loop until Stopped' will avoid having to synchronize what you want to orally share with your audience with the timeline of the video. When the video is finished, it will play again, and again, until you proceed to the next slide.
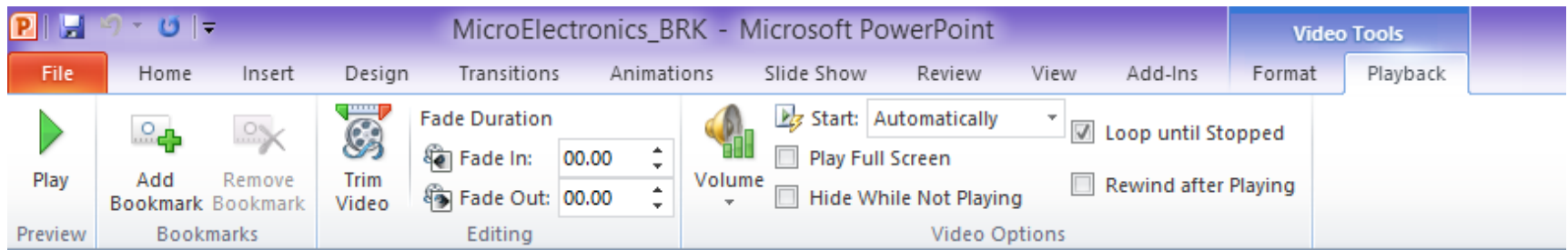

There have been some reports of movies not running automatically after the file was saved and reopened. This issue can be solved by manually changing the file extension of the movie to .wmv.

Running 2 movies simultaneously

- go to the Animation Pane in 'Animations' and remove the triggers by right-clicking on them
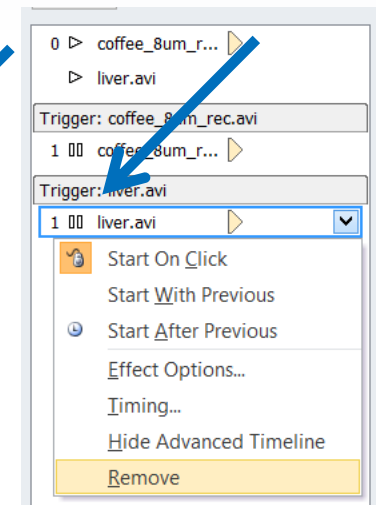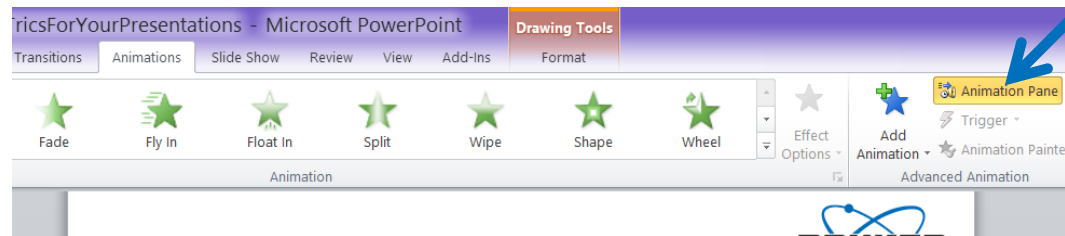
- Select the next movie. By default it is set to start After the previous movie. Choose to start 'With previous'.
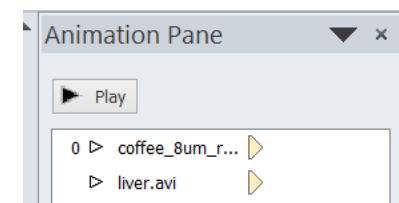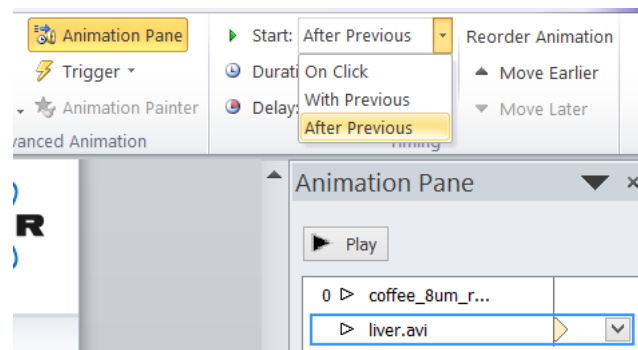
- Keep an eye on the size of the presentation. To keep the size workable, Powerpoint provide an option to compress all media. 'presentation quality' will reduce your file size significantly while maintaining a sufficient quality and is hence very useful for our purpose. In the example below, containing 10 movies, 2.8Gb was saved.
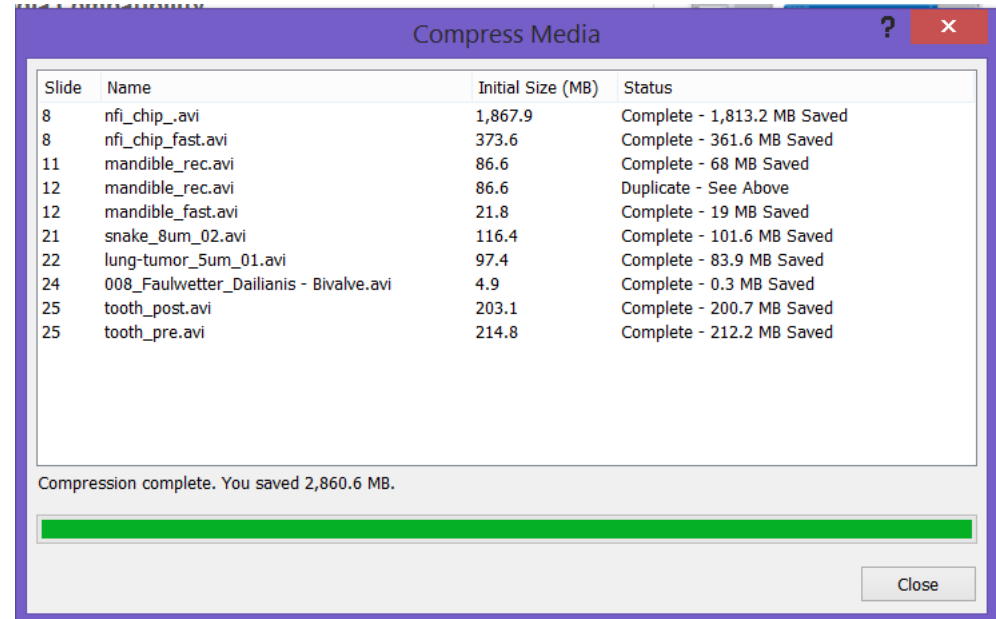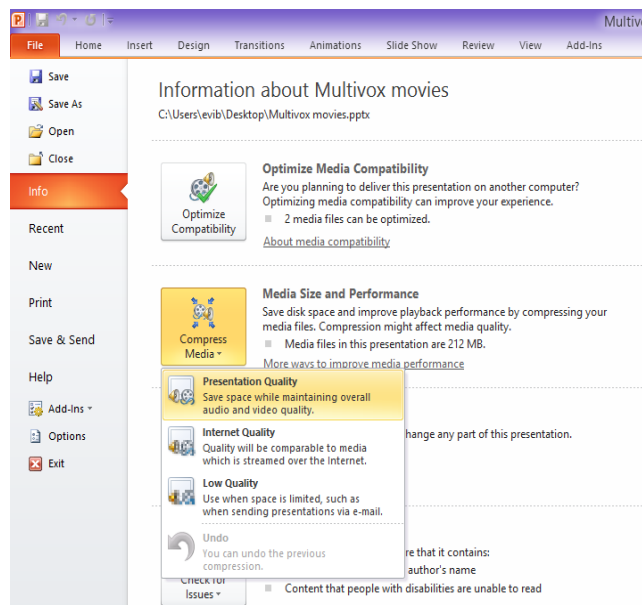
Projecting the powerpoint on screen

Finally, what your presentation will look like on screen might be slightly different from what you have prepared on your laptop. Every beamer is different. If possible, do a trial run with that projector. Some beamers tend to make everything a bit darker. You may want to consider always increasing the brightness of the movies and images in your powerpoint with 10-20%. Right-clicking on the movie will allow to 'Format Video' with options for brightness and contrast.
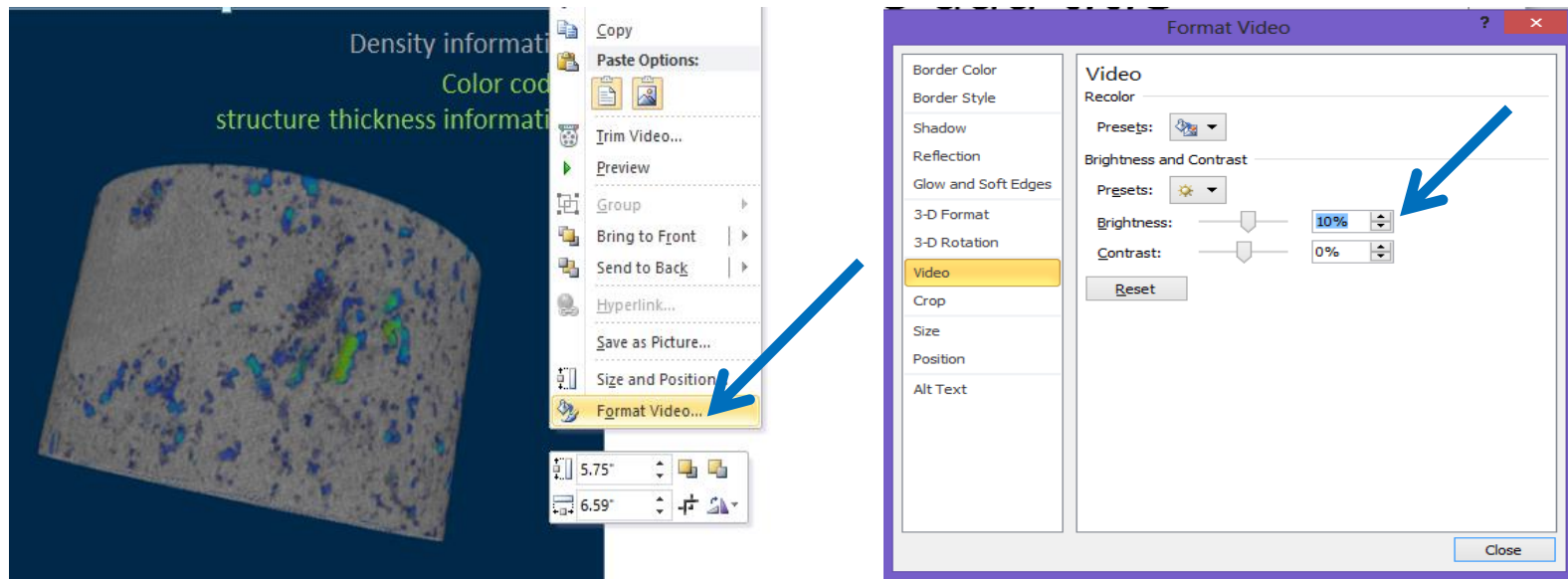
Don't forget!

**Submit your result for the
Bruker microCT User meeting**

Picture & Movie contest

Need more inspiration?

Visit us at http://bruker-microct.com/company/usersmeeting2016.htm to find the work of your colleagues in the abstract books from previous editions.

And find more on Youtube too!
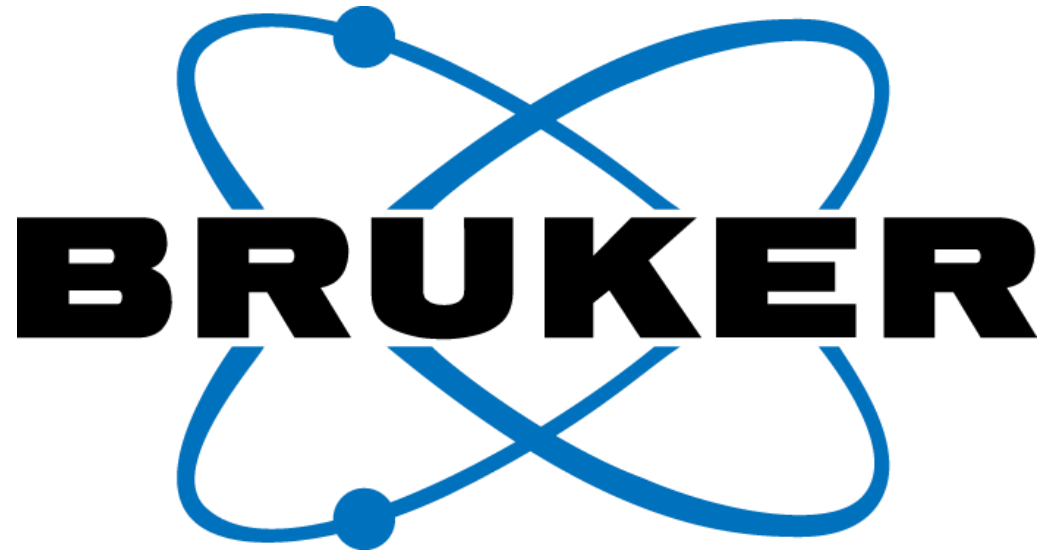
Innovation with Integrity