012814 MR-US AMIGO
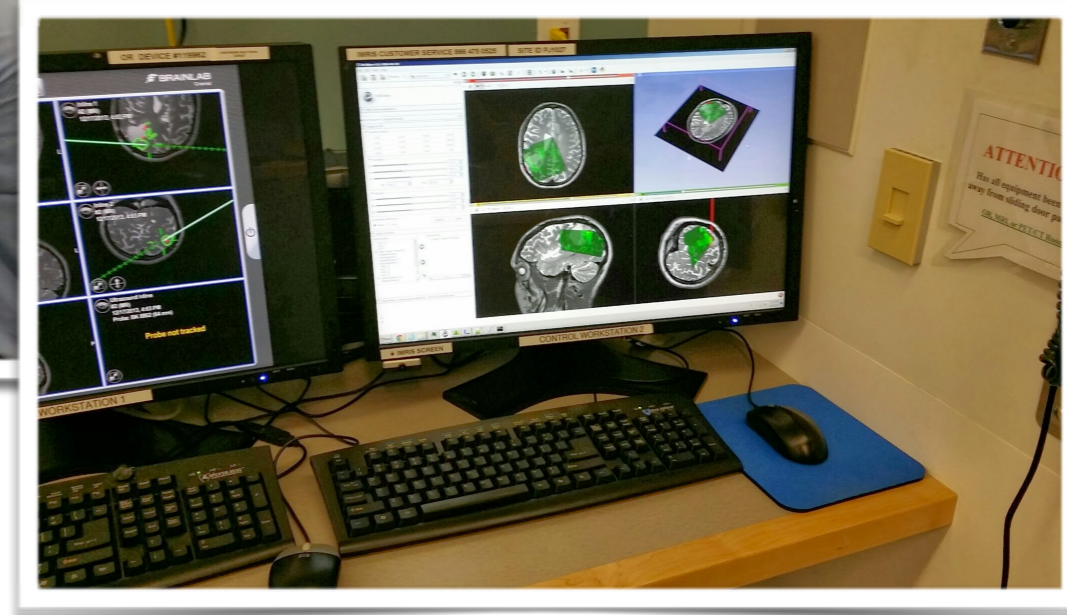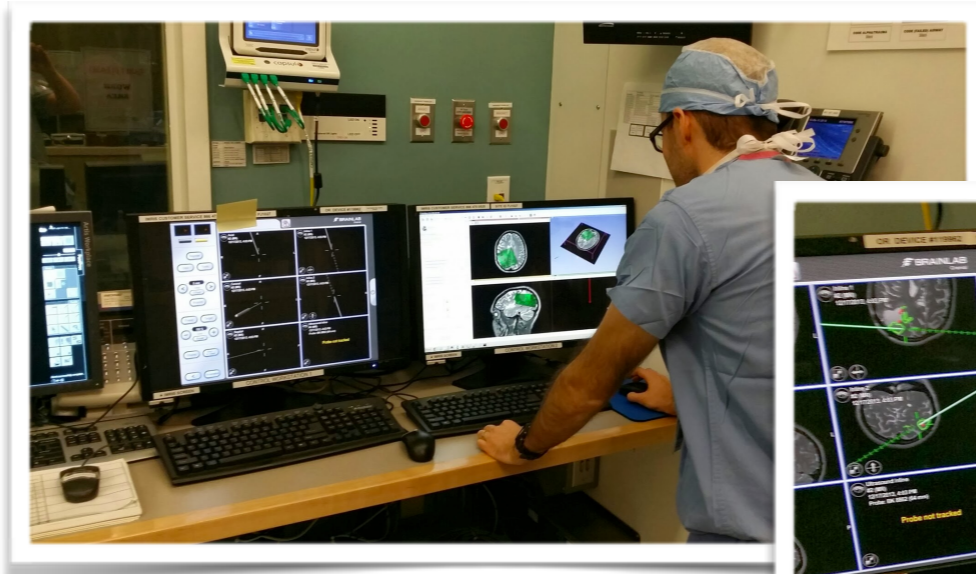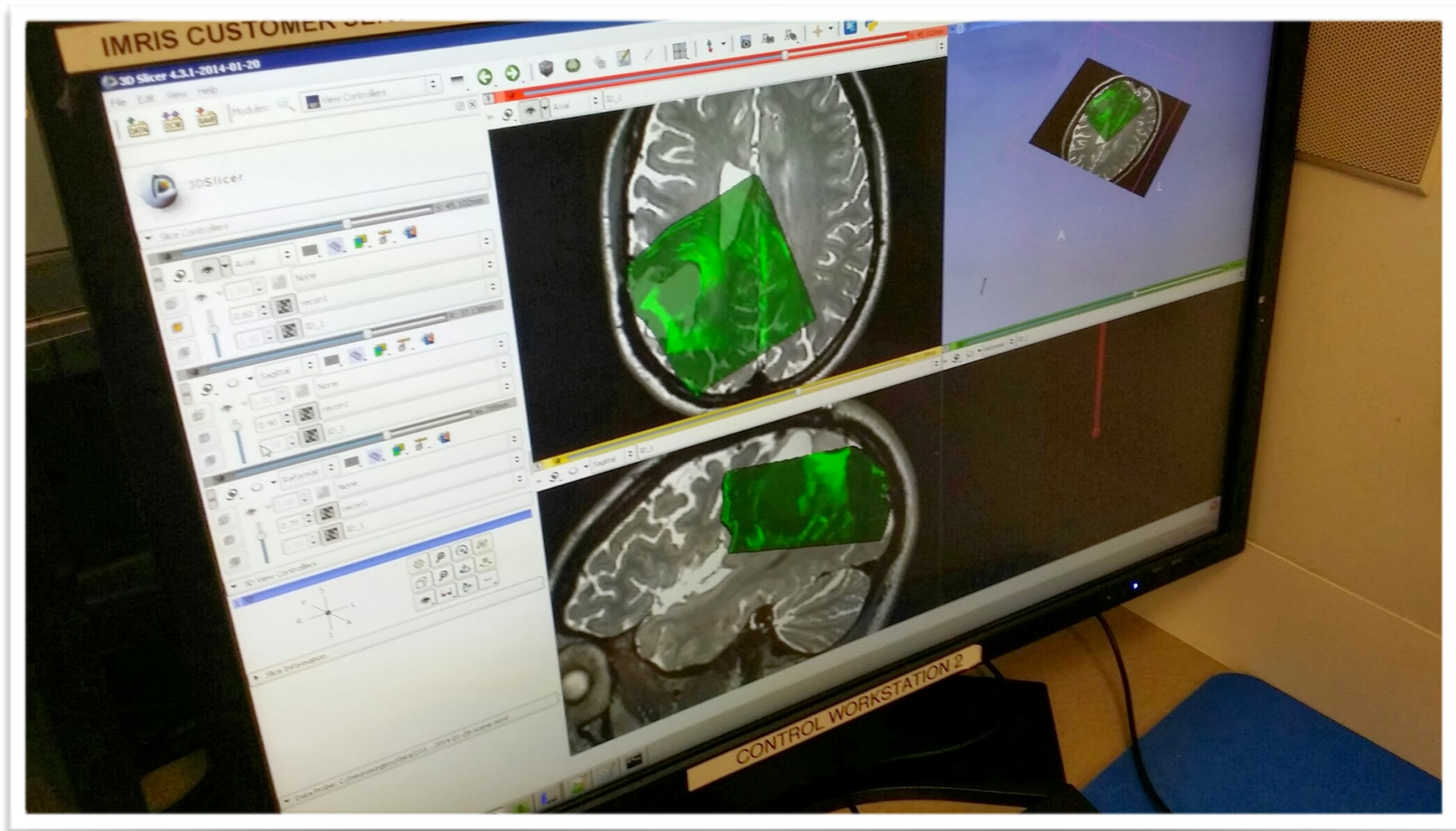
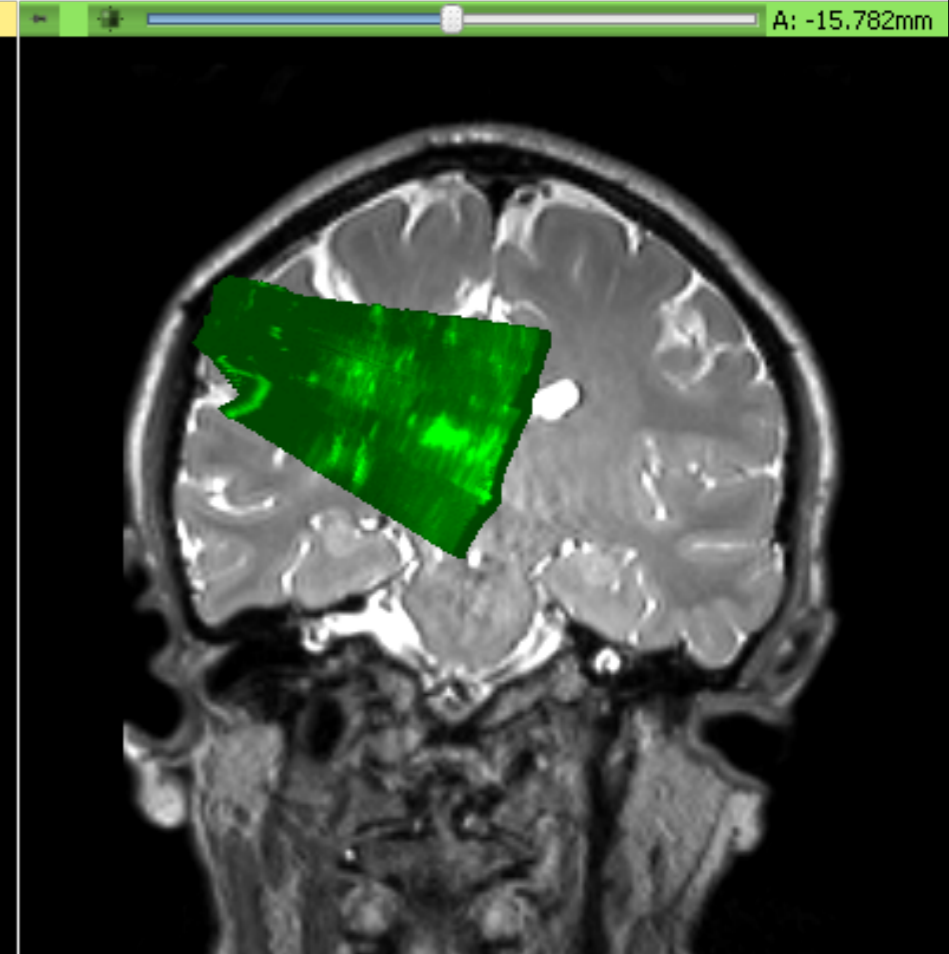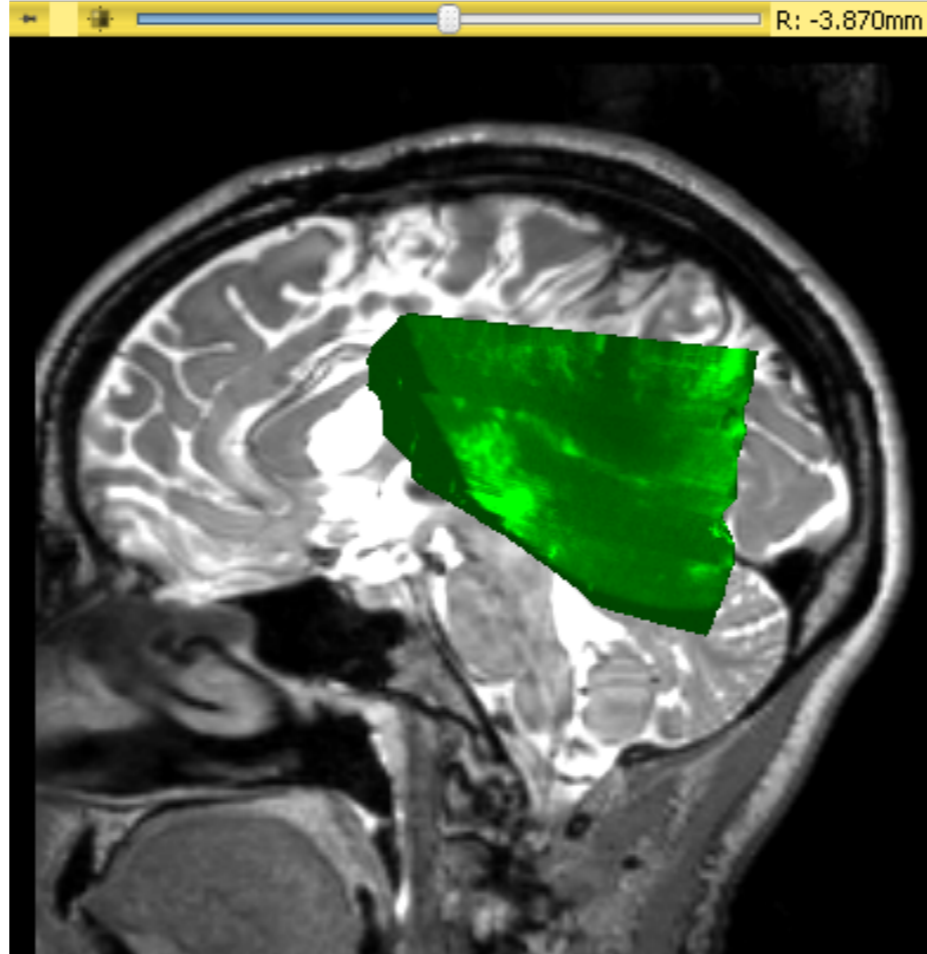Cavity Alignment Test
Steve Pieper - 2014-02-15
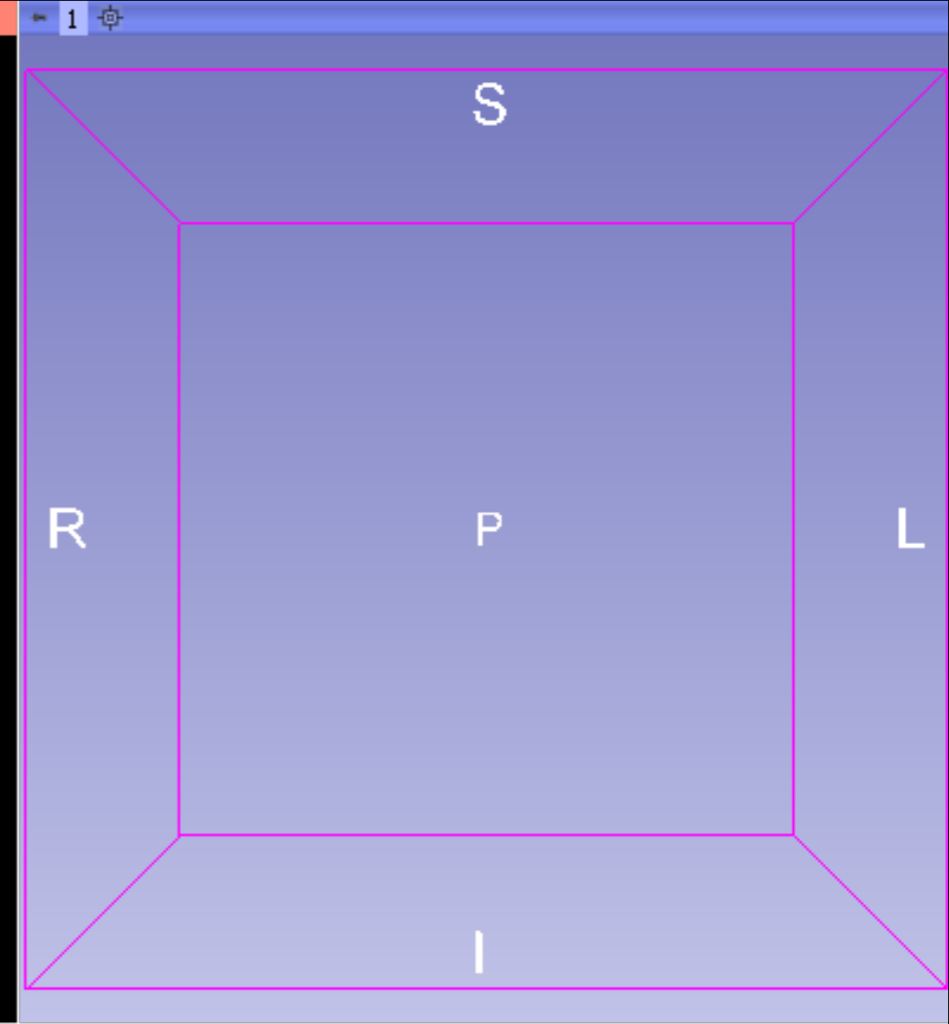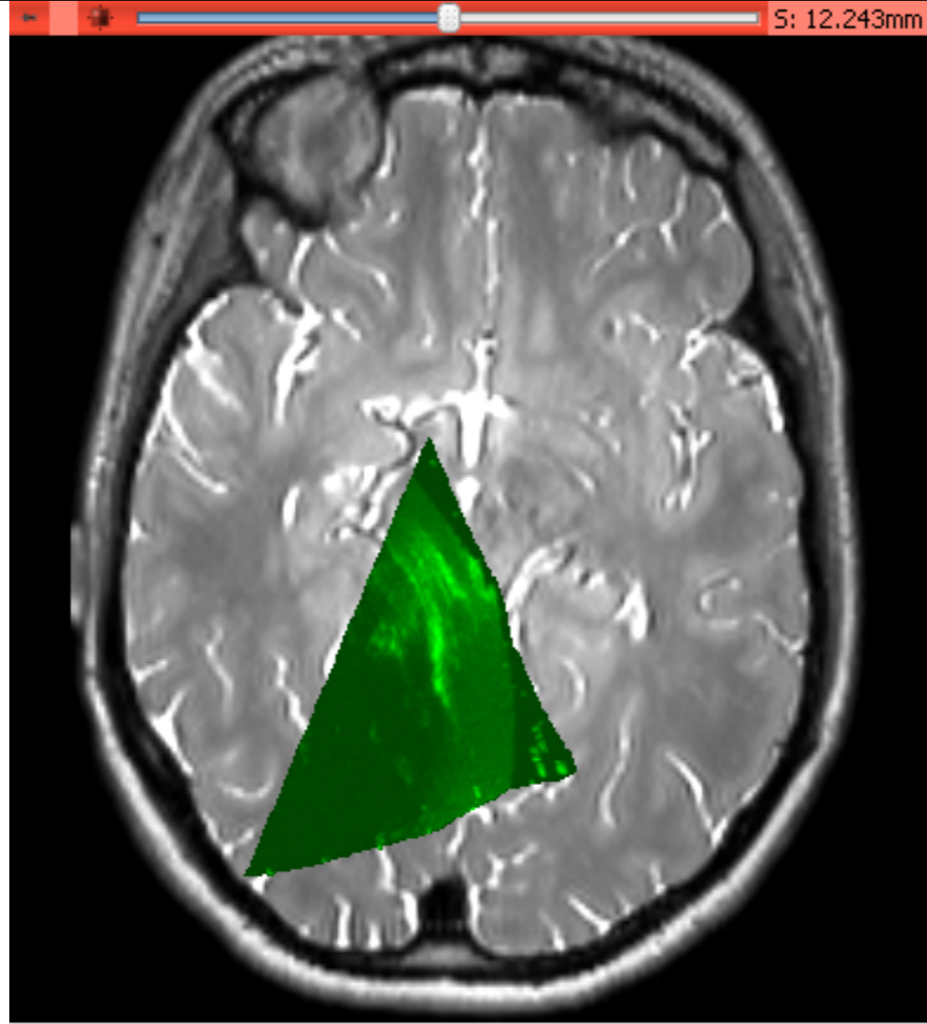
First use of Slicer for
MR US in AMIGO
January 28, 2014

It wasn't registered.

Initial Registration

- US position provide through OpenIGTLink from Brainlab

- Unexplained mismatch between MR and US

- Question if US volume is internally consistent or if it is distorted

- Unclear match between hyper/hypoechoic US and hyper/hypointense MR regions

First Clues

- Jim suggested segmenting US hyper echoic region for comparison to ventricle

- Looked like a match in shape, but not in registration

- Ron said the thalamus should be in that region under the venticle
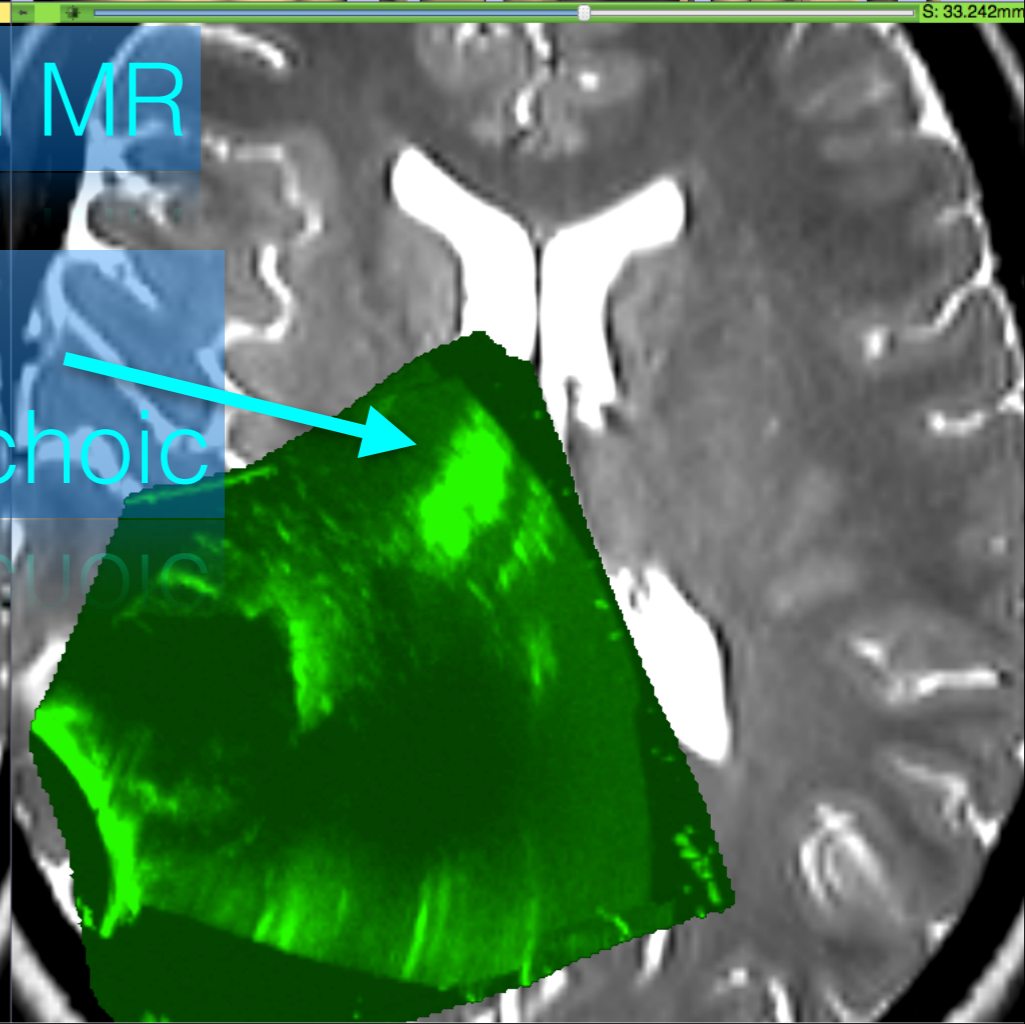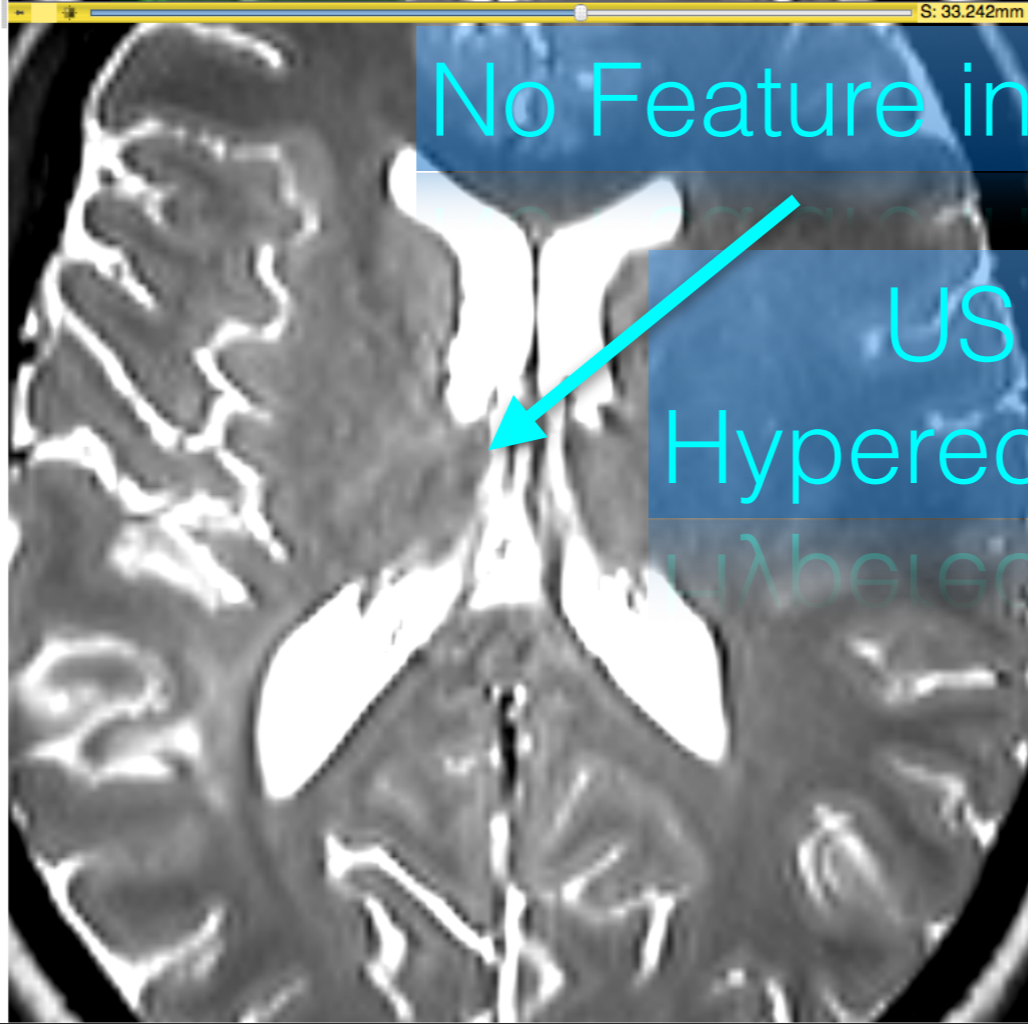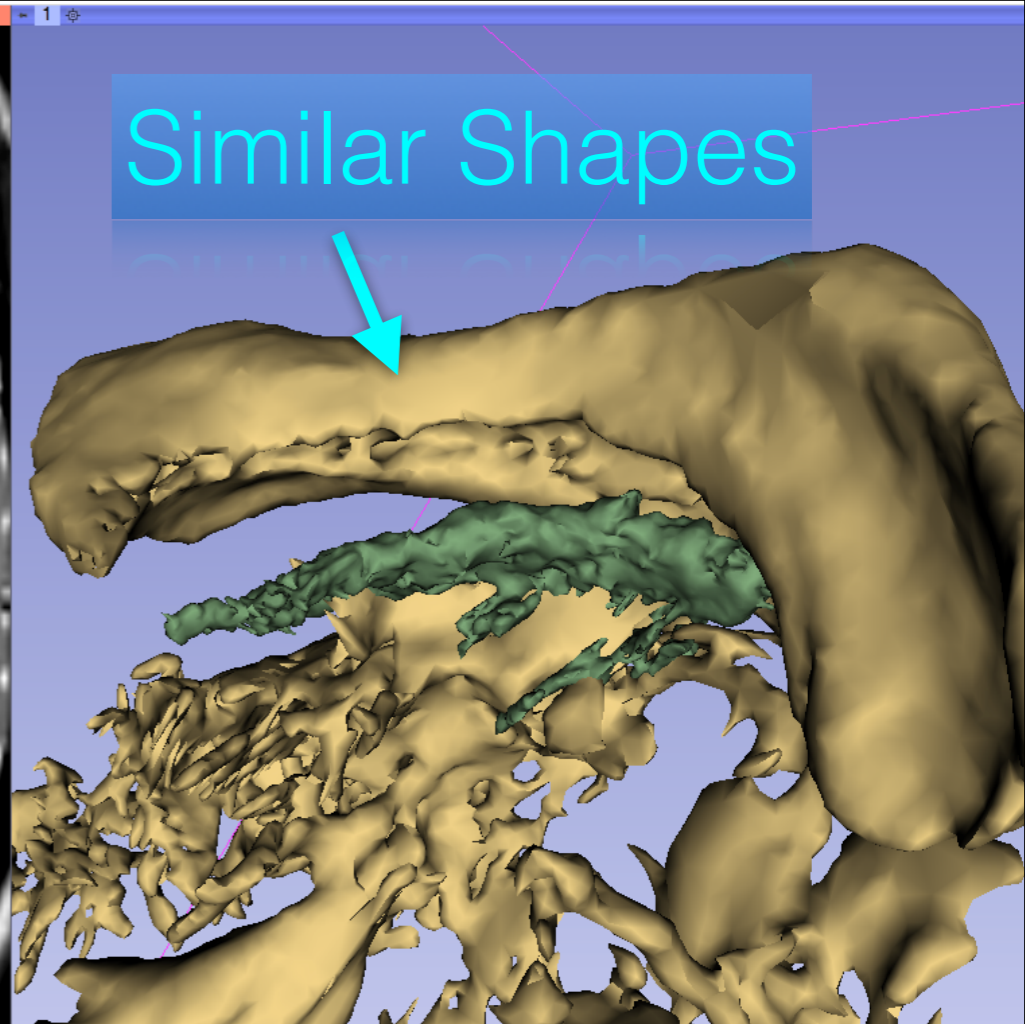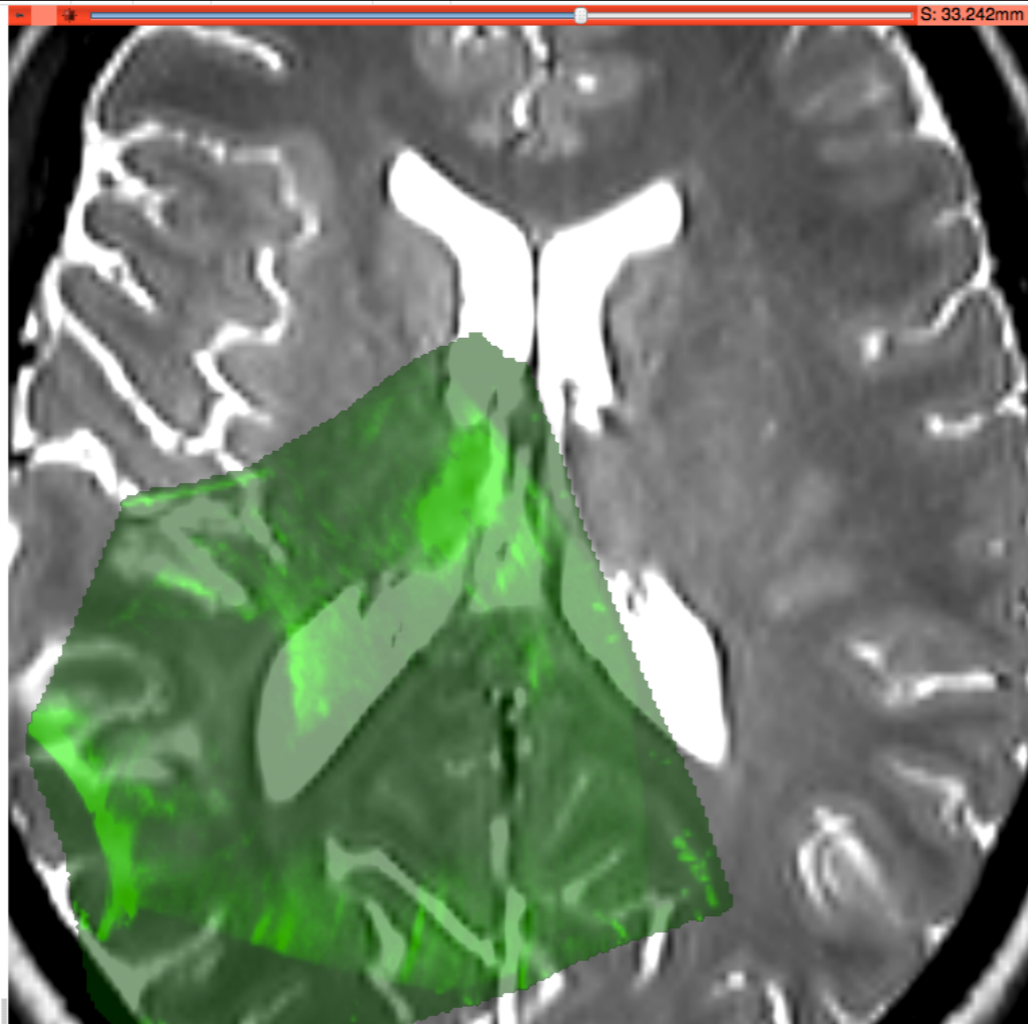
Cavity Alignment Experiment

- Previous resection cavity appeared similar in both volumes
- Used Editor to segment the cavity in MR and US
- Used Transforms to visually align cavity models
- Translation only, dRAS = (3.16, -2.76, 5.74) mm
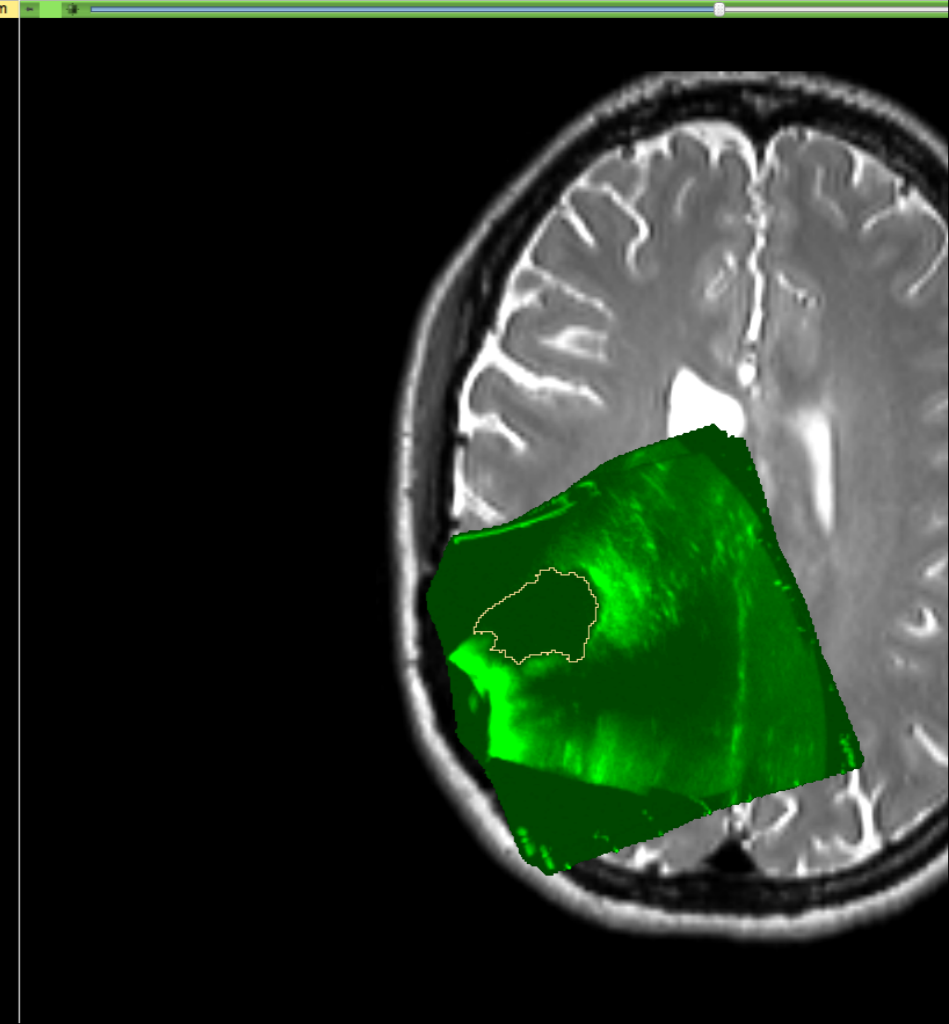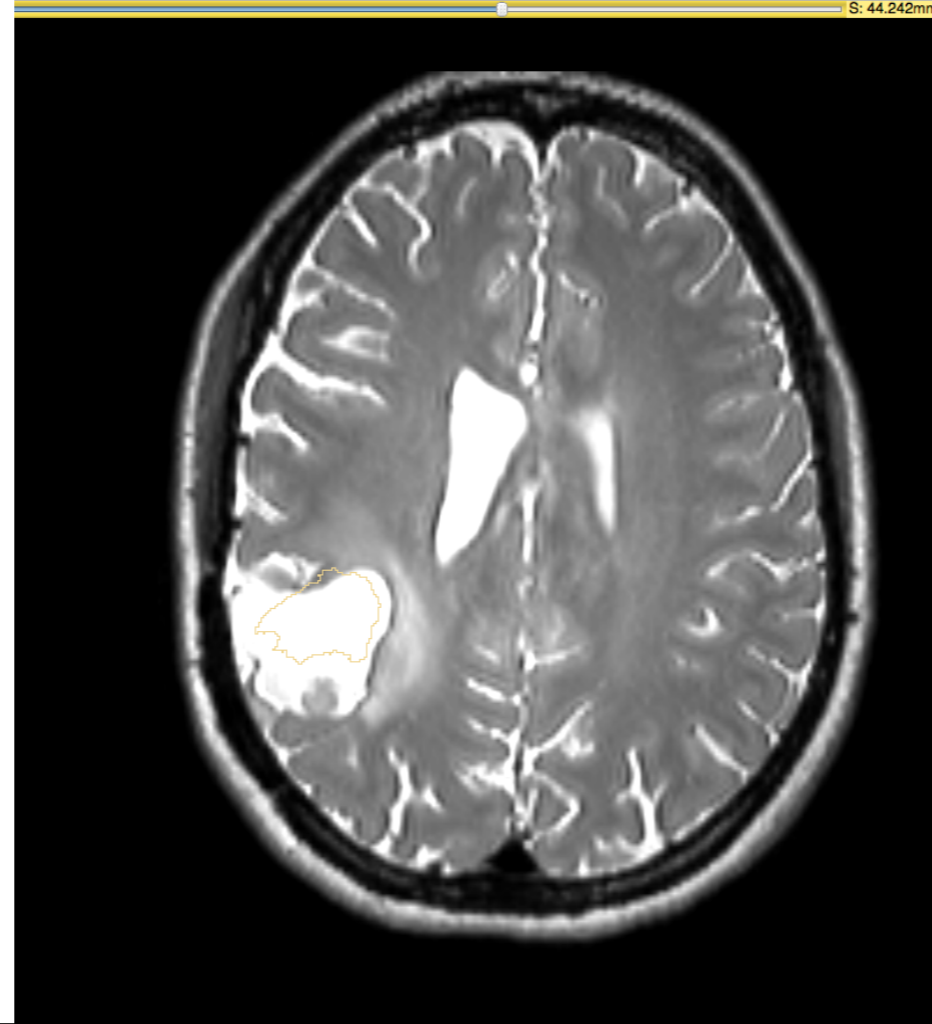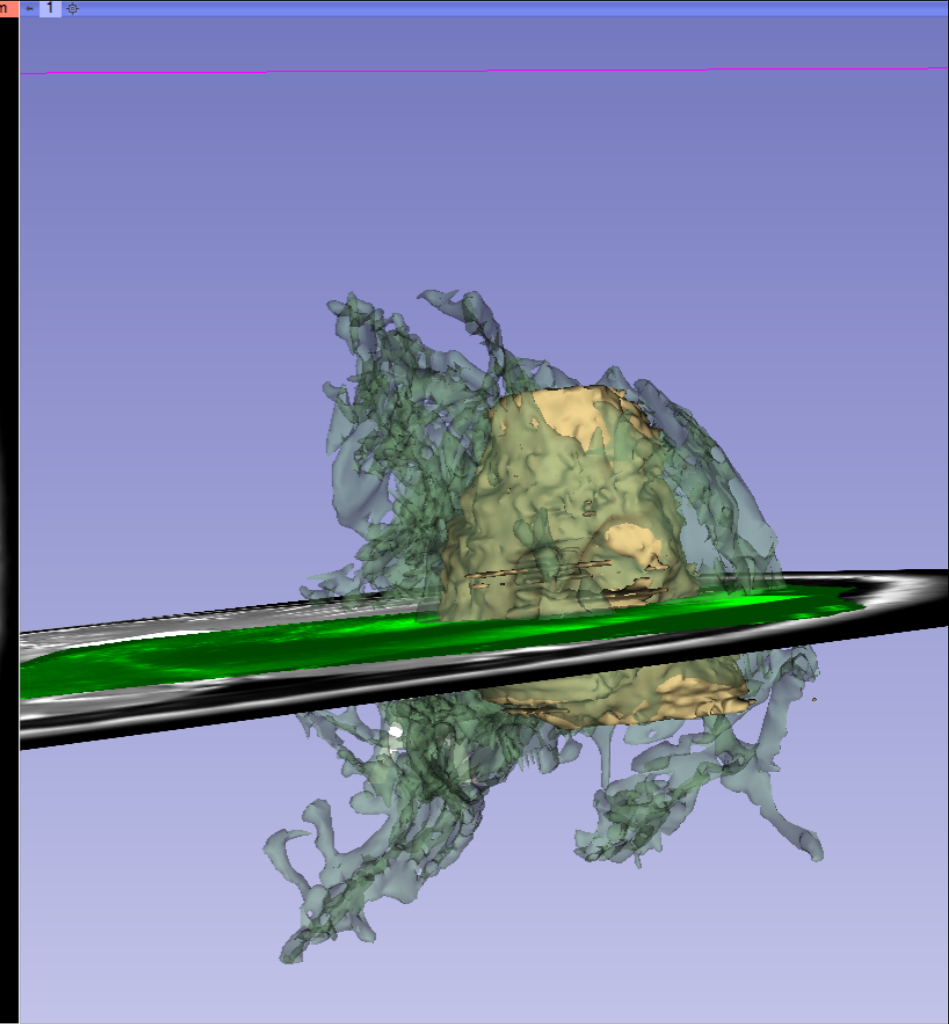- Note that falx and sulci near midline match perfectly now

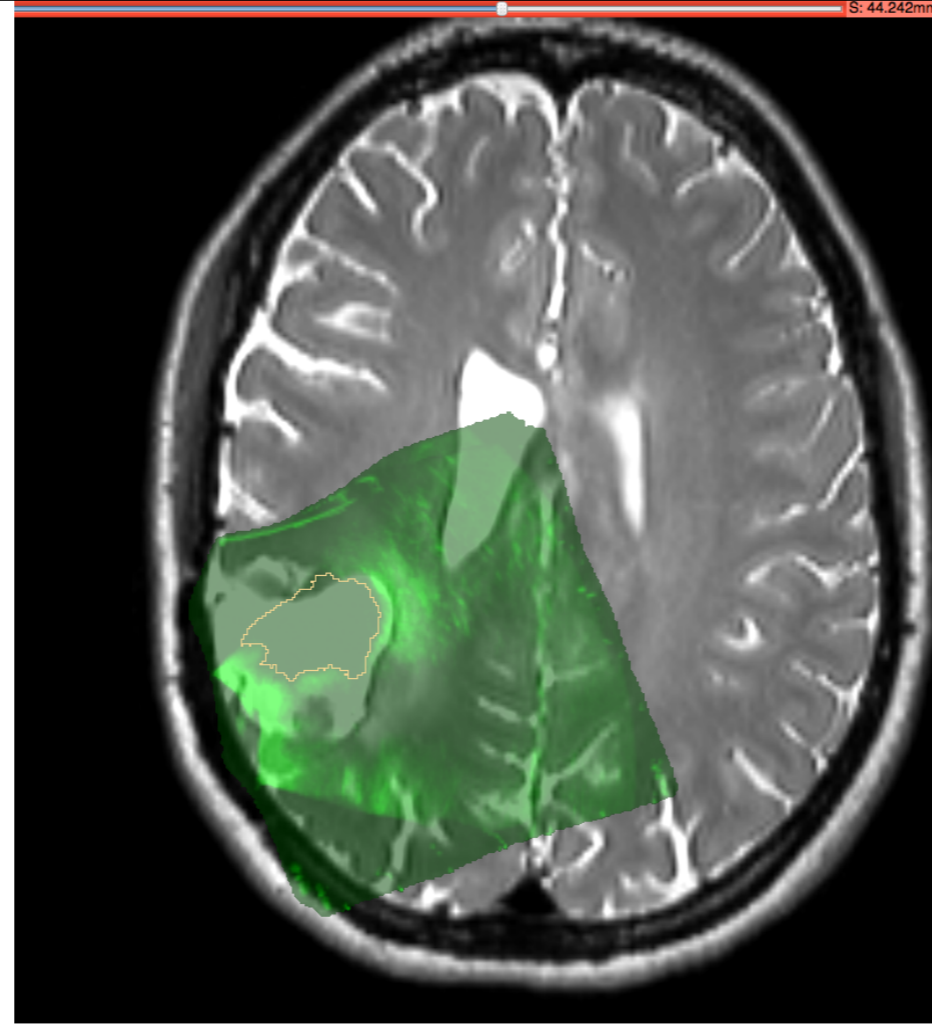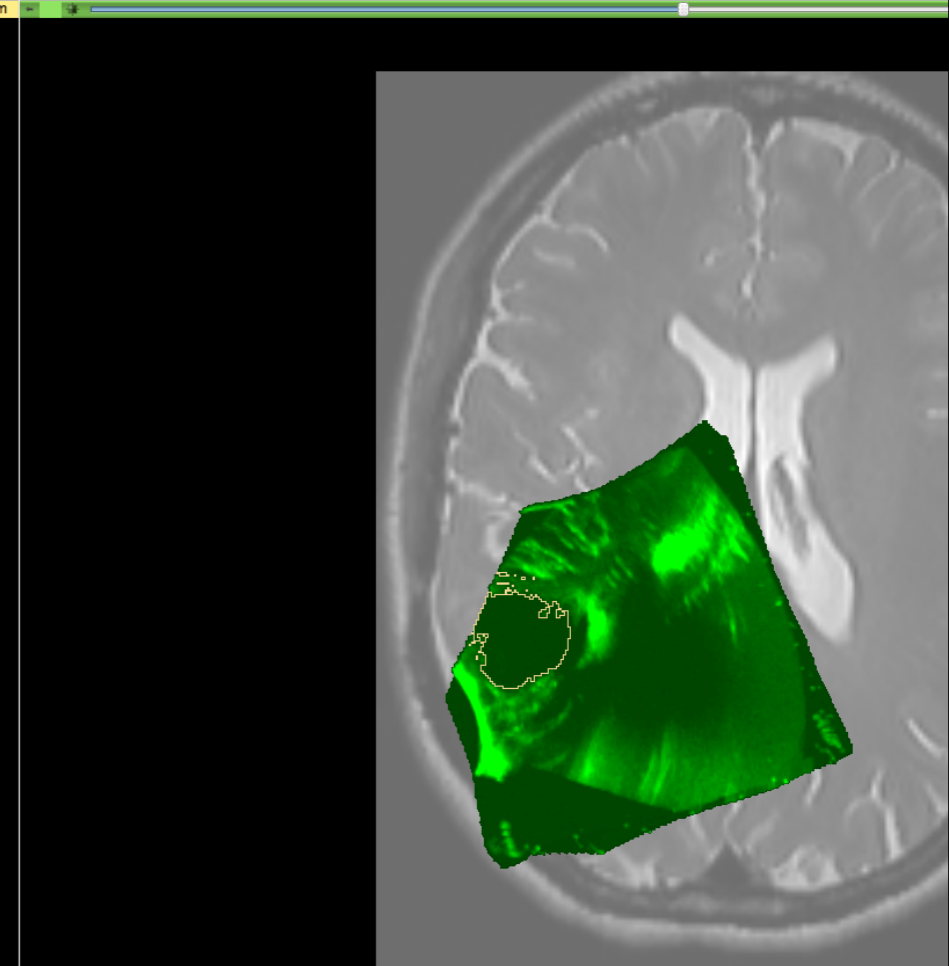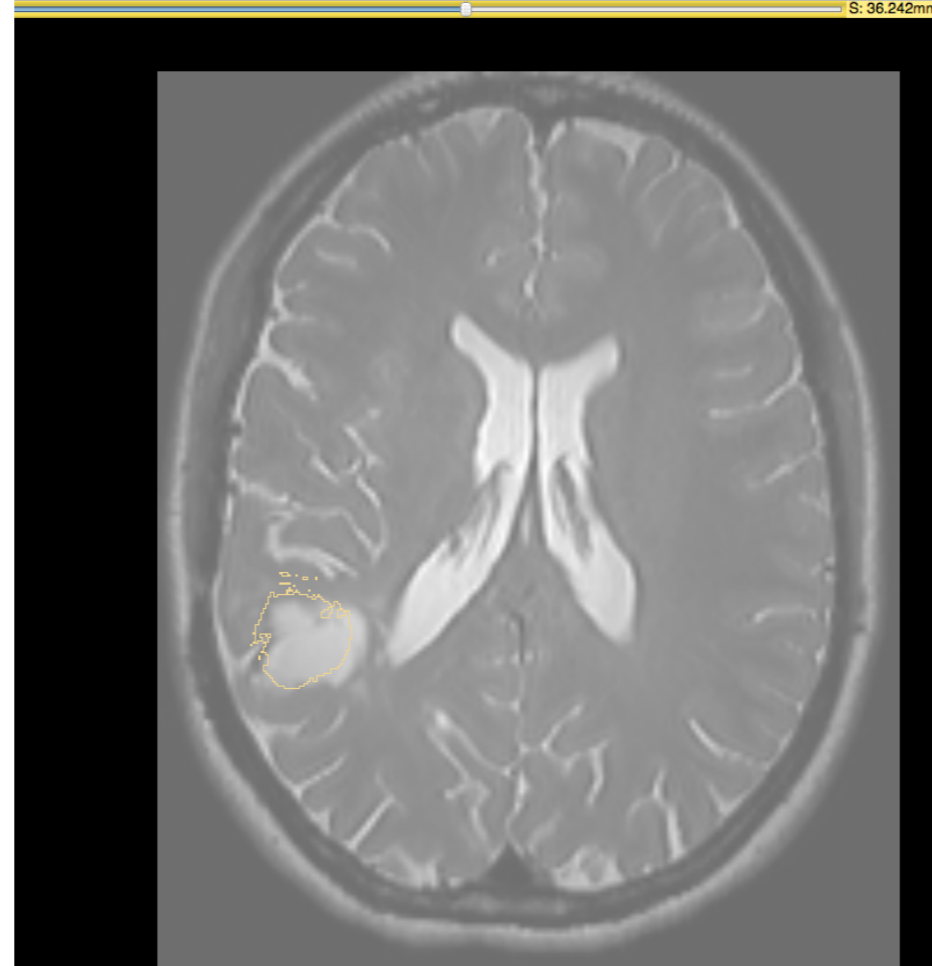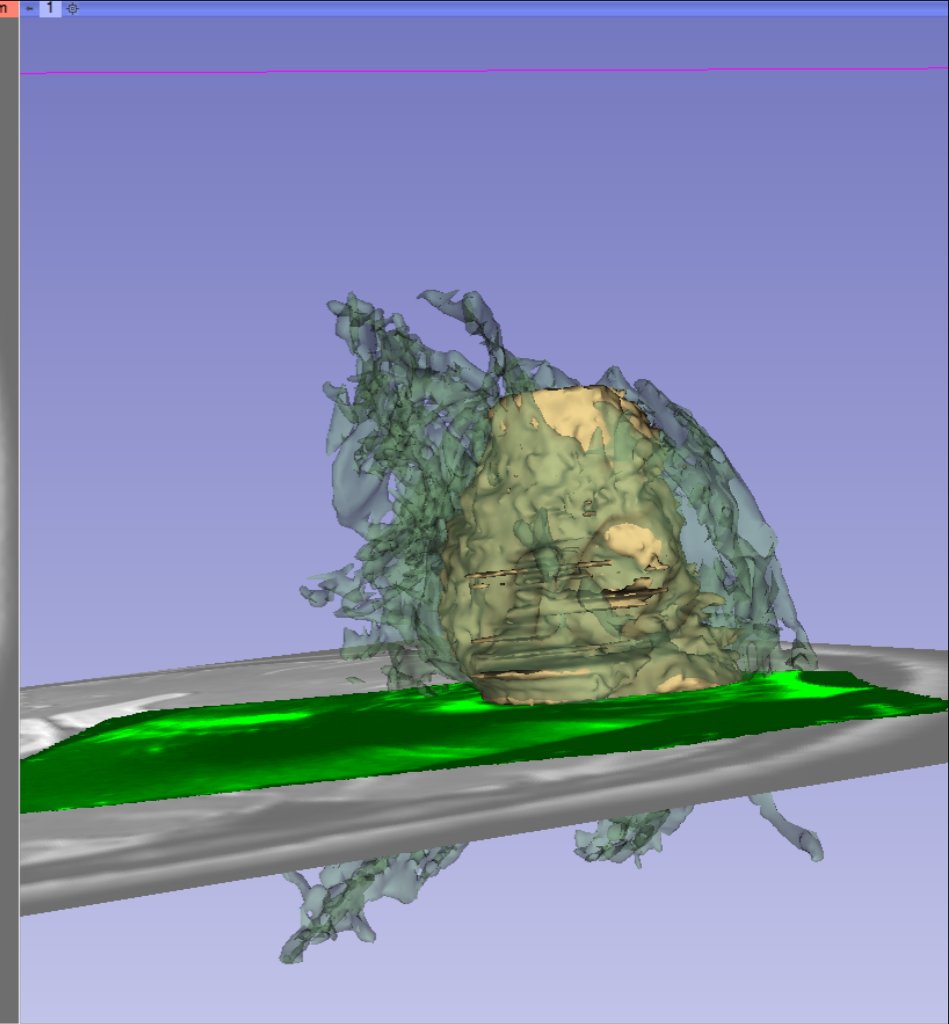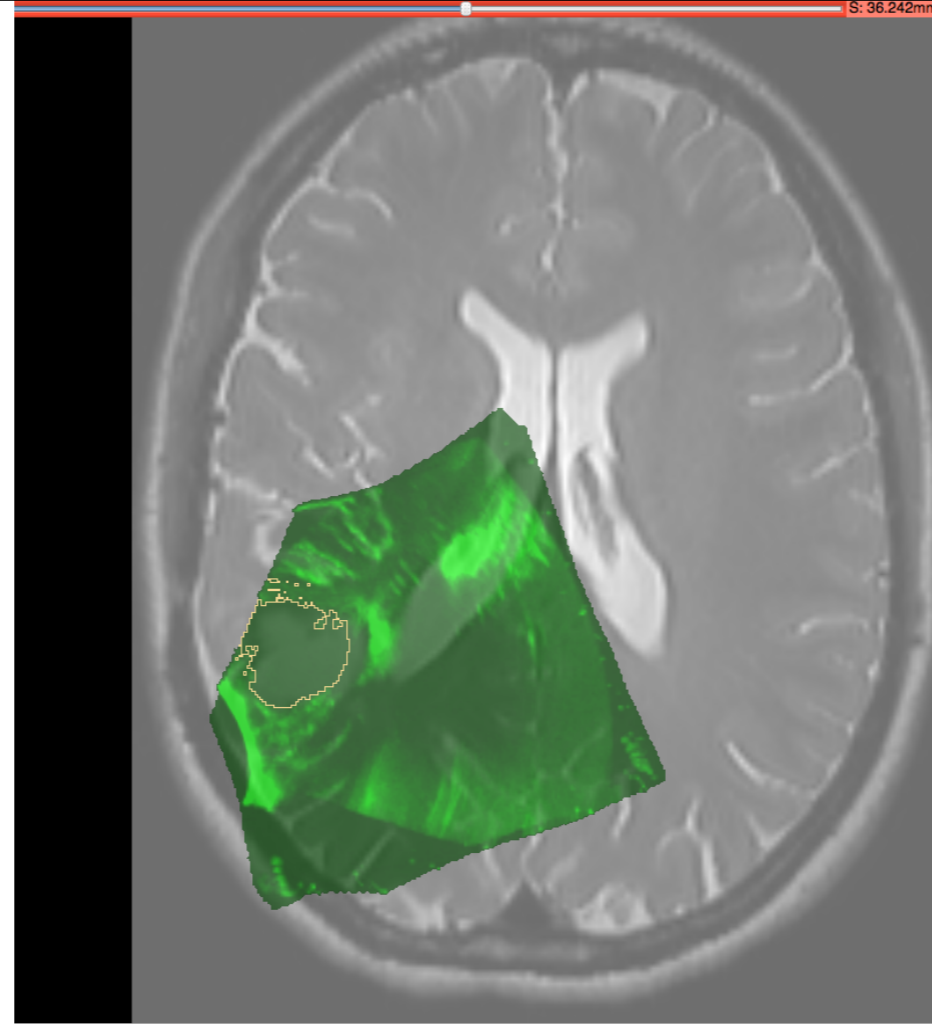Segmented Cavities
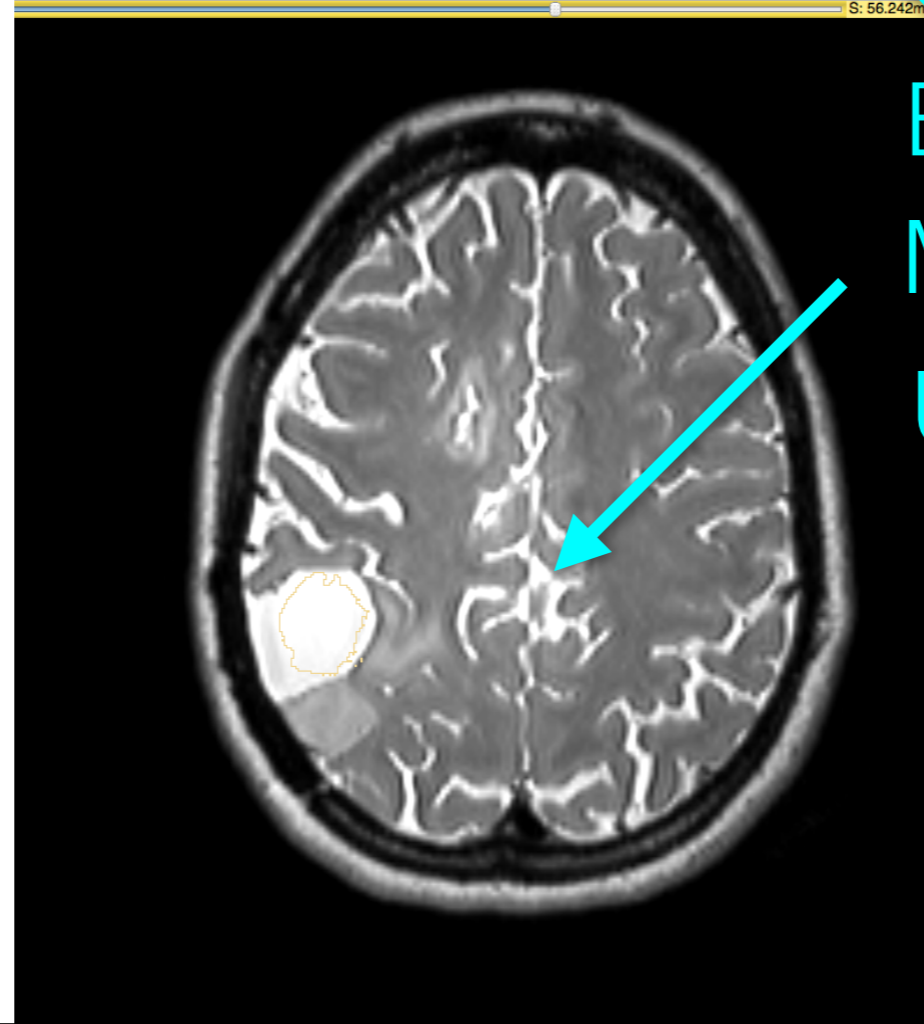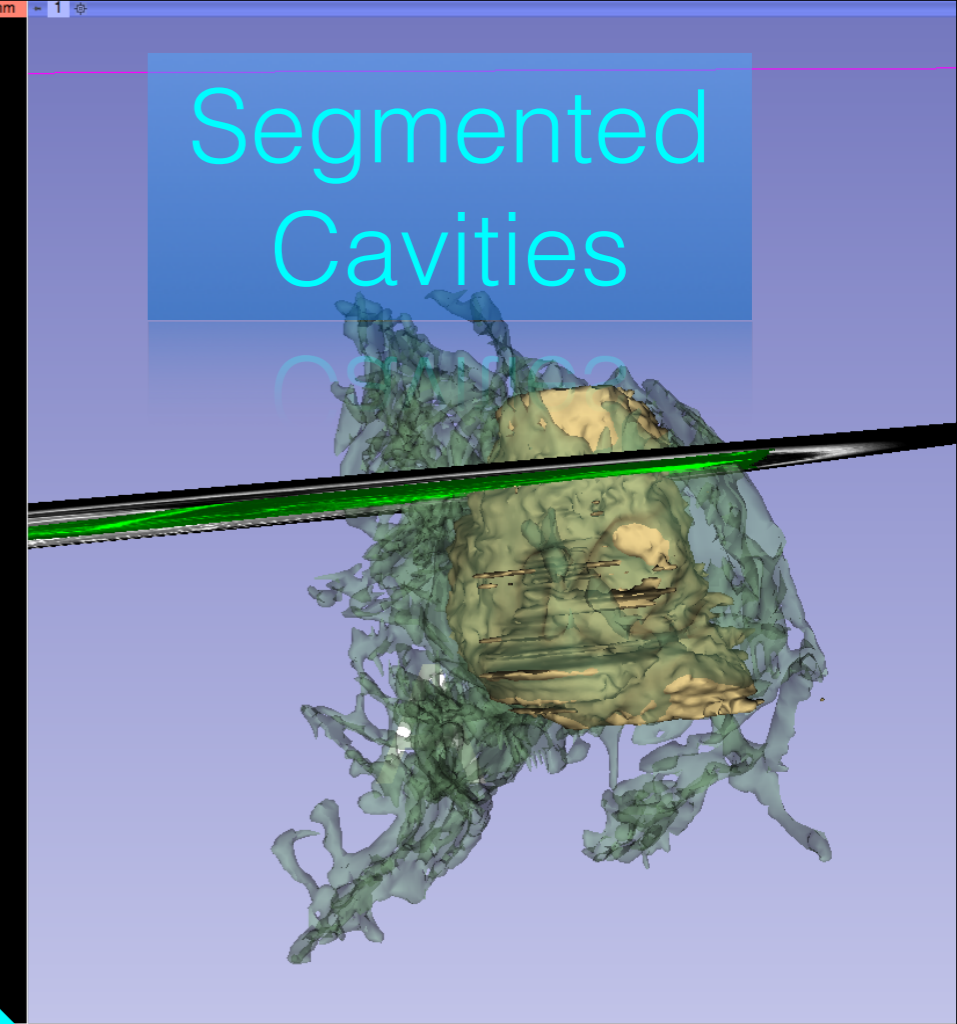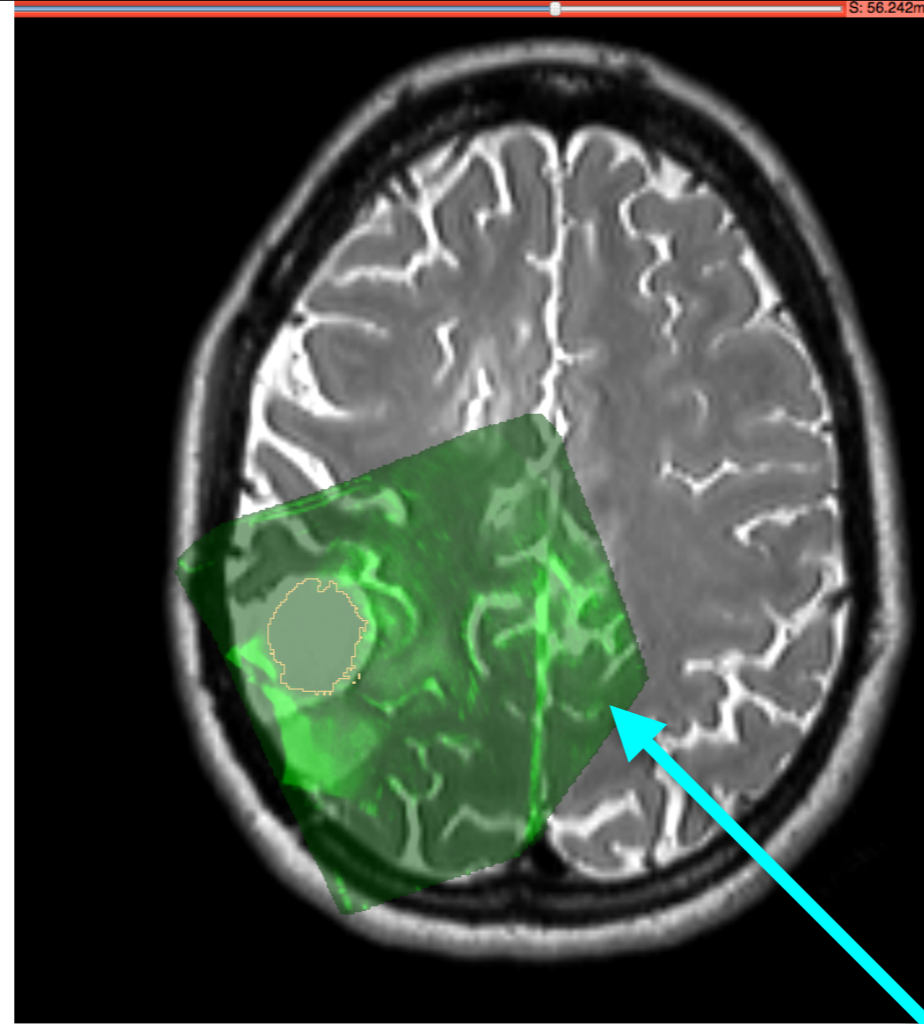
Blended

MR Only

US Only
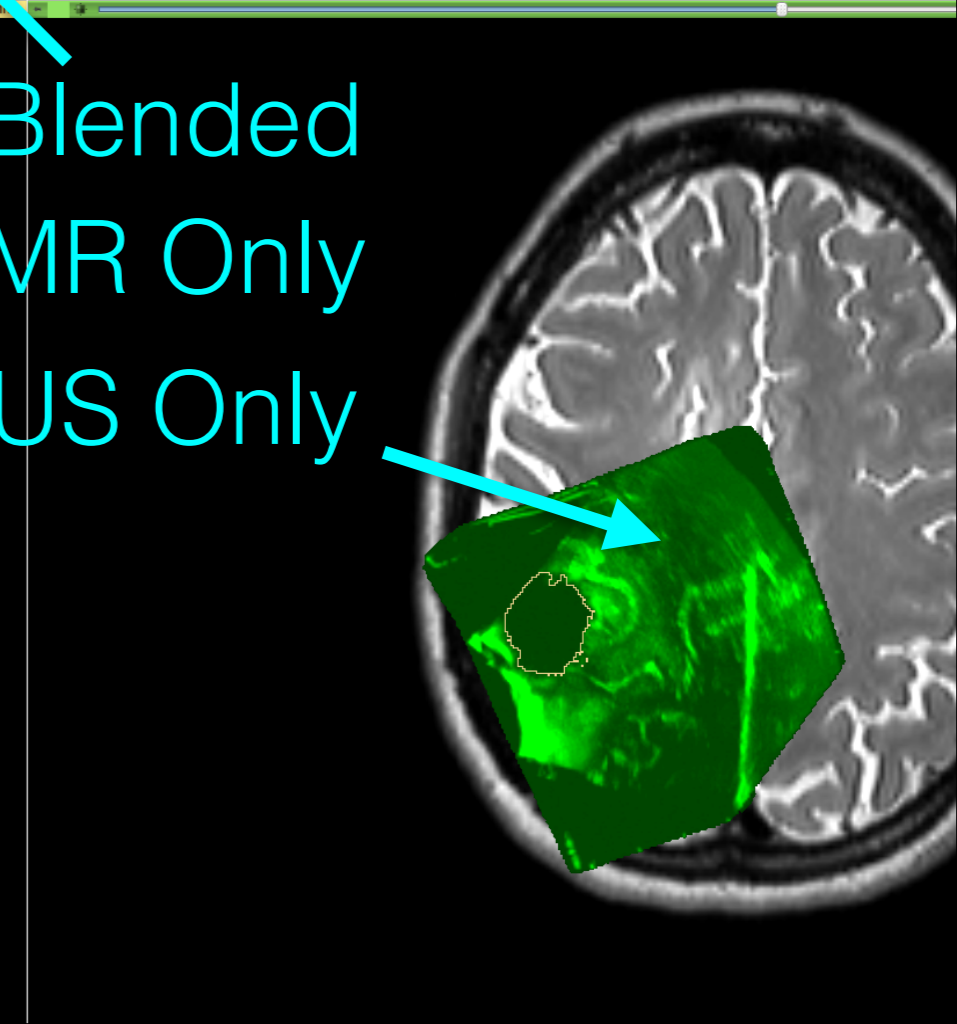
Cavity Alignment
Experiment

- Further down

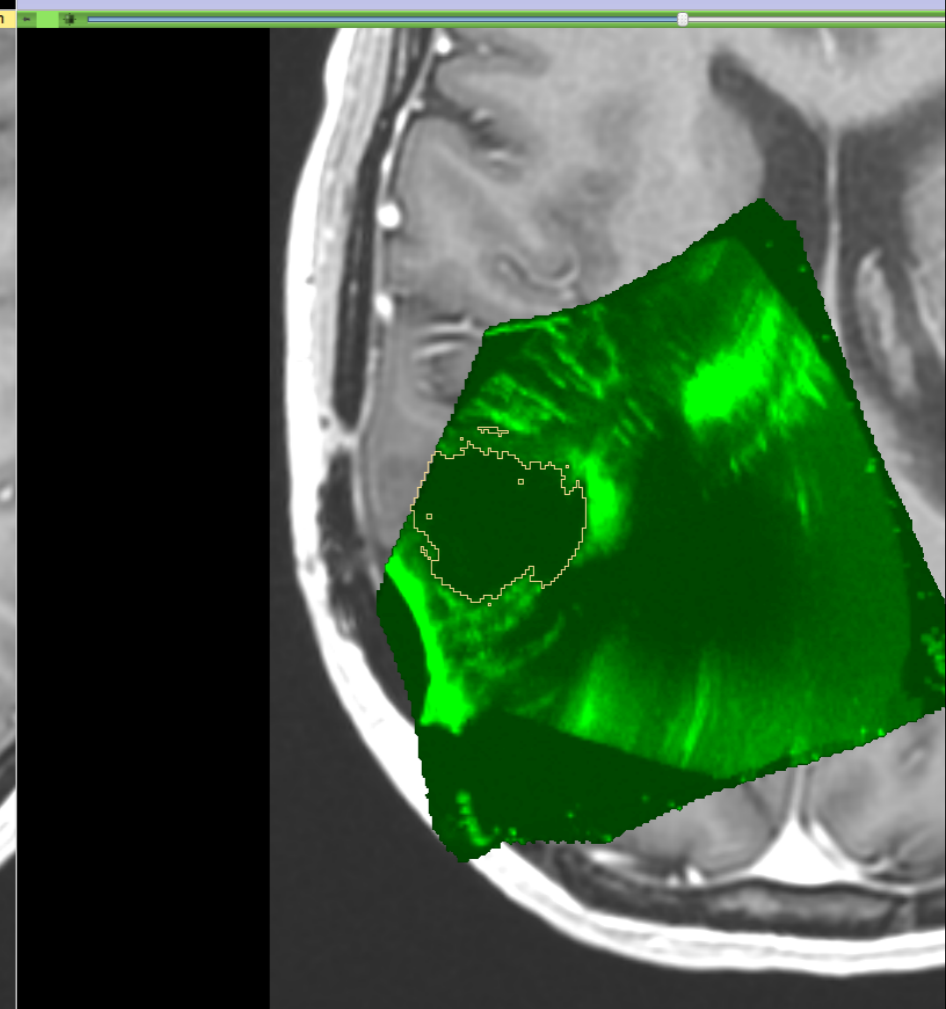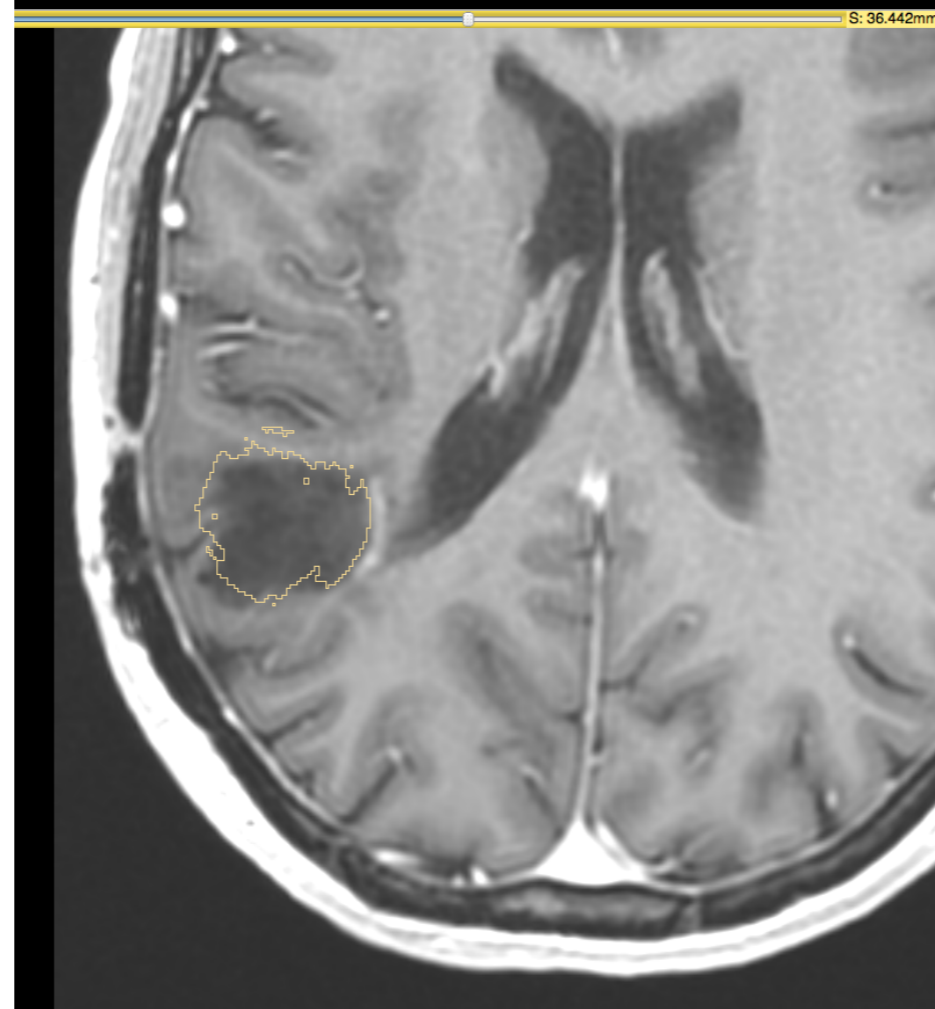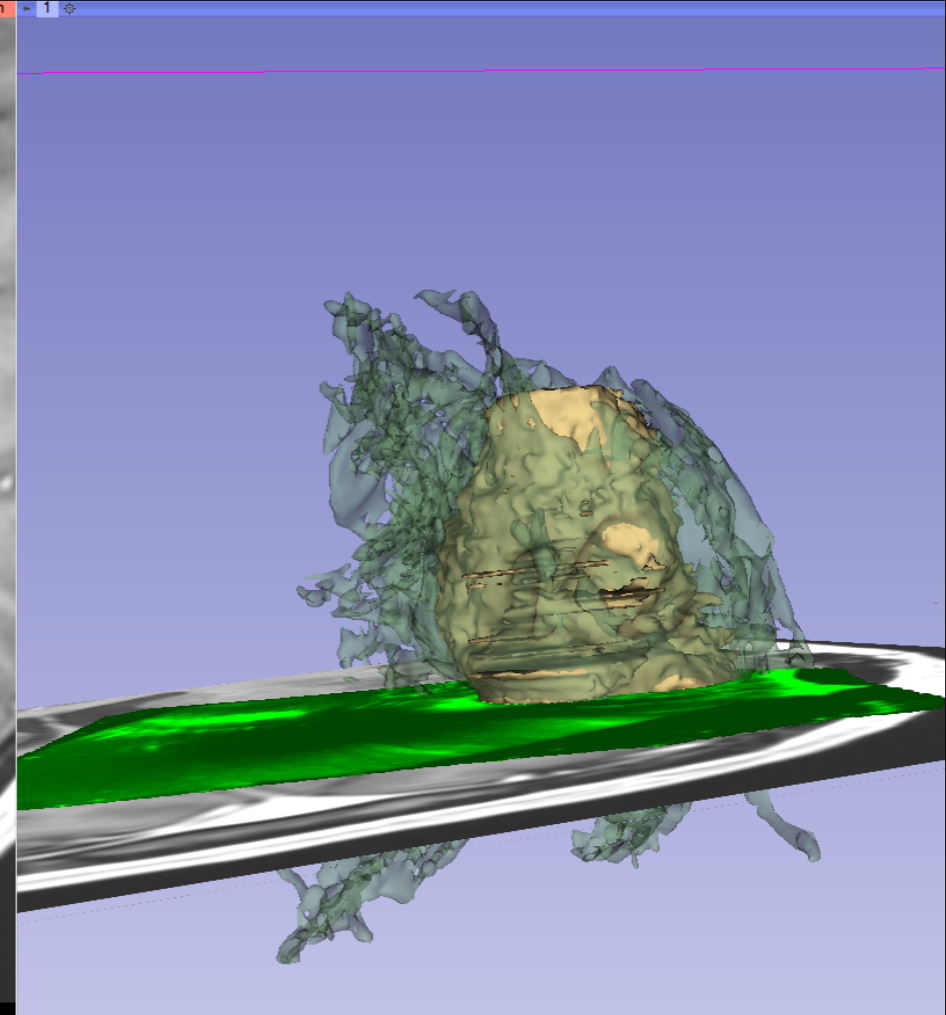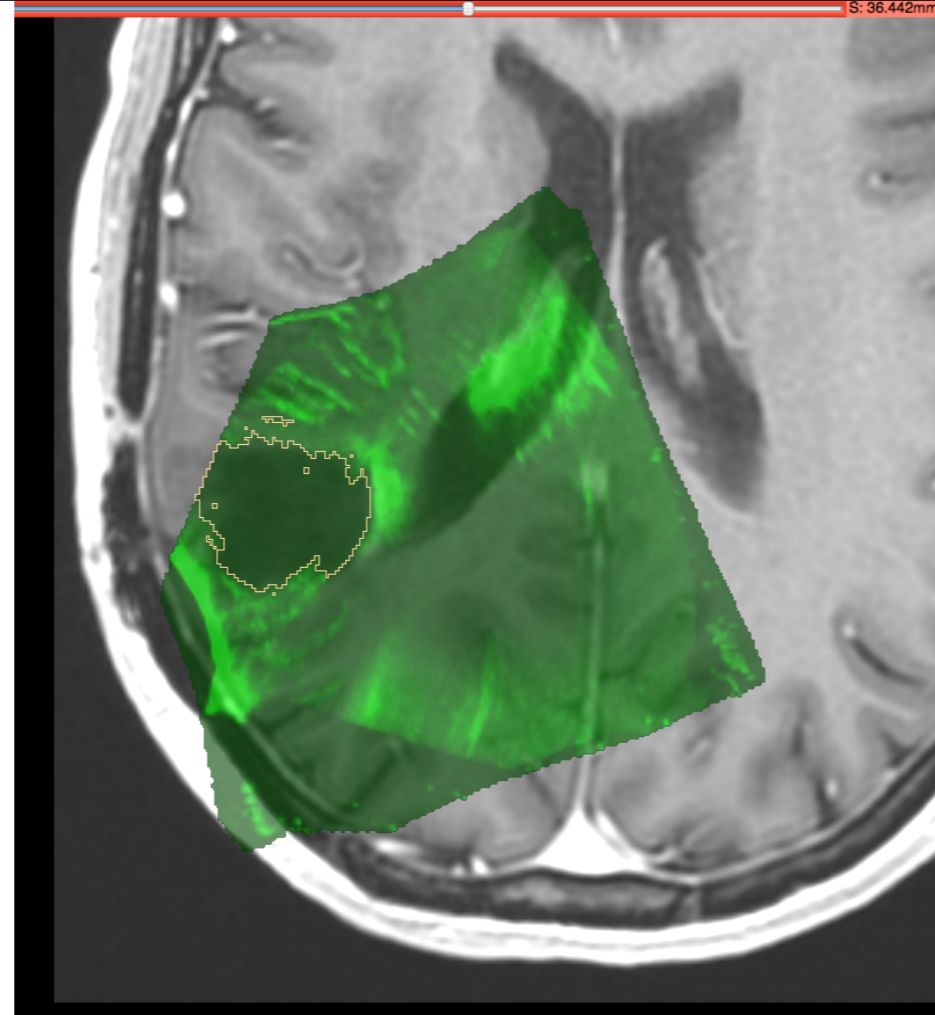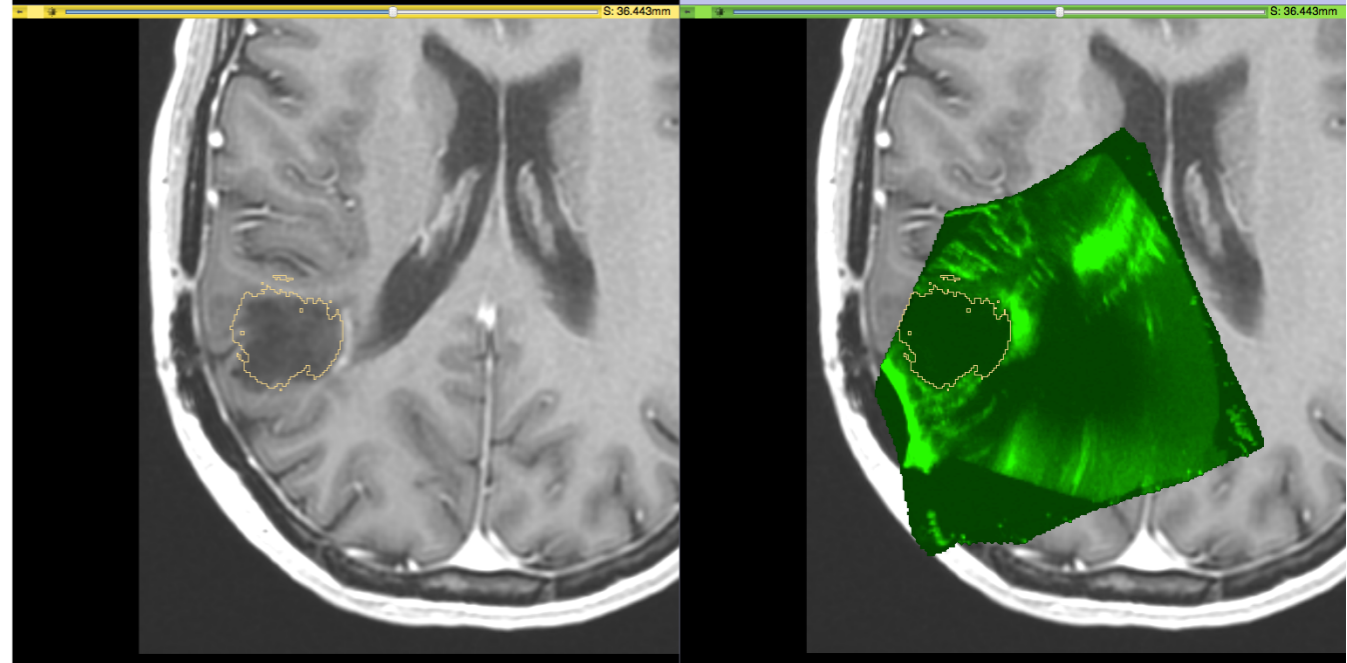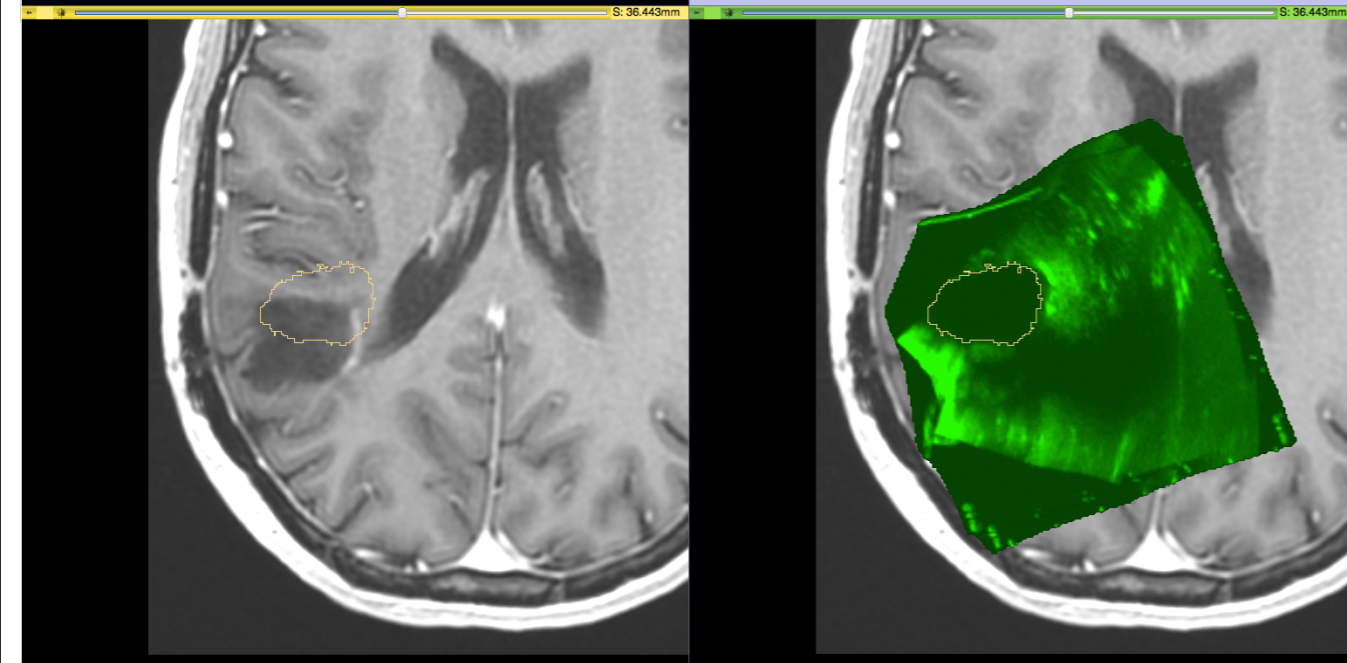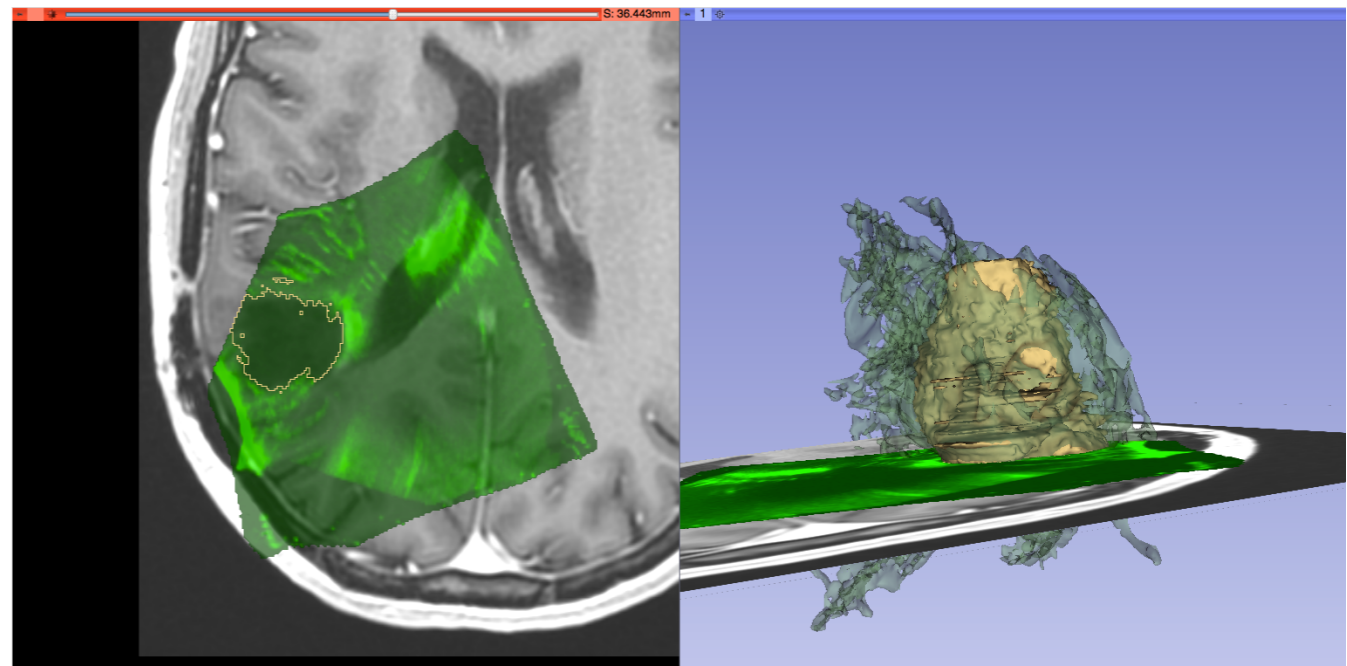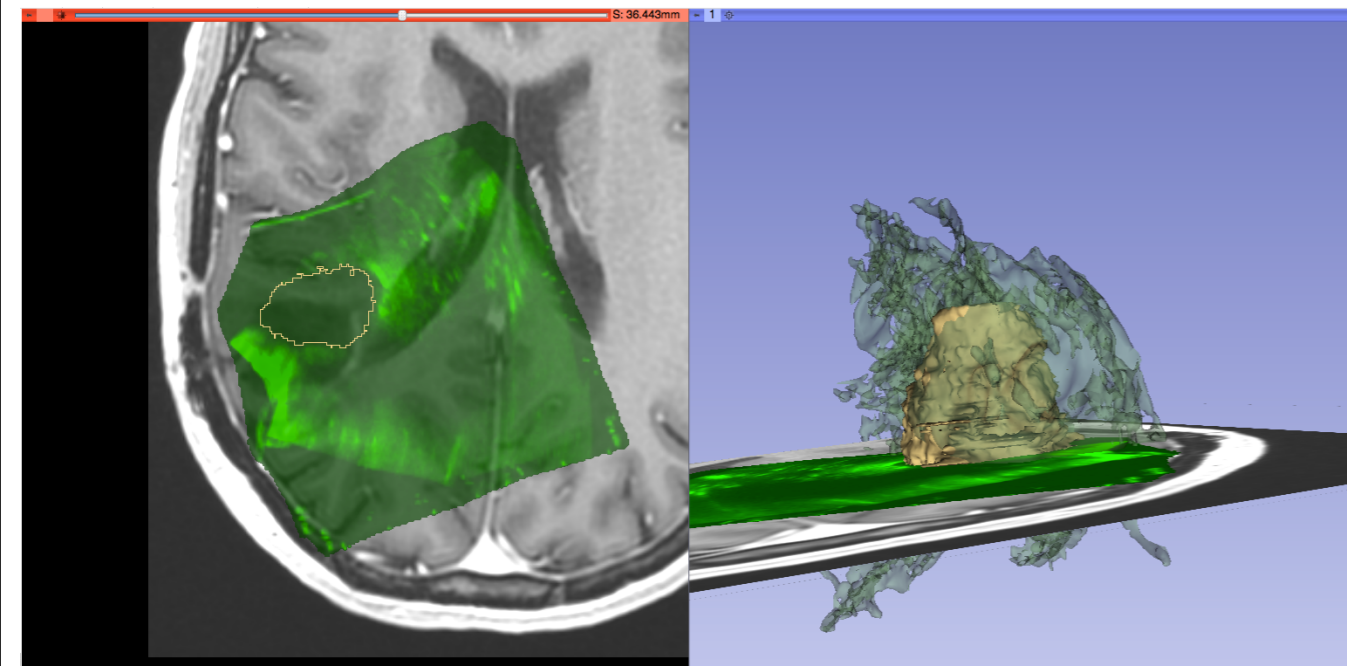Anatomy that is hyperechoic in US becomes visible in MR by changing the windowing

- Steve and Jim suggested that a layered structure would cause the observed hyperechoic image

- Ron identified the choroid plexus inside the ventricle

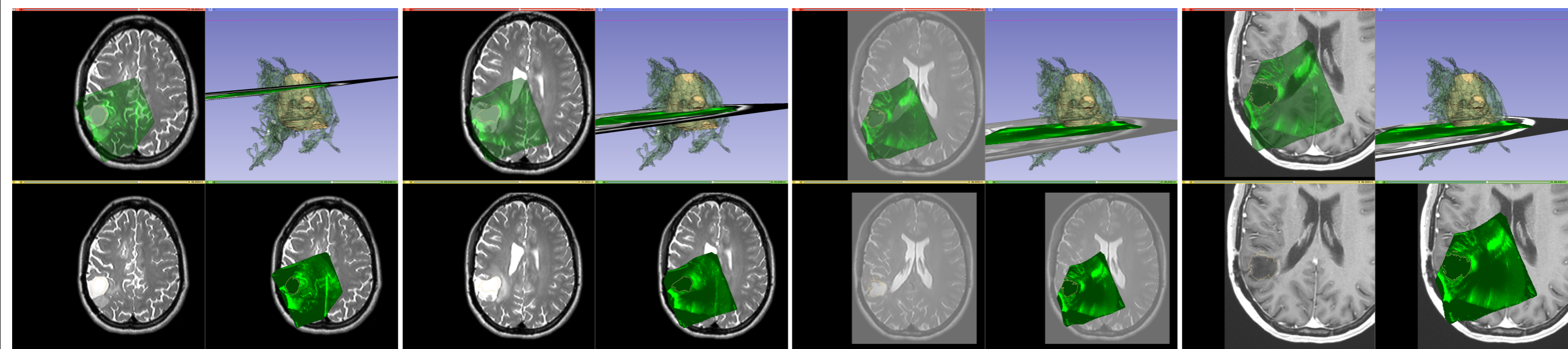- Alignment looks very good

Match is even clearer
on T1

Before
Cavity Alignment

After
Cavity Alignment

Summary

- US reconstruction is not overly distorted
- Some US/MR visual differences can be explained
- Analysis could form the basis for automated registration or improved tracker calibration