Intro to FreeSurfer Jargon

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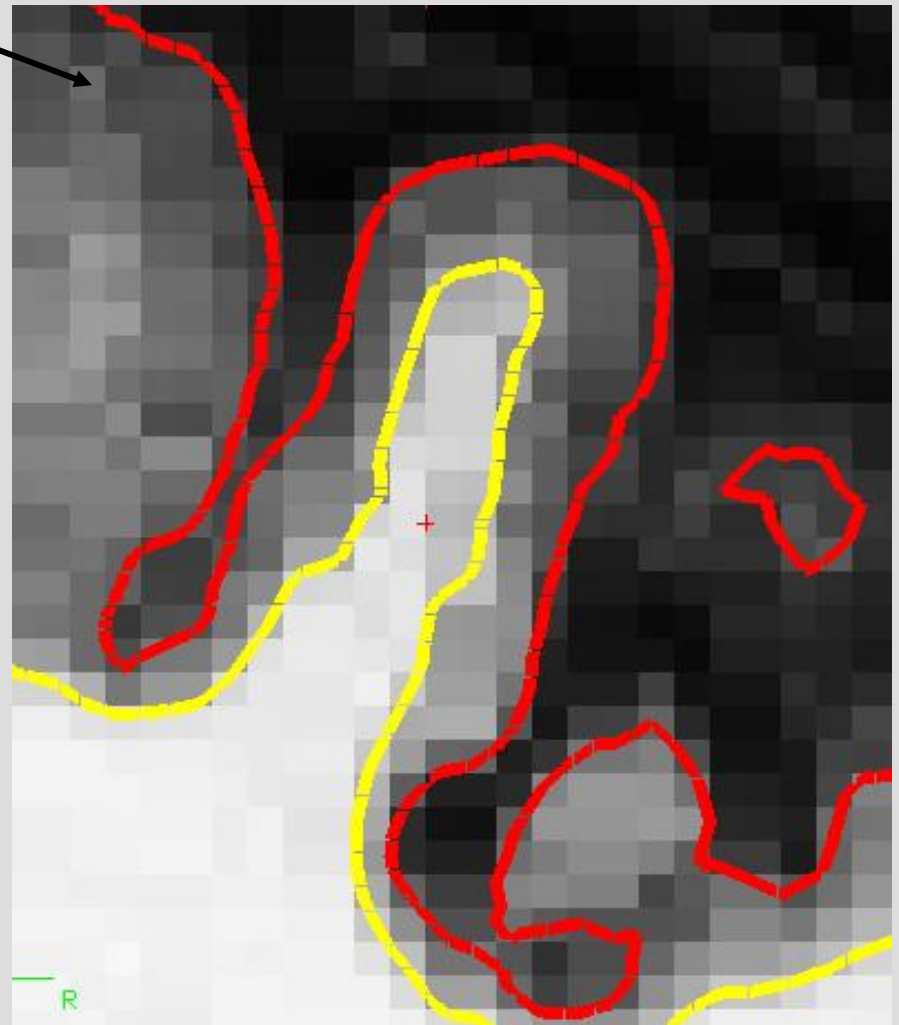voxel

surface

volume

vertex

surface-based

recon

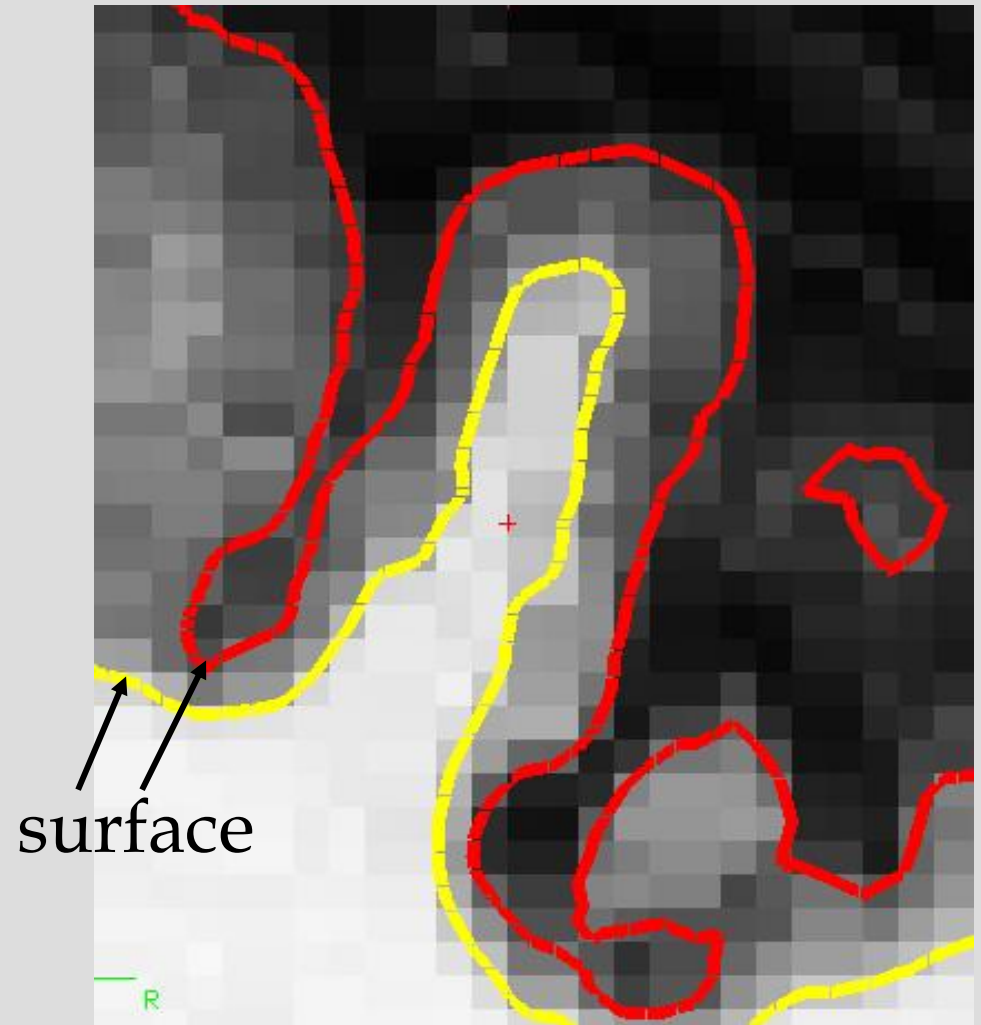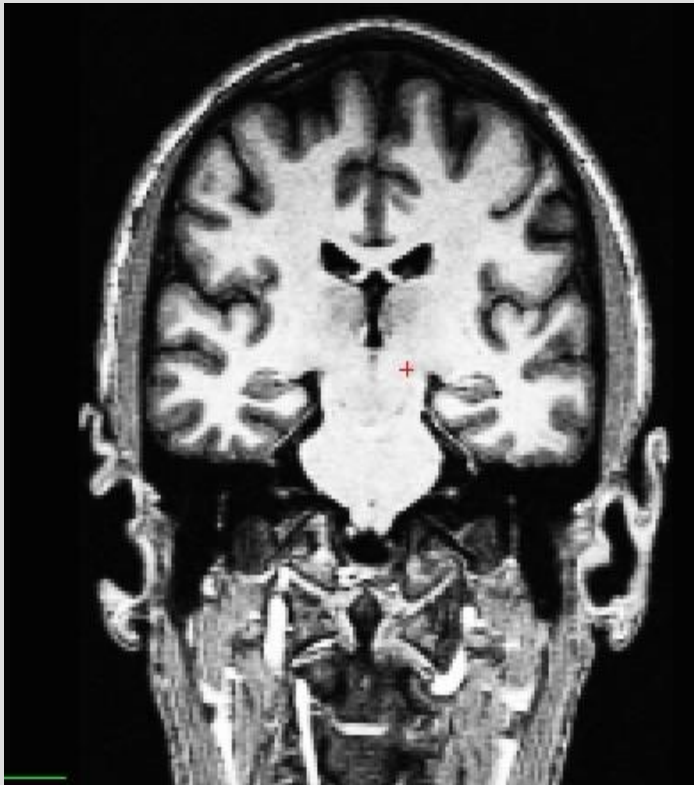cortical, subcortical

parcellation/segmentation

registration, morph, deform, transforms
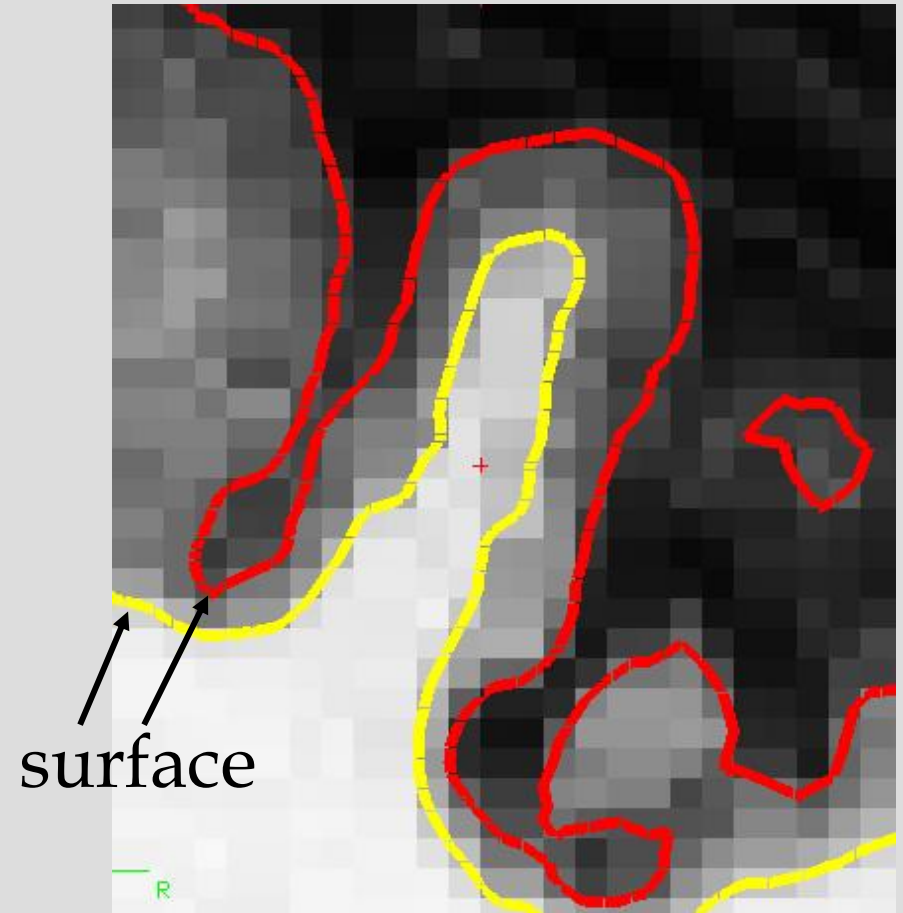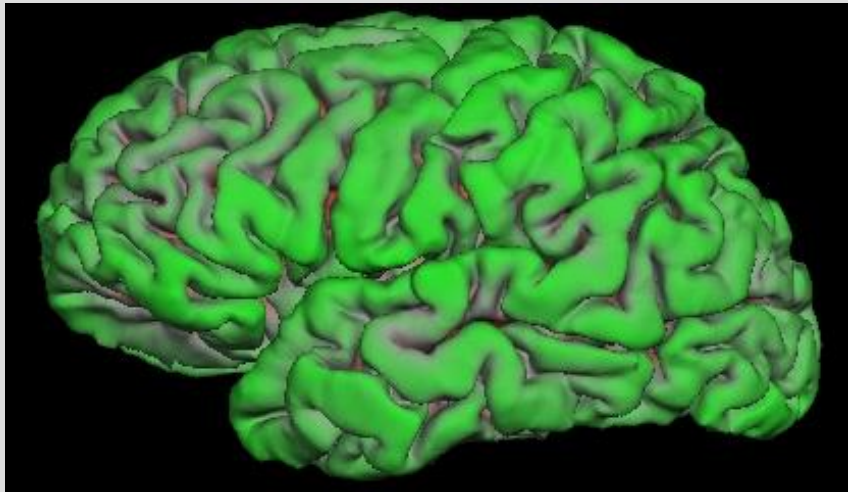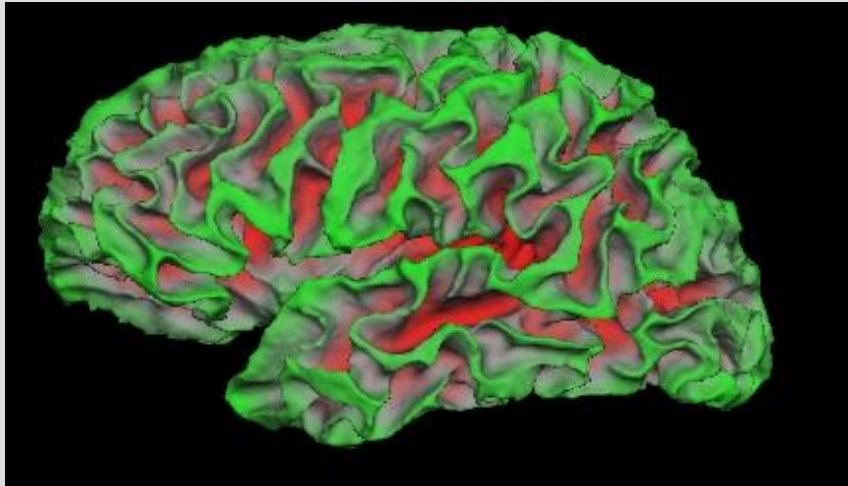 (computing vs. resampling)

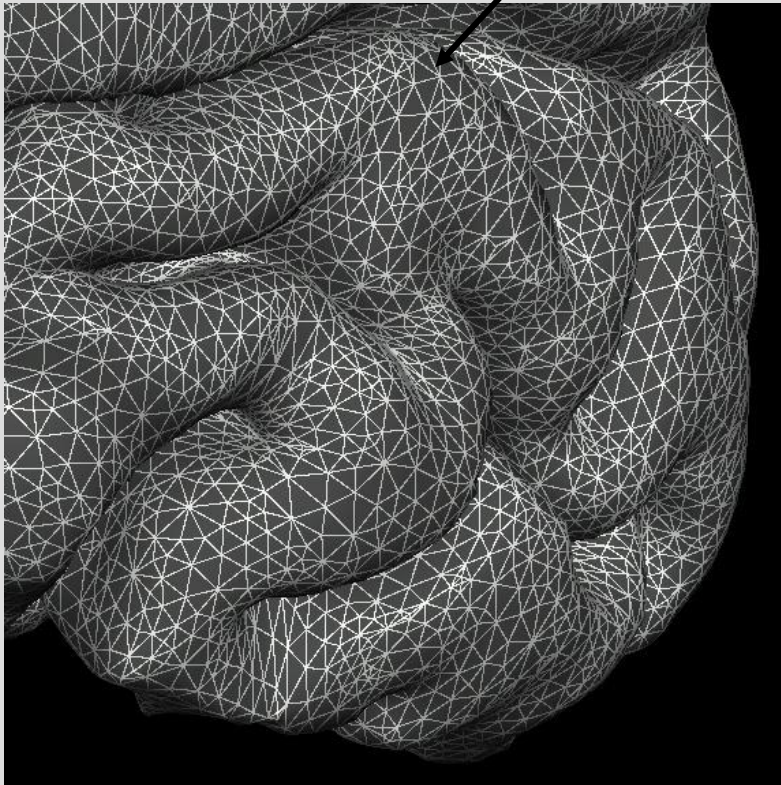# Intro to FreeSurfer Jargon

voxel

Intro to FreeSurfer Jargon
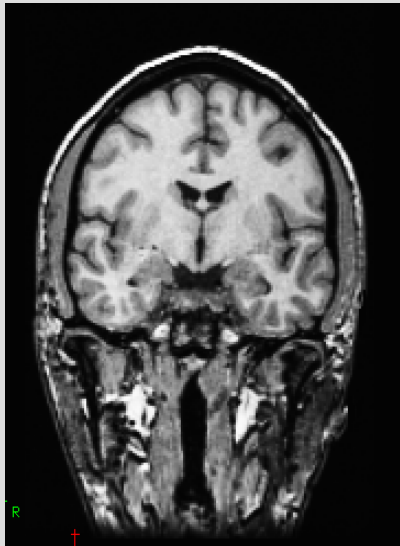

surface

Intro to FreeSurfer Jargon

surface

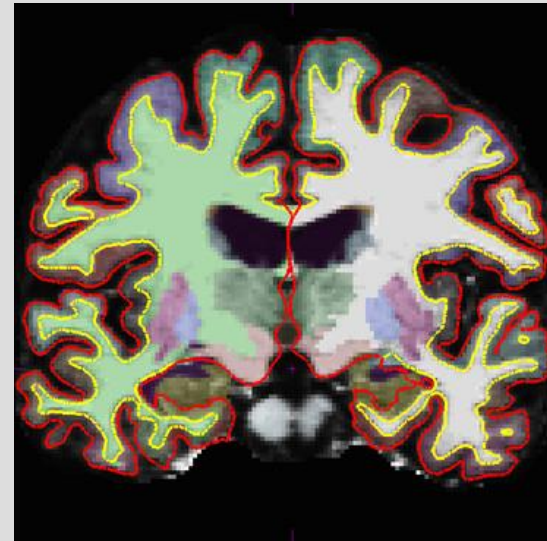# Intro to FreeSurfer Jargon

vertex

What FreeSurfer Does…

FreeSurfer creates computerized models of the brain from MRI data.

Input:
T1-weighted (MPRAGE)
1mm^3 resolution
(.dcm)

Output:
Segmented & parcellated conformed volume
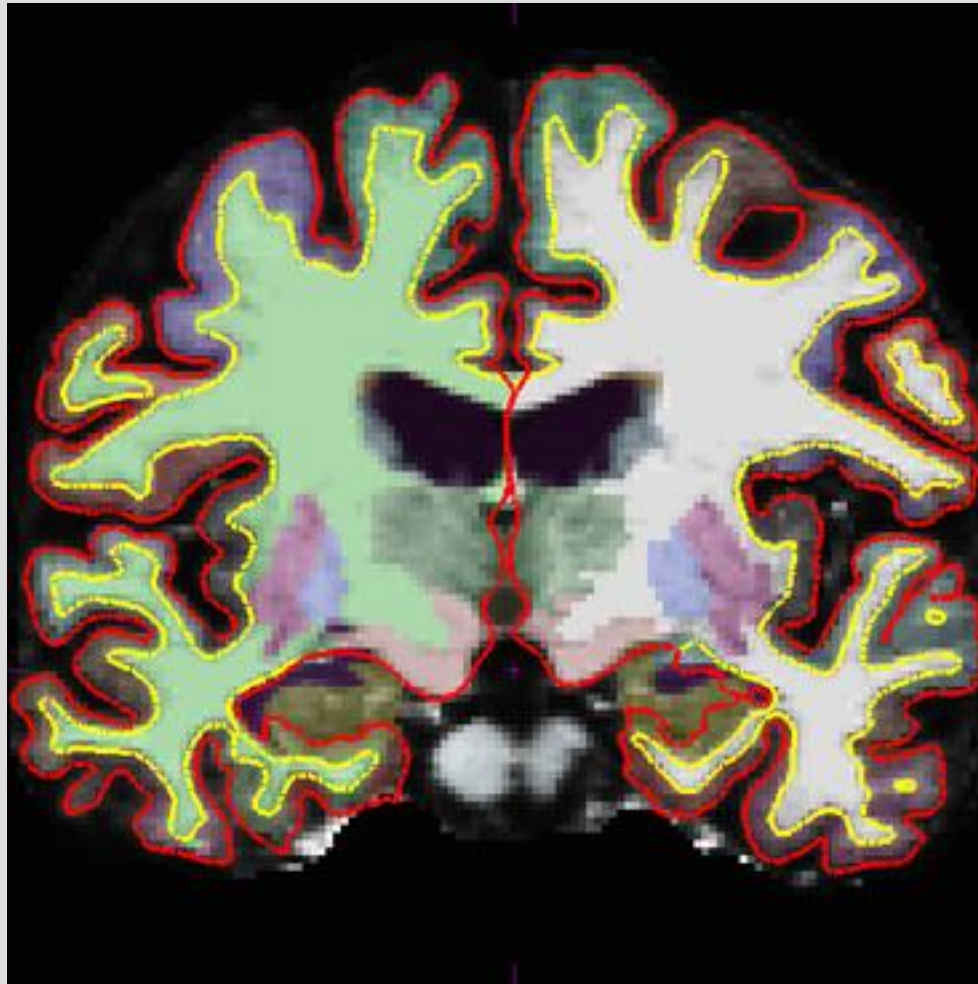(.mgz)

Recon

"*recon* your data"

   …short for *reconstruction*

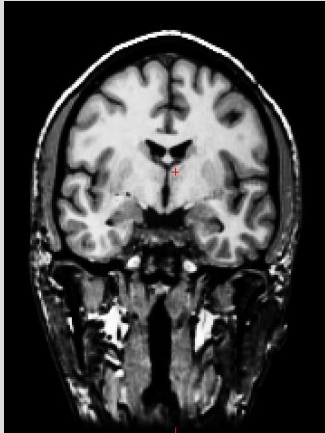   …cortical surface *reconstruction*
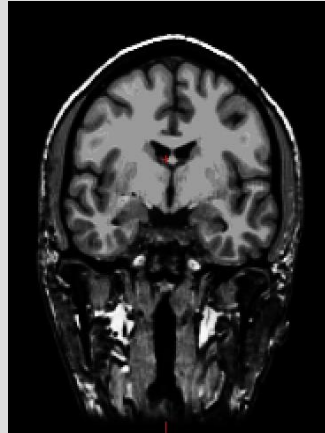
         …shows up in command *recon-all*

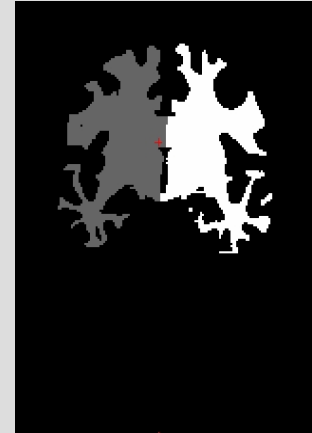# Recon

Volumes

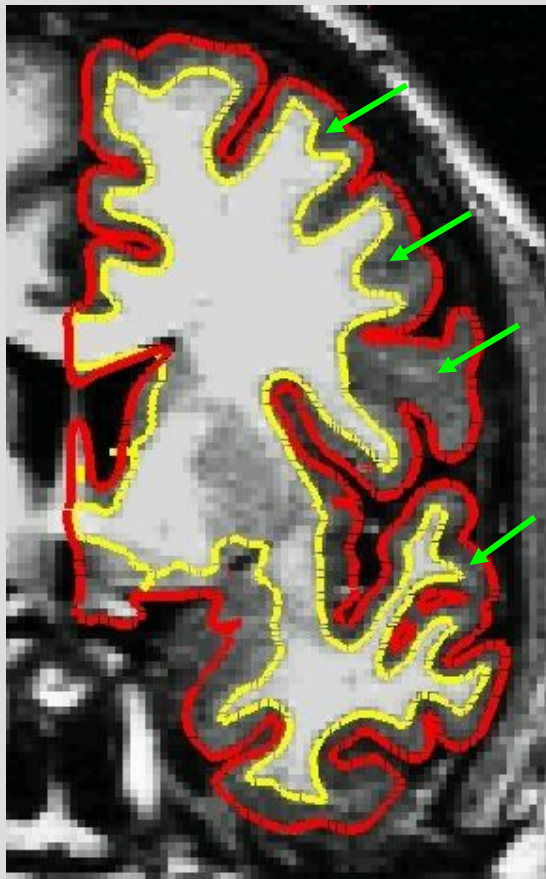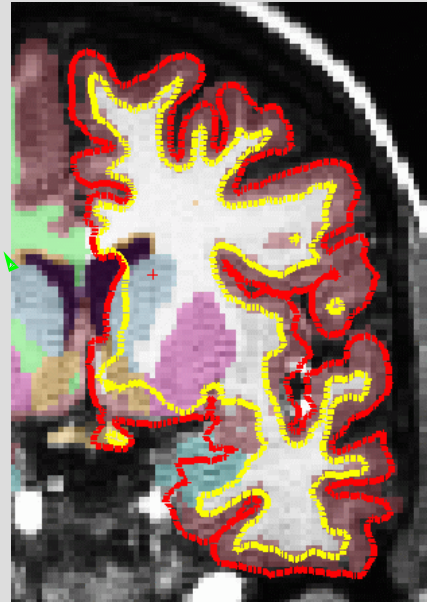orig.mgz   T1.mgz   brainmask.mgz   wm.mgz   filled.mgz
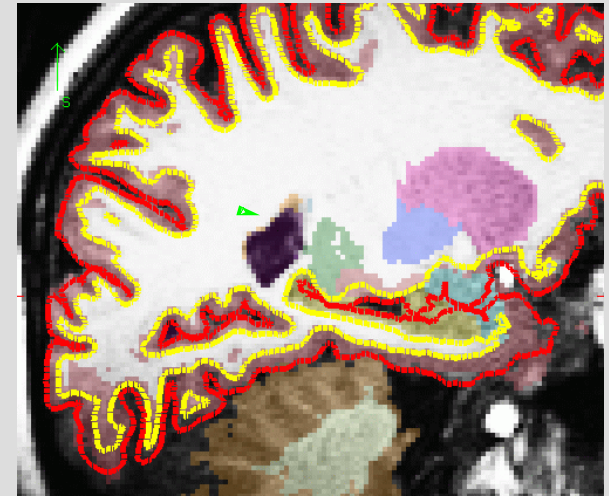(Subcortical Mass)

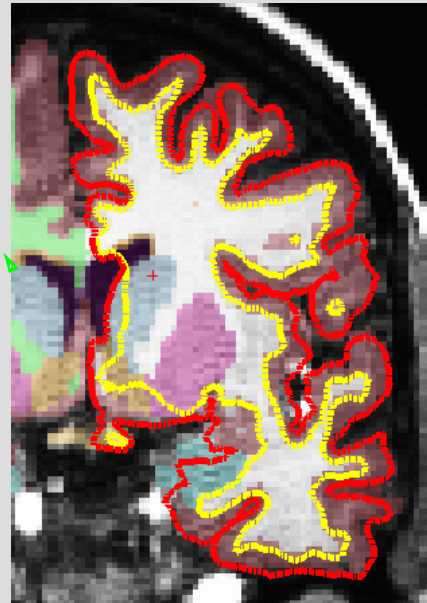# Cortical vs. Subcortical GM
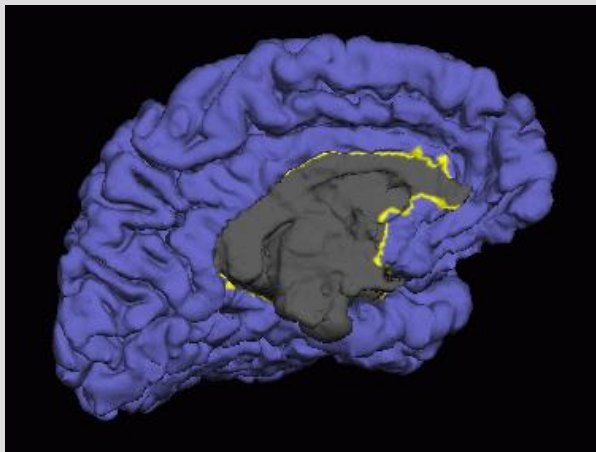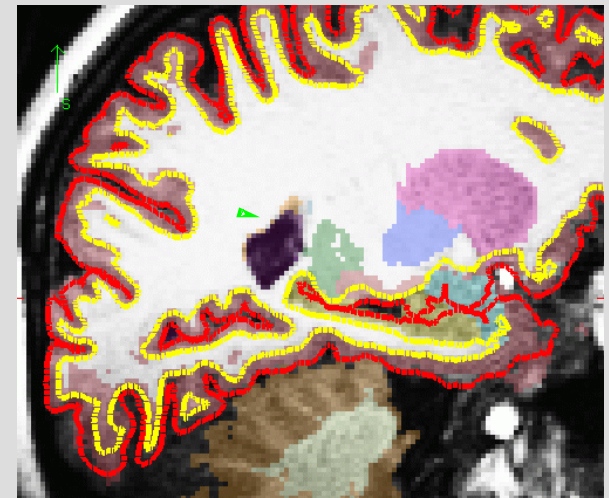
cortical gm

subcortical gm

coronal

sagittal

Cortical vs. Subcortical GM

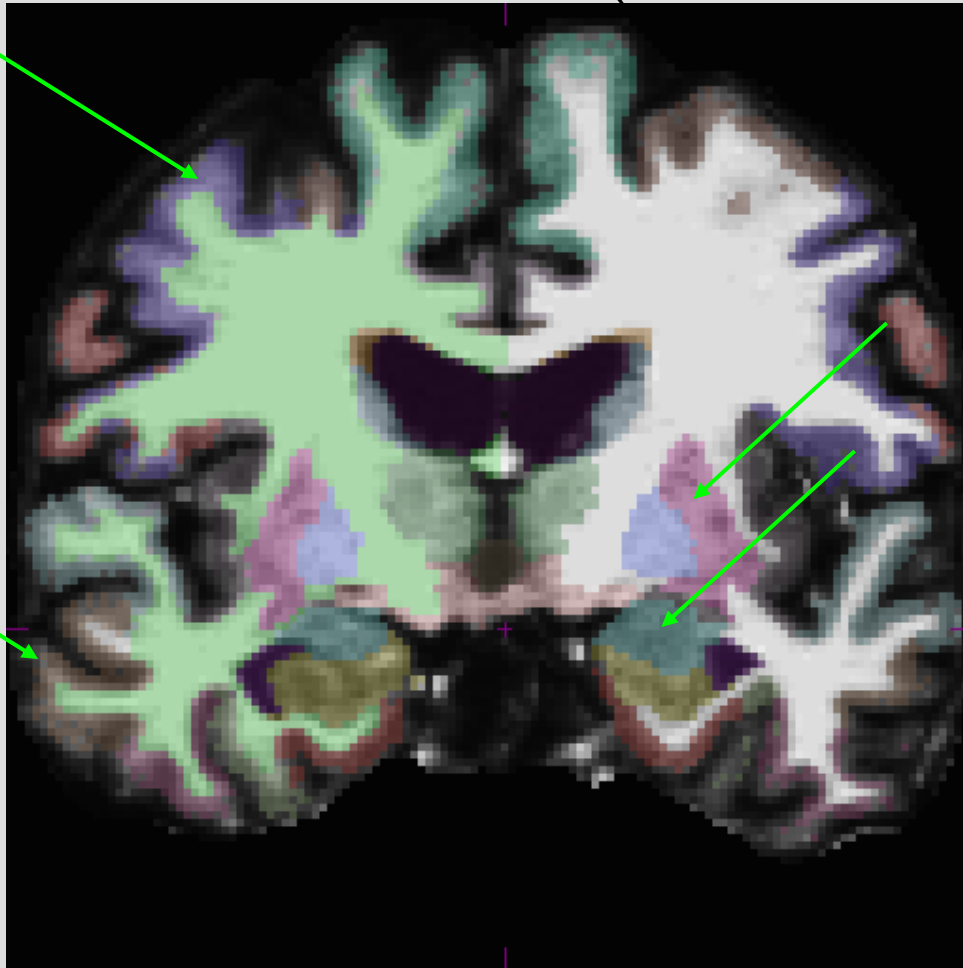subcortical gm

coronal

sagittal

Parcellation vs. Segmentation

(cortical) parcellation   (subcortical) segmentation

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registration, morph, deform, transforms
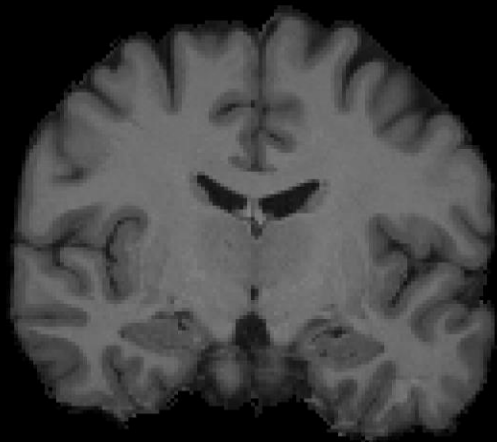 (computing vs. resampling)

Registration

Goal:

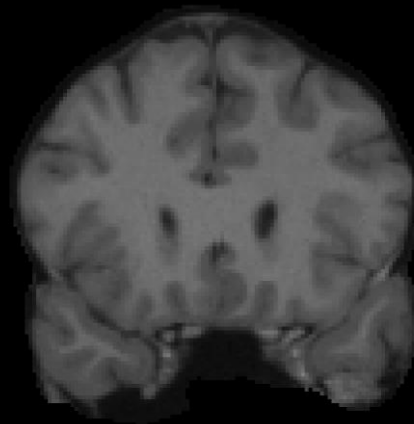to find a common coordinate system for the input data sets

Examples:

• comparing different MRI images of the same individual (longitudinal scans, diffusion vs functional scans)

• comparing MRI images of different individuals

Inter-subject, uni-modal example

target

subject
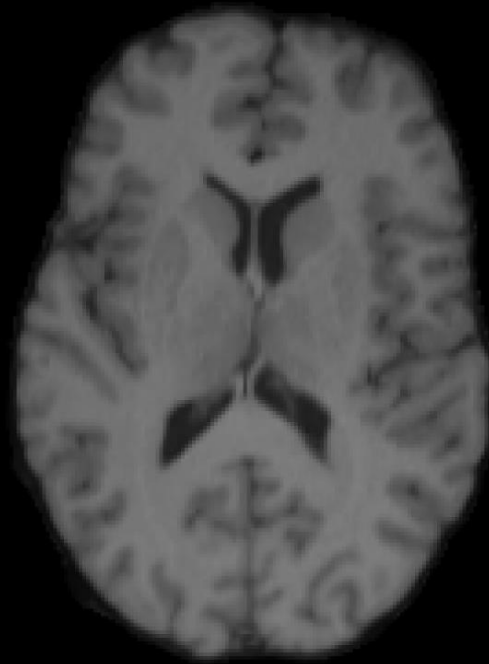
flirt 6 DOF

flirt 9 DOF

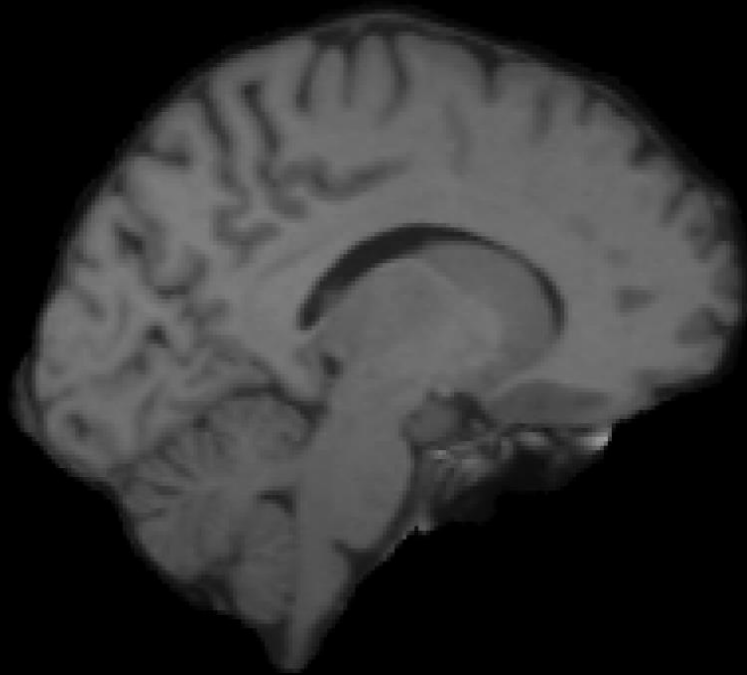flirt 12 DOF

Linear registration: 6, 9, 12 DOF

target

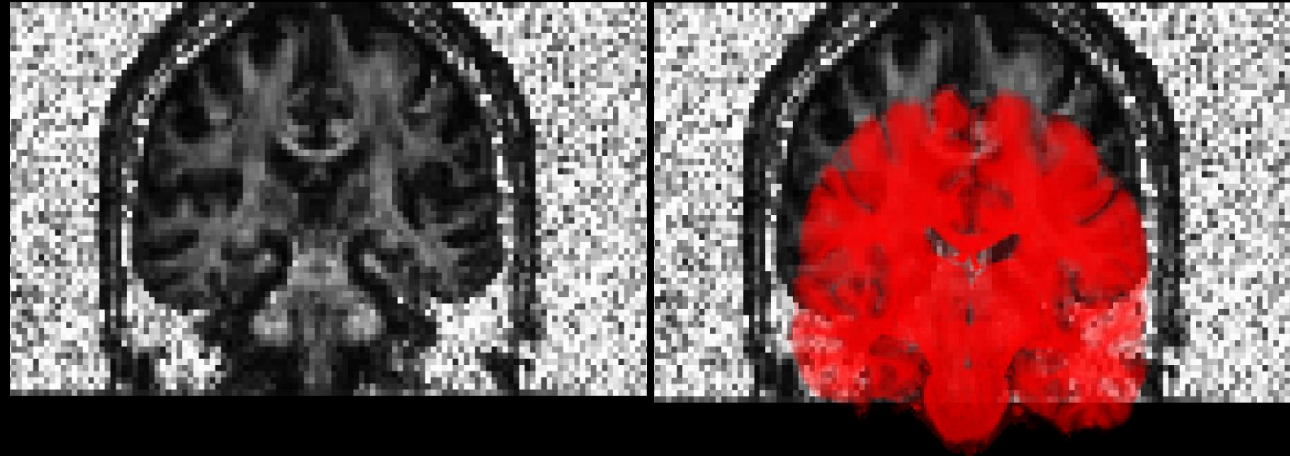# Linear registration: 6, 9, 12 DOF

Flirt 12 DOF

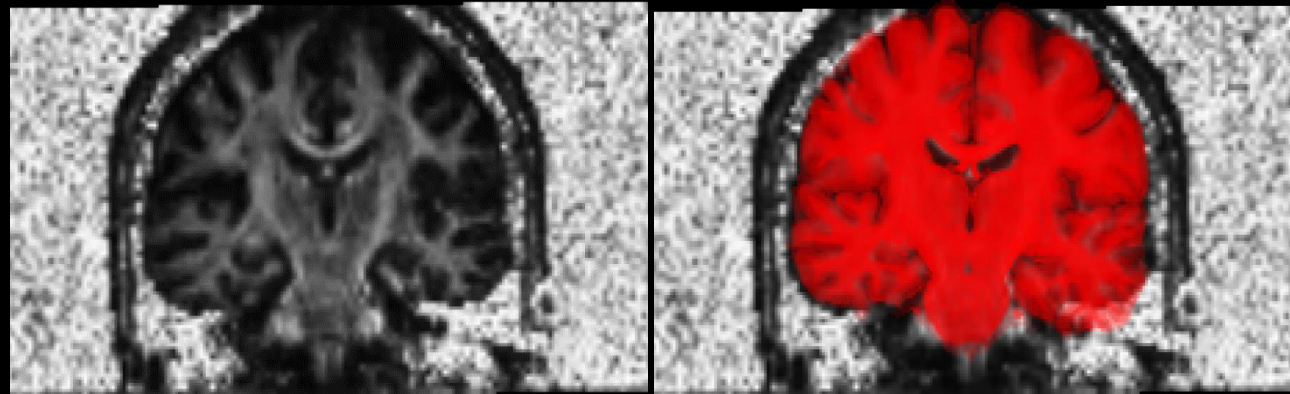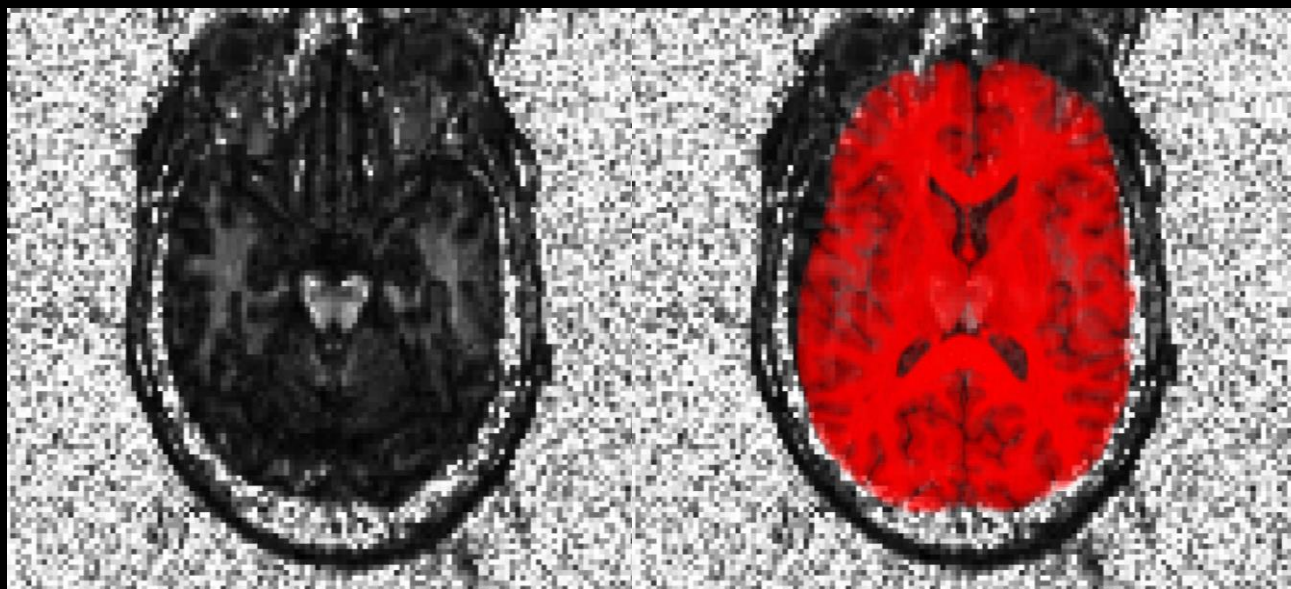# Linear registration: 6, 9, 12 DOF
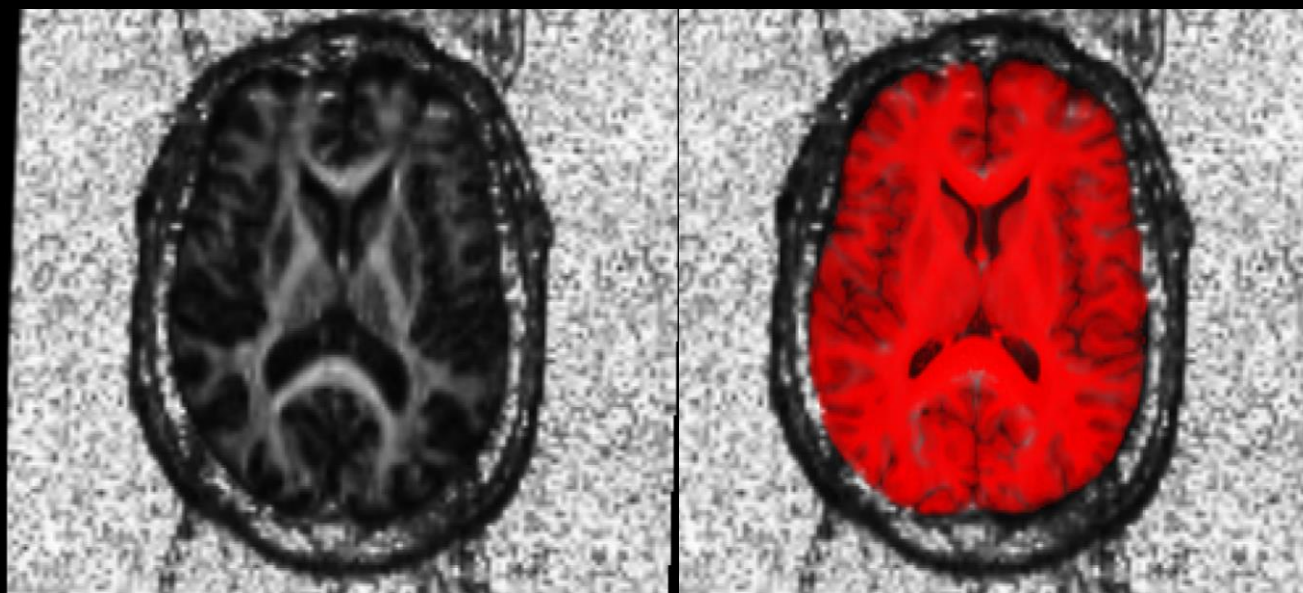

Flirt 12 DOF

Intra-subject, multi-modal example
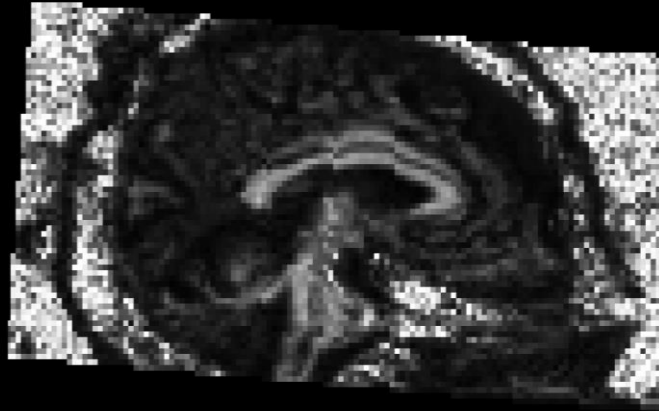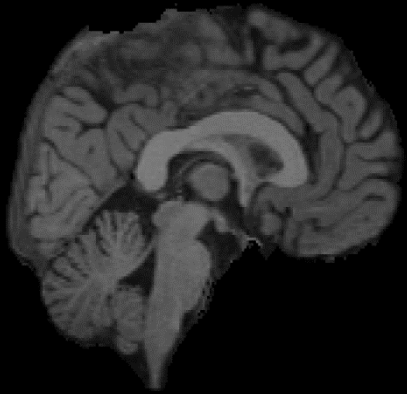

before spatial alignment

after spatial alignment
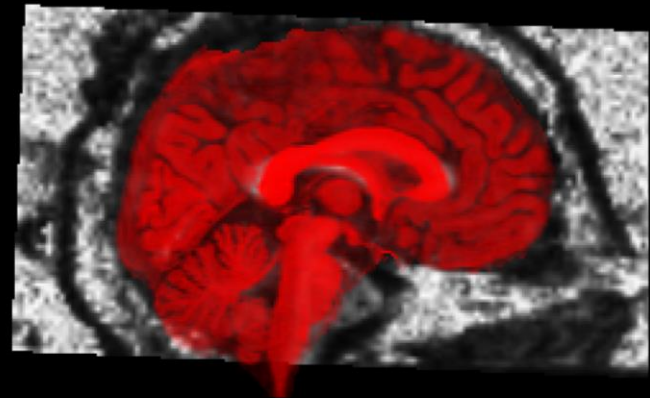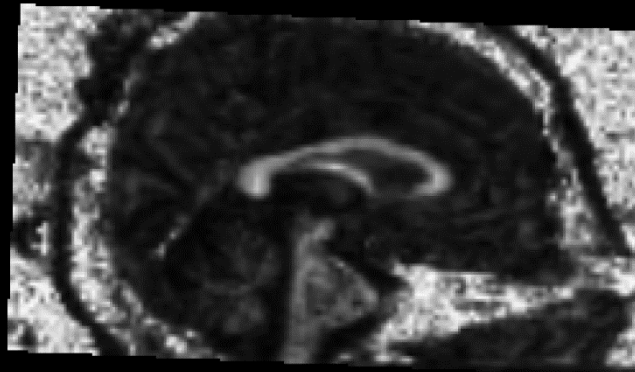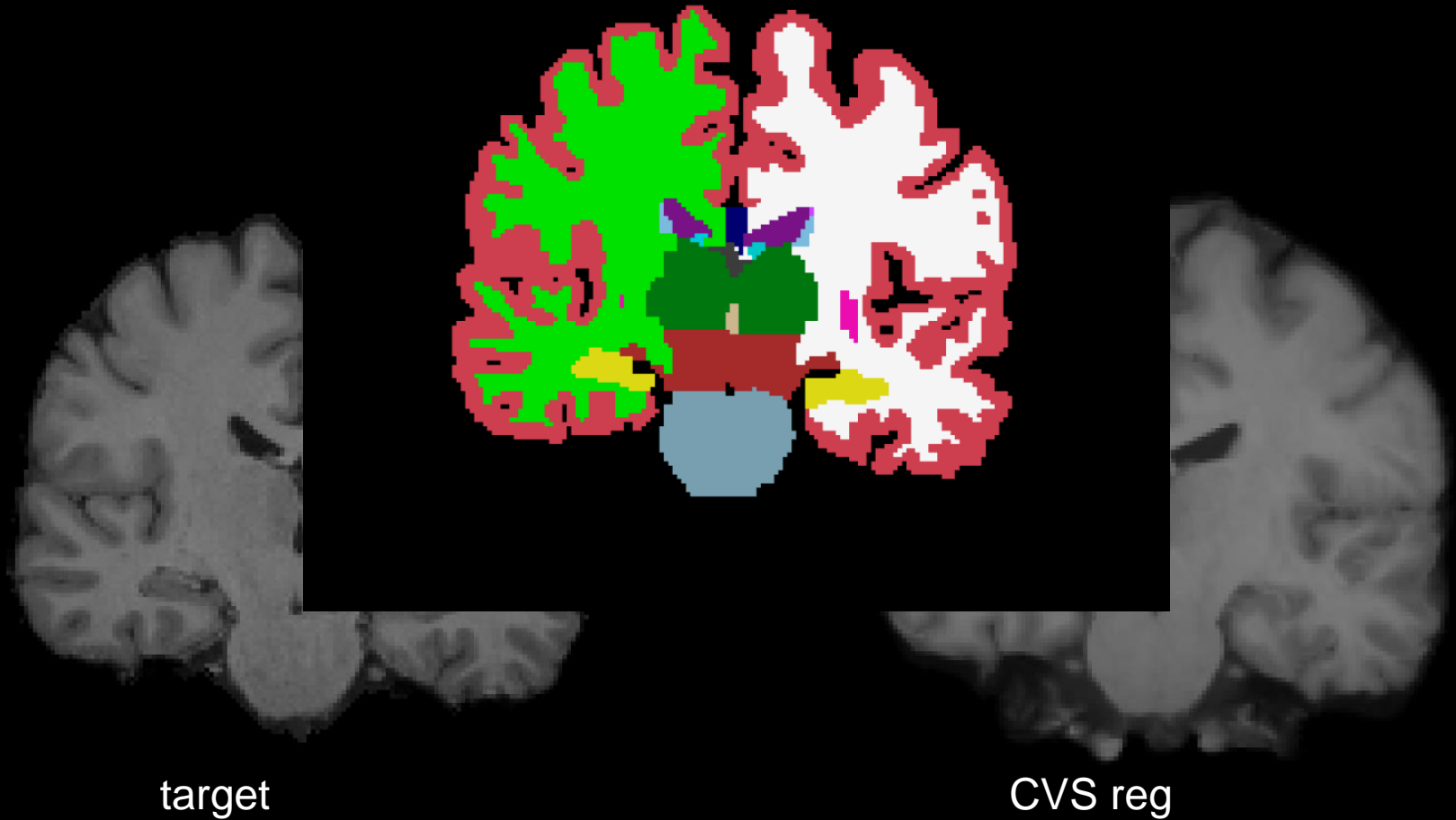
before spatial alignment

after spatial alignment
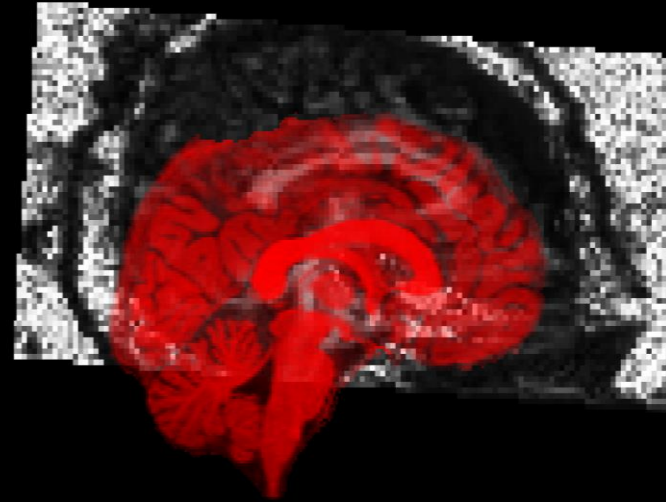
before spatial alignment

after spatial alignment

Inter-subject non-linear example

target

CVS reg

Some registration vocabulary

- Input datasets:
  - Fixed / template / target
  - Moving / subject
- Transformation models
  - rigid
  - affine
  - nonlinear
- Objective / similarity functions

- Applying the results
  - deform, morph, resample, transform
- Interpolation types
  - (tri)linear
  - nearest neighbor

FreeSurfer Questions

Search for terms and answers
to all your questions in the Glossary FAQ

FreeSurfer Mailing List Archives