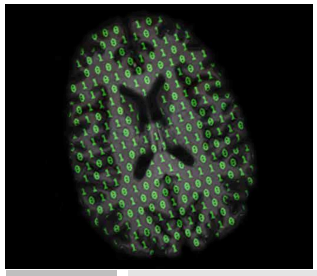
THEME 3 / LECTURE 6: IMAGE REGISTRATION USING FSLR

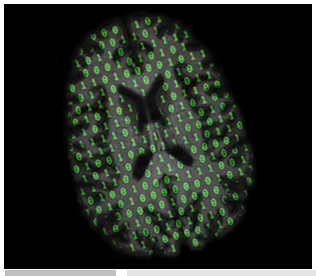


Linear Image Registration

From FSL: “FLIRT (FMRIB's Linear Image Registration Tool) is a automated and robust tool for linear (rigid, affine) intra- and inter-modal brain image registration"

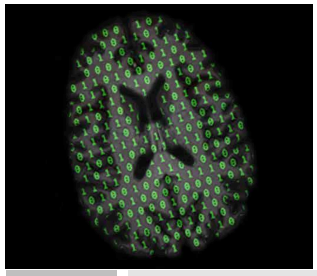
`fslr::flirt` takes in a input filename (or nifti) and a reference filename (or nifti) to transform the infile to:

```
tempdir <- "/home/fsluser/Desktop/MOOC-2015/Template"

template<-readNIfTI(file.path(tempdir, "/
MNI152_T1_1mm_brain.nii.gz"), reorient=FALSE)

registered_fast = flirt(infile=bet_fast2, reffile =
template, dof = 6,retimg = TRUE)
```

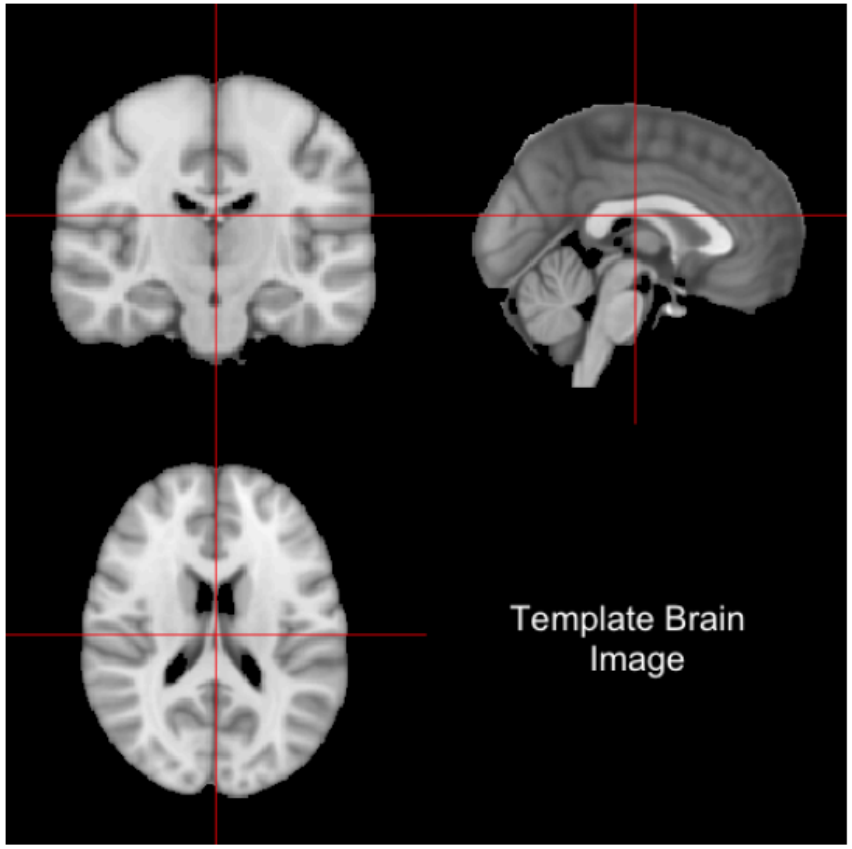


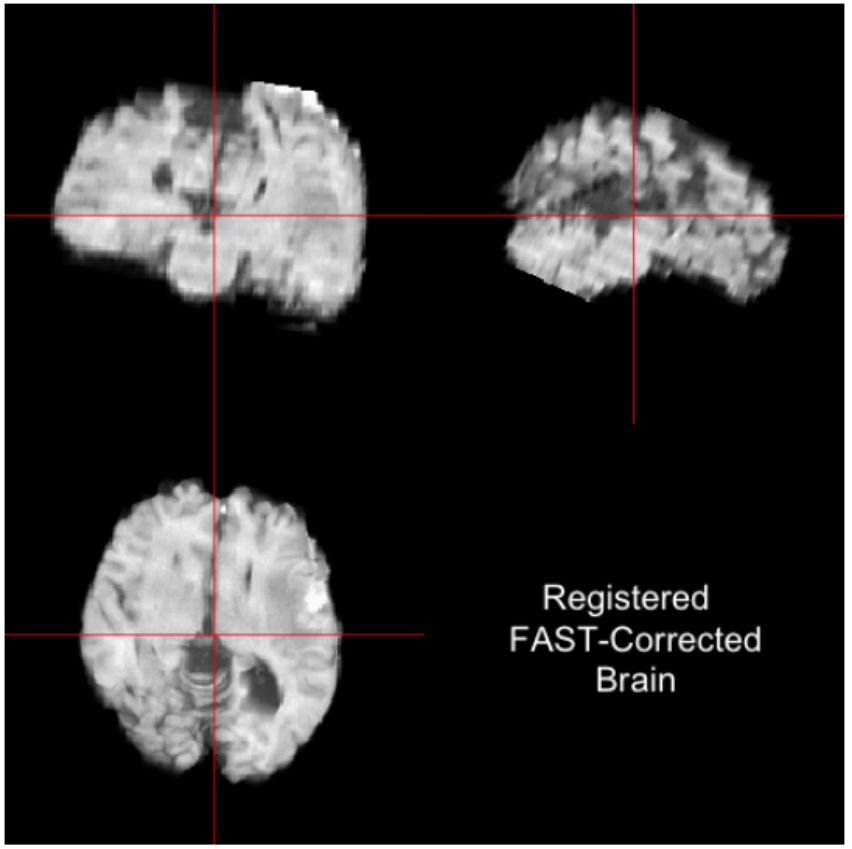
fslr: Image Registration (Rigid) Results

```
orthographic(template)
orthographic(registered_fast)
```



fslr: Image Registration (Rigid) Results





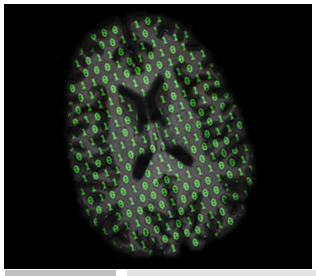
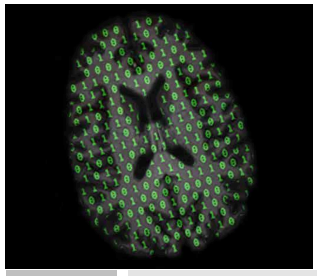


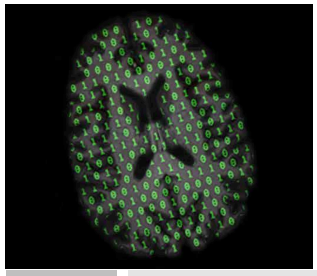
Image dimensions

```
dim(template)
[1] 182 218 182

dim(registered_fast)
[1] 182 218 182

dim(bet_fast2)
[1] 170 256 256
```

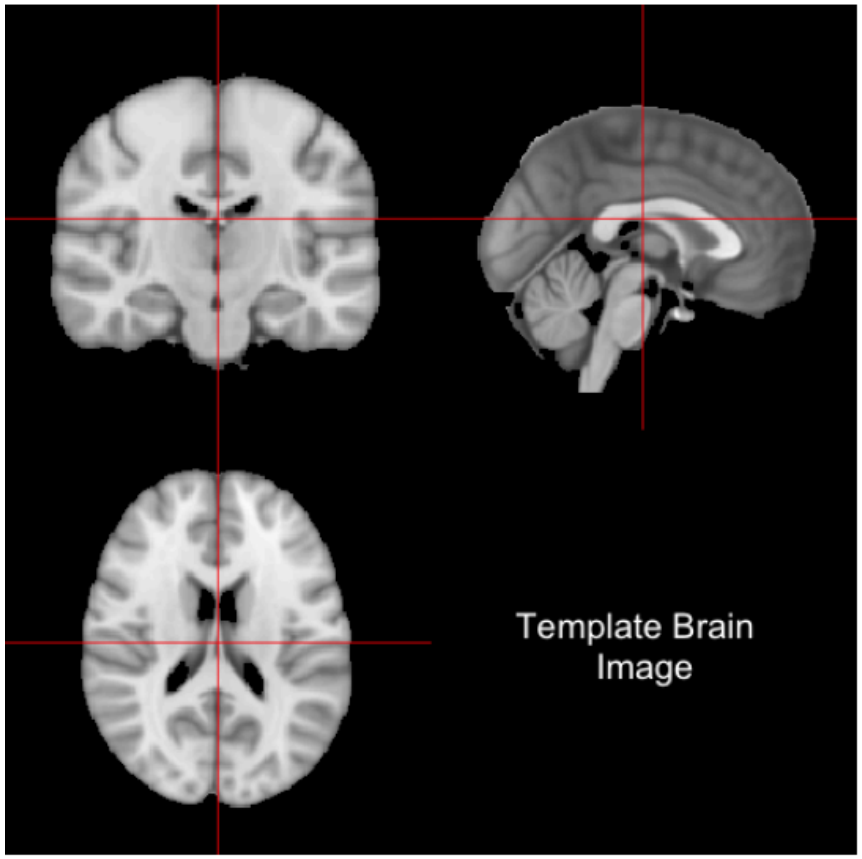


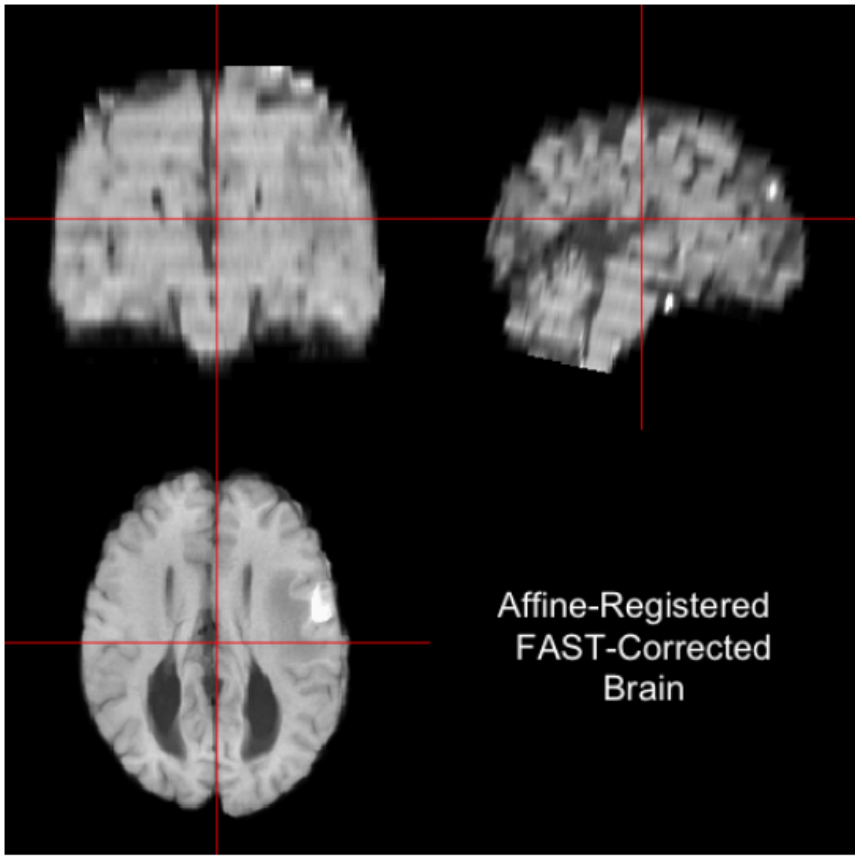
fslr: Affine Image Registration

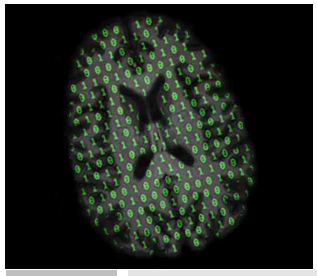
```
reg_fast_affine = flirt(infile=bet_fast2, reffile =
template, dof = 12,retimg = TRUE)
```



fslr: Image Registration (Affine) Results





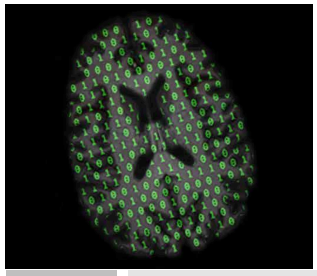


fslr: Nonlinear Image Registration

FNIRT performs non-linear registration. An affine registration must be performed before using FNIRT

- `fslr::fnirt_with_affine:` affine registration + FNIRT
- perform this on skull-stripped images
- this may take a while

```
fnirt_fast = fnirt_with_affine(infile=bet_fast2,
reffile = template, outfile = "FNIRT_to_Template",
retimg=TRUE)
```



fslr: Image Registration (Nonlinear) Results