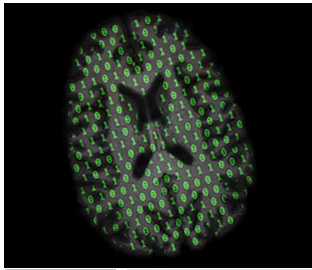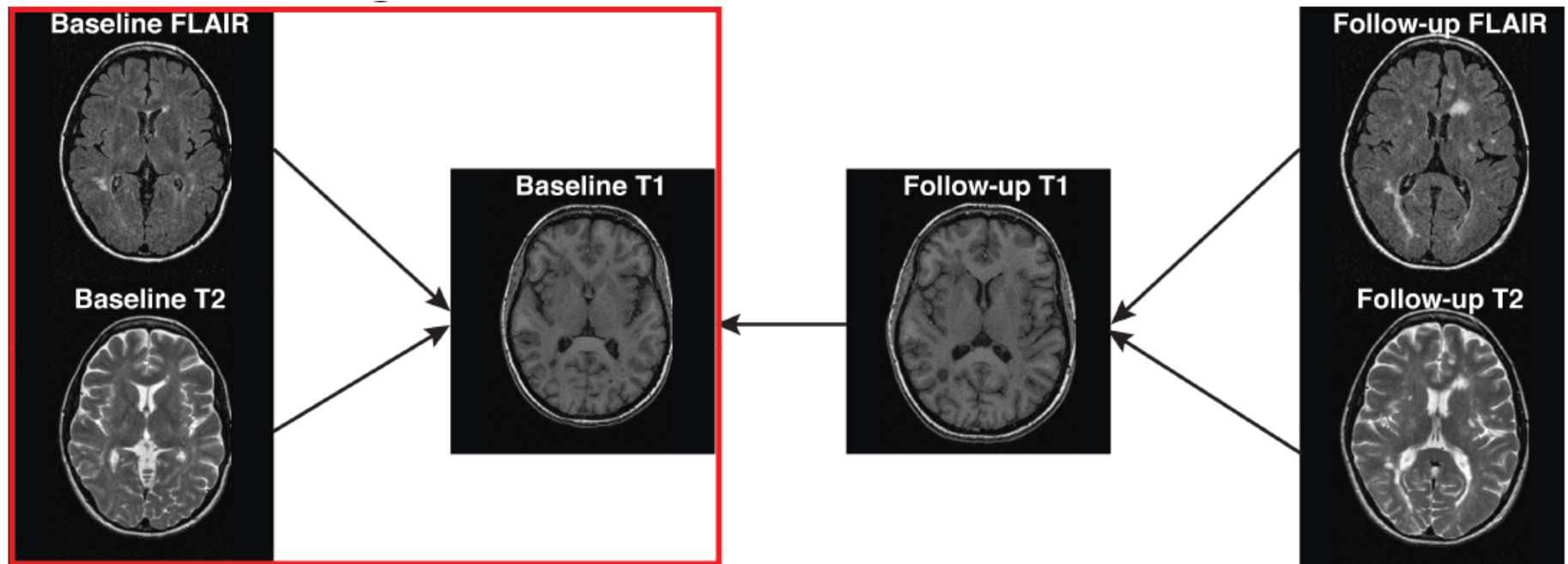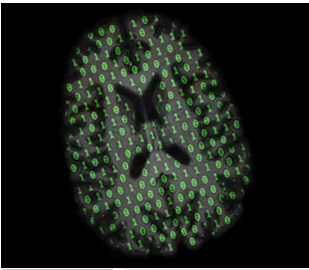# THEME 4 / LECTURE 2: FSLR CO-REGISTRATION
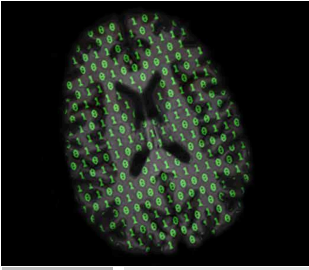
fslr: Co-Registration

Co-Registration: Registration Within the Same Subject

- Requires fewer degrees of freedom
  - sequences from the same individual/brain are more alike than images from different subjects

- Example analyses that do not require a reference template
  - Identify location-specific longitudinal changes within an individual
  - Tissue class or structural segmentation
 - Analysis of individual-subject change in intensities
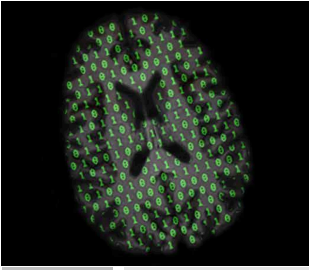
Reading the T1 Scan from Visit 1

```r
library(oro.nifti)
library(extrantsr)
library(fslr)
kirbydir <- "/home/fsluser/Desktop/MOOC-2015/kirby21"
mridir=file.path(kirbydir, "visit_1", "113")
T1_file=file.path(mridir, "113-01-MPRAGE.nii.gz")
T1=readNIfTI(T1_file,reorient=FALSE)
```

FLIRT: FSL's Linear Registration Tool

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

☐ Here we will register the scan with the skull on
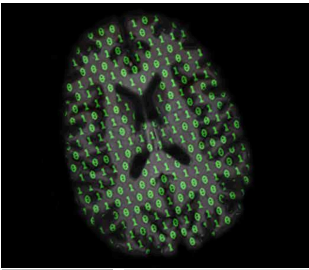
FLIRT: Kirby21 Co-Registration of T2w to T1

Use the `fslr` function `flirt` to register the T2w (infile) to the T1 (reffile), which calls the `FSL` function `flirt`
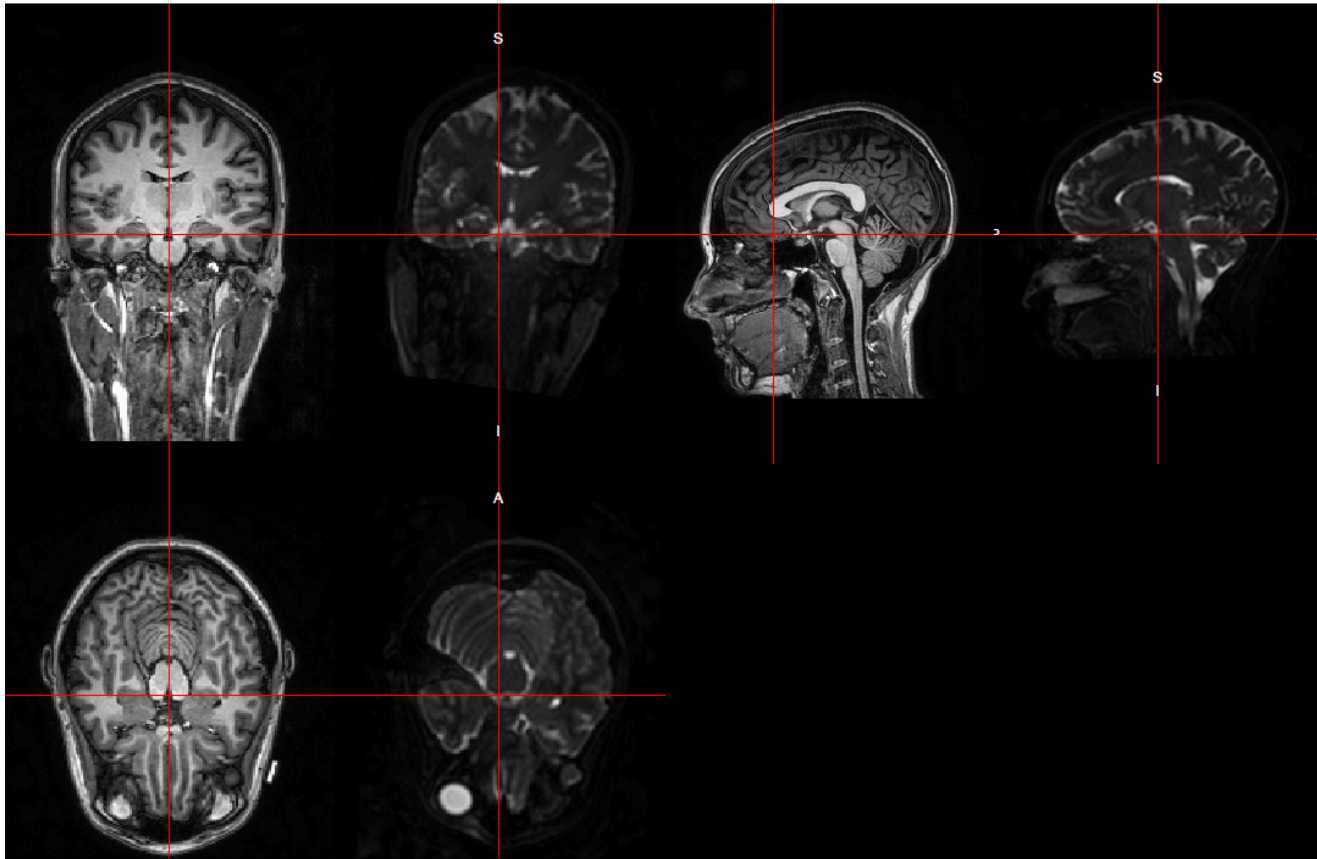
```
T2_file=file.path(mridir, "113-01-T2w.nii.gz")
T2w=readNIfTI(T2_file)
flirt_reg_t2_img = flirt(infile = T2_file, reffile =
T1,dof = 6,verbose = FALSE)
```
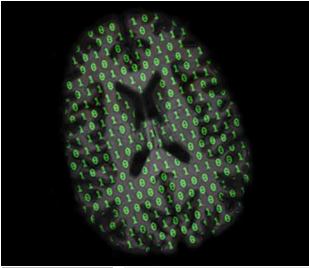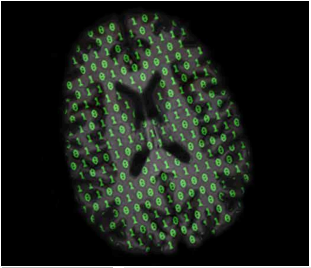
Results

T2w image is tilted and the eye in the axial slice (bottom left) is out of sync

`double_ortho(T1, flirt_reg_t2_img)`

Dimensions of Images

```
dim(T1)
[1] 170 256 256

dim(flirt_reg_t2_img)
[1] 170 256 256

dim(T2w)
[1] 180 256 256
```