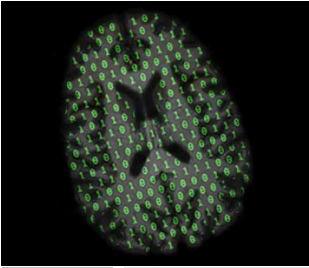




# THEME 2/LECTURE 3: BASIC VISUALIZATION



# Basic Visualization

- ☐ Slices
- ☐ Digital zoom
- ☐ Histograms
- ☐ Back mapping



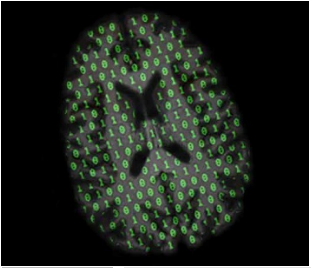
# Basic Visualization

- `readNIfTI` function in the `oro.nifti` package

```
library(oro.nifti)
setwd("~/Neurohacking_data/BRAINIX/NIfTI")
fname="Output_3D_File"
print({nii_T1= readNIfTI(fname=fname)})
NIfTI-1 format
```

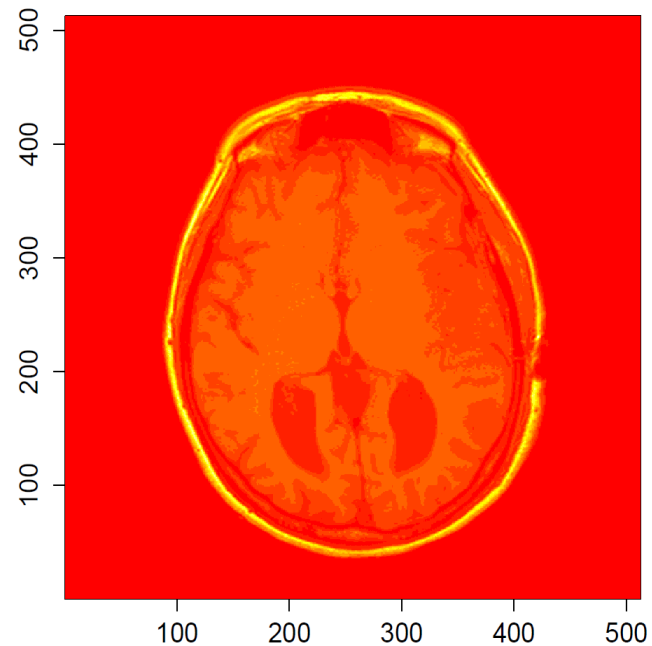
```
Type                : nifti
Data Type            : 4 (INT16)
Bits per Pixel       : 16
Slice Code           : 0 (Unknown)
Intent Code          : 0 (None)
Qform Code           : 2 (Aligned_Anat)
Sform Code           : 2 (Aligned_Anat)
Dimension            : 512 x 512 x 22
Pixel Dimension      : 0.47 x 0.47 x 5
Voxel Units          : mm
Time Units           : sec
```

Data structure



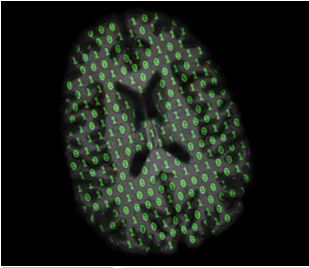
# Visualizing an Image Slice

```
image(1:d[1],1:d[2],nii_T1[, ,  
11],xlab="",ylab="")
```



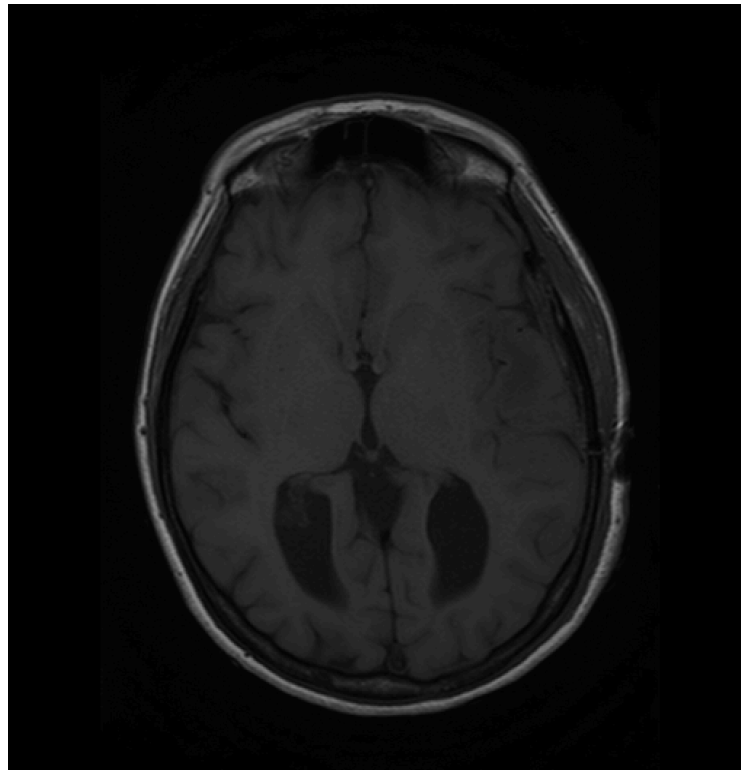
graphics::image uses the default  
heat.colors(12)

Colors can be reset: `col=gray(0:64/64)`

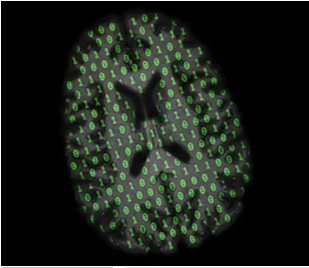


# Visualizing an Image Slice

```
image(nii_T1, z=11, plot.type="single")
```

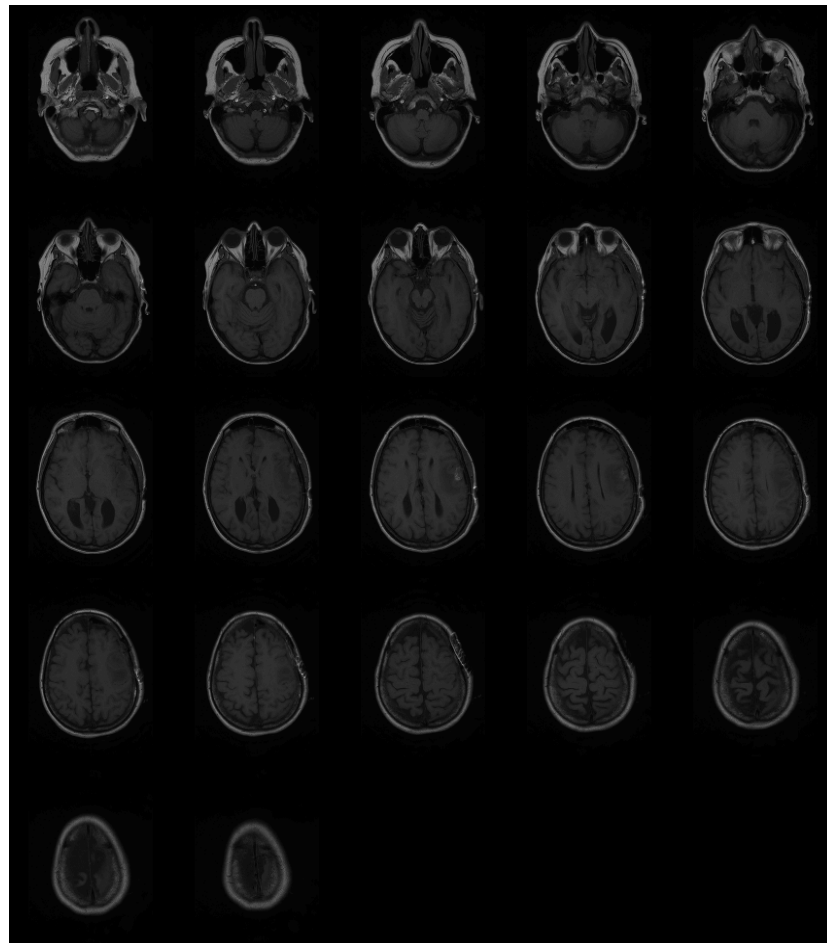


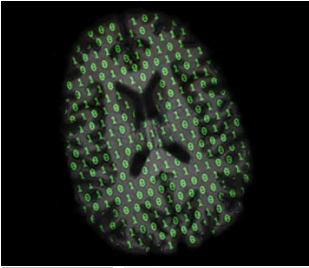
`oro.nifti::image` uses the nifti object, needs to specify the slice



# Visualizing All Slices

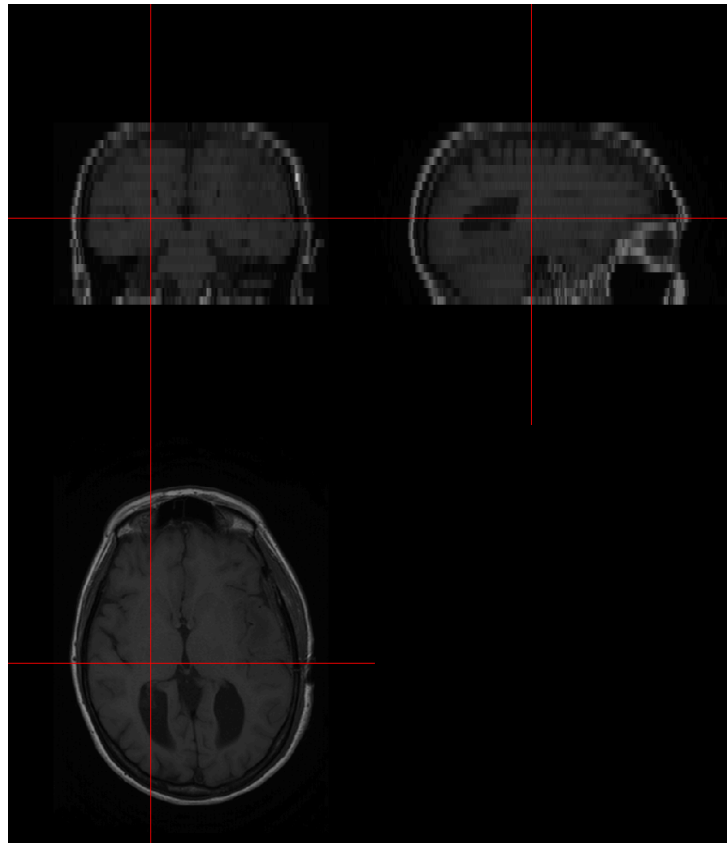
```
image(nii_T1)
```

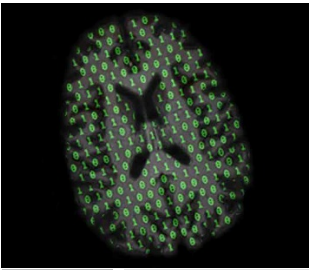




# All Planes: Coronal, Sagittal, Axial

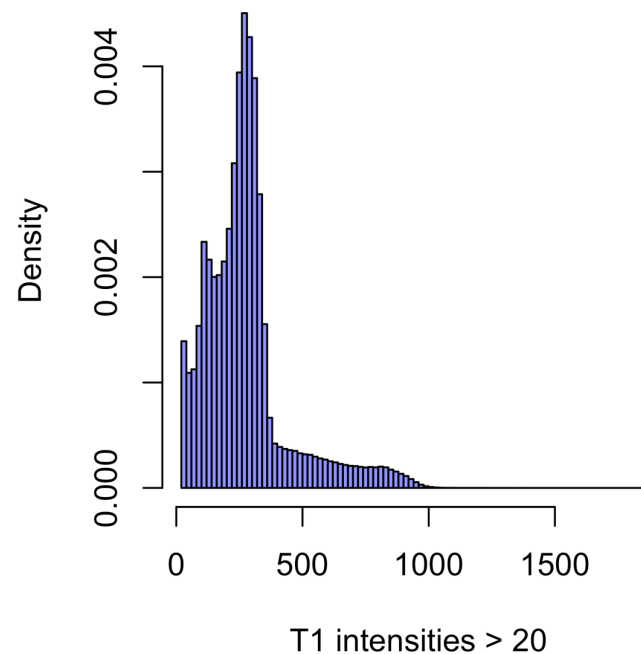
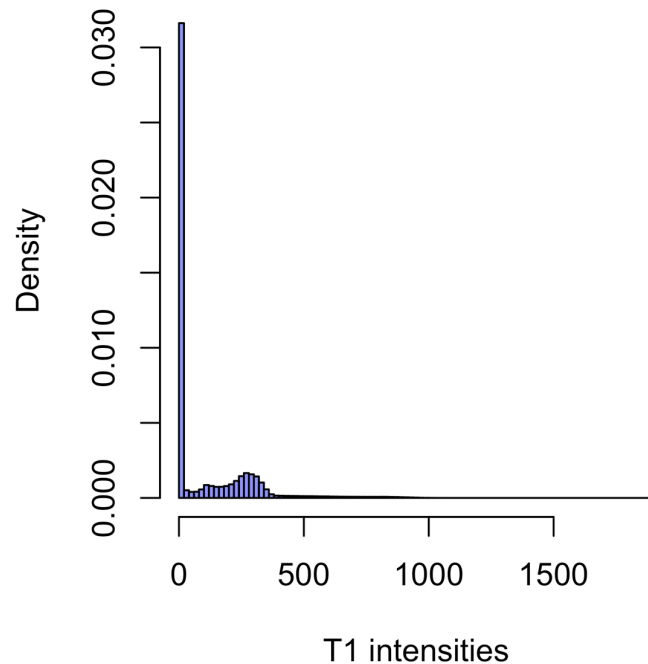
```
orthographic(nii_T1,xyz=c(200,220,11))
```



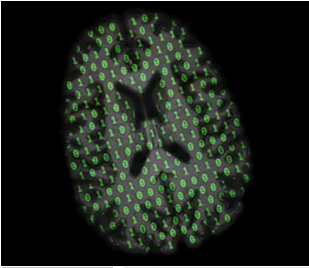


# Visualizing All Slices

```
par(mfrow=c(1,2));  
o<-par(mar=c(4,4,0,0))  
hist(nii_T1, breaks = 75, prob=T, xlab="T1  
intensities", col=rgb(0,0,1,1/2), main="");  
hist(nii_T1[nii_T1 > 20], breaks =  
75, prob=T, xlab="T1 intensities > 20",  
col=rgb(0,0,1,1/2), main="")
```

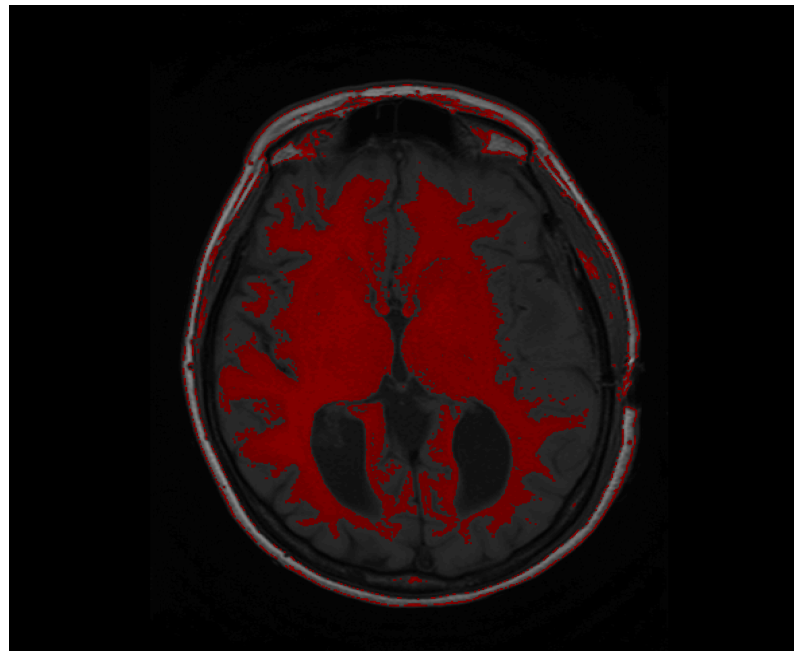


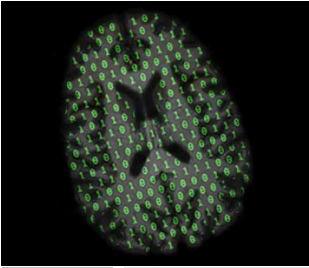




# Backmapping One Slice

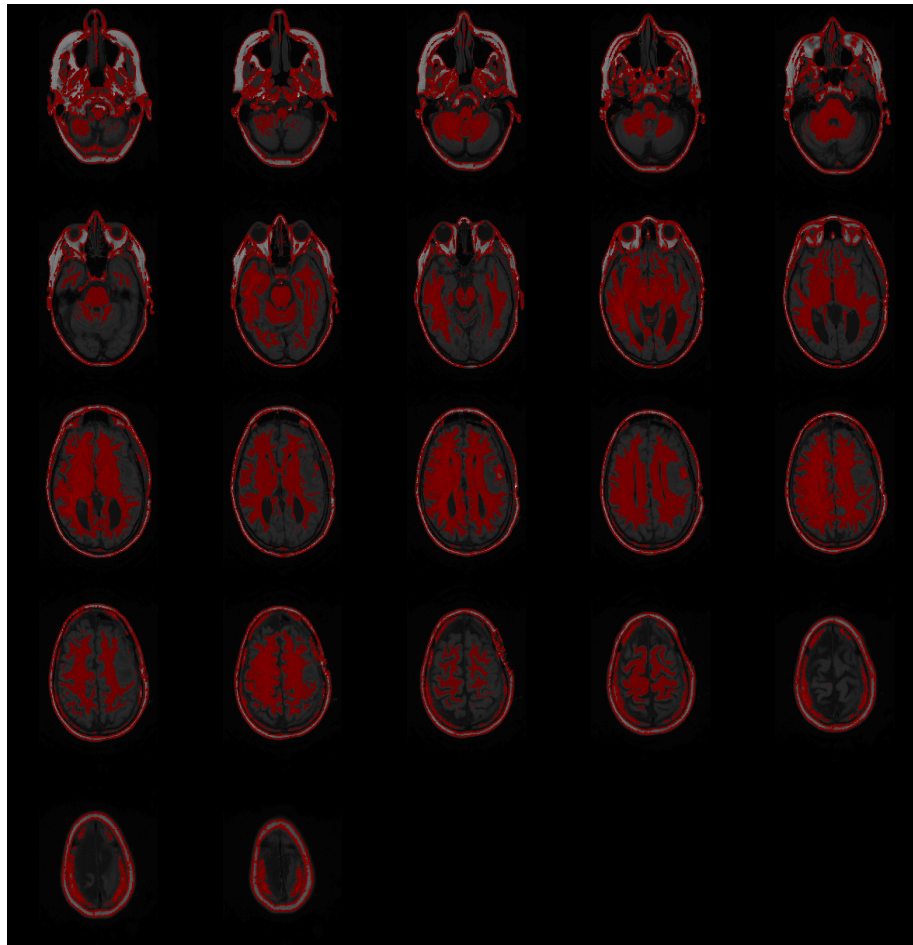
```
is_btw_300_400<- ((nii_T1>300) &  
(nii_T1<400))  
nii_T1_mask<-nii_T1  
nii_T1_mask[!is_btw_300_400]=NA  
overlay(nii_T1,nii_T1_mask,z=11,plot.type="  
single")
```

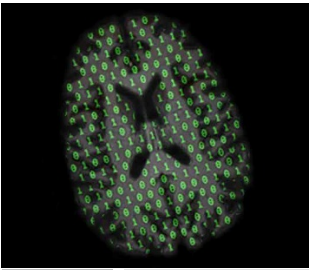




# Backmapping All Slices

```
overlay(nii_T1,nii_T1_mask)
```





# Back Mapping Orthographic

```
orthographic(nii_T1,nii_T1_mask,xyz=c(200,20,11), text="Image overlaid with mask", text.cex = 1.5)
```





# Functions Discussed

- `oro.nifti::readNIfTI` -- read in the data
- `graphics::image` -- display matrix of data
- `oro.nifti::image` -- display NIfTI data
- `oro.nifti::orthographic` -- display 3-planes of an image
- `oro.nifti::overlay` -- display overlay of two images, NAs are not plotted in the y-image