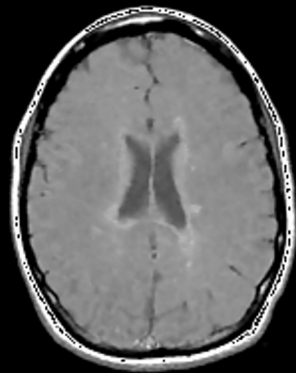


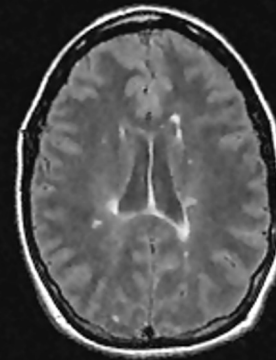
# Introduction to Project 3: Multiple Sclerosis Lesion Segmentation

# Segmenting brain lesions from normal tissue

$T_1$  weighting



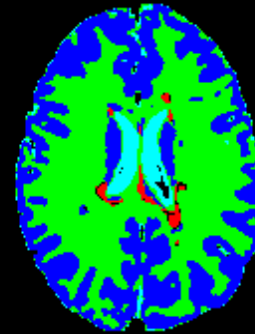
$T_2$ -weighting



$M_0$  weighting

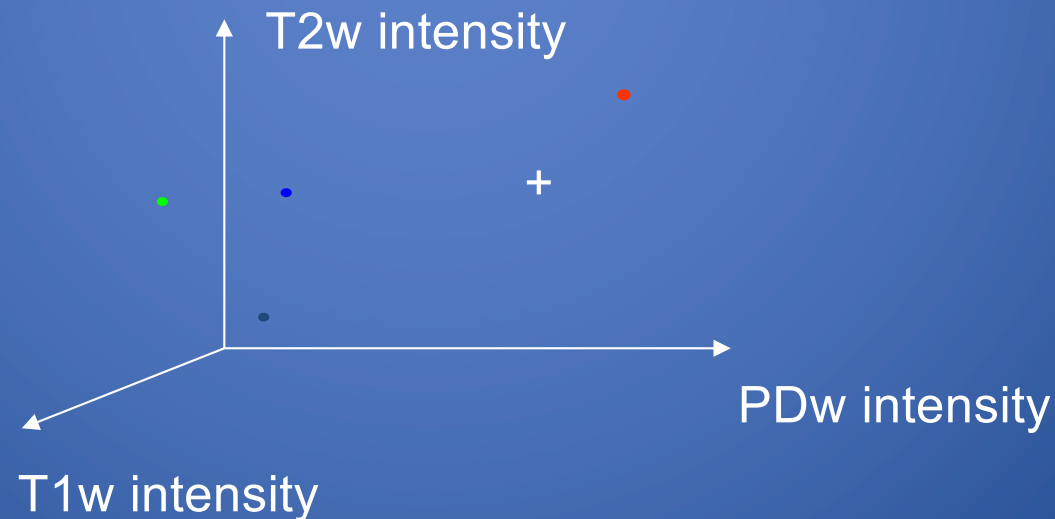


Segmented



# Goals

- Goal
  - Use multi-spectral data to classify voxels
    - White matter, gray matter, cerebral spinal fluid, lesion
  - Measure lesion volume



# Steps in project

- Define training points for the important tissue classes
  - Lesion
  - White matter
  - Gray matter
  - Cerebral spinal fluid
- Determine class centers in the multi-spectral 'feature space'
- Classify each image pixel
  - Assign to class with closest class center
- Goal of project: find number and extent of lesion voxels

## Helpful hint: Array indexing in MATLAB

- Two methods: multidimensional and linear


Image\_m(1, 3)

1	4	7
2	5	
3	6	

Image\_m(7)

- Translating between methods:
  - `[1,3] = ind2sub(size(Image_m), 7);`
  - `7 = sub2ind(size(Image_m), [1,3]);`

# Variable naming convention:

Variables hold the intensity of each tissue class  
in each image type

- Image contrast: first three characters
  - Proton-density weighted = 'pdw'
  - T2-weighted = 't2w'
  - T1-weighted = 't1w'
- Tissue class: fourth character
  - Lesion ('pdw', 't2w', 't1w')
  - White matter ('pdww', 't2ww', 't1ww')
  - Gray matter ('pdwg', 't2wg', 't1wg')
  - Cerebrospinal fluid ('pdwc', 't2wc', 't1wc')