

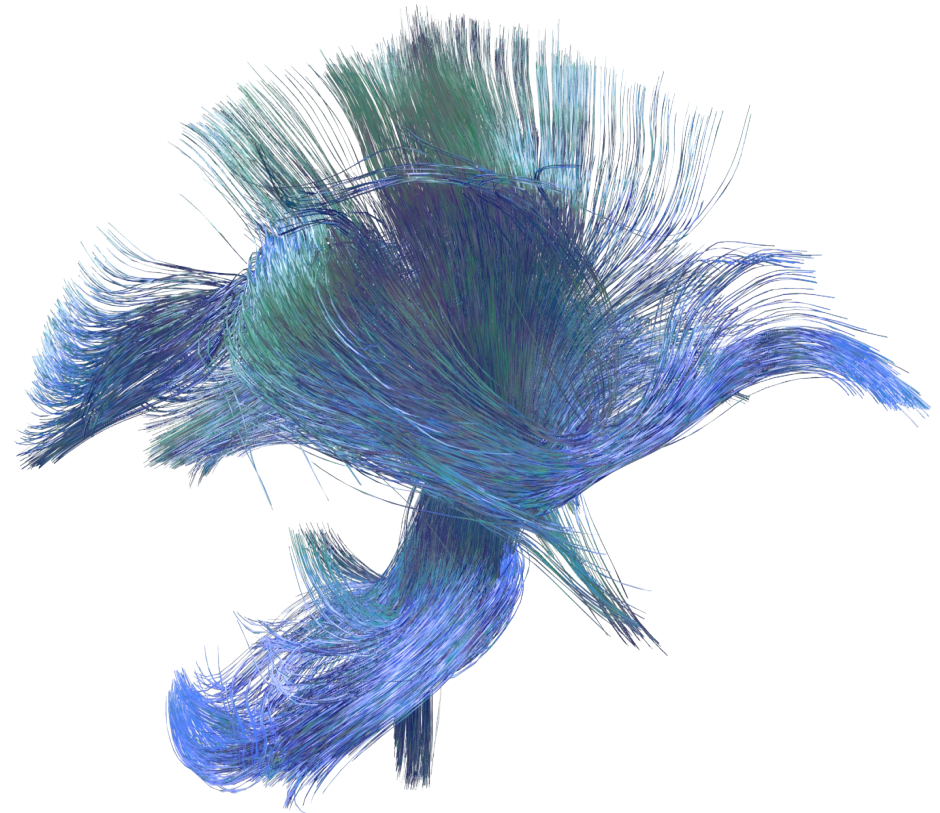
# Diffusion Tensor Imaging quality control : artifacts assessment and correction

A. Coste, S. Gouttard, C. Vachet, G. Gerig



DTI is a powerful technique giving insights into white matter organization

- Allows Tractography
- Increased Artifacts
- Reduced Signal to Noise Ratio
  
- Need of Quality Control
- Correct Artifacts



# Collaboration

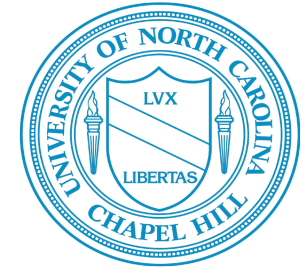
Scanning sites

Data management

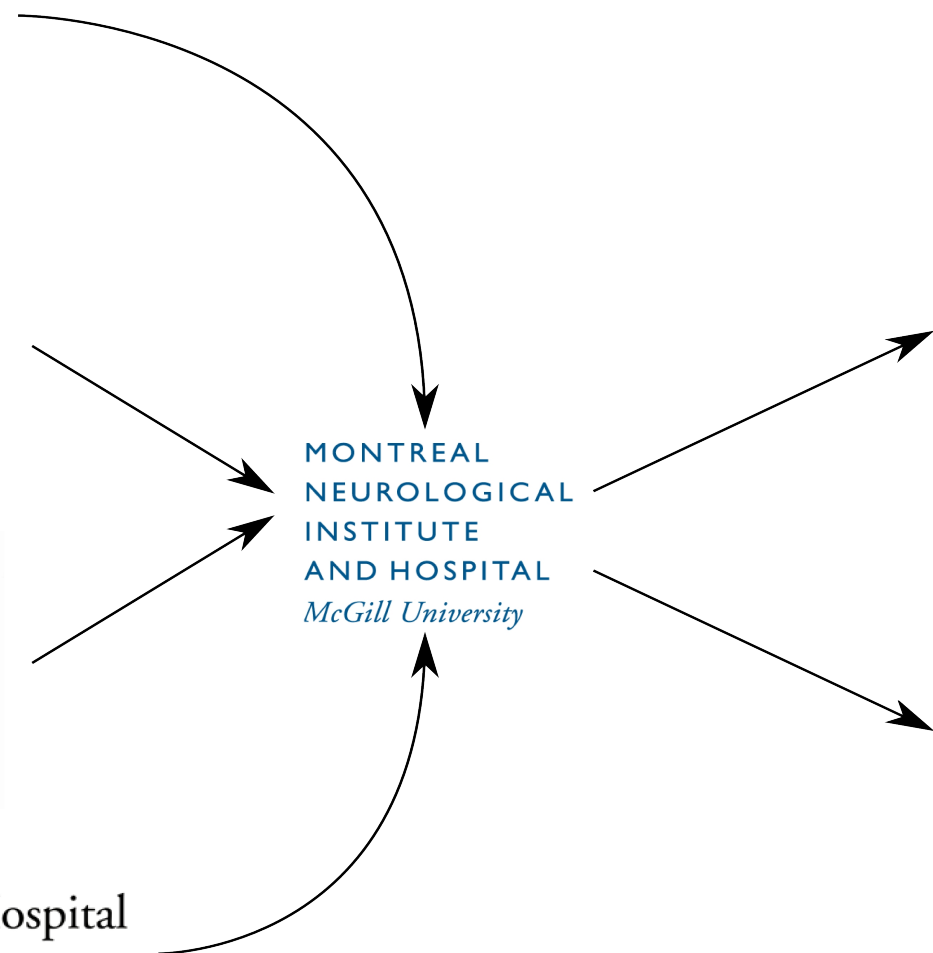
Image Processing  
Statistical Analysis



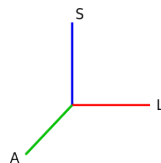
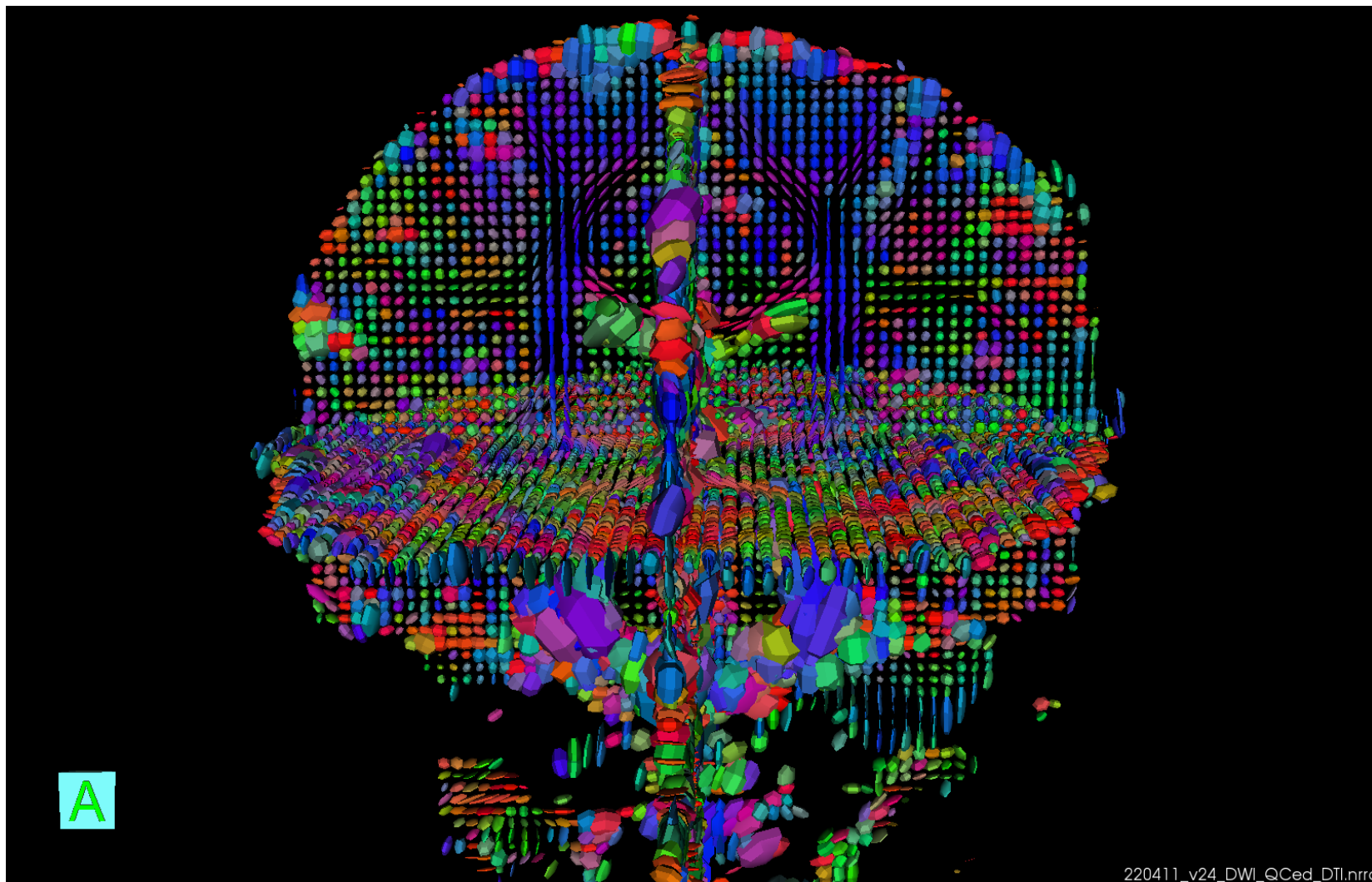
MONTREAL  
NEUROLOGICAL  
INSTITUTE  
AND HOSPITAL  
*McGill University*



 The Children's Hospital  
of Philadelphia®

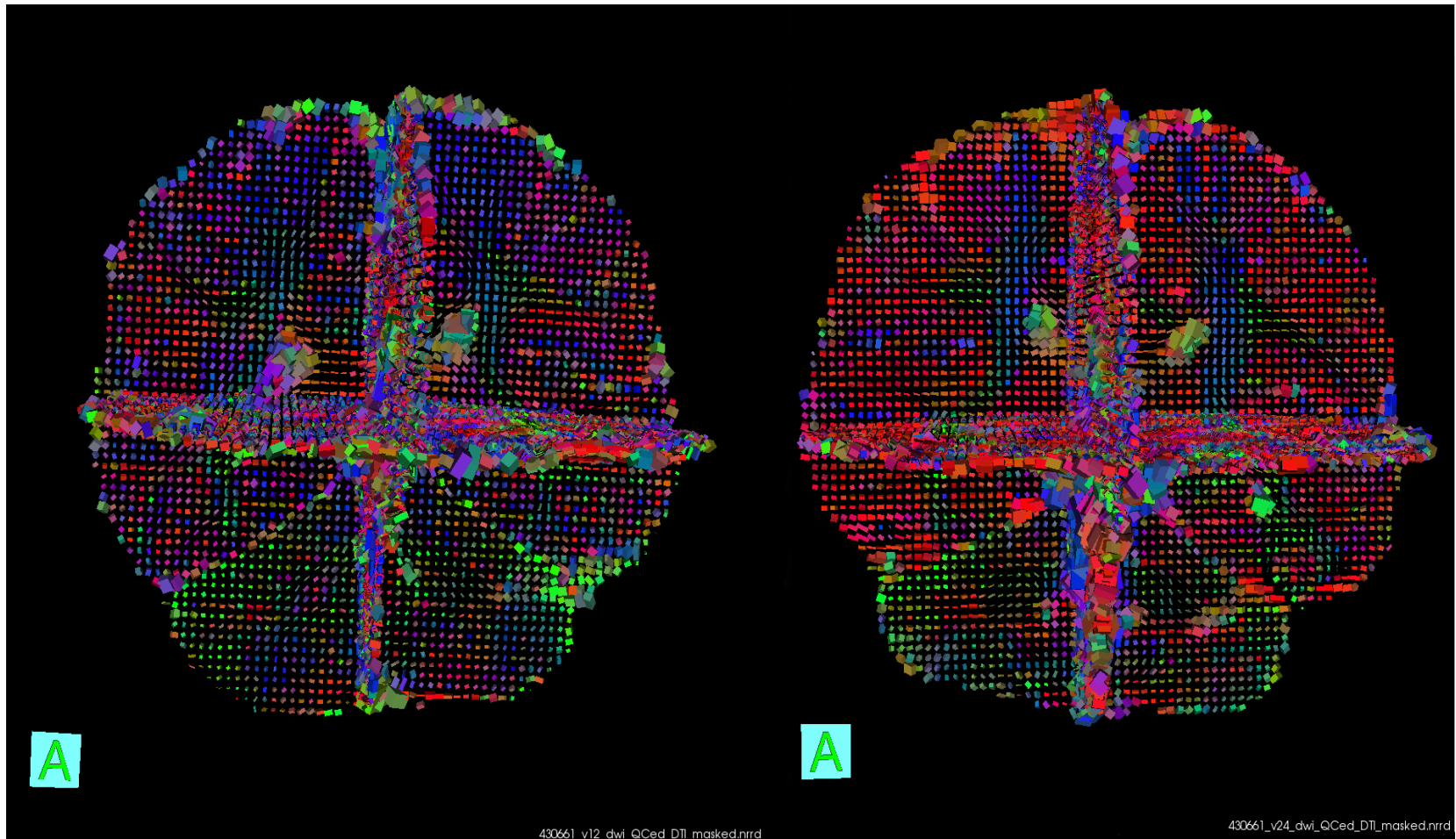


# DTI Visualization



# Artifact Assessment

“Red” Tensors

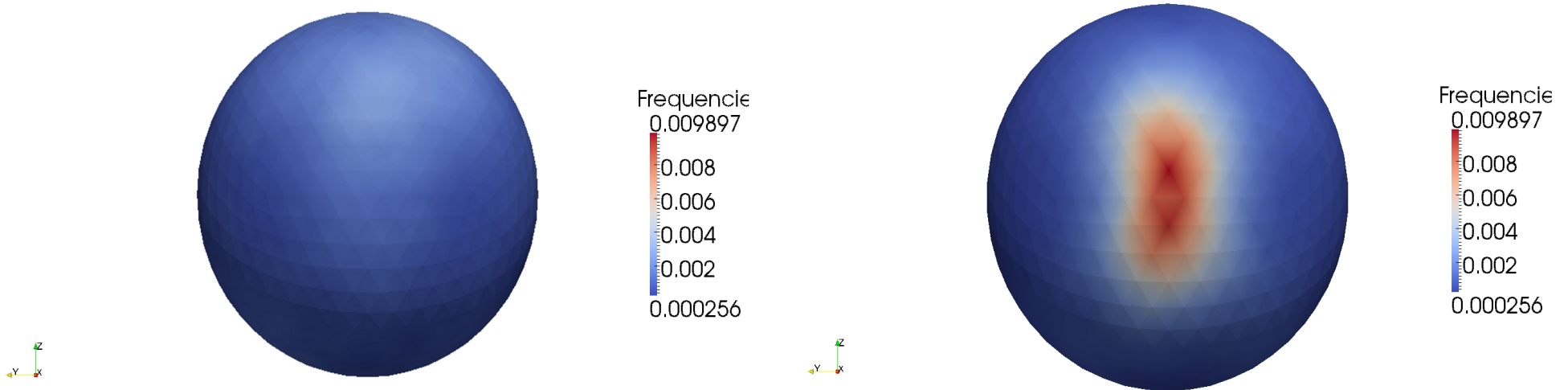


Good case

Bad case

# Artifact Detection

- Principal Direction Spherical Histogram

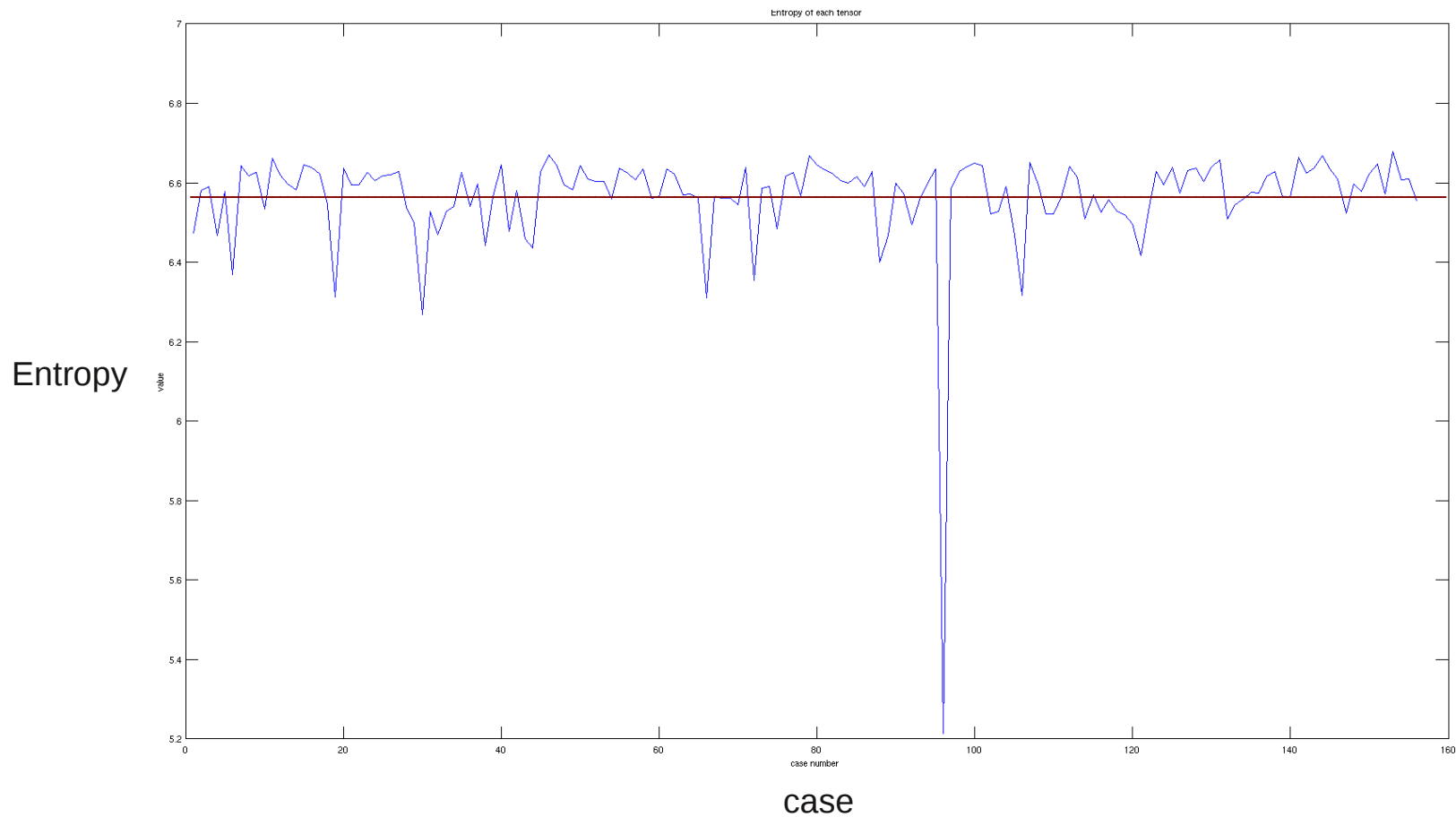


Entropy Based Diffusion Imaging Quality Control via Principal Orientation Distribution : M. Farzinfar et al

# Artifact Detection

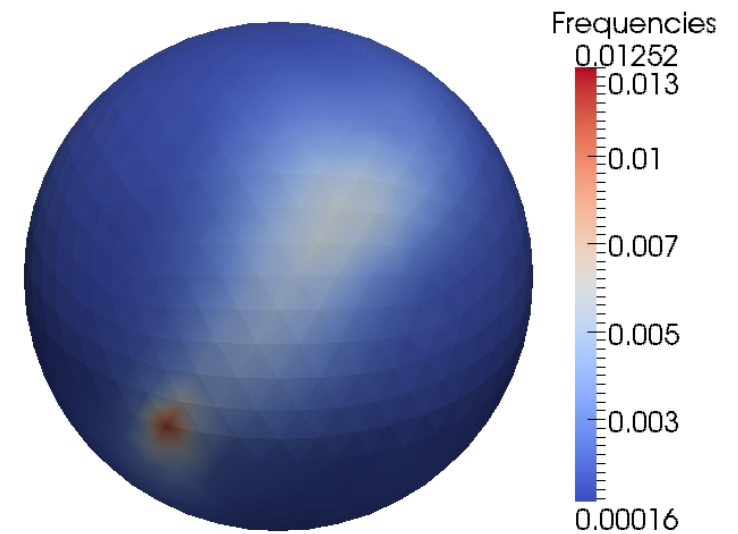
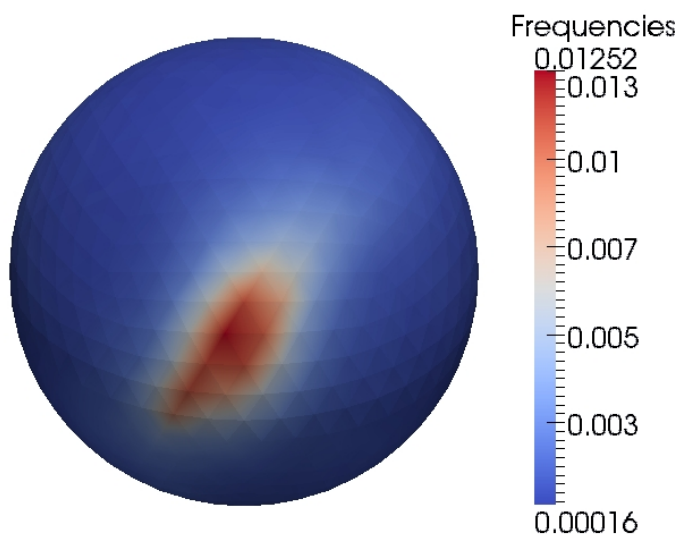
- Entropy

$$E = - \sum_{i=1}^K p_i \log(p_i)$$



# Possible Correction

- Analysis with Principal Direction Distribution





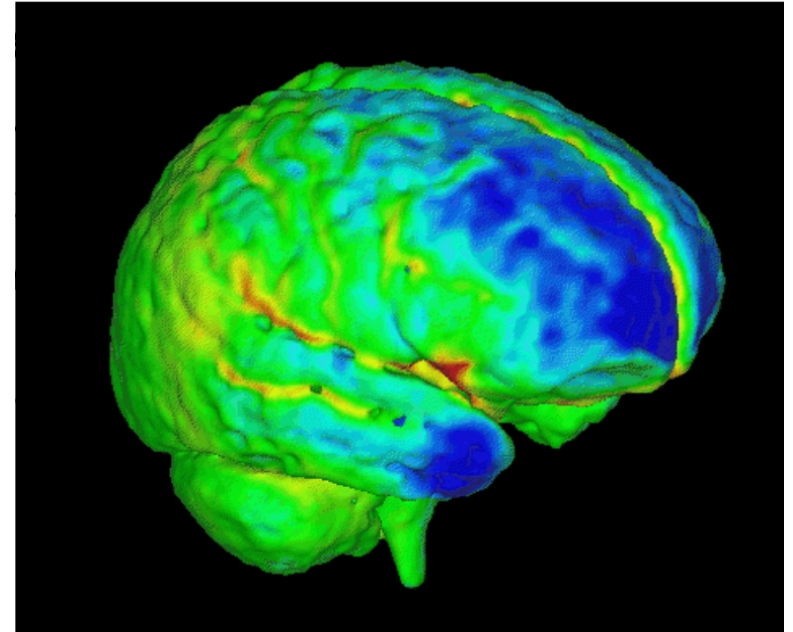
# Conclusion

- Identify and characterize directional artifact
- Possible automated detection via entropy
- Possible correction pipeline developed
  
- Provide better images for Statistical Analysis.
- Framework for common analysis

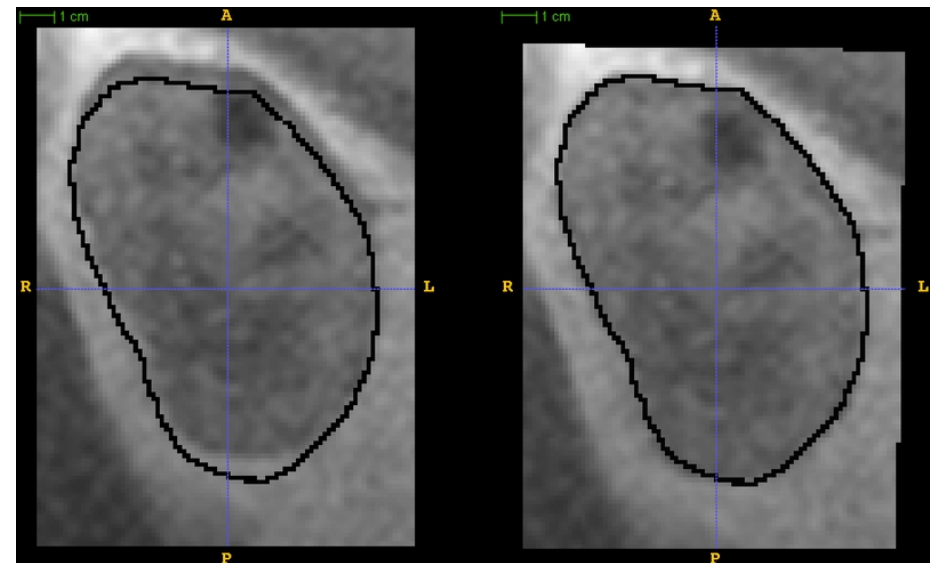


# Dr Gerig's Group

- Brain Imaging
  - Longitudinal Analysis
  - Shape Analysis



- Kidney motion correction



Questions

Questions ?