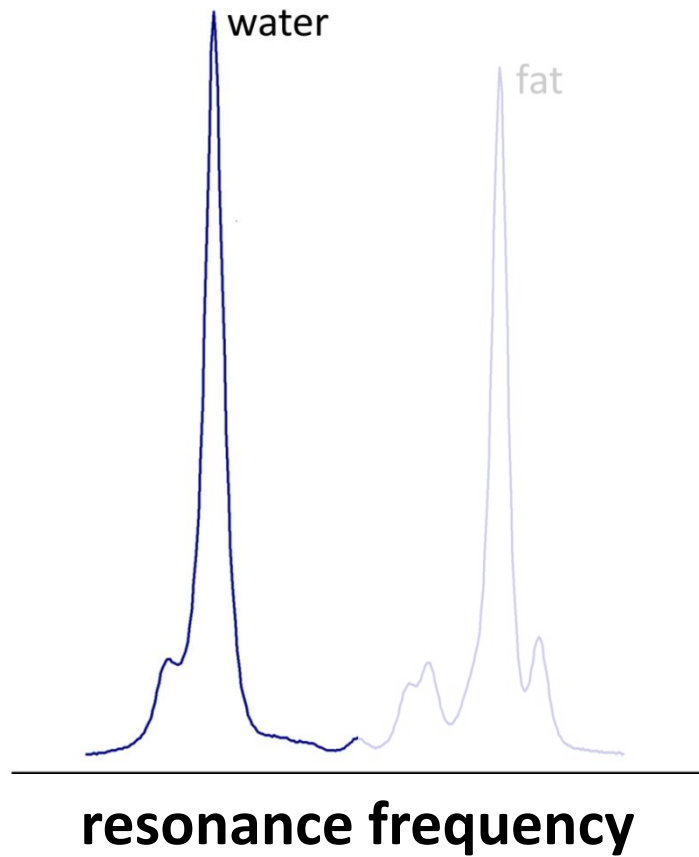


# **Accelerated Chemical Shift Encoded Water-Fat MRI**

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**April 20<sup>th</sup>, 2012**

# Chemical Shift Encoded Water-Fat MRI



# Chemical Shift Encoded Water-Fat MRI

$$\text{fat fraction} = \frac{\text{fat}}{\text{fat} + \text{water}}$$



**Data Acquisition of fat and water  
Clinical Setting!**

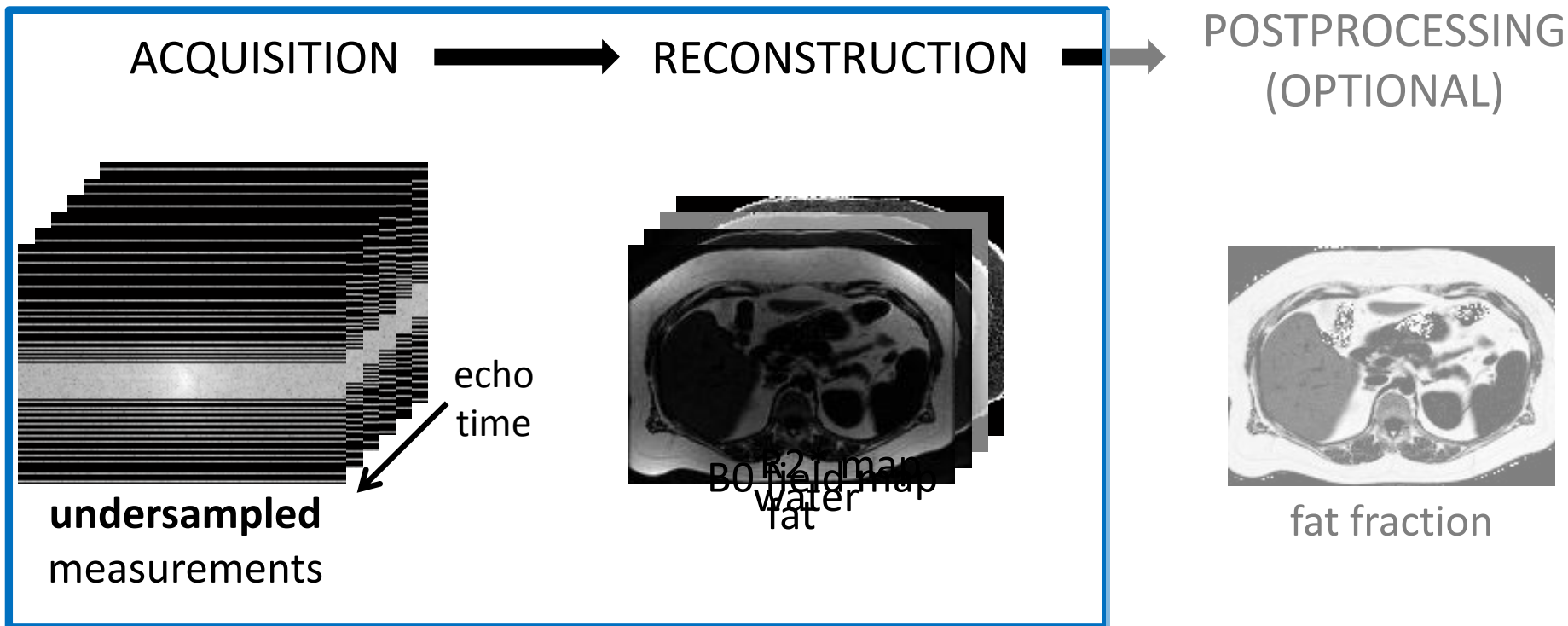
*Hines et al. JMIR 2011*

## Goal of This Work

**To accelerate the data acquisition of water-fat MRI, while maintaining accurate separation & quantitation**

1. reduce motion artifacts (especially in breath-held cardiac and abdominal scans)
2. increase volume coverage
3. finer spatial resolution
4. increase clinical throughput
5. improve patient comfort

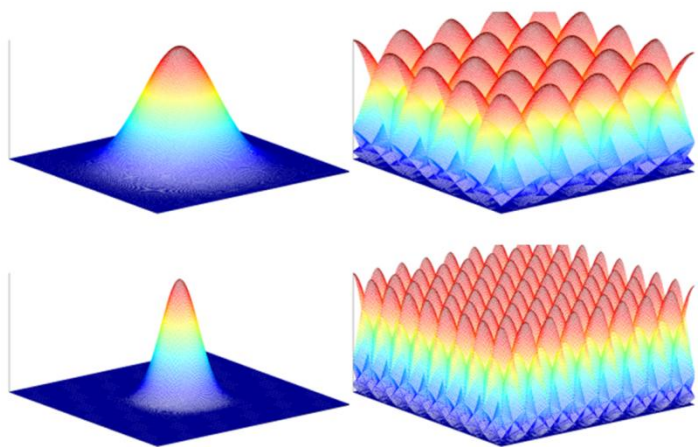
# Our Proposed Acceleration Approach



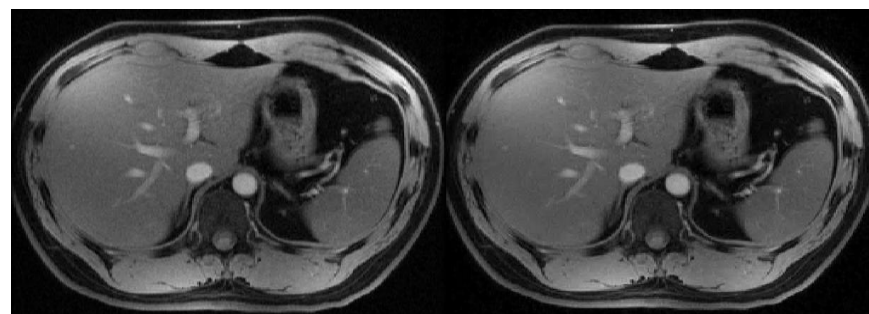
**Focus Of Our Work**

# Reconstruction Tools

## multiscale cubic B-splines



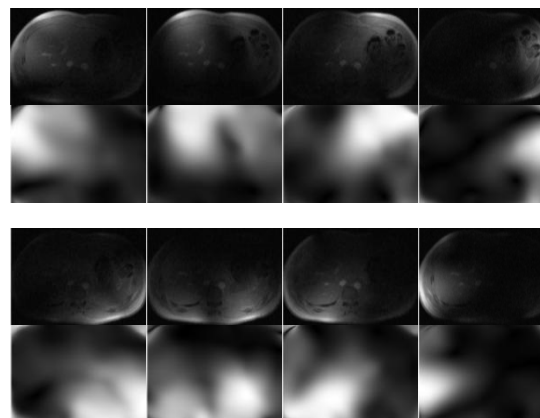
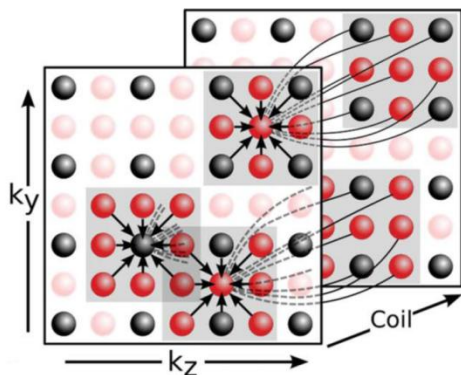
## compressed sensing



100% wavelet cfs.

35% wavelet cfs.

## parallel imaging



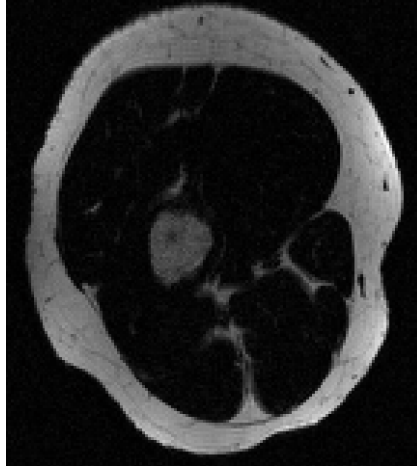
*Lustig et al. MRM 2010*

## Water-Fat Separation

water



fat

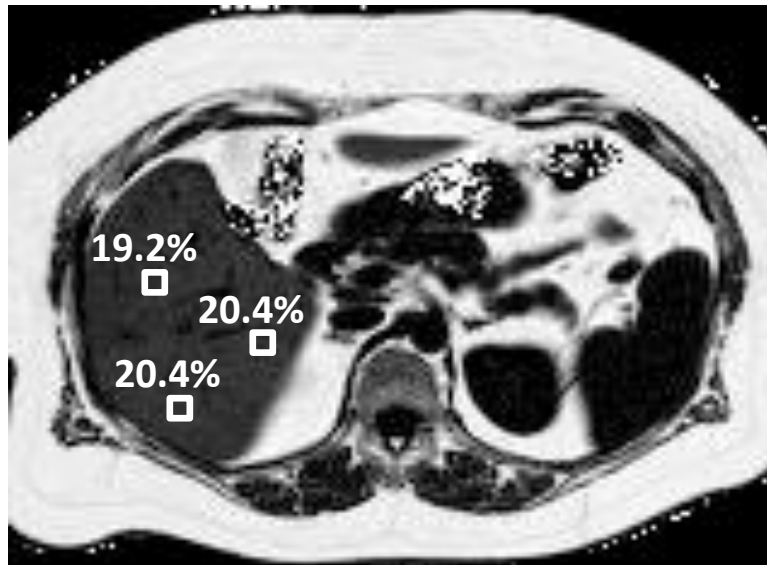


reference

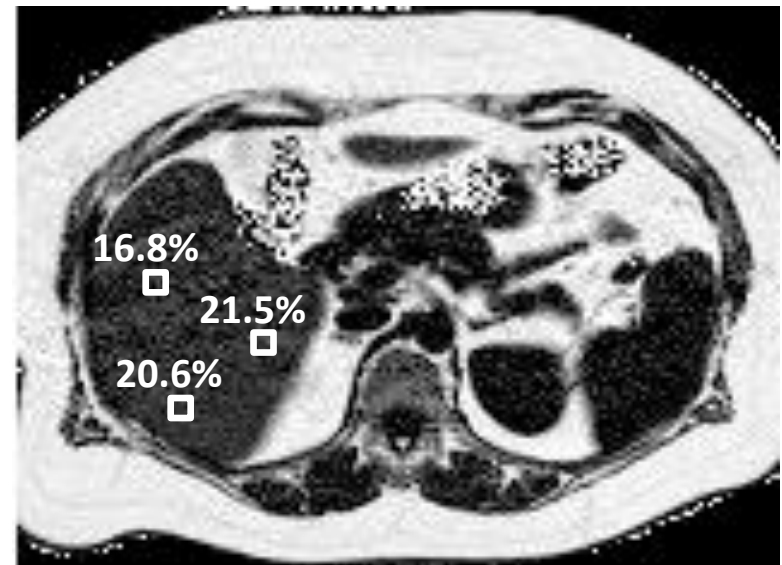
(acquisition time = 10:11)

## Water-Fat Quantitation

fat  
fraction



reference  
(acquisition time = 00:18)

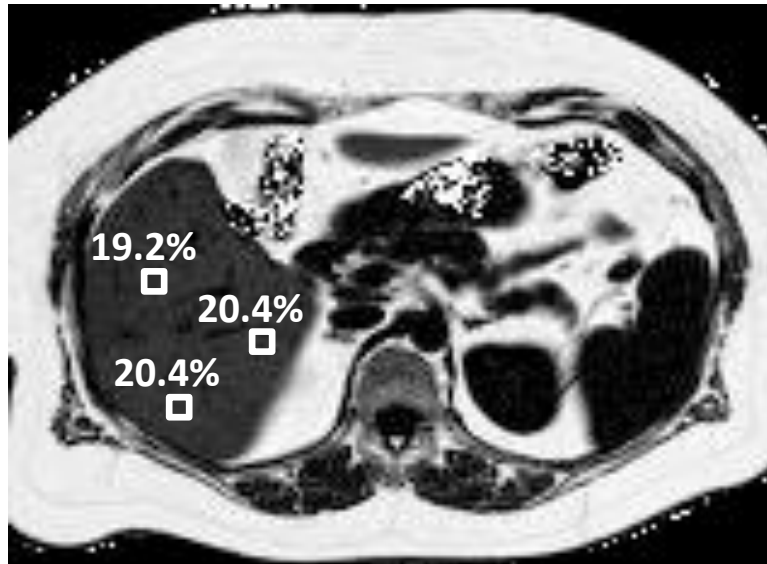


current method  
(acquisition time = 00:06)

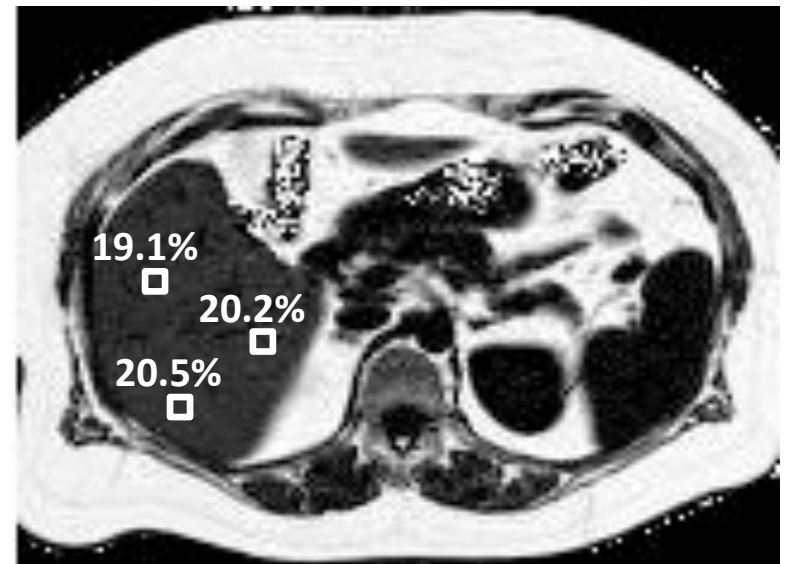


## Water-Fat Quantitation

fat  
fraction

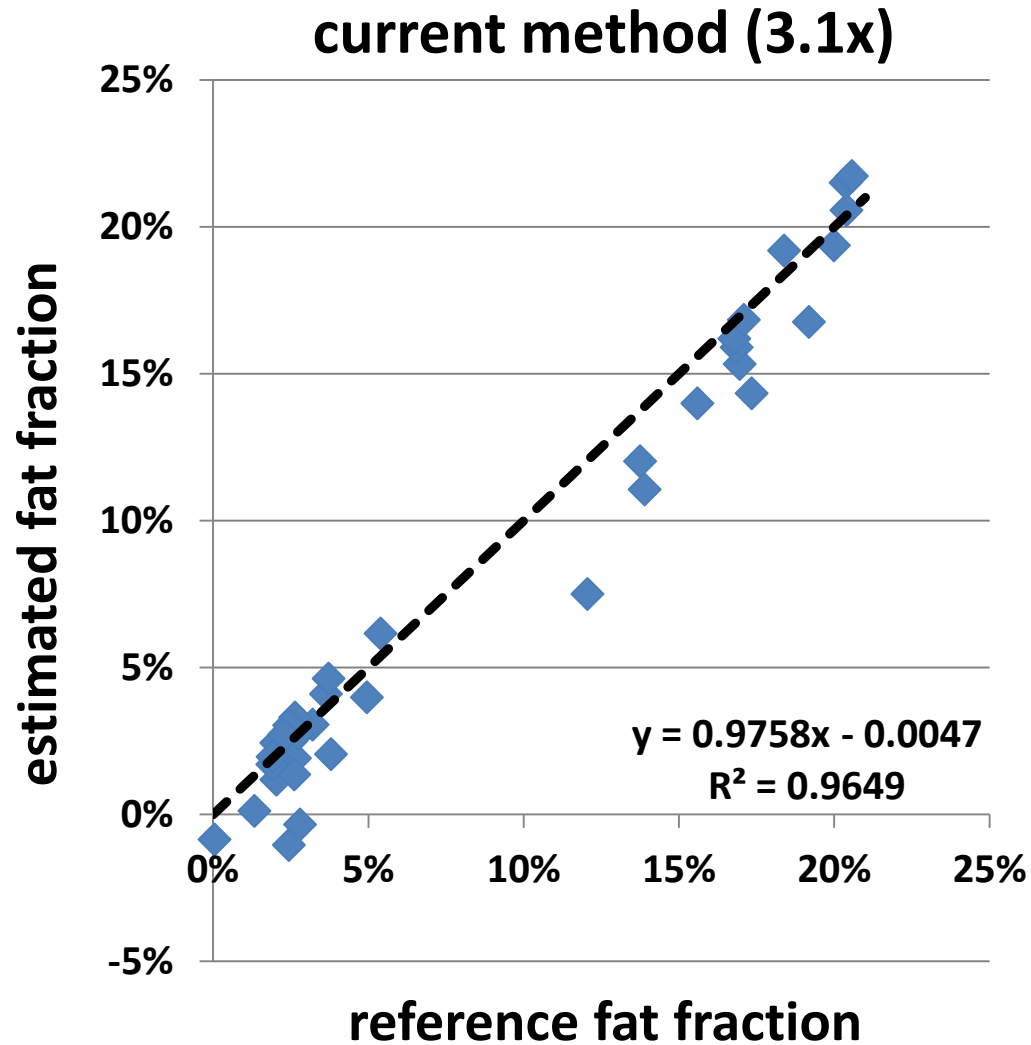


reference  
(acquisition time = 00:18)

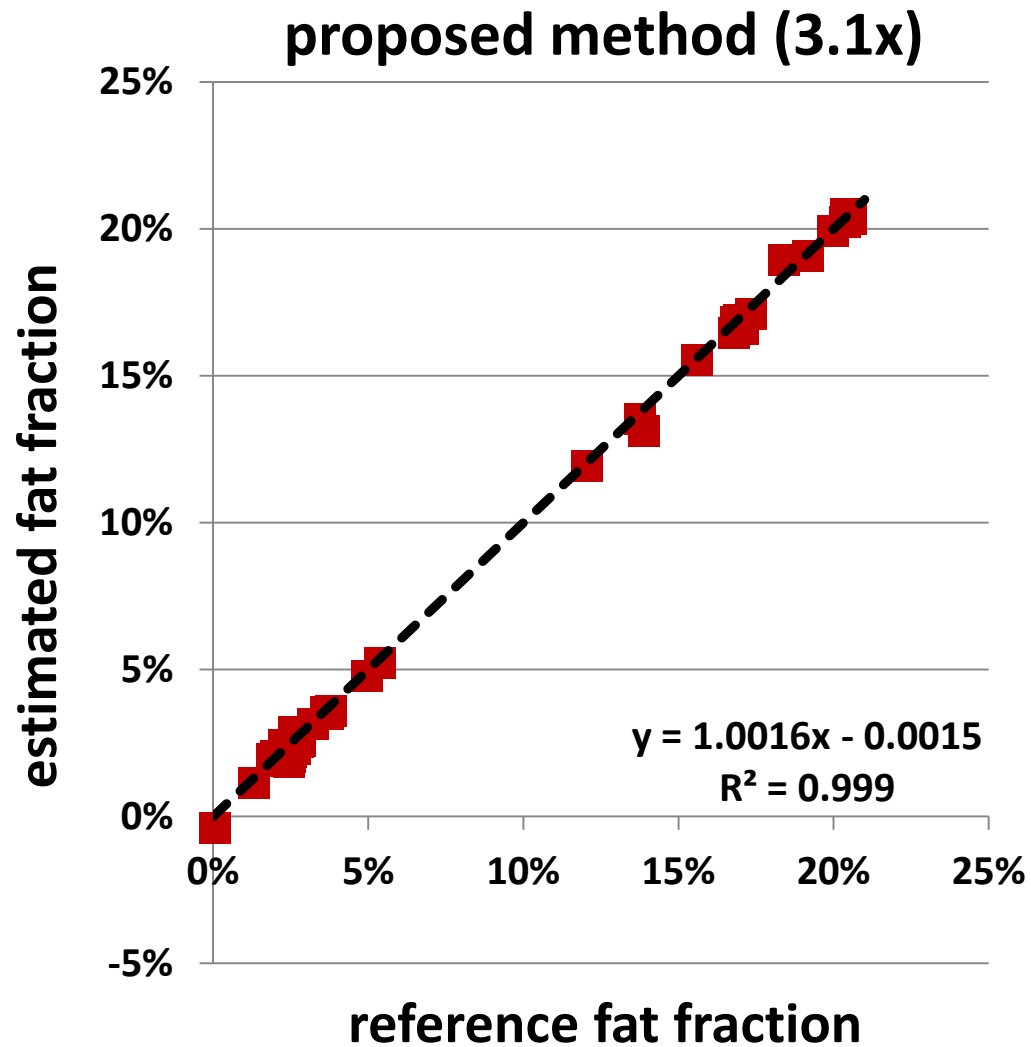


proposed method  
(acquisition time = 00:06)

# Accuracy of Quantitation



# Accuracy of Quantitation



**Thank you!**