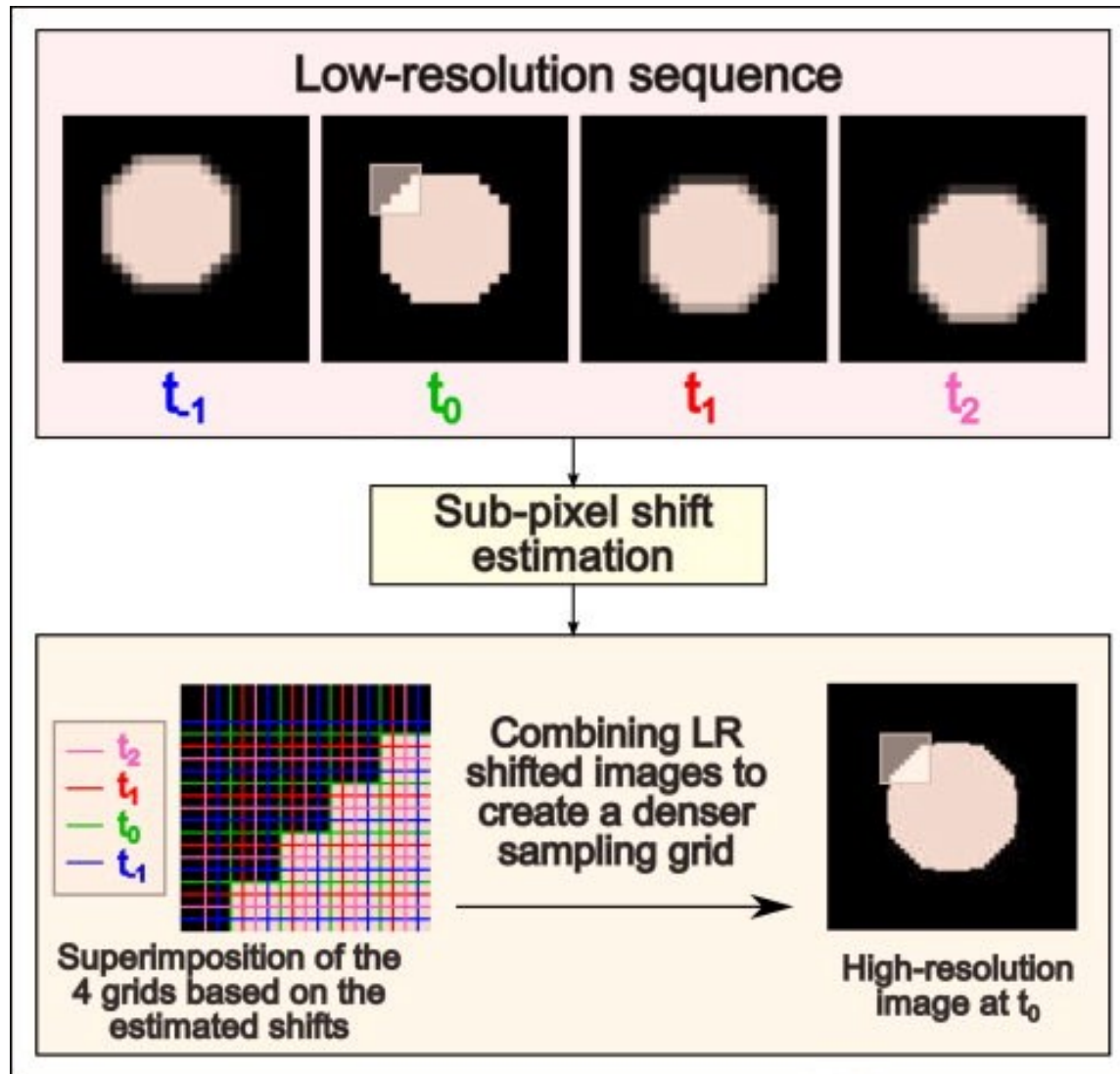


# Reconstruction schemes for MR Data

## **Discussion session**

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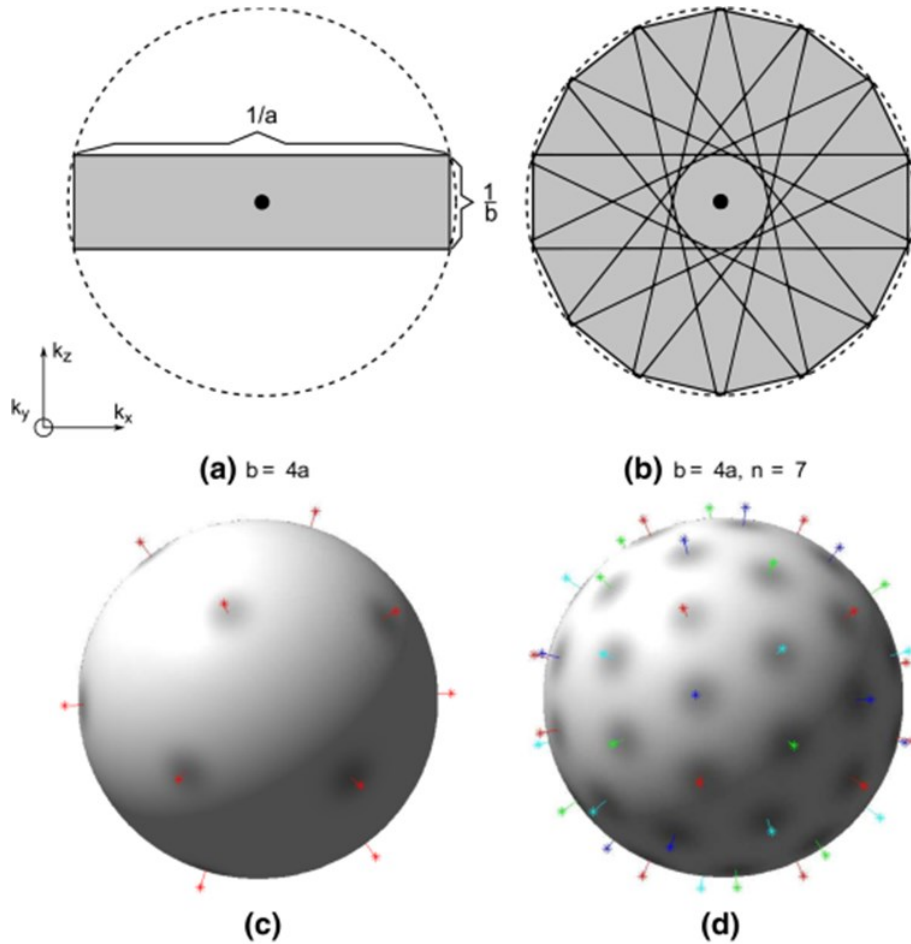
# Super-resolution in magnetic resonance imaging: A review (2012)



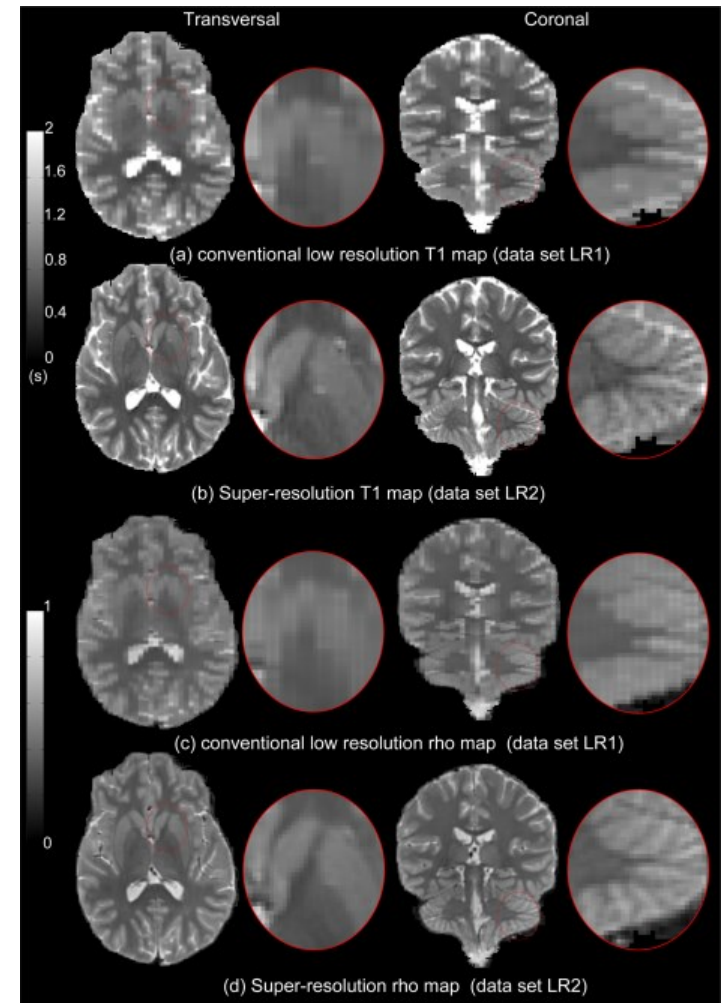
- ✓ Back-projection approach
- ✓ Deterministic regularised approach
- ✓ Statistical Regularisation Approach
- ✓ Projection onto Convex sets

# New developments in 2016

Super-resolution reconstruction of diffusion parameters from diffusion-weighted images with different slice orientations



Super-resolution  $T_1$  estimation: Quantitative high resolution  $T_1$  mapping from a set of low resolution  $T_1$ -weighted images with different slice orientations



**Magnetic Resonance in Medicine**

Volume 75, Issue 1, pages 181-195, 22 JAN 2015 DOI: 10.1002/mrm.25597

<http://onlinelibrary.wiley.com/doi/10.1002/mrm.25597/full#mrm25597-fig-0001>

**Magnetic Resonance in Medicine**

1 JUL 2016 DOI: 10.1002/mrm.26262

<http://onlinelibrary.wiley.com/doi/10.1002/mrm.26262/full#mrm26262-2-fig-0003>

# Super-resolution in other imaging modalities using Artificial Neural Networks

- Valdés Hernández MC, Inamura M. Spatial Resolution Improvement of Remotely Sensed Images by a Fully Interconnected Neural Network Approach. IEEE Trans Geosci. & Remote Sensing 2000,38(5):2426-2430
- Valdés Hernández MC, Inamura M. Improvement of remotely sensed low spatial resolution images by back-propagated neural networks using data fusion techniques. Int J Remote Sensing 2001,22(4):629-642  
<http://dx.doi.org/10.1080/01431160050505892>

- Is super-resolution an answer to increase fidelity on reconstructed MR data?
- Can new machine learning methods (e.g. convolutional neural networks) be applied successfully to reconstructing/increase resolution of MR data?
- Can multimodality MR (e.g. spectroscopy and MRI) be combined in super-resolution schemes?
- Can dynamic optimisation schemes be applied to reconstruct MR data?
- Can, on the other hand, current MR reconstruction schemes be applied to dynamic optimisation problems?
- Can the multi-frame super-resolution scheme presented be applied to the reconstruction/ super-resolution of MR data?