



## Diffusion Tensor Imaging Using Highly Constrained Image Reconstruction Method

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**WARF: P06144US**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new method for collecting diffusion weighted data and reconstructing DWI images.**

### Overview

Magnetic resonance imaging (MRI) is a medical imaging technique that takes measurements, or “views,” of a subject’s nuclear magnetic resonance (NMR) to form images of internal structures. Diffusion tensor magnetic resonance imaging (DT-MRI) utilizes the same technique to image axonal fiber bundles in nerve tissue that typically connect areas of high neural density in places such as the brain.

Magnetic fields are applied in a diffusion weighted imaging (DWI) pulse sequence to image the diffusion of water or other fluid, which occurs mostly in the direction of the axonal fiber bundles. Diffusion tensor coefficients are obtained from each image pixel to track the direction of these axonal fiber bundles. However, a lengthy scan time is necessary to obtain the diffusion tensor coefficients.

### The Invention

UW-Madison researchers have developed a new method for collecting diffusion weighted data and reconstructing DWI images. A highly constrained backprojection method reconstructs each DWI image using a composite image made up of interleaved projection views.

The method is able to produce good quality images with far less data, reducing overall scan time. The highly constrained backprojection reconstruction method weights image pixels to increase the image quality at areas in which the composite image pixels intersect structures in the subject. Increasing the quality of this composite image directly increases the reconstructed image quality.

### Applications

- Highly constrained image reconstruction for DT-MRI

### Key Benefits

- Produces good quality images with far less data
- Reduces scan time
- Allows for high quality images if a high quality composite image is used

### Additional Information

#### For More Information About the Inventors

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Related Technologies

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- [For information about functional magnetic resonance imaging \(fMRI\), see WARF reference number P06143US.](#)

#### Tech Fields

- [Medical Imaging : MRI](#)

For current licensing status, please contact Jeanine Burmania at [jeanine@warf.org](mailto:jeanine@warf.org) or 608-960-9846

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