



## Highly Constrained Backprojected Reconstruction (HYPR) for Computed Tomography Images

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**WARF: P05437US**

Inventors: Charles Mistretta

**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new way for reconstructing computed tomography (CT) images using an improved backprojection method for time-resolved vastly undersampled imaging with projections (VIPR).**

### Overview

Computed tomography (CT) is a medical imaging technique that takes many 2-D X-ray images to generate 3-D images. The most common method for reconstructing the final 3-D image is called the filtered backprojection technique in which an incorrect assumption is made that the backprojected signal is homogeneous. The resulting error is minimized by taking a sufficient amount of data or increasing the X-ray intensity, which increase scan time and the X-ray dose to the subject, respectively.

In some clinical applications, the time required to collect a large amount of data is not available. For example, in time-resolved angiography a contrast agent is introduced into the subject and snapshots are taken as rapidly as possible to acquire 3-D images, but streaks can appear due to the images being undersampled.

### The Invention

A UW-Madison researcher has developed a new method for reconstructing CT images using an improved backprojection method. The method uses a composite image and an assumption of an inhomogeneous backprojected signal to weight the distribution of the backprojected views to reconstruct images. This allows quality CT images to be reconstructed using either less data to reduce scan time or a lower X-ray dose to reduce patient risk.

The composite image can be obtained from either the CT scan or previous data to enhance undersampled data sets. The improved back projection method enables images to be acquired with a lower X-ray dose without significant loss in the image's signal-to-noise ratio (SNR). This is done by reconstructing a set of low dose images with one single high SNR composite image.

### Applications

- Highly constrained backprojection reconstruction during CT scans

### Key Benefits

- Produces good quality images with far less X-ray attenuation data and/or lower X-ray doses
- Increases speed of scans

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## Additional Information

### For More Information About the Inventors

- [Charles Mistretta](#)

### Related Technologies

- [For information about the magnetic resonance imaging \(MRI\) version of this technology, see WARF reference number P05436US.](#)

### 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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