



## SYSTEM AND METHOD FOR MOTION-ROBUST MULTI-CONTRAST MAGNETIC RESONANCE IMAGING

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MRI has become a powerful imaging modality with exquisite soft tissue contrast and a wide variety of achievable contrast mechanisms. By controlling the acquisition parameters and subsequent signal processing, quantitative imaging biomarkers can be obtained. However, MRI acquisitions are relatively slow and often lead to imaging artifacts, bias, and variability when motion occurs during the acquisition. For example, many MRI acquisitions for abdominal applications rely on breath-holding. For patients who are unable to sustain a 15-20 second breath-hold this leads to significant motion related artifacts. Other types of motion such as peristalsis are beyond the control of patients and can also lead to corruption of image quality. This challenge limits the reliability and complicates the workflow of conventional clinical MRI.

### The Invention

UW-Madison researchers have developed a method for motion-robust MRI with multiple contrasts, using a short temporal footprint, simple post-processing and optimized SNR. The method uses multiple consecutive acquisition modules with desired contrast and/or quantification, and a short temporal footprint, obtained by selecting flip angles and image encoding strategies in combination with other magnetization preparation modules. Each module may include a magnetization preparation component, potentially followed by a delay, followed by a readout (e.g., spoiled gradient echo (SGRE)) with selected encoding order and flip angles, and followed by a post-acquisition magnetization preparation (such as a saturation pulse to reset the magnetization or other magnetization preparation pulses). The modules (including their magnetization preparations, encoding orders, delays, and flip angles) can be optimized jointly. This ability to select and design a combination of quantitative and qualitative image datasets provides clinicians with flexibility of contrast.

### Additional Information

#### For More Information About the Inventors

- [Diego Hernando Arribas](#)
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#### Tech Fields

- [Medical Imaging : MRI](#)

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