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**Jade Larriva-Latt, Angela Morrison\*** (arm14@albion.edu), **Alison Radgowski** and **Joseph Tobin**. *Living on the Edge: Improved Reconstruction of Fourier Series using Jump Information with Applications to MRI*.

Magnetic Resonance Imaging (MRI) is a critical non-invasive tool used by medical professionals to take images of the human body. MRI machines work by returning the Fourier Coefficients corresponding to the patient being imaged which are then used to reconstruct a picture of the patient. The imaging process is error prone due to, e.g., instrumentation limitations as well as motion by the patient during the scanning process. Additionally, due to the presence of multiple tissues and organs in patients' bodies, the underlying images tend to have a piecewise-smooth structure, resulting in imaging errors that distort the boundaries between tissues due to the Gibbs Phenomenon. We propose a highly effective method of detecting edges from Fourier data in order to produce more accurate reconstructions by mitigating Gibbs artifacts. We describe several advanced sampling and reconstruction methods supported by numerical results that produce quicker and more accurate reconstructions relative to the modern standard. (Received September 20, 2016)