

**Project Title:** MR Elastography for Assessment of Kidney Fibrosis in Chronic Kidney Disease (CKD)

**Abstract:** The increasing incidence of CKD is leading to a large burden of cardiovascular mortality and renal failure. Kidney fibrosis is considered the final common pathway of renal injury leading to progression of CKD. It is thus useful to know the degree of fibrosis to determine treatment and prognosis, but there is currently no non-invasive way to do so with acceptable sensitivity and specificity. Estimates of glomerular filtration rate are often discordant with tissue damage and subject to hemodynamic fluctuation. Even kidney biopsy has sampling error and its risk precludes frequent repetition.

A novel MRI technique known as MR elastography (MRE) has been developed to assess tissue elasticity. In the liver, elasticity or stiffness has been shown to correlate with hepatic fibrosis. The technique has been applied to the normal kidney, but studies have not yet been performed to correlate tissue stiffness as measured by MRE with pathologic degree of fibrosis, renal function or progression in CKD patients.

We propose applying MRE to detect and quantify kidney fibrosis in patients with CKD. First, we will validate our protocol in normal controls; second we will see if MRE measured stiffness correlates with renal fibrosis in patients with CKD; and third we will correlate stiffness with renal function as measured by glomerular filtration rate.

If effective, this technique could become a useful noninvasive tool for assessing early renal disease when GFR is still normal and evaluate the efficacy of emerging treatments to delay fibrosis and CKD progression.