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My primary research interests involve the development and application of non-invasive nuclear magnetic resonance (NMR) imaging and spectroscopy methods and other complementary experimental methods to evaluate and characterize the development of tissue damage in non-hemorrhagic and hemorrhagic stroke, brain tumors and various other central nervous system (CNS) disorders in experimental disease models. In addition to MRI, these complementary experimental methods may include quantitative autoradiography, histology, immunohistochemistry and fluorescence microscopy. The focus of this work has been the development and implementation of novel quantitative MRI methods to stage the evolution of tissue and vascular damage in stroke and predict eventual outcome. More recently, with the validation of MR methods to assess changes in cerebral blood flow and vascular permeability, I have been interested in applying these measures to other disease states including, intracerebral hemorrhage, epilepsy, multiple sclerosis, spinal cord injury and the evaluation of interventions in stroke. The long-term goal of this work will be the successful translation of these techniques to humans.

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