Recent exciting developments in preclinical high field magnetic resonance imaging (MRI)

ABSTRACT  Magnetic resonance imaging (MRI) is known for its superb soft tissue contrast and its noninvasive character. Compared to clinical MRI where resolutions of several millimeters may suffice when imaging humans, preclinical high field MRI often investigates objects that have about the dimensions of the human MRI voxel size. In this presentation, I will talk about new developments in MR detector designs and acquisition methods. Several applications from the preclinical field will be shown including stroke and atherosclerosis in mice, brain plasticity in lizards, bird MRI, and MR microscopy. Furthermore, future possibilities, including multi modal imaging, will be discussed.

BIOGRAPHY  After finishing his undergraduate work in physics at the University of Wuerzburg, Germany, Dr. Thomas Neuberger started his career working on glowing discharges of an excimer laser at the University of Texas at Austin. Coming back to Germany he joined the group of Prof. Haase and Prof. von Kienlin to work on phosphor and proton chemical shift magnetic resonance imaging on perfused rat hearts. During his PhD in Wuerzburg he became an expert in sodium magnetic resonance imaging (MRI). He developed methods to investigate the sodium homeostasis in small rodents using MRI. Furthermore, he started working on lipid distributions in intact plants and detection limits of iron labeled stem cells. After joining the Bioengineering Department at Penn State for his Postdoc, he developed a method to quantitatively determine the localized lipid content in intact seeds. Since 2009 he is leading the High Field Magnetic Resonance Imaging Facility of the Huck Institutes of the Life Sciences and is responsible for a recently upgraded 7 tesla Bruker BioSpec and a 14 tesla Agilent micro imaging system. He is overseeing all the preclinical MR imaging research conducted in the facility. Since 2010 he is holding a courtesy appointment in BME and since 2013 he is working with the 3 tesla human MRI facility.