



Student Researcher: Angel F. Zamorano  
Faculty Mentor: Dr. Wright

Department of Electrical Engineering  
Texas A&M University

### **Abstract**

**OVERVIEW:** With MR imaging becoming faster and faster the idea of taking real-time images is becoming more and more compelling. How does one model blood flow through veins and the stresses exerted on certain tissues? The objects being imaged must somehow interact with the outside. One of the coils currently in use greatly hinders the ability to do this.

**STUDENT PROJECT:** The objective of this research is to model an existing coil and modify it without drastically changing the image quality so that there is more space to maneuver objects inside the magnet. The parallel plate coil will be cut until a drastic change in field patterns occur. The magnetic field of each cut will be plotted using a field probe and network analyzer. After it has been decided to stop cutting away at the coil it will have to be matched to 50ohms with the use of a matching capacitor network. This research will supply the data for someone who wants to make a modular coil. This will allow the person who is imaging to take his or her own "calculated risk". By making a design modular the person making the image can choose if they want more space for a lower quality image or sacrifice some space in order to achieve better image quality. One will be able to make pieces which are interchangeable with a prefabricated base. The coil developed in this research will make it possible to image an object while allowing the object to interact with the outside, strengthening the prospect of real-time images. With a better understanding of magnetic resonance, materials such as bombs could be detected with RF pulses, benefiting Homeland Security.