



**Name:** Sydney Nguyen

**Email:** smnguyen2@wisc.edu

**Major Professor:** Thaddeus Golos

**Degree Objective:** Ph.D. Endocrinology and Reproductive Physiology

**Background:** BS Biology, Indiana University – Purdue University Indianapolis

BS Neuroscience, Indiana University – Purdue University Indianapolis

### **Current Research Project:**

Ferumoxytol (Feraheme©) is a superparamagnetic iron oxide nanoparticle (SPION) used in the treatment of iron deficiency in adults. It also had been used as a contrast agent in Magnetic Resonance Imaging (MRI). Ferumoxytol is phagocytized by macrophages, which accumulate at sites of inflammation in the body. Ferumoxytol has been successfully used in MRI to model the inflammation patterns of type 1 diabetes in the pancreas, for example. We hope to utilize ferumoxytol and MRI to develop a map of inflammation in the maternal-fetal interface for adverse pregnancy outcomes. The maternal-fetal interface is where the placenta attaches the fetus to the lining of the uterus. Nutrients from the mother pass to the fetus – important for fetal growth during pregnancy. When placental function or development is abnormal, a spectrum of adverse pregnancy outcomes can result, including preeclampsia, miscarriage, preterm birth, and stillbirth. Ultimately, we hope to develop a method to predict adverse outcomes early in pregnancy so that the mother can be closely monitored, and in the future, that therapeutic interventions may be considered. In this project, macaques will be utilized for imaging. Comparisons will be made between healthy pregnancies and pregnancies with experimentally induced inflammation or infection. A number of MRI modalities (Phase Contrast-Vastly Undersampled Isotropic Projection Imaging, Arterial Spin Labeling, intravoxel incoherent motion, and Blood Oxygenation Level Determination) will also be adapted for placental imaging and utilized in the analysis of the maternal-fetal interface. It is hypothesized that the macrophages (and possibly other phagocytic cells, such as neutrophils) in the pregnant decidua will effectively be visualized with aid of ferumoxytol.

### **Honors:**

### **Grants Received:**

U01 HD087216-01 (PIs: D. Shah, O. Wieben, co-investigator: T. Golos) 10/01/15-09/30/19

NIH, Yr 1 Direct \$746,015 (total \$2,996,111).

Advanced MRI for Uteroplacental Flow, Perfusion, Oxygenation & Inflammation



The goal of this grant is to develop new imaging approaches to assess placental structure and function, in real time, for the purpose of providing predictive value to MRI for adverse pregnancy outcomes.

## **Publications:**

## **National Presentations:**

International Federation of Placenta Associations, *Magnetic Resonance Imaging of Utero-Placental Vascular Flow and Tissue Perfusion in Pregnant Rhesus Macaques*, 2016 Portland OR – Poster Presentation

## **Other Presentations:**

Endocrinology and Reproductive Physiology Symposium, *Magnetic Resonance Imaging of Utero-Placental Vascular Flow and Tissue Perfusion in Pregnant Rhesus Macaques*, 2016 Portland OR – Poster Presentation, Poster Award Finalist

## **Teaching and Mentorship:**

## **ERP Service:**

Member of the ERP Student Committee (June 2016-current)