

**Name:**

Sydney Nguyen (Skopos)

Email:

smnguyen2@wisc.edu

Major Professor:

Ian Bird

Degree Objective:

Ph.D., Endocrinology and Reproductive Physiology (UW School of Medicine and Public Health)
Minor, Clinical Investigation (UW Institute for Clinical and Translational Research)
Certificate, Strategic Innovation (UW School of Business)

Background:

B.S. Biology, Indiana University – Purdue University Indianapolis

B.S. Neuroscience, Indiana University – Purdue University Indianapolis

Current Research Project:

The use of magnetic resonance imaging (MRI) in pregnancy could provide critical information about the health of the placenta and, by extension, the developing fetus -- information that is not currently collected. A pregnancy can be adversely affected by many different factors, including but not limited to inflammation, viral infection, insufficient placental perfusion, and incorrectly formed utero-placental vasculature. Often times, these factors are related to one another and could create problems that permanently alter the placenta and therefore persist throughout pregnancy. In initial pregnancy MRI experiments in a ~100 days gestation rhesus macaque model, Ferumoxytol (Feraheme®), a solution of superparamagnetic iron oxide nanoparticles, was used as a contrast agent. The goal was to study inflammation patterns, as Ferumoxytol is phagocytosed by active macrophages at sites of inflammation. However, during these scans, it was discovered that imaging during injection of Ferumoxytol created detailed maps of placental perfusion, in which each functional cotyledon could be identified. Meanwhile, a separate series of experiments was being completed concerning the effects of Zika virus on pregnancy, also in ~100 days gestation rhesus macaques. Consistently, infarcts were identified in these placentas, but it was not clear what effects these infarcts had on fetal development. This prompted the hypothesis that we could associate the presence of these infarcts with placental perfusion using ferumoxytol MRI. This project involves the identification of placental cotyledons via MRI and collection of perfusion data in Zika-infected pregnant rhesus macaques, the 3D printing of this data to act as a guide during placental dissection, the placental dissection itself following cesarean section, and the identification of infarcts histologically. The histological images from each cotyledon are compared to that cotyledon's functional data from the MRI to determine if the MRI perfusion data can predict the location of infarcts.



Honors:

Douglas W. Laube Award for Best Trainee Paper, UW Madison Dept. of Obstetrics & Gynecology June 2019

Elsevier Travel Award, International Federation of Placenta Associations Conference September 2018

NIH T32 Training Fellowship (2T32HD041921-16), July 2018-July 2019

NIH Travel Award, International Federation of Placenta Associations Conference 2017

Publications:

Nguyen SM, Seiter D, Ludwig KD, Bleedorn JA, Murphy ME, Schotzko ML, Shah DM, Wieben OE, Golos TG. (*under review, February 2020*) A placental dissection guide: 3D printed magnetic resonance imaging data of placental blood space in a rhesus macaque.

Zhu A, Reeder SB, Johnson KM, **Nguyen SM**, Fain SM, Bird IM, Golos TG, Wieben O, Shah DM, Hernando D. (Oct 2018) Quantitative Ferumoxytol-enhanced MRI in Pregnancy: A Feasibility Study in the Nonhuman Primate. *MRI*. 65: 100-108.

Nguyen SM, Wiepz GJ, Schotzko M, Simmons HA, Mejia A, Ludwig KD, Zhu A, Brunner K, Hernando D, Reeder S, Wieben O, Johnson K, Shah D, Golos TG. (Sep 2019) Impact of Ferumoxytol Magnetic Resonance Imaging on the Rhesus Macaque Maternal-Fetal Interface. *BOR* 102(2): 434-444.

Zhu A, Reeder SB, Johnson KM, **Nguyen S**, Golos TG, Shimakawa A, Bird IM, Fain SB, Shah DM, Wieben O, Hernando D. (July 2019) Validation of a Motion-robust 2D Chemical Shift-Encoded Technique for R2* and Field Map Quantification in Ferumoxytol-Enhanced MRI of the Placenta in Pregnant Rhesus Macaques. *JMRI* 51: 580-592.

Ludwig KD, Fain SB, **Nguyen SM**, Golos TG, Reeder SB, Bird IM, Shah DM, Wieben OE, Johnson KM. (Oct 2018) Perfusion of the Placenta assessed using Arterial Spin Labeling and Ferumoxytol Dynamic Contrast Enhanced Magnetic Resonance Enhance Imaging in the Rhesus Macaque. *MRM* 81(3): 1964-1978.

Macdonald JA, Corrado PA, **Nguyen SM**, Johnson KM, Francois CJ, Magnus R, Shah D, Golos T, Wieben O. (Aug 2018) Uteroplacental and Fetal Flow MRI in the Pregnant Rhesus Macaque. *JMRI* 49(2): 534-545.

Nguyen SM*, Antony KM*, Dudley DM*, Kohn S, Simmons HA, Wolfe B, Salamat MS, Teixeira LBC, Wiepz GJ, Thoong TH, Aliota MT, Weiler AM, Barry GB, Weisgrau KL, Vosler LJ, Mohns MS, Breitbach ME, Stewart LM, Rasheed MN, Newman CM, Graham ME, Wieben OE, Turski PA, Johnson KM, Post J, Hayes JM, Schultz-Darken N, Schotzko ML, Eudailey JA, Permar SR, Rakasz EG, Mohr EL, Capuano S, Tarantal AF, Osorio JE, O'Connor SL, Friedrich TC, O'Connor DH, Golos TG. (May 2017) Highly efficient maternal-fetal Zika virus transmission in pregnant rhesus macaques. *PLoS Pathog* 13(5): e1006378.



National/International Presentations:

International Federation of Placenta Associations Conference

Poster

Sep 22nd, 2018

MRI with ferumoxytol iron oxide nanoparticles does not alter iron content in fetal or maternal-fetal interface tissues.

Sydney Nguyen, Michele Schotzko, Kai Ludwig, Ante Zhu, Diego Hernando, Kevin Johnson, Dinesh Shah, Oliver Wieben, Thaddeus Golos

The Jikei University School of Medicine (Tokyo, Japan)

Before You Were Born, Public Engagement Event

Oral Presentation

Sep 2nd, 2017

Uncovering the Invisible: Assessing Pregnancy Health with MRI

Sydney Nguyen

Manchester Central Convention Complex (Manchester, England)

International Federation of Placenta Associations Conference

Oral Presentation, Elsevier New Investigator Competition finalist

Aug 30th, 2017

Ferumoxytol uptake by macaque macrophages: feasibility of imaging inflammation by MRI

Sydney Nguyen, Kai Ludwig, Kevin Johnson, Sean Fain, Scott Reeder, Dinesh Shah, Oliver Wieben, Ted Golos

Manchester Central Convention Complex (Manchester, England)

International Federation of Placenta Associations Conference

Poster

Sept 14th, 2016

Magnetic Resonance Imaging of Utero-Placental Vascular Flow and Tissue Perfusion on Pregnant Rhesus Macaques

J Macdonald, **S Skopos**, K Johnson, K Ludwig, S Fain, S Reeder, D Shah, O Wieben, T Golos
Oregon Convention Center (Portland, OR)

Fundamentals of Robotic Surgery Conference

Oral Presentation

Aug 1st, 2014

Preparation of a Tissue Model for da Vinci Surgical System Training

Sydney Skopos, Alyssa Tanaka, Roger Smith

Florida Hospital, Nicholson Center (Kissimmee, FL)



Other Presentations:

Endocrinology and Reproductive Physiology Seminar

Oral Presentation

December 5th, 2019

Topics in Placental MRI

S Nguyen, D Seiter, K Ludwig, A Zhu, G Wiepz, M Schotzko, H Simmons, A Mejia, K Brunner, D Hernando, S Reeder, O Wieben, K Johnson, D Shah, T Golos
University of Wisconsin – Madison (Madison, WI)

Endocrinology and Reproductive Physiology Symposium

Poster, award finalist

Apr 18th, 2019

Impact of Ferumoxytol Magnetic Resonance Imaging on the Rhesus Macaque Maternal-Fetal Interface

S Nguyen, G Wiepz, M Schotzko, H Simmons, A Mejia, K Ludwig, A Zhu, K Brunner, D Hernando, S Reeder, O Wieben, K Johnson, D Shah, T Golos
University of Wisconsin – Madison (Madison, WI)

Endocrinology and Reproductive Physiology Seminar

Oral Presentation

February 7th, 2019

Ferumoxytol MRI in the Pregnant Rhesus Macaque: Effects to the Maternal-Fetal Interface and Further Applications

Sydney M. NGUYEN, Gregory J. WIEPZ, Michele SCHOTZKO, Heather A. SIMMONS, Andres MEJIA, Kai D. LUDWIG, Ante ZHU, Kevin BRUNNER, Diego HERNANDO, Scott B. REEDER, Oliver WIEBEN, Kevin JOHNSON, Dinesh SHAH, MD₂, Thaddeus G. GOLOS
University of Wisconsin – Madison (Madison, WI)

Endocrinology and Reproductive Physiology Symposium

Poster

May 3rd, 2018

Ferumoxytol uptake by macaque macrophages: feasibility of imaging inflammation by MRI

K Ludwig*, **S Nguyen***, J Macdonald, P Corrado, C Francois, S Reeder, I Bird, D Shah, O Wieben, K Johnson, T Golos
University of Wisconsin – Madison (Madison, WI)

Endocrinology and Reproductive Physiology Seminar

Oral Presentation

February 1st, 2018

MRI in Pregnancy: Exploring Placental Health and Inflammation at the Maternal-Fetal Interface

S Nguyen, K Ludwig, J Macdonald, P Corrado, C Francois, S Reeder, I Bird, D Shah, O Wieben, K Johnson, T Golos
University of Wisconsin – Madison (Madison, WI)



Endocrinology and Reproductive Physiology Symposium

Oral Presentation

June 15th, 2017

Ferumoxytol Imaging at the Maternal-Fetal Interface

S Nguyen, J Macdonald, K Ludwig, P Corrado, S Fain, C Francois, S Reeder, I Bird, D Shah, O Wieben, K Johnson, T Golos

University of Wisconsin – Madison (Madison, WI)

Obstetrics and Gynecology Research Symposium

Poster

May 18th, 2017

Ferumoxytol Imaging at the Maternal-Fetal Interface

J Macdonald*, **S Nguyen***, P Corrado, S Fain, C Francois, S Reeder, I Bird, D Shah, O Wieben, K Johnson, T Golos

University of Wisconsin – Madison (Madison, WI)

Endocrinology and Reproductive Physiology Seminar

Oral Presentation

February 23rd, 2017

Using MRI to Identify Adverse Pregnancy in Rhesus

Macaques

S Nguyen, J Macdonald, S Fain, C Francois, S Reeder, I Bird, D Shah, O Wieben, K Johnson, T Golos

University of Wisconsin – Madison (Madison, WI)

Endocrinology and Reproductive Physiology Symposium

Poster, award finalist

June 16th, 2016

Magnetic Resonance Imaging of Utero-Placental Vascular Flow and Tissue Perfusion in Pregnant Rhesus Macaques

J MacDonald, **SM Skopos**, K Johnson, TG Golos, O Wieben

University of Wisconsin – Madison (Madison, WI)

Women in Science Forum

Oral Presentation

Nov 20th, 2014

Student Research and Additional Opportunities: Kicking Off your Career in Science

Sydney Skopos

Indiana University – Purdue University Indianapolis (Indianapolis, IN)

Undergraduate Research Symposium

Poster

Apr 12th, 2013

Generation of Klotho Conditional Knockout Mice

Sydney Skopos, Mohammed Alkhouli, Aime Gray, Shoji Ichikawa

Indiana University School of Medicine (Indianapolis, IN)



Abstracts:

1. Chen R, **Nguyen S**, Ludwig K, Seiter D, Murphy ME, Antony KM, Morgan TK, Zhu A, Kim D, Fain SB, Wieben O, Golos TG, Johnson KM. Placental Perfusion Imaging on Zika-Infected Rhesus Macaques using Velocity-Selective ASL MRI. Submitted for presentation at the Annual Meeting of the International Society for Magnetic Resonance in Medicine in Sydney, Australia, April 2020.
2. Seiter D, Ludwig KD, **Nguyen S**, Murphy ME, Antony KM, Chen R, Morgan TK, Zhu A, Dhyani A, Fain SB, Johnson KM, Golos TG, Wieben O. Quantitative Ferumoxytol Dynamic Contrast Enhanced (DCE) MRI Evaluation of the Placenta after Zika Virus Infection in the Rhesus Macaque. Submitted for presentation at the Annual Meeting of the International Society for Magnetic Resonance in Medicine in Sydney, Australia, April 2020.
3. **Sydney Nguyen**, Michele Schotzko, Kai Ludwig, Ante Zhu, Diego Hernando, Kevin Johnson, Dinesh Shah, Oliver Wieben, Thaddeus Golos. MRI with ferumoxytol iron oxide nanoparticles does not alter iron content in fetal or maternal-fetal interface tissues. Submitted for presentation at the Annual Meeting of the International Federation of Placenta Associations, Tokyo, Japan, September 2018.
4. **S Nguyen***, K Ludwig*, J Macdonald, P Corrado, C Francois, S Reeder, I Bird, D Shah, O Wieben, K Johnson, T Golos. Ferumoxytol uptake by macaque macrophages: feasibility of imaging inflammation by MRI. Submitted for presentation at the Annual Endocrinology and Reproductive Physiology Research Symposium in Madison, WI, May 2018.
5. Zhu A, Ludwig K, Zha W, **Nguyen S**, Golos T, Bird I, Shah D, Wieben O, Fain S, Reeder S, Hernando D, Johnson K. Placental Functional Imaging with Endogenous Contrast: Preliminary Comparison of BOLD Effect and ASL FAIR in Rhesus Macaque and Human. Oral presentation at the International Society for Magnetic Resonance in Medicine (ISMRM) Workshop on MRI of the Placenta, Atlanta, Georgia, February 2018.
6. Ludwig K, Fain S, Adamson E, **Nguyen S**, Golos T, Reeder S, Bird I, Wieben O, Shah D, Johnson K. Quantitative ferumoxytol DCE MRI of the primate placenta perfusion domains. Submitted for presentation at the International Society for Magnetic Resonance in Medicine (ISMRM) Workshop on MRI of the Placenta, Atlanta, Georgia, February 2018.
7. Ludwig K, Fain S, **Nguyen S**, Golos T, Reeder S, Bird I, Wieben O, Shah D, Johnson K. Perfusion MRI of the Placenta by Arterial Spin Labeling (ASL) and Ferumoxytol Dynamic Contrast Enhanced (DCE) MRI in the Rhesus Macaque. Submitted for presentation at the International Society for Magnetic Resonance in Medicine (ISMRM) Workshop on MRI of the Placenta, Atlanta, Georgia, February 2018.
8. Corrado P, Macdonald J, **Skopos S**, Johnson K, Francois C, Reeder S, Bird I, Shah D, Golos T, Wieben O. 4D Flow MRI of Uterine Blood Flow in the Pregnant Rhesus Macaque: Flow Distribution and Repeatability. Submitted for presentation at the Annual Meeting of the Society for Magnetic Resonance Angiography (SMRA), South Africa, October 2017.
9. Macdonald J, **Nguyen S**, Corrado P, Francois C, Reeder S, Bird I, Shah D, Wieben O, Johnson K, Golos T. Ferumoxytol uptake by macaque macrophages: feasibility of imaging inflammation by MRI. Submitted for presentation at the Annual Meeting of the International Federation of Placenta Associations, Manchester, England, September 2017.
10. Ludwig K, Fain S, Adamson E, **Nguyen S**, Golos T, Reeder S, Bird I, Wieben O, Shah D, Johnson K. Mapping the placental domains with ferumoxytol DCE MRI. Submitted for presentation at the Human Placenta Project Meeting of the National Institute of Health in Bethesda, Maryland, 24-15 July 2017.
11. Corrado P, Macdonald J, **Nguyen S**, Johnson K, Francois C, Reeder B, Bird I, Shah D, Golos T, Wieben O. 4D flow of MRI utero-placenta blood flow in the rhesus macaque: Flow distribution and repeatability. Submitted for presentation at the Human Placenta Project Meeting of the National Institute of Health in Bethesda, Maryland, 24-15 July 2017.
12. Zhu A, Johnson K, **Nguyen S**, Bird I, Fain S, Golos T, Shah D, Wieben O, Reeder S, Hernando D. Ferumoxytol-Enhanced Magnetic Resonance Imaging of the Rhesus Placenta. Submitted for presentation at the Human Placenta Project Meeting of the National Institute of Health in Bethesda, Maryland, 24-15 July 2017.



13. Dudley D, **Nguyen S**, Antony K, Kohn S, Simmons H, Wolfe B, Salamat M, Teiseira L, Wiepz G, Thoong T, Aliota M, Weiler A, Barry G, Weisgrau K, Vosler L, Mohns M, Breitbach M, Stewart L, Rasheed M, Newman C, Graham M, Wieben O, Turski P, Johnson K, Post J, Hayes J, Schultz-Darken N, Schotzko M, Eudailey J, Permar S, Rakasz E, Mohr E, Capuano III S, Tarantal A, Osorio J, O'Connor S, Friedrich T, O'Connor D, Golos T. Vertical Zika Virus Transmission in Rhesus Macaques. Submitted for presentation at the Annual Meeting of the American Society for Vivology in Madison, Wisconsin, 25-28 June 2017.
14. Macdonald J, **Nguyen S**, Johnson K, Corrado P, S Fain, Francois C, Reeder S, Bird I, Shah D, Wieben O, Golos T. Ferumoxytol Imaging at the Rhesus Maternal-Fetal Interface. Submitted for presentation at the Annual Endocrinology and Reproductive Physiology Research Symposium in Madison, WI, June 2017.
15. Macdonald J, **Nguyen S**, Corrado P, Francois C, Reeder S, Bird I, Shah D, Wieben O, Johnson K, Golos T. Ferumoxytol Imaging at the Rhesus Maternal-Fetal Interface. Submitted for presentation at the Annual Meeting of the Society for Reproductive Investigation in Orlando, Florida, 15-18 March 2017.
16. **Nguyen S**, Antony K, Dudley D, Kohn S, Simmons H, Wolfe B, Salamat M, Teixeira L, Wiepz G, Thoong T, Aliota M, Weiler A, Barry G, Weisgrau K, Vosler L, Mohns M, Breitbach M, Stewart L, Rasheed M, Newman C, Graham M, Wieben O, Turski P, Johnson K, Post J, Hayes J, Schultz-Darken N, Schotzko M, Eudailey J, Permar S, Rakasz E, Mohr E, Capuano III S, Tarantal A, Osorio J, O'Connor S, Friedrich T, O'Connor D, Golos T. Highly Efficient Vertical Zika Virus Transmission in Pregnant Rhesus Macaques. Submitted for presentation at the Annual Meeting of the Society for Reproductive Investigation in Orlando, Florida, 15-18 March 2017.
17. Ludwig K, Fain S, **Nguyen S**, Golos T, Reeder S, Bird I, Wieben O, Shah D, Johnson K. Perfusion MRI of the Placenta: Preliminary Results using ASL FAIR and Ferumoxytol DCE MRI in the Rhesus Macaque. Submitted for presentation at the ISMRM 25th Annual Meeting & Exhibition in Honolulu, Hawaii, 22-27 April 2017.
18. Zhu A, Shimakawa A, **Nguyen S**, Johnson K, Bird I, Golos T, Fain S, Shah D, Wieben O, Reeder S, Hernando D. Comparison of R2* and B0 Field in 2D and 3D Ferumoxytol-Enhanced Chemical Shift-Encoded MRI of the Healthy Rhesus Placenta. Submitted for presentation at the ISMRM 25th Annual Meeting & Exhibition in Honolulu, Hawaii, 22-27 April 2017.
19. Zhu A, Sharma S, **Nguyen S**, Johnson K, Bird I, Golos T, Fain S, Shah D, Wieben O, Reeder S, Hernando D. Ferumoxytol-Enhanced Quantitative Susceptibility Mapping of the Rhesus Placenta. Submitted for presentation at the ISMRM 25th Annual Meeting & Exhibition in Honolulu, Hawaii, 22-27 April 2017.
20. Macdonald J, Corrado P, **Nguyen S**, Francois C, Reeder S, Bird I, Shah D, Golos T, Wieben O, Johnson K. Ferumoxytol MRA in the Pregnant Rhesus Macaque. Submitted for presentation at the ISMRM 25th Annual Meeting & Exhibition in Honolulu, Hawaii, 22-27 April 2017.
21. Macdonald J, Corrado P, **Nguyen S**, Johnson K, Francois C, Bird I, Shah D, Golos T, Wieben O. 4D Flow MRI in the Rhesus Macaque Fetus. Submitted for presentation at the Meeting of the International Society for Magnetic Resonance Medicine. Submitted for presentation at the ISMRM 25th Annual Meeting & Exhibition in Honolulu, Hawaii, 22-27 April 2017.
22. Antony K, **Skopos S**, Kohn S, Post J, Capuano III S, Schultz-Darken N, Dudley D, Friedrich T, Weiler A, Barry G, Mohns M, Newman C, Brietbach M, Tarantal A, Mohr E, Osorio J, O'Connor D, and Golos TG. Fetal sonographic findings in rhesus macaques infected with Zika virus (ZIKV) during pregnancy. Submitted for presentation at the 42nd Annual Meeting of the Society for Maternal-Fetal Medicine, January 2017.
23. Macdonald J, **Skopos S**, Johnson K, Francois C, et al. 4D Flow Imaging of the Placenta and Umbilical Cord in the Rhesus Macaque – Initial Experience. Submitted for presentation at the 28th Meeting of the Society for Magnetic Resonance Angiography (SMRA). Chicago, IL, September 2016.
24. Hernando D, Golos T, Wieben O, Bird I, Zhu A, Shah D, Reeder S, Sharma S, **Nguyen S**. Ferumoxytol-enhanced QSM in the rhesus placenta. Submitted for presentation at the 4th International workshop on MRI phase contrast & quantitative susceptibility mapping, Graz, Austria, September 26-28, 2016.
25. Macdonald J, **Skopos S**, Johnson K, Ludwig K, Fain S, Reeder S, Shah D, Wieben I, Golos T. Magnetic resonance imaging of utero-placental vascular flow and tissue perfusion in pregnant rhesus macaques. Submitted for presentation at the Annual Meeting of the International Federation of Placenta Associations, Portland OR, September 2016.
26. Macdonald J, **Skopos S**, Johnson K, Golos T, Wieben O. Magnetic Resonance Imaging of Utero-Placental Vascular Flow and Tissue Perfusion in Pregnant Rhesus Macaques. Submitted for presentation at the Annual Endocrinology and Reproductive Physiology Research Symposium in Madison, WI, June 2016.



Teaching and Mentorship:

Claude Vandevender, undergraduate student: immunohistochemistry, tissue imaging, data analysis

Joslin Musick, BS – undergraduate student: tissue handling, tissue dissection

Andrea Wenzel, BS – veterinary student: tissue handling, tissue dissection, immunohistochemistry, data analysis

Megan Murphy, BS – research intern: tissue dissection, necropsy preparation

ERP Service:

Member of the ERP Student Committee (2016-current)

Symposium Planning Committee

Seminar Planning Committee

Society Memberships:

International Federation of Placenta Associations (2016-current)

International Society for Magnetic Resonance in Medicine (2018-current)

WiSolve Student Consulting Group (2019-current)