

## CURRICULUM VITAE

### PERSONAL INFORMATION

Name: Mark W. Cunningham Jr., Ph.D, MBA  
Citizenship: U.S. citizen  
Address: University of Mississippi Medical Center  
Department of Pharmacology and Toxicology  
2500 N State St.  
Jackson, MS 39212  
Phone: (601) 815-1402  
E-mail: [Mwcunningham@umc.edu](mailto:Mwcunningham@umc.edu)

### EDUCATION

2017 – Present      Instructor  
Department of Pharmacology & Toxicology  
University of Mississippi Medical Center

2014 – 2017      Postdoctoral Research Fellow  
Department of Pharmacology & Toxicology  
University of Mississippi Medical Center  
Laboratory of Dr. Babbette LaMarca

2016 – 2017      Executive Masters of Business Administration (MBA)  
Millsaps College Else School of Management

2008 – 2014      Ph.D, Medical Sciences  
Physiology and Pharmacology Concentration  
Department of Physiology and Functional Genomics  
University of Florida (UF) College of Medicine, Gainesville, Florida  
Ph.D Advisor: Professor Chris Baylis, PhD

2004 - 2008      B.S., Biology, Morehouse College, Atlanta, Georgia  
(*Magna Cum Laude & Phi Beta Kappa*)

### RESEARCH EXPERIENCE

2014 – Present      T32 Hypertension and Cardiorenal Disease Post-doctoral Fellow  
(T32HL105324), (PI: Dr. Joey Granger)  
UMC, Cardiovascular- Renal Research Center  
Mentor: Professor Babette LaMarca, Ph.D.  
Project: *The Role of AT1 Receptor Autoantibodies in ANGII Increased Sensitivity, Renal Hemodynamics, and Hypertension during*

- 2010 – 2014 T32 Nephrology and Hypertension Pre-doctoral Fellow (T32DK751825), (PI: Dr. Mark Segal) UF, Dept. of Physiology and Functional Genomics  
Mentor: Professor Chris Baylis, Ph.D.  
Project: *Renal Nitric Oxide and Oxidative Stress Regulation during a Normal and Abnormal Rat Pregnancy*
- 2007 Undergraduate Research Experience  
Summer Honors Undergraduate Research Program (SHURP)  
Harvard Medical, Boston, Massachusetts  
Mentor: Associate Professor Jorge Plutzky, M.D.  
Project: *Hepatocyte Nuclear Factor 4 alpha (HNF4a) mRNA Expression in Mouse Macrophages; A possible link between atherosclerosis and the inflammatory system.*
- 2006 - 2008 Undergraduate Research Assistant  
Morehouse College, Atlanta, Georgia  
Mentor: Professor Valarie Haftel, Ph.D.  
Project: *Rat Movement Behavior in Early Diabetes*
- 2006 Minority Undergraduate Research Experience  
Leadership Alliance Summer Program  
John Hopkins, Baltimore, Maryland  
Mentor: Professor William Isaacs, Ph.D.  
Project: *Cytokine Profile's of Prostate Cancer Patients; Possible Biomarkers and Predictors of Prostate Cancer Progression*

## HONORS AND AWARDS

- 2017 APS Water and Electrolyte Homeostasis Section Postdoctoral Research Distinction Award, 2017 Experimental Biology Conference, Chicago, IL
- 2017 Postdoctoral Poster Award, 2017 University of Mississippi Medical Center Graduate School Research Day, Jackson, MS
- 2016 Top Trainee Oral Abstract Award for AHA 2016 Council of Hypertension Conference, Orlando, Florida
- 2016 Travel Award FASEB Research Conference on Renal Hemodynamics and Cardiovascular Function in Health and Disease, Big Sky, MT
- 2016 Postdoctoral Poster Award, 2016 University of Mississippi Medical Center Graduate School Research Day, Jackson, MS
- 2015 Millsaps Business Advantage Program, Millsaps College, Jackson, MS
- 2015 Postdoctoral Poster Award, 2015 University of Mississippi Medical Center Graduate School Research Day, Jackson, MS
- 2015 APS Minority Travel Fellowship Award for the Cardiovascular, Renal and Metabolic Disease: Physiology and Gender Conference in Annapolis, MD
- 2015 Juan Carlos Romero and Water & Electrolyte Homeostasis Section Postdoctoral Research Recognition Award Finalist, Experimental Biology Conference in Boston, MA
- 2014 -Present T32 Hypertension and Cardiorenal Disease Post-doctoral Fellow (T32HL105324), UMMC

2014	APS/NIDDK Minority Travel Fellowship Award for the Experimental Biology (EB) Conference in San Diego, CA
2012	2012 Caroline tum Suden/Frances Hellebrandt Professional Opportunity Award (Experimental Biology Society Award)
2012	APS/NIDDK Minority Travel Fellowship Award for the Experimental Biology (EB) Conference in San Diego, CA
2011	APS/NIDDK Minority Travel Fellowship Award for the Physiology of Cardiovascular Disease; Gender Disparities Conference in Jackson, MS
2011	APS/NIDDK Minority Travel Fellowship Award for the Experimental Biology (EB) Conference in Washington, DC
2010	APS/NIDDK Minority Travel Fellowship Award for the Experimental Biology (EB) Conference in Anaheim, CA
2010 - 2013	T32 Nephrology and Hypertension Pre-doctoral Fellowship (T32DK751825) from the UF Division of Nephrology, Hypertension, and Renal Transplantation
2008 - 2010	Bridges to Doctorate Fellowship for Minority students in the Science Technology Engineering and Mathematics (STEM) disciplines at the UF
2008	Achievement Reward for College Scientists Scholarship at Morehouse College

## COMMITTEE ASSIGNMENTS

2012 - 2017	Student Trainee Representative for the Membership Committee of the American Physiological Society
2012 - 2014	Graduate Studies Committee Member for the UF Graduate Student Organization (GSO)
2012 - 2013	Chair-person (2012-2013), co-chair (2011-2012), and member (2009-2011) of the Graduate Student Advisory Council (I <sup>3</sup> Program). This is an interdisciplinary program designed to foster research, training programs, professional development, and collaboration among UF graduate students. NSF Funded from 2008-2013
2010 - 2012	Graduate Student Advisory Board Representative for the UF GSO
2009 - 2010	Physiology Concentration Representative for the UF GSO
2009 - 2010	Vice-President of the Black Graduate Student Organization (BGSO) at UF
2009 - 2010	Recruitment chair-person for the UF GSO
2008 - 2009	1 <sup>st</sup> Year Representative for the UF GSO

## TEACHING EXPERIENCES

2017	General Biology 101 Lecture and Lab, Jackson State University, Jackson Mississippi
2016	General Biology Lab Instructor, Biology 107, Belhaven College, Jackson, Mississippi
2015	Guest Lecturer, Cell Biology 305, Mississippi College, Clinton Mississippi
2014-2017	Small Group Leader, Pharmacology course for medical students, University of Mississippi Medical Center, Jackson, Mississippi

2011 - 2012	Teacher's Assistant, Medical Physiology/Renal Section (GMS 6408), Spring Course, UF
2010 - 2012	Teacher's Assistant, Renal Physiology for Dental students (DEN 5120C), Spring Course, UF
2009 - 2013	Co-leader, Physiology & Disease, High School Summer Science Training Program (Section 5438), Summer Course, UF

## SERVICE

2015	Poster Judge Leader for the Bruce Award Undergraduate Research Competition at the 2015 EB Conference, Boston, MA
2014	Poster Judge for the Bruce Award Undergraduate Research Competition at the 2014 EB Conference, San Diego, CA
2014	Recruiter for the UF biomedical science program at the 2014 EB Conference, San Diego, CA
2013	Chair-person for the "Hypertension: Mechanisms and Consequences" session at the 2013 Experimental Biology Conference, Boston, MA
2012	Recruiter for the UF biomedical science program and seminar speaker at Morehouse and Spelman College, Atlanta, GA
2011 - 2012	Chair-person and organizer for the UF Graduate Student Research Day and the UF National Science Foundation (NSF) Research Day
2011	Chair-person for the "Cardiovascular disease and fertility" session at the 2011 Physiology of Cardiovascular Disease: Gender Disparities conference, Jackson, MS
2010 - 2012	American Physiological Society PhUn Week presenter at Dr. N. H. Jones Elementary School in Ocala, FL and Kimball Wiles Elementary School in Gainesville, FL
2010 - 2011	Research facilitator and tour guide leader for the Mini-Medical School Program at the UF
2010	Committee member for UF Graduate Student Council Research Conference (GSC)
2010	Organizer and moderator for a college preparatory workshop designed for high school students in the local Gainesville, FL community.
2010	Mentor for undergraduate students at the UF interested in a career in science
2009 & 2011	Peer advisor to 1 <sup>st</sup> year graduate students in the Board of Education (BOE) Summer Program at the UF
2009 - 2011	Guest panelist, poster judge, and oral presentation judge for undergraduate students attending the Florida Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) Conference at University of Miami, Miami, FL (2009); University of South Florida, Tampa, FL (2010); Jacksonville, FL (2011)
2009	Recruiter for the UF biomedical science program at the Annual Biomedical Research Conference for Minority Students (ABRCMS) Phoenix, Arizona
2008	Activity coordinator, tutor, and head counselor for the Health Careers Opportunities Program (HCOP)/Thomas J. Blocker (TJB) Summer Program for pre-freshmen students at Morehouse College, Atlanta, Georgia

## MENTORING

2016- Present	Shyanne McDuffy, High School Base Pair Student
2015-2016	Taia McAfee , High School Base Pair Student
2016- Present	Nathan Usury, Summer Undergraduate student
2015- Present	Nathan Campbell, Summer Undergraduate student
2015 - Present	Venkata Ramana Vaka, Graduate Student

## PROFESSIONAL SOCIETIES

2009 - Present	Regular member, American Physiological Society
2014 - Present	Regular member, American Heart Association

## PUBLICATIONS

1. **Cunningham MW Jr**, Castillo J, Ibrahim T, Campbell N, Amaral L, Vaka VR, Usry N, Spradley FT, Faulkner J, Williams JM, LaMarca B. Angiotensin II Type 1 Receptor Agonistic Autoantibody Inhibition Improves Maternal Outcomes in Reduce Uterine Perfusion Pressure Rats. **Manuscript in preparation.**
2. **Cunningham MW Jr**, Vaka VR, Ibrahim T, Amaral L, Faulkner J, Cornelious D, Usry N, Campbell N, Scott J, and LaMarca B. Angiotensin II Type 1 Receptor Agonistic Autoantibody Inhibition improves Natural killer cell and Oxidative stress in Placental Ischemic Rats. **Manuscript in preparation.**
3. **Cunningham MW Jr.** and LaMarca B. ( 2017). Editorial Focus: Hypertension in Pregnancy: Effects on Mother and Baby. *Am J Physiol Regul Integr Comp Physiol*; Review Article: **In process.**
4. Amaral LM, Faulkner JL, Elfarra J, Cornelius DC, **Cunningham MW**, Ibrahim T, Vaka VR, McKenzie J, and LaMarca B.(2017) Continued Investigation into 10-OHPC: Results from the preclinical RUPP rat model of preeclampsia. *Hypertension*. **Just published.**
5. Faulkner JL, Plenty NL, Wallace K, Amaral LM, **Cunningham MW**, Murphy S, and LaMarca B. Selective inhibition of 20-hydroxyeicosatetraenoic acid lowers blood pressure in a rat model of preeclampsia. (2017) *Prostaglandins Other Lipid Mediat*. **Just published.**
6. Elfarra J, Amaral LM, McCalmon M, Scott JD, **Cunningham MW Jr.**, Gnam A, Ibrahim T, LaMarca B, and Cornelius DC. (2017) Natural Killer Cells Mediate Pathophysiology in Response to Reduced Uterine Perfusion Pressure. *Clin Sci (lond)*. **Just published.**
7. Ibrahim T, Przybyl L, Harmon AC, Amaral LM, Faulkne JL, Cornelius DC, **Cunningham MW Jr**, Hunig T, Herse F, Wallukat G, Dechend R, LaMarca B. (2017) Proliferation of endogenous regulatory T cells improves the pathophysiology associated with placental ischaemia of pregnancy. *AM J Reprod Immunol* 78: 1-8.
8. Faulkner JL, Amaral LM, Cornelius DC, **Cunningham MW**, Ibrahim T, Heep A, Campbell N, Usry N, Wallace K, Herse F., Dechend R, LaMarca B. (2017). Vitamin D supplementation

reduces some AT1-AA-induced downstream targets implicated in preeclampsia including hypertension. *Am J Physiol Regul Integr Comp Physiol* 312:R125-R131.

9. **Cunningham MW Jr**, Williams J, Amaral L, Usry N, Wallukat G, Dechend R, LaMarca B. (2016). Agonistic Autoantibodies to the Angiotensin II Type 1 Receptor Enhance ANG II Induced Renal Vascular Sensitivity and Reduce Renal Function during Pregnancy. *Hypertension*. 68:1308-1313.
10. Santiago-Font J, Amaral L, Faulkner J, Ibrahim T, Vaka V, **Cunningham M**, and LaMarca B. (2016). Serelaxin improves the pathophysiology of placental ischemia in the reduced uterine perfusion pressure (RUPP) rat model of Preeclampsia. *Am J Physiol Regul Integr Comp Physiol* 311:R1158-R1163.
11. LaMarca B, Cornelius DC, Harmon AC, Amaral LM, **Cunningham MW**, Faulkner JL, Wallace K. (2016). Identifying immune mechanisms mediating the hypertension during preeclampsia. *Am J Physiol Regul Integr Comp Physiol* 311:R1- R9.
12. LaMarca B, Amarak LM, Harmon AC, Cornelius DC, Faulkner JL, **Cunningham MW Jr**. (2016). Placental Ischemia and Resultant Phenotype in Animal Models of Preeclampsia. *Curr Hypertens Rep* 18: 38.
13. Harmon AC, Cornelius DC, Amaral LM, Faulkner JL, **Cunningham MW Jr**, Wallace K, LaMarca B. (2016). The role of inflammation in the pathology of preeclampsia. *Clin Sci (Lond)* 130:409-419.
14. Faulkner JL, Cornelius DC, Amaral LM, Harmon AC, **Cunningham MW Jr**, Darby MM, Ibrahim T, Thomas DS, Herse F, Wallukat G, Dechend R, LaMarca BD. (2015). Vitamin D supplementation improves pathophysiology in a rat model of preeclampsia. *Am J Physiol Regul Integr Comp Physiol*. 310:R3469-R354.
15. Cornelius DC, Castillo J, Porter J, Amaral L, Campbell N, Paige A, Thomas A, Harmon A, **Cunningham MW**, Wallace K, Herse F, Wallukat G, Dechend R, LaMarca B. (2015) Blockade of CD40 ligand reduces hypertension, placental oxidative stress, and AT1-AA in response to adoptive transfer of CD4+ T lymphocytes from RUPP rats. *AM J Physiol Regul Integr Comp Physiol*. 309:R1243-R1250.
16. Amaral LM, **Cunningham MW Jr**, Cornelius DC, LaMarca B. (2015). Preeclampsia: long term consequences or vascular health. *Vasc Health Risk Manag*. 11:403-415.
17. **Cunningham MW Jr**, West CA, Wen X, Deng A, Baylis C. (2015). Pregnant rats treated with a high-fat/prooxidant Western diet with ANGII and TNF $\alpha$  are resistant to elevations in blood pressure and renal oxidative stress. *AM J Physiol Regul Integr Comp Physiol*. 308: R945-R956.
18. Sasser JM, **Cunningham MW Jr**, Baylis C. (2014). Serelaxin reduces Oxidative Stress and Asymmetric Dimethylarginine in Angiotensin II Induced Hypertension. *Am J Physiol Renal Physiol*. 307: F1355-1362.
19. West CA, Shaw S, Sasser JM, Fekete A, Alexander T, **Cunningham MW Jr**, Masilamani SM, Baylis C. (2013). Chronic vasodilation increases renal medullary PDE5A and  $\alpha$  ENaC

- through independent renin-angiotensin-aldosterone system (RAAS) pathways. *Am J Physiol Regul Integr Comp Physiol*. 305: R1133-1140.
20. **Cunningham MW Jr.**, Sasser JM, West CA, and Baylis C. (2013) Renal Redox Responses to Normal Pregnancy in the Rat. *Am J Physiol Regul Integr Comp Physiol*. 304: R443- R449.
21. **Cunningham MW, Jr.**, Sasser JM, West CA, Milani CJ, Baylis C, and Mitchell KD. (2013) Renal Nitric Oxide Synthase and Antioxidant Preservation in Cyp1a1-Ren-2 Transgenic Rats With Inducible Malignant Hypertension. *Am J Hypertens*. 26: 1242- 1249.
22. Moningka NM, **Cunningham MW**, Sterling M, West CA, Verlander JW, Croker BP, Ahlgren J, Hayward L, and Baylis C. (2013) Effects of Voluntary Wheel Running on the Kidney at Baseline and After Ischemia-Reperfusion Induced Acute Kidney Injury: A Strain Difference Comparison. *J Physiol*. 591:1313-1324.
23. Chen GF, Moningka NC, Sasser JM, Zharikov S, **Cunningham MW Jr.**, Tain YL, Schwartz IF, and Baylis C. (2012) Arginine and asymmetric dimethylarginine (ADMA) in Puromycin Aminonucleoside Induced Chronic Kidney Disease in the Rat. *Am J Nephrol* 35:40-48.
24. Sasser JM, Moningka NC, **Cunningham MW Jr.**, Crocker B, and Baylis C. (2010) Asymmetric dimethylarginine in angiotensin II-induced hypertension. *Am J physiol Regul Integr Comp Physiol*; 298(3): R740-R746.
25. Fujita K, Ewing CM , Sokoll LJ, Elliott DJ, **Cunningham M**, De Marzo AM, Isaacs WB, and Pavlovic CV. (2008) Cytokine profiling of prostatic fluid from cancerous prostate glands identifies cytokines associated with extent of tumor and inflammation. *Prostate*; 68(8):872-82.

## ABSTRACTS

**Cunningham MW Jr.**, Vaka V, Amaral L, Fan F, Ibrahim T, Roman RJ, LaMarca. B Angiotensin II Type 1 Receptor Autoantibody Inhibition Improves Blood Pressure and Markers of Neurological Damage and Oxidative Stress in Brains of Placental Ischemic Rats during Pregnancy. *Presented at American Hear Council of Hypertension Conference, San Francisco, CA; 2017*

Amaral L, Cottrell J, Harmon A, Cornelius DC, **Cunningham MW Jr**, Wallukat G, Herse F, Ibrahim T, Dechend R, LaMarca B. Interleukin-4 supplementation improves chronic inflammation and hypertension in response to placental ischemia during pregnancy. *Presented at American Hear Council of Hypertension Conference, San Francisco, CA; 2017*

**Cunningham MW, Jr.**, Castillo J., Vaka V, Amaral L, Cornelius D, Spradley F, Ibrahim T, Campbell N, Usry N, Williams J, LaMarca B. Inhibition of Angiotensin II Type 1 Receptor Agonistic Autoantibody Binding Improves Maternal Outcomes in Rats with Placental Ischemia. *Presented at Experimental Biology (EB) Conference, Chicago, IL; 2017*

**Cunningham MW, Jr.**, Haase N, Faulkner J, Ibrahim T, Vaka V, Dechend R, Foster D, LaMarca B. Selective Maternal Hepatic Silencing of Angiotensinogen in Reduced Uterine Placental Pressure (RUPP) Rats Improves Blood Pressure and Fetal Weights. *Presented at American Hear Council of Hypertension Conference, Orlando, FL; 2016*

**Cunningham MW, Jr.**, Castillo J., Spradley F, Faulkner J, Ibrahim T, Usry N, Elfarra J, LaMarca B. Angiotensin II Type 1 Receptor Agonistic Autoantibody Inhibition Improves Maternal Outcomes in Reduce Uterine Perfusion Pressure Rats. *Presented at Experimental Biology (EB) Conference, San Diego, CA; 2016*

**Cunningham MW, Jr.**, Williams J., Wallukat G., Dechend R., LaMarca B. Agonistic Autoantibodies to the Angiotensin II Type 1 Receptor Enhances ANGII Induced Renal Vascular Sensitivity and reduce renal Function during Pregnancy. *Presented at Renal Hemodynamics Conference, Big Sky, MT, American Heart Council of Hypertension Conference, Washington DC; 2016 and UMMC Graduate School Research Day, Jackson, MS; 2015*

**Cunningham MW, Jr.**, Faulkner J, Amaral L, Cornelius D, Kramer R, LaMarca B. Agonistic Autoantibodies to the Angiotensin II Type 1 Receptor Enhance ANGII Binding on Vascular Endothelial Cells. *Presented at Experimental Biology Conference (EB) Conference, Boston, MA; 2015*

**Cunningham MW, Jr.**, West CA, Baylis C. Pregnant rats treated with a high fat/pro-oxidant western diet (HFD) with angiotensin II (ANGII) and tumor necrosis factor  $\alpha$  (TNF $\alpha$ ) are resistant to elevations in blood pressure (BP) and have the normal fall in BP during late pregnancy. *Presented at Experimental Biology Conference (EB) Conference, San Diego, CA; 2014.*

**Cunningham MW, Jr.**, Sasser JM, Baylis C. Profile of antioxidant and pro-oxidant enzymes and markers in the kidney cortex (KC) during rat pregnancy. *Presented at Experimental Biology Conference (EB) Conference, San Diego, CA; 2012.*

**Cunningham MW, Jr.**, West CA, Sasser JM. A Day with a Physiologist Hands on Experiments for Elementary School Students. *Presented at Experimental Biology Conference (EB) Conference, San Diego, CA, 2012.*

**Cunningham MW, Jr.**, Sasser JM, Baylis C. Profile of antioxidant and pro-oxidant enzymes and markers in the kidney cortex (KC) during rat pregnancy. *Presented at Physiology of Cardiovascular Disease: Gender Disparities conference, Jackson, MS; 2011.*

**Cunningham MW, Jr.**, Moninga NC, Sasser JM. A Day with a Physiologist: The Lung-o-meter Experiment in Fifth Grade Science Classes. *Presented at Experimental Biology Conference (EB) Conference, Washington, DC; 2011*

**Cunningham MW, Jr.**, Sasser JM, Milani CJ, Mitchell KD, Baylis C. Kidney Cortex (KC) Nitric Oxide Synthase (NOS) and Superoxide Dismutase (SOD) in Cyp1a1-Ren2 Transgenic Rats with ANG II-Dependent Hypertension. *Presented at Experimental Biology Conference (EB) Conference, Washington, DC; 2011.*

Moningka NC, **Cunningham MW**, Sterling M, Baylis C. Renal hemodynamic responses to Uninephrectomy (UNX) and Ischemia/Reperfusion (I/R) Injury: Impact of Exercise (EX) and Rat Strain. *Presented at Experimental Biology, Washington D.C.; 2011.*



**Cunningham MW, Jr.**, Chen GF, Moninga NC, Tain YL, Sasser JM, Baylis C. Asymmetric Dimethylarginine (ADMA) Regulation in Puromycin Aminonucleoside (PAN) induced Chronic Kidney Disease (CKD). *Presented at the Experimental Biology (EB) Conference, Anaheim, CA; 2010.*

Moninga NC, **Cunningham MW**, Sterling M, Baylis C. Exercise exacerbates ischemia-reperfusion (IR) induced acute kidney injury (AKI) in the Sprague Dawley (SD) but not Fisher 344 (F344) rat. *Presented at American Society for Nephrology, Denver, Colorado; 2010.*

Moninga NC, **Cunningham MW**, Sterling M, Baylis C. Exercise exacerbates ischemia-reperfusion induced acute kidney injury (AKI) in the Sprague Dawley (SD) but not Fisher 344 (F344) rat. *Presented at University of Florida's Medical Research Day; 2010.*

Moninga NC, **Cunningham MW**, Sterling M, Baylis C. Impact of 12 wks exercise on renal nitric oxide and antioxidant status: a strain difference comparison. *Presented at Experimental Biology meeting, Anaheim, CA; 2010.*

**Cunningham MW, Jr.**, Chen GF, Sasser JM, Zharikov S, Schwartz D, Baylis C. Arginine Availability in Puromycin Aminonucleoside Induced Chronic Kidney Disease. *Annual Biomedical Research Conference for Minority Students (ABRCMS), Phoenix, AZ; 2009.*

**Cunningham MW, Jr.**, Orasanu G, Plutzky J. Glucose, Insulin, and Oxidized Low Density Lipoprotein (OxLDL) Increase Hepatocyte Nuclear Factor 4 alpha (HNF4 $\alpha$ ) mRNA Expression in Mouse Macrophages. *Twentieth Annual F. E. Mapp Symposium at Morehouse College, Atlanta, GA; 2008.*

Adams G, Jr., **Cunningham MW, Jr.**, Leslie V, Haftel VK. Rat movement behavior and muscle spindle structure may not explain altered proprioceptor firing pattern in early diabetes. *Society for Neuroscience, San Diego, CA; 2007.*