**William G Schrage, PhD**

**Professor**

**Department of Kinesiology**

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## EDUCATION

College: BS in Biology University of Utah 1987-1991

Graduate: MS in Exercise Physiology University of Utah 1992-1994

Graduate: PhD in Physiology University of Missouri 1995-2001

Postdoctoral: Dept. of Veterinary Biomedical Science University of Missouri 2001

Postdoctoral: Integrative Human Physiology Mayo Clinic 2001-2006

## PROFESSIONAL EXPERIENCE

*Professor,* Department of Kinesiology University of Wisconsin 2015-

*Associate Professor,* Department of Kinesiology University of Wisconsin 2012-2015

*Assistant Professor,* Department of Kinesiology University of Wisconsin 2006-2012

*Assistant Professor,* Department of Physiology Mayo Clinic 2006

*Research Fellow*, Human Integrative Physiology Laboratory Mayo Clinic 2001-2005

*Postdoctoral Fellow*, Veterinary Biomedical Science University of Missouri 2001

*NASA Predoctoral Fellow*, Department of Physiology University of Missouri 1998-2001

*Teaching Assistant*, Department of Physiology University of Missouri 1995-1997

*Teaching/Research Assistant*, Exercise & Sport Science Dept. University of Utah 1992-1994

## HONORS/AWARDS

Vilas Associates Professor, University of Wisconsin, 2015-2017

American Diabetes Association-Gail Patrick Innovation Award, for highest Innovation Grant score, 2013

NIH LRP Clinical Research Award, 2003-2007

American Physiological Society-Environmental & Exercise Physiology Recognition Award, 2004

NIH Individual National Research Service Award (NRSA), 2002-2005

*Space Shuttle Columbia* (STS-107) Research Team Member of FRESH Project (MD Delp, PI), 2003

NASA Predoctoral Fellowship, University of Missouri, 1998-2001

## RESEARCH GRANTS

***Active***

Agency: NIH/NHLBI HL105820 (R01)

Title: “Peripheral Vasodilation in Obese Humans”

Dates of Award: 09/01/11 – 06/30/18 $1,930,392 direct costs- NCE for until 2018

Goal: The aims are to determine control of skeletal muscle microcirculation in younger obese adults.

Role: PI

Agency: American Diabetes Association-Innovative Clinical Translational Science Award (1-16-ICTS-099)

Title: “*Feed the body, starve the brain: Insulin acutely hypoperfuses the brain in insulin resistance*”

Dates of Award: 01/01/16 – 12/31/19 $600,000 total costs

Goal: The aims are to determine mechanisms for reduced CBF in healthy young adults with insulin resistance, using state-of-the-art MRI methods.

Role: PI

***Pending***

Agency: NIH/NICHD (R21)     Scored 20%ile. Resubmitted Nov 2018

Title: “Insulin resistance, cognitive health, and perfusion of the adolescent brain”

Dates of Award: 07/01/19 – 06/30/21             $275,000 direct costs

Goal: The aims are to determine how insulin resistance effects cognition and blood flow responses in the brains of adolescents.

Role: PI

Agency: NIH/NHLBI (R01) Scored 38%ile. Will resubmit February 2019

Title: “Quantifying brain blood flow with 4D MRI: Spatial and sex-specific mechanisms”

Dates of Award: 07/01/18 – 06/30/23 $1,750,000 direct costs

Goal: The aims are to determine unique sex differences in how blood flow is controlled in the brains of healthy humans using cutting edge MRI.

Role: PI

Agency: NIH/NHLBI (R01) Resubmitting June 2019

Title: “Impact of IR on vascular and neurologic trajectories in middle-age adults at high risk for AD”

Dates of Award: 07/01/18 – 06/30/23 $2,199,000 direct costs

Goal: The aims are to determine how insulin resistance changes brain blood flow regulation in healthy humans at risk of developing neurodegenerative diseases.

Role: PI

***Completed***

Agency: UW-Madison Graduate School Fall Competition

Title: “Insulin Resistance in Children: Neural, Vascular and Cognitive Consequences”

Dates of Award: 07/01/14 – 06/30/15 $48,166 total costs

Goal: The aims are to examine the impact of insulin resistance on vascular and neuronal structure and function in younger obese children.

Role: PI

Agency: American Diabetes Association, Innovation Research Award 1-12-IN-39

Title: “*In Vivo* Imaging of Cerebrovascular Structure and Function in Metabolic Syndrome”

Dates of Award: 01/01/12 – 06/30/13 $100,000 total costs

Goal: The aims are to determine structural and functional control of cerebral blood flow in pre-diabetes patients, using state-of-the-art MRI methods.

Role: PI

Agency: American Heart Association, AHA Midwest Affiliate Predoctoral Fellowship 11PRE7390038

Title: “Role of prostaglandins in impaired cerebral blood flow in metabolic syndrome”

Dates of Award: 07/01/11 – 06/30/13 $52,000 total costs

Goal: The aims are to determine mechanisms for blunted CBF responses in adults with pre-diabetes.

Role: Mentor to JW Harrell, PI

Agency: American Heart Association, AHA 0815622G Midwest Affiliate Predoctoral Fellowship

Title: “Neural control in metabolic syndrome”

Dates of Award: 07/01/10 – 06/30/11 $26,000 total costs

Goal: The aims are to determine the relationship between sympathetic nerve activity and adrenergic responses in controlling blood flow during exercise, and how this relationship is altered in metabolic syndrome.

Role: Mentor to JK Limberg, PI

Agency: NIH, NHLBI HL091397 (R21)

Title: “Aging and Microvascular Dysfunction in Human Skeletal Muscles”

Dates of Award: 01/15/09 – 12/31/11 $275,000 Direct costs

Goal: The aims are to determine structural, functional, and protein differences in leg microcirculation from quadriceps muscles of young and older adults.

Role: PI

Agency: American Heart Association, AHA 0815622G Midwest Affiliate Predoctoral Fellowship

Title: “Neural adrenergic vasoconstriction in exercising females: impact of hormone status”

Dates of Award: 07/01/08 – 06/30/10 $52,000 total costs

Goal: The aims are to determine sexual differences in adrenergic control of blood in young adults.

Role: Mentor to JK Limberg, PI

Agency: American Federation for Aging Research (AFAR) Research Grant

Title: “Aging and the Red Blood Cell: Linking Endothelial and Exercise Dysfunction”

Dates of Award: 07/01/08 – 06/30/10 $60,000 total costs

Goal: The aims are to determine whether impaired ATP signaling contributes to reduced blood flow in older humans.

Role: PI

Agency: Minnesota Obesity Center Pilot Grant

Title: “Vascular control of muscle blood flow in obese humans”

Dates of Award: 04/01/06 – 12/31/07 $50,000 total costs

Goal: The aims were to determine whether obesity reduces muscle blood flow during exercise.

Role: PI

Agency: NIH/NHLBI NRSA HL69692 03/01/02 – 02/28/05

Title: “Role of chemical dilation in mechanical vasodilation”

Dates of Award: 03/01/02 – 02/28/05 $120,000 total costs

Goal: The aims were to determine whether nitric oxide alters the effectiveness of the skeletal muscle pump.

Role: PI fellow

## PUBLICATIONS

***Articles published or accepted in refereed journals (in reverse chronological order):***

1. Kellawan JM, Limberg JK, Scruggs ZM, Nicholson WT, **Schrage WG**, Joyner MJ, Curry TB. Phosphodiesterase-5 inhibition preserves exercise-onset vasodilator kinetics when NOS activity is reduced. *J Appl Physiol* (1985). Epub 2017 Oct 5. PMID: 28982942
2. Hoscheidt SM, Kellawan JM, Berman SE, Rivera-Rivera LA, Krause RA, Oh JM, Beeri MS, Rowley HA, Wieben O, Carlsson CM, Asthana S, Johnson SC, **Schrage WG**, Bendlin BB. Insulin resistance is associated with lower arterial blood flow and reduced cortical perfusion in cognitively asymptomatic middle-aged adults. *J Cereb Blood Flow Metab*. 2017 Jun;37(6):2249-2261. PMID: 27488909
3. Kellawan JM, Harrell JW, Roldan-Alzate A, Wieben O, and **WG Schrage**. Regional hypoxic cerebral vasodilation facilitated by diameter changes primarily in anterior versus posterior circulation. *J Cereb Blood Flow Metab*. 2017 Jun;37(6):2025-2034. doi: 10.1177/0271678X16659497. Epub 2016 Jan 1. PMID: 27406213
4. Limberg JK, KR Malterer, JM Kellawan J, **WG Schrage**, Wilkins BW, WT Nicholson, JH Eisenach, MJ Joyner, and TB Curry. Potentiation of the NO-cGMP pathway and blood flow responses during dynamic exercise in healthy humans. *Eur J Appl Physiol.* 2016 Dec 24. [Epub ahead of print] PMID: 28013386
5. Limberg JK, GL Peltonen, RE Johansson, JW Harrell, JM Kellawan, MW Eldridge, JJ Sebranek, BJ Walker, and **WG Schrage**. Greater Beta-Adrenergic Receptor Mediated Vasodilation in Women Using Oral Contraceptives. *Front Physiol.* 2016 Jun 8;7:215. PMID: 27375493
6. Peltonen GL, JW Harrell, BP Aleckson, KM LaPlante, MK Crain, and **WG Schrage**. Cerebral blood flow regulation in women across menstrual phase: differential contribution of cyclooxygenase to basal, hypoxic, and hypercapnic vascular tone. *Am J Physiol Regul Integr Comp Physiol.* 2016 Aug 1;311(2):R222-31. PMID: 27225949
7. Limberg JK, BJ Morgan, and **WG Schrage**.Peripheral Blood Flow Regulation in Human Obesity and Metabolic Syndrome. *Exerc Sport Sci Rev.* 2016 Jul;44(3):116-22. PMID: 27223271
8. Limberg JK, RE Johansson, GL Peltonen, JW Harrell, JM Kellawan, MW Eldridge, JJ Sebranek, and **WG Schrage**. β-adrenergic mediated vasodilation in young men and women: Cyclooxygenase restrains nitric oxide synthase. *Am J Physiol Heart Circ Physiol*. 2016 [Epub ahead of print] PMID: 26747505
9. Harrell JW, RE Johansson, TD Evans, JJ Sebranek, BJ Walker, MW Eldridge, RC Serlin, and **WG Schrage**. Preserved Microvascular Endothelial Function in Young, Obese Adults with Functional Loss of Nitric Oxide Signaling. *Front Physiol*. 2015 Dec 22;6:387. PMID: 26733880
10. Kellawan JM, JW Harrell, EM Schrauben, CA Hoffman, A Roldan-Alzate, **WG Schrage**, and O Wieben. Quantitative cerebrovascular 4D flow MRI at rest and during hypercapnia challenge. *Magn Reson Imaging.* 2015. [Epub ahead of print] PMID: 26708027
11. Peltonen GL, JW Harrell, CL Rousseau, BS Ernst, ML Marino, MK Crain, and **WG Schrage**. Cerebrovascular regulation in men and women: stimulus-specific role of cyclooxygenase. *Physiol Rep*. 2015 (7). doi: 10.14814/phy2.1245
12. Exercise vasodilation is greater in women: contributions of nitric oxide synthase and cyclooxygenase. JM Kellawan, RE Johansson, JW Harrell, JJ Sebranek, BJ Walker, MW Eldridge, and **WG Schrage** . *Eur J Appl Physiol*. 2015 Mar 28. [Epub ahead of print] PMID: 25820143
13. JK Limberg, JM Kellawan, JW Harrell, RE Johansson, MW Eldridge, LT Proctor, JJ Sebranek, and **WG Schrage**. Exercise-mediated vasodilation in human obesity and metabolic syndrome: Effect of acute ascorbic acid infusion. *Am J Physiol Heart Circ Physiol*. (Epub ahead of print) 2014. PMID: 25038148
14. Du S, MJ Joyner, TB Curry, JH Eisenach, CP Johnson, **WG Schrage**, MD Jensen. Effect of β2-adrenergic receptor polymorphisms on epinephrine and exercise-stimulated lipolysis in humans. Physiol Rep. May 20;2(5), (Epub ahead of print) 2014. PMID: 24844639
15. Limberg, J, BJ Morgan and **WG Schrage.** Mechanical and metabolic reflex activation of the sympathetic nervous system in younger adults with metabolic syndrome.  *Autonomic Neuroscience* 183:100-105, 2014. PMID: 24680829
16. Limberg JK, BJ Morgan, JJ Sebranek, LT Proctor, MW Eldridge, and **WG** **Schrage**. Neural control of blood flow during exercise in human metabolic syndrome. *Exp Physiol*. 2014 [Epub ahead of print]. PMID: 24659613
17. Harrell, JW and **WG Schrage**. Vasoconstrictor prostaglandins restrain hypoxic vasodilation in humans with metabolic syndrome *Am J Physiol Heart Circ Physiol*. 15 306(2): 261-9, 2014. PMCID: 3920126. Selected by AJPH Editors for Pod Cast On-line Interview.
18. Limberg, JK, RE Johansson, PE McBride and **WG Schrage**. Increased leg blood flow and improved femoral artery shear patterns in metabolic syndrome after a diet and exercise program. *Clinical Physiology and Functional Imaging* *34(4):282-289*, 2013. PMID: 24237709
19. Limberg JK, JW Harrell, RE Johansson, MW Eldridge, LT Proctor, JJ Sebranek, and **WG Schrage**. Microvascular function in younger adults with obesity and metabolic syndrome: Role of oxidative stress. *Am J Physiol Heart Circ Physiol*. 305(8):H1230-7, 2013 PMID: 23934859
20. Limberg, JK, BJ Morgan, **WG Schrage** and JA Dempsey. Respiratory modulation of sympathetic nerve activity in the steady state. *Am J Physiol Heart Circ Physiol* 304(12):H1615-23, 2013. PMID: 23585141, PMCID: 3680774
21. Harrell, JW, BJ Morgan and **WG Schrage**. Impaired hypoxic cerebral vasodilation in younger adults with metabolic syndrome. *Diab Vasc Dis Res.* 10(2):135-42, 2013. PMCID 3899935.
22. Limberg, JK, BJ Morgan, JS Sebranek, LT Proctor, BJ Walker, MW Eldridge and **WG Schrage**. Altered neurovascular control of the resting circulation in human metabolic syndrome. *J Physiol,* 590 (Pt 23): 6109-19, 2012. PMID: 23027821
23. Blain, GM, JK Limberg, GF Mortenson, and **WG Schrage**. Reduced rapid vasodilation in obese humans. *Acta Phys 205 (1): 103-112, 2012*. PMID:21981828
24. Limberg, JK, and **WG Schrage**. Hypoxia: Just say NO? *J Physiol* 589(Pt 9):2111-2, 2011. PMID: 2153203
25. Limberg, JK, TD Evans, CM Zillner, JJ Sebranek, LT Proctor, MW Eldridge and **WG Schrage**. Heterogeneous Vascular Responses to Hypoxic Forearm Exercise in Young and Older Adults. *European J Appl Physiol* 2011. PMID: 22198326
26. Limberg, JK, TD Evans, GM Blain, DF Pegelow, JR Danielson, MW Eldridge, LT Proctor, JJ Sebranek and **WG Schrage**. Effect of obesity and metabolic syndrome on hypoxic vasodilation. *European J Appl Physiol* 112 (2): 699-709, 2011. PMID: 21656228
27. Limberg, JK, MW Eldridge, LT Proctor, JS Sebranek and **WG Schrage**. Alpha-Adrenergic Control of Blood Flow during Exercise: Effect of Sex and Menstrual Phase. *J Appl Physiology 109(5): 1360-68 2010*. PMCID: 2980375
28. **WG Schrage**, BW Wilkins, CP Johnson, JH Eisenach, JK Limberg, NM Dietz, TB Curry and MJ Joyner. Roles of nitric oxide synthase and cyclooxygenase in leg vasodilation and oxygen consumption during prolonged low-intensity exercise in untrained humans. *J Appl Physiology 109*(3):768-777, 2010 PMID: 20558755
29. Limberg, JK, MD Devita, G Blain and **WG Schrage.** Muscle blood flow responses to dynamic exercise in young obese humans, *J Appl Physiology* 108(2):349-55, 2010. PMID: 20007857
30. Kirby BS, VF Voyles, CB Simpson, RE Carlson, **WG** **Schrage**, and FA Dinenno. Endothelium-dependent vasodilatation and exercise hyperaemia in ageing humans: impact of acute ascorbic acid administration. *J. Physiol* 587(Pt 9):1989-2003, 2009. PMID: 19307300
31. **WG Schrage**. Not a search in vein: Novel stimulus for vascular dysfunction after simulated microgravity. *J Appl Physiology* 104(5):1257-58, 2008 PMID: 18276902
32. Basu, A, N Charkoudian, **W Schrage**, RA Rizza, R Basu, and MJ Joyner. Beneficial Effects of Glucagon-like peptide-1 (GLP-1) on Endothelial Function in Humans: Dampening by Glyburide but not by Glimepiride. *Am J Physiol Endocrinol Metab.* 293(5): 289-95, 2007. PMID: 17711996
33. Masuki, S, JH Eisenach, **WG Schrage**, CP Johnson, NM Dietz, BW Wilkins, P Sandroni, PA Low, and MJ Joyner. Reduced stroke volume during exercise in postural tachycardia syndrome. *J. Appl Physiology* 103(4): 1128-35, 2007. PMID:1762683
34. Masuki, S, JH Eisenach, **WG Schrage**, NM Dietz, CP Johnson, BW Wilkins, RA Dierkhising, P Sandroni, PA Low, and MJ Joyner. Arterial baroreflex control of heart rate during exercise in postural tachycardia syndrome. *J Appl Physiology* 103(4):1136-42, 2007. PMID: 17673566
35. Masuki, S JH Eisenach, C Johnson, NM Dietz, L Benrud-Larson, **WG Schrage**, TB Curry, P Sandroni, PA Low, and MJ Joyner. Excessive heart rate response to orthostatic stress in Postural Tachycardia Syndrome is not caused by anxiety. *J Appl Physiology* 102(3):896-903, 2007. PMID: 1711050
36. **Schrage, WG**, JH Eisenach and MJ Joyner. Aging reduces nitric oxide and prostaglandin mediated vasodilation during exercise. *J. Physiol* 579(1):227-36, 2007. PMID:17138603
37. **Schrage, WG**, NM Dietz and MJ Joyner. Effects of combined inhibition of ATP-sensitive potassium channels, nitric oxide and prostaglandins on hyperemia during moderate exercise. *J. Appl Physiology* 100(5): 1506-12, 2006. PMID: 16469932
38. Eisenach, JH, DR Schroeder, TL Pike, CP Johnson, **WG Schrage**, EM Snyder, BD Johnson, ST Turner and MJ Joyner Dietary sodium restriction and *β*2-adrenergic receptor polymorphism modulate cardiovascular function in humans. *J Physiol* 574(3): 955-65, 2006. PMID: 16740612
39. Wilkins BW, **WG Schrage**, Z Liu, KC Hancock and MJ Joyner. Systemic hypoxia and vasoconstrictor responsiveness in exercising human muscle. *J. Appl Physiology* 101(5):1343-50, 2006. PMID: 16809628
40. **Schrage, WG**, JE Eisenach, NM Dietz and MJ Joyner. Agonist-dependent variability of contributions of nitric oxide and prostaglandins in human skeletal muscle. *J. Appl Physiology* 98(4): 1251-1257, 2005.
41. **Schrage, WG**, BW Wilkins, VL Dean, JP Scott, NK Henry, ME Wylam and MJ Joyner. Exercise hyperemia and vasoconstrictor responses in humans with cystic fibrosis. *J. Appl Physiology* (99), 1866-1871, 2005.
42. **Schrage, WG**, MJ Joyner and FA Dinenno. Local inhibition of nitric oxide and prostaglandins independently reduces forearm exercise hyperaemia in humans *J. Physiol* 557 (2): 599-611, 2004. Also, see *Perspectives Editorial* on this research: Boushel, R, and M Kjaer. Redundancy reflects versatility of blood flow regulation mechanisms. *J Physiol* 557(2): 346, 2004.
43. **Schrage, WG**, JE Eisenach, FA Dinenno, P Sandroni, PA Low and MJ Joyner. Effects of midodrine on exercise-induced hypotension and blood pressure recovery in autonomic failure *J. Appl. Physiol.* 97(5): 1978-1984, 2004.
44. Laughlin, MH, CR Woodman, **WG Schrage**, D Gute and EM Price. Interval sprint training enhances endothelial function and eNOS content in some arteries that perfuse white gastrocnemius muscle. *J. Appl. Physiol.* 96(1): 233-244, 2004.
45. Laughlin, MH, J Turk, **WG Schrage**, CR Woodman, and EM Price. Influence of coronary artery diameter on eNOS protein content. *Am. J. Physiol.* (Heart) 284 (4), H1307-1312, 2003.
46. Laughlin, MH, LJ Rubin, JWE Rush, EM Price, **WG Schrage** and CR Woodman. Short-term training enhances endothelium-dependent relaxation in coronary arteries, not arterioles. *J. Appl. Physiol* 94 (1): 234-244, 2003.
47. **Schrage, WG**, CR Woodman and MH Laughlin. Mechanisms of flow and ACh-induced dilation in rat soleus arterioles are altered by hindlimb unweighting. *J. Appl. Physiol* 92 (3): 901-911, 2002.
48. Woodman, CR, **WG Schrage**, JWE Rush, CA Ray, EM Price, EM Hasser, and MH Laughlin. Hindlimb unweighting decreases endothelium-dependent dilation and eNOS expression in soleus not gastrocnemius. *J. Appl. Physiol* 91(3): 1091-1098, 2001.
49. Laughlin, MH, **WG Schrage**, RM McAllister, HA Gaverick, and AW Jones. Interaction of gender and exercise training: vasomotor reactivity of porcine skeletal muscle arteries. *J. Appl. Physiol* 90 (1): 216-227, 2001.
50. **Schrage, WG**, CR Woodman, and MH Laughlin. Hindlimb unweighting alters endothelium-dependent vasodilation and ecNOS expression in soleus arterioles. *J. Appl. Physiol.* 89 (4): 1483-1490, 2000.
51. Laughlin, MH and **WG Schrage**. Effects of muscle contraction on skeletal muscle blood flow: When is there a muscle pump? *Med. Sci. Sports Exerc.* 31(7): 1027-1035, 1999.

# ***Invited Reviews***

# Limberg JK, BJ Morgan, and **WG** **Schrage**. Peripheral blood flow regulation in human obesity and metabolic syndrome. *Exercise Sport Science Reviews, July, 2016.*  [Epub ahead of print ]

# ***Book Chapters***

# Rush, JWE, CR Woodman, AP Aaker, **WG Schrage**, and MH Laughlin. Skeletal muscle blood flow and endurance exercise: limiting factors and dynamic responses. *Endurance in Sport 2nd ed*. Edited by R.J. Shepherd and P.O. Astrand. Volume II of the Encyclopedia of Sports Medicine. Blackwell Science, Oxford, UK, 2000.

# Joyner, MJ, **WG Schrage** and JH Eisenach. Control of Blood Pressure and Neurogenic Orthostatic Hypotension. *Neurobiology of Disease*, Edited by S Gilman and PA Low. Elsevier Academic Press; 997-1005, 2007.

# ***Lay press or non-peer reviewed articles***

# **Schrage, WG**. *Diabetes Forecast Magazine*. Cerebral blood vessels in prediabetes 2013.

# Limberg, JK, BJ Morgan and **WG Schrage**. The sympathetic nervous system and control of resting blood flow in adults with metabolic syndrome. *Physiologic News*, October, 2013.

## PROFESSIONAL MEMBERSHIPS AND SERVICE

***Society Memberships***

American College of Sports Medicine, 1992-present.

American Physiological Society, 1996-present.

American Diabetes Association, 2011-present.

American Autonomic Society, 2003-2005.

***Professional Service***

*Symposia Chair at National/International Meetings*

Experimental Biology, 2012. Chaired two separate Featured Topics: 1) Hypoxia 2) Neural control

Symposia Chair at Physiology 2016, Dublin, Ireland, July, Chair of session: Insulin Resistance in Children: Cardiovascular and autonomic consequences.

Symposia Chair at Experimental Biology 2017, Chicago, IL. Exercise and Metformin interactions.

***Editorial Duties***

 *Journal of Applied Physiology Editorial Board,* 2007- present

 *Frontiers in Physiology*, Exercise Physiology Editorial Board, 2011- present

***Grant Reviewer***

 National Aeronautics and Space Administration (NASA), 2014

 American Heart Association, 2012-

 NIH-NHLBI Permanent Ad Hoc member, CICS Study Section, 2012-

 NSERC, Canadian Natural Science Engineering Research Council, 2013-

University of Indiana CTSA Pilot Grant, External Reviewer, 2013

***Peer Review***

*Journal of Physiology*, 2004-present

*Journal of Applied Physiology*, 2001-present

*Physiologic Genomics,* 2008-present

*Canadian Journal of Applied Physiology*, 2004-2005

*Autonomic Neuroscience: Basic and Clinical*, 2004-2007

*American Journal of Physiology-Heart and Circulation,* 2003-present

*American Journal of Physiology-Regulatory,* 2006-present

*Medicine and Science in Sport and Exercise*, 2002-present

*Applied Physiology, Nutrition and Metabolism*, 2005-present

*American Journal of Physiology-Endocrinology and Metabolism,* 2006-present

*European Journal of Applied Physiology, 2009-present*

*Exercise & Sport Science Reviews, 2010-present*

*Hypertension, 2010-present*

*Obesity, 2012-present*

***University Affiliations***

*UW Cardiovascular Research Center*, 2006-present

*UW Institute on Aging (IOA), 2007-present*

*Wisconsin Prevention of Obesity and Diabetes (WiPOD)*, 2008-present

***University Service***

Departmental Level

Space, Facilities and Technology Committee, 2007- present

Climate, Equity and Diversity Committee, 2007-2016

Kinesiology Faculty Search Committee, member, 2011-12, 2012-13 (Chair), 2013-14.

Kinesiology Faculty Search Committee for academic staff search, (Chair), 2015-16.

External Relations Committee, 2013

Merit Committee, 2014, 2015 (Chair), 2016 (Chair)

Badger Bash Organizing Committee, American College of Sports Medicine, 2014-

Project Chair for Strategic Initiative #2: TA distribution, 2014

UW-WARF 2020 Initiative team, for research infrastructure grant submission. Member 2015

TA Job Description Committee (Mason, Koltyn) 2016

Marsh Center Committee, 2016-

School of Education

Speaker for campus visit for underrepresented high school students. Career opportunities demonstrated and discussed, 2011, 2012, 2013

Counselors on Campus for underrepresented students, School of Education, 2011-present

Kinesiology contact, Ad Hoc assistance for Office of Undergraduate Recruitment and Retention (OURR), 2012, 2013, 2016

Center for Educational Opportunity (CeO), invited speaker to engage/explain Kinesiology as a major leading to career choices. 2-3 times per year. 2012, 2013

University Level

Biological Sciences Fellowship Committee, Kinesiology representative, 2012-2015 (4-year term)

Faculty Senate, Departmental representative, 2008-2012

UW Hospital CTSA K12 Scholars Program, Ad-hoc reviewer 2008-11, 2015, 2017

UW WiPOD ad-hoc reviewer for Annual conference, 2010

UW CTSA Institute for Clinical & Translational Research (ICTR) Pilot Grant, Reviewer 2010-11,

2013

***Community Outreach***

1. *Harambee*. Harambee is a daylong event entitled aimed at increasing student awareness in STEM related career paths. 90+ underrepresented high school students from Milwaukee, Racine and Madison communities explored the School of Education, CALS, and Engineering. Students interested in pursuing STEM related majors experienced hands-on laboratory tours combined with a brief lecture on major options and career choices stemming from a Kinesiology degree. 2011, 2012, 2013.
2. Counselors on Campus for Schools of Education, Engineering, and CALS. High school counselors from racially diverse high schools attended UW for day-long event. Organized and implemented an hour-long program to demonstrate career and research opportunities within Kinesiology. 2012, 2013.

## EDUCATIONAL ACTIVITIES

## Teaching

1. Kinesiology 314, *Undergraduate Exercise Physiology*, UW Madison, 2007, 2008 x 2, 2009 x 2, 2010 x 2, 2011 x 2, 2012, 2013 x 2, 2014 x 2, 2015 x2, 2016 x2, 2017. 24 lecture hours. 60-85 students.
2. Kinesiology 614, *Advanced Exercise Physiology*, UW Madison, 2007x2, 2008, 2009, 2010, 2011, 2012, 2013 (22 lecture hours). 44lecture hours for 2014, 2015, 2016, 2017. 25-50 students.
3. Kinesiology 615, *Laboratory Methods in Exercise Physiology*, UW Madison, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016. 64 contact hours over 16 weeks. 8-12 students.
4. Kinesiology 953, *Graduate Seminar in Exercise Physiology-Special Topics*, UW Madison, 2007, 2008, 2009, 2010, 2012, 2014, 2016. 5-11 students.
5. *Kinesiology 773, Cardiorespiratory Adaptation to Exercise and Environment,* UW Madison, 2006, 2008, 2010, 2011, 2013. 45-46 lecture hours. 5-20 students.
6. *Kinesiology 900, Graduate Seminar,* UW Madison, S2013, F2015. Organize and lead weekly seminar series, including group activities for student professional ethics and career development.
7. *Instructor*, Integrative Physiology, Mayo Graduate School, 2002-2006. 3 lectures to Biomedical Engineering graduate students.
8. *Teaching Assistant*, Principals of Physiology, University of Missouri-Columbia, 1995-1997.

## Mentoring at University of Wisconsin (Student honors and awards noted in bold italics.)

***Postdoctoral Fellows***

1. J. Mikhail Kellawan, PhD. January 2013-present. Supported by NIH R01 funding to Schrage. Awarded American Physiological Society ***Environmental and Exercise Physiology Postdoctoral Research Awards***, Experimental Biology 2014, 2015, 2017. ***American Heart Association Postdoctoral Fellow***, 2014-2015. *Recently accepted tenure track faculty position at University of Oklahoma (start date August 2017).*

***Graduate Students***

1. Jacqueline K Limberg, MS. August 2007-2012. PhD May 2012. ***Awarded two independent American Heart Association (AHA) Predoctoral grants*** *(2008-10, 2010-11). Recipient of* ***UW Institute on Aging Young Investigator Award*** *2011, and* ***APS-NCAR Young Investigator Award 2013****.* Awarded postdoctoral fellowship on NIH Training Grant (Endocrinology) at Mayo Clinic, Rochester, MN, 2012-2015, and NIH NRSA 2014-2016, K99/R00 June 2016. *Accepted tenure track position at University of Missouri-Columbia (Start date August 2017).*
2. John W Harrell, MS. August 2009-2014. Doctoral student. Anticipated graduation May 2014.Received ***American Physiological Society Environmental Exercise Physiology Predoctoral Recognition Award*** *at Experimental Biology 2010, and* ***Caroline Tum Suden Award*** EB 2013 *and* EB 2014*. Recipient of* ***American Heart Association Predoctoral Fellowship, 2011-2013****.* Tenure track faculty in School of Pharmacy and Health Sciences, Drake University, Des Moines, Iowa, 2014*. Moved to faculty at Carroll College in Waukesha, WI September 2016.*
3. Rebecca E Johansson, BS. August 2011-2013. MS student. Doctoral Program in Sports Physiology at University of Cape Town, South Africa 2016-2018.
4. Garrett L Peltonen, MS. August 2012-2017. Doctoral student. Garret studied cerebral vascular mechanisms of vasodilation to environmental stress. Applied twice for AHA predoctoral fellowship (2013, score 17%ile 2014 but funded to 15%ile). ***Caroline Tum Suden Award*** EB 2016. Assistant professor at Western New Mexico State University*.*
5. Katrina J Carter, BS. January 2015-present. Physiology program doctoral student. Anticipated graduation 2020.
6. Aaron Ward, MS. August 2016-present. Kinesiology doctoral student interested in muscle and brain blood flow. Awarded American Physiological Society ***Cardiovascular Section Predoctoral Research Award***, Experimental Biology 2017.

## Graduate Committee Duties (*Bold* indicates primary mentorship)

Doctoral Committees

Noah J Marcus, Kinesiology, 2007-09

***Jacqueline K Limberg***, Kinesiology, 2007-12

Rebecca Vanderpool, Biomedical Engineering, 2008-10

Diana Marcela Tabima, Biomedical Engineering, 2009-10

Ryan Koenig, Kinesiology, 2009-12

Jon Dickman, Kinesiology, 2009-12

Chounghun Kang, Kinesiology, 2009-11

***John W Harrell***, Kinesiology, 2009-2014

Tiffany Akins, Kinesiology, 2010-2012

Greg Barton, Kinesiology, 2012-2015

***Garrett L Peltonen***, Kinesiology 2012-2017

Omid Forouzan (Biomedical Engineering) 2013-2015

Laura Tetri, (Medical Scientist Training Program, MD-PhD) 2014-2017

Joseph Sepe, (Physiology Graduate Program) 2014-

Jacob McDonald, MS, (Medical Physics) 2016-2018

Masters Committees

Bradley Julius, Kinesiology, 2008-2009

Jessica Danielson, Animal Science, 2008-2009

***Rebecca E Johansson***, Kinesiology, 2011-2013

Marie M Hoffman, Kinesiology, 2012-2013.

Joseph Sepe, Kinesiology, 2012-14.

Kathleen Miller, Kinesiology, 2015-2017

***Shapiro Medical Scholar for Research Program.*** *(A UW program that sponsors 2nd year medical students for 10-12 weeks of summer research.)*

1. Meghan J Furlong, summer 2007. Meghan studied oxidative stress proteins in aging human skeletal muscle. Co-authored Experimental Biology (EB) abstract 2008.
2. Michael D De Vita, 2008. Mike recruited lean and obese subjects for studies measuring muscle blood flow during exercise. Mike was awarded the ***2009 Herman Shapiro Outstanding Research Scholar Award***, and is a coauthor on obesity paper in 2010 in *Journal of Applied Physiology.*
3. Garrett F Mortenson, BS. Summer 2009. Garrett studied lean and obese subjects for studies measuring muscle blood flow during exercise during normoxia and hypoxia. Garrett was a coauthor for an EB 2010 meeting abstract, and a coauthor on a published paper in 2011 in *Acta Physiologica*.
4. Lee Linstroth, BS.Summer 2010. Lee studied cerebral vascular responses in obese and metabolic syndrome patients. Lee was co-author on EB 2011 abstract.
5. Peter A Yanke, BS. Summer 2012. Peter studied mechanisms of cerebrovascular dysfunction in health and metabolic syndrome.
6. Aaron Owen, BS, Summer 2015, Aaron studied brain blood flow responses in children. Published manuscript with JM Kellawan (postdoctoral fellow).
7. Kyle Rourke, BS. Summer 2017. Helped with MRI CBF studies funded by ADA.

***International Medical Student Federation Association (IMSFA)*** *Program****.*** *(Sponsors international medical students for 1-2 months of summer research.)*

1. *Sergio Maia Jr* (Brasil), July 2011. Sergio studied the role of vasoconstrictor nervesin controlling muscle blood flow in healthy and diseased humans.
2. *Monica Csejnovia* (Slovenia), August 2011. Monica helped us study cerebral blood flow control in metabolic syndrome patients.

***Undergraduate Students.*** *(For research credits unless noted otherwise.)*

1. Samantha R. Schilling, 2007-2008. Co-author on Experimental Biology abstract in San Diego, 2008. University of Wisconsin Cancer Biology graduate school Spring 2011.
2. Heather N. Hrusckocy, 2007-2008. Biology major working in lab for credit. Capstone project 2007-2008. Co-author on Experimental Biology abstract in San Diego, 2008.
3. Lindsey Stifter, Fall 2007. Kinesiology major working for research credit internship. Now attends University of Wisconsin Physical Therapy School for her doctorate in PT.
4. Megan Nelson, BS Spring 2008. Kinesiology major working for research credit internship. Co-authored EB abstract 2008. Attending University of Wisconsin Physical Therapy School for her doctorate in PT summer 2008.
5. Alyssa Drezson, BS, Fall 2008. Alyssa worked in the lab for Kinesiology Practicum credit. She assisted with human physiology studies. Alyssa is coauthor on a published APS abstract, and is attending PA school.
6. Angelique G Brellenthin, Spring 2009. Kinesiology major who helped with vascular studies in normoxia and hypoxia. Current graduate student in Kinesiology, University of Wisconsin.
7. Adam J Keifer, Fall 2009. Biology major who helped with vascular studies in normoxia and hypoxia, analyzed data. Co-author on EB abstract 2010. Medical school fall 2011.
8. Trent D Evans, Spring 2009-Fall 2010. Kinesiology major working for 2 credits under Biology 152 course, followed by paid work. Studied muscle blood flow in older humans under normoxia and hypoxia conditions. Awarded ***American Physiological Society* (APS) Undergraduate Summer Research Fellowship 2009.** Awarded ***David S. Bruce Excellence in Undergraduate Research 2010 at Experimental Biology 2010.*** Following BS May 2011, Trent earned MS at CU Boulder in Douglas R Seals laboratory 2011-2013. Trent was co-author on two manuscripts published in 2012.
9. Patrick Meyers, Spring 2009. Kinesiology major working for 2 credits under Biology 152 course. Studied muscle blood flow in obese humans, including the role of RBC in regulation of blood flow. Entered medical school 2011 at University of Wisconsin.
10. Caitlin Zillner, Summer 2009-Fall 2010. Biology major volunteer research assistant in our lab. Helped with vascular studies in normoxia and hypoxia, analyzed data comparing lean and obese exercise blood flow responses. Awarded ***American Physiological Society (APS) Summer Undergraduate Research Fellowship for 2010***. Awarded ***David S. Bruce Outstanding Undergraduate Abstract Award for Experimental Biology 2011***. Finalist candidate **for *David S. Bruce Excellence in Undergraduate Research at Experimental Biology 2011.*** Presented abstracts at EB 2011.Caitlin was co-author on a manuscript in 2011. Caitlin worked as a research technician at Oklahoma State University Medical School, and plans on attending PA school in 2013.
11. Kathleen Grabowski, Fall 2009-Spring 2010, Fall 2011. Biology major working for 2 research credits in Biology 152 course. Studied vascular responses to hypoxic exercise in older adults and metabolic syndrome patients.
12. Molly Dixon, Spring-Summer 2010. Biology and Spanish double major working for 2 research credits in Biology 152 course. Studied vascular responses to exercise in metabolic syndrome patients before and after an exercise training intervention. Molly plans on attending medical school in 2012.
13. Jennie Scidmore, Summer-Fall 2010. Biology major worked for 2 research credits in Biology 152 course. Studied effects of anti-oxidants on vascular function in metabolic syndrome. Attending physician assistant MS program starting Feb 2011.
14. Julian M Franko, 2010. Biology major working for 2 research credits in Biology 152 course. Studied cerebral blood flow responses to exercise.
15. Edward J McKenna, 2010-11. Kinesiology major working for 2 research credits in Kinesiology research practicum. Studying inflammatory markers in obesity and metabolic syndrome. ***Awarded American Physiological Society (APS) Summer Undergraduate Research Fellowship for 2011*** to study cerebral vascular function in metabolic syndrome patients. Attending EB 2012 in San Diego to present a poster. Attended medical school at Medical College of Wisconsin, 2012.
16. DJ Ciancio, Spring 2011. Biology major working for 2 research credits in Biology 152 course. Studied sympathetic control in patients with metabolic syndrome with graduate student.
17. Michelle Usset, Spring 2011. Kinesiology major working for 2 research credits. Helping with data collection vascular function in metabolic syndrome patients before, during and after an 11-month lifestyle intervention. Michelle attended Minnesota for her doctorate in physical therapy Fall 2011.
18. Keelin O’neill, Fall 2011-May 2012. Undergraduate Research Scholar for entire academic year. Helps with all aspects of lab, including screening subjects, data collection, lab set-up, lab meetings, and so on. Plans on entering medical school summer 2013.
19. Anne Bolgert, Fall 2011-May 2012. Undergraduate Research Scholar for entire academic year. Helped with all aspects of lab, including screening subjects, data collection, lab set-up, lab meetings, and so on. Helped primarily with Diabetes Prevention Program studies, and performed blood assays.
20. Kelly Winkle. Fall 2011. Kinesiology major working for research credits. Helping with data collection vascular function in metabolic syndrome patients. Attens in physical therapy in Colorado, 2012.
21. Jessica Schrimp, 2011-2015. **Chancellor’s Scholar Program**. Meet monthly with student to offer open forum for young underrepresented students to develop and grow independently. Jessica is a double major in Political Science and Communications.
22. Luke Wernberg, Spring 2012. Kinesiology major working for research credit. Helping with data collection vascular function in obese and metabolic syndrome patients. Attends DPT school at University of Minnesota 2013-2016.
23. Brianna Pilling. Summer 2012. Kinesiology major working for research credit. Helped with data collection vascular function in obese patients.
24. Cameron L Rousseau. Summer-Fall 2012, and Spring 2013 Kinesiology practicum student. Kinesiology undergraduate volunteering on research projects. Spring 2013 Kinesiology Practicum student**. *Awarded ADA Minority Undergraduate Internship in 2013,*** and submitted two independent American Physiological Society Summer Research Fellowships. Plans to attend medical school. ***Awarded APS Summer Fellowship for 10 weeks of full-time research in our lab 2013***.
25. Caitlin Quinn Fall 2012. Kinesiology Practicum working for research credit. Attending medical school 2014 at Medical College of Wisconsin.
26. Kaitlin Berns. Fall 2012. Biology 152 student. Worked on cerebral blood flow studies with graduate student. Plans to attend PA school.
27. Joshua Trierweiler, Fall 2012. Student volunteer. Volunteered Spring and Summer 2013. Participating in Kinesiology Practicum (3cr) Fall 2013. Worked as student researcher Spring 2014 on NIH grant.
28. Nikki Reugsegger. Fall 2012. Kinesiology Practicum working for research credit. Started DPT progam Fall 2013.
29. Ying Mei. Fall 2012, Spring 2013. Kinesiology undergraduate volunteered on research projects related to our NIH R01 grant.
30. Sean Reush Spring 2013. Kinesiology undergraduate volunteering on research projects related to our muscle blood flow grant. Participated in Kinesiology Practicum (3cr) Fall 2013. Continued to volunteer Spring 2014. Plans for Medical School 2014.
31. Isaiah Rozich. Spring 2013. Biology 152 student working for research credit. Plans to attend medical school.
32. Claire Ngyen. Spring 2013. Biology 152 student working for research credit. Plans to attend medical school.
33. Kevin Richards. Spring 2013. Kinesiology Practicum working for research credit. Helped run our NIH-funded diabetes prevention program.
34. Maxwell Roy, Summer 2013. Summer Research Opportunity Program (SROP) for underrepresented students. Max worked half-time in lab for 8 weeks on blood flow control projects.
35. Zachary Zinda. Fall 2013. Kinesiology Practicum working for research credit. Helped run our NIH-funded diabetes prevention program.
36. Brady Ernst. Fall 2013. Biology 152 student working in lab for credit. Focused on our brain blood flow studies. Continued to volunteer Spring 2014. Paid Fall 2014 from NIH grant to help with data collection.
37. Elizabeth Duxbury. Fall 2013. Biology major volunteered for 2 Cr independent study.
38. Megan Simon. Spring 2014. Biology major working for 2 Cr for Biology 152.
39. Ben Johnson. Fall 2014. Kinesiology Practicum working on NIH grant.
40. Ben Aleckson. Summer and Fall 2014. Biology 152 student working on ADA studies. Awarded ***American Physiological Society (APS) Summer Undergraduate Research Fellowship for 2015***. Presenting abstract at EB 2016.Ben plans on attending medical school in 2017.
41. Ryan Buda. Summer and Fall 2014. Kinesiology major volunteering in lab.
42. Kaylie LaPlante. Summer 2014, Fall and Spring 14-15. Pre-Kinesiology volunteering for independent study. Volunteer Fall 2015 and paid worker on NIH R01 Spring 2016.
43. Alyssa Schenzel: Fall 2014. Kinesiology Practicum student. Attending PA School.
44. Alex Eggen, Spring 2015. Kinesiology Practicum student helping with blood flow studies.
45. Kara Krugel, Fall 2015. Kinesiology Practicum student helping with hypoxia studies.
46. McKenzie Tirrel, Spring 2015. Biology 152 student working in lab for credit.

# ***Abstracts (Presented at national and international meetings, recent from a list of >80)***

1. Kellawan, JM, A Roldan, O Wieben and **WG Schrage**. 4D Flow MRI to quantify cerebral blood flow during environmental challenges. International Society for Magnetic Resonance in Medicine (ISMRM). Annual International Meeting.
2. GL Peltonen, CL Rousseau, JW Harrell and **WG Schrage**. Influence of menstrual cycle phase on the cerebrovascular response to hypoxia: role of cyclooxygenase. FASEB J. 2014.
3. JW Harrell, GL Peltonen, CL Roussau and **WG Schrage**. Role of cycooxgenase in sex-specific cerebrovascular responses to hypoxia. FASEB J. 2014.
4. JM Kellawan, RE Johansson, JW Harrell, J Trierweiler, MK Crain, JJ Sebranek, BJ Walker, MW Eldridge and **WG Schrage**. Sex differences observed in forearm exercise vasodilation are not mediated through differences in nitric oxide or prostaglandin signaling. FASEB J. 2014.
5. MK Crain, RE Johansson, JW Harrell, JK Limberg, JJ Sebranek, BJ Walker, MW Eldridge, and **WG Schrage**. Contribution of NOS and COX to β-adrenergic vasodilation in obesity. FASEB J. 2013.
6. RE Johansson, JW Harrell, JK Limberg, MK Crain, CL Rousseau, PA Yanke , JJ Trierweiler, JJ Sebranek, BJ Walker, MW Eldridge and **WG Schrage**. Contributions of nitric oxide and prostaglandins to exercise hyperemia in young obese adults FASEB J. 2013.
7. GL Peltonen, RE Johansson, JW Harrell, JK Limberg, MK Crain, JJ Sebranek, BJ Walker, MW Eldridge and **WG Schrage**. Endothelium dependent vasodilation in young, obese adults: contribution of NOS. FASEB J. 2013.
8. JK Limberg, EJ McKenna, BJ Morgan, JS Sebranek, LT Proctor and **WG Schrage**. Augmented alpha-adrenergic vasoconstriction during exercise in human metabolic syndrome FASEB J. 2012.
9. JW Harrell, EJ McKenna, BJ Morgan and **WG Schrage**. Stimulus-specific cerebrovascular dysfunction in humans with metabolic syndrome. FASEB J. 2012.
10. EJ McKenna, JK Limberg, BJ Morgan, LT Proctor, JS Sebranek, and **WG Schrage**. Paradoxical relationship between alpha-adrenergic tone and muscle sympathetic nerve activity in human metabolic syndrome FASEB J. 2012.
11. RE Johansson, JK Limberg, PM McBride and **WG Schrage**. Can diabetes prevention program increase resting leg blood flow and antegrade shear rate in patients with metabolic syndrome? FASEB J. 2012.
12. TD Evans, GM Blain, JK Limberg, A Kiefer, JJ Sebranek, LT Proctor, and **WG Schrage**. Impaired hypoxic exercise vasodilation in older adults. FASEB J. 2010 24:619.11
13. JK Limberg, TDEvans, Gregory Blain, CM Zillner, LT Proctor, JJ Sebranek, and WG **Schrage**. Hypoxic exercise responses in lean and obese humans FASEB J. 2010 24:990.7
14. JW Harrell, GM Blain, JK Limberg, GF Mortensen, and **WG Schrage**. Is rapid vasodilation in response to single contractions impaired in human obesity? FASEB J. 2010 24:804.13

## SEMINARS & ORAL PRESENTATIONS

1. Cerebrovascular Control is Challenged by Insulin Resistance. Symposium: Deranged Cardiovascular Stress Responses in Individuals with Insulin Resistance. Presented at American College of Sports Medicine Annual Meeting, Denver, CO, 2017.
2. Cerebral blood flow during stress: impact of insulin resistance. Department of Anesthesiology Grand Rounds, UW-Madison, December 14, 2016.
3. Controlling muscle blood flow in obese humans. Department of Kinesiology, York University, Toronto, Ontario, Canada. October 28, 2016.
4. Cerebral blood flow during stress: impact of insulin resistance. Department of Kinesiology and Health, University of Birmingham, UK, August 4, 2016
5. Sympathetic and vascular control of skeletal and cerebral circulations in younger prediabetic humans. Department of Kinesiology and Nutrition, University of Illinois, Chicago, Illinois. November 20, 2015
6. Consequences of metabolic syndrome on skeletal muscle and cerebral blood flow regulation. Department of Nutrition, University of Wisconsin-Madison, November 5, 2015.
7. Subclinical changes in vascular function in insulin resistant adults. Invited talk to Alzheimer’s Disease Research Center and VA GRECC. University of Wisconsin, Madison, WI, October 17, 2014.
8. Blood flow control during exercise in obesity and metabolic syndrome. Symposium: "Exercise and Vascular Health". Trainee presentation. Invited talk, Integrated Physiology of Exercise meeting, Miami, FL, September 19, 2014.
9. Insulin resistance in young adults: Impact on skeletal and cerebral circulations. University of Milan, Department of Physiology, Milan, Italy, May 12, 2014.
10. Vascular consequences of metabolic syndrome on skeletal and cerebral circulations in younger adults. University of Minnesota, Department of Kinesiology, March 3, 2014.
11. Cerebral and Skeletal Muscle Circulations: Impact of Prediabetes. University of Wisconsin, Cardiovascular Research Center monthly seminar. April 2013.
12. Hypoxic vasodilation in human cerebral circulation. Department of Comparative Biomedical Sciences, University of Wisconsin, February, 2013.
13. Vascular adaptations in obesity and metabolic syndrome. University of Wisconsin Hospital, Department of Endocrinology Grand Rounds. April 2012.
14. Regulation of muscle blood flow in obesity. Invited symposium talk at American College of Sports Medicine national meeting, Baltimore, MD, Jun 4, 2010.
15. Vascular control in obese humans. Invited talk to Department of Exercise and Sport Science, University of Utah, Salt Lake City, UT, Jan 29, 2010,
16. Regulation of muscle blood flow in obese humans. Invited talk to Noll Laboratory, Department of Kinesiology, Penn State University, State College, PA, Nov 6, 2009.
17. Blood flow responses to exercise in obese humans. UW campus seminar series talks, Department of Comparative Biomedical Sciences and Department of Kinesiology, Madison, WI, Sept 25, 2009,
18. Neurovascular control of blood flow in exercising humans. Department of Biomedical Sciences, University of Missouri, Columbia, MO, May 14, 2008.
19. Vascular function in aging humans: role of ATP. Invited presentation at St. Louis University, Department of Physiology and Pharmacology. St. Louis, MO, May 5, 2008.
20. Effects of combined inhibition of ATP-sensitive potassium channels, nitric oxide and prostaglandins on forearm exercise hyperemia. American College of Sports Medicine, Denver, CO, 2006.
21. Vascular signaling during exercise in young and aging humans. Dept Health and Kinesiology, Texas A&M University, College Station, TX, May 1, 2006. Also given at: Dept of Health and Exercise Science, Colorado State University, Fort Collins, CO, April 18, 2006; Dept of Kinesiology, University of Wisconsin, Madison, WI, March 24, 2006; Dept of Exercise Science, Syracuse University, Syracuse, NY, February 20, 2006.
22. Vascular signaling in older humans. Mayo Clinic Department of Biomedical Engineering and Physiology weekly seminar. Rochester, MN, January 13, 2006.
23. Beta-2 Adrenergic Polymorphism Alters the Cardiac Output and Blood Pressure Response to Exercise. International Symposium of the Autonomic Nervous System, Los Cabos, Mexico, October 9, 2005.
24. Effects of midodrine on exercise-induced hypotension and blood pressure recovery in autonomic failure. Joint Conference of the American and European Autonomic Societies, Amsterdam, Netherlands, Oct 21, 2004.
25. Role of nitric oxide and prostaglandins in exercise hyperemia. Rankin Memorial Symposium on Blood Flow Regulation and Endothelial Function. Department of Exercise Science, University of Wisconsin, Madison, WI, Oct 4-5, 2004.
26. Midodrine causes forearm vasoconstriction during cycling in patients with pure autonomic failure. *American College of Sports Medicine Annual Meeting*, Indianapolis, IN, 2004.
27. Inhibition of nitric oxide and/or prostaglandins during exercise reduces forearm exercise hyperemia. *Experimental Biology*, Washington, DC, 2004.
28. eNOS gene expression and vasodilator mechanisms in soleus muscle arteries from hindlimb unweighted rats. *Department of Anesthesia Research*, Mayo Clinic, 2001.
29. Simulated microgravity: Effects on skeletal muscle microcirculation structure, function, and gene expression. *Department of Cardiology*, Penn State Medical Center, Hershey, PA, 2001
30. Skeletal muscle vascular control mechanisms after simulated microgravity. Department of Integrative Physiology, University of Colorado-Boulder, 2001.
31. Acetylcholine-induced dilation of soleus second order arterioles in hindlimb unweighted rats. *American College of Sports Medicine Annual Meeting*, Baltimore, MD, 2001.
32. Mechanisms of flow-induced dilation are altered following hindlimb unweighting. *Department of Physiology Seminar*, University of Missouri, Columbia, MO, 2000.
33. Acetylcholine-induced vasodilation in skeletal muscle from interval sprint trained rats. *American College of Sports Medicine Annual Meeting*, Seattle, WA, 1999.
34. Changes in eNOS gene expression and vasodilator function after physical deconditioning, *Department of Physiology Seminar*, University of Missouri, Columbia, MO, 1999
35. NOS: Interactions of artery size and exercise training in pig coronary arterioles. *Department of Physiology Seminar*, University of Missouri, Columbia, MO, 1997.
36. Role of the muscle pump in exercise hyperemia. *Department of Physiology Seminar*, University of Missouri, Columbia, MO, 1996.