

## CURRICULUM VITAE

Name: Robert L. Hester, Ph.D.

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Home Address: 1577 Barnes Rd  
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Date and place of birth: September 12, 1953; Starkville, Mississippi

### Education:

1975 (B.S) Mississippi State University, Miss. State, MS. Biological Engineering:  
1975-1976 Mississippi State University, Miss. State, MS. Mechanical Engineering:  
1982 (Ph.D.) University Miss. Medical Center, Jackson, MS. Biomedical Engineering

### Membership in professional societies:

American Physiological Society  
Microcirculatory Society  
Biomedical Engineering Society  
Society Simulation Health Care

### Research interests:

Computer simulation of human physiology  
Effect of obesity on cardiovascular function

**Professional experience:**

2013-Present	Professor, Department of Orthopedic Surgery, University Mississippi Medical Center, 2500 N. State St., Jackson, MS 39216
2011-Present	President, HC Simulation, LLC
2000-present:	Professor, Department of Physiology and Biophysics, University Mississippi Medical Center, 2500 N. State St., Jackson, MS 39216
1993-2000:	Associate Professor, Department of Physiology and Biophysics, University Mississippi Medical Center, 2500 N. State St., Jackson, MS 39216
1985-1993:	Assistant Professor, Department of Physiology and Biophysics, University Mississippi Medical Center, 2500 N. State St., Jackson, MS 39216
1982-85:	Postdoctoral fellow, Department of Physiology, University of Virginia, Charlottesville, Virginia.
1982:	Research assistant, Department of Physiology and Biophysics University of Mississippi Medical, Jackson, MS
1975-1976	Teaching Assistant, Mechanical Engineering Department, Mississippi State University.

**Honors and Awards**

1976-1982	NIH Predoctoral Training Grant
1983-1985	NRSA Postdoctoral Grant
1994-2001	Editorial Board American Journal of Physiology: Regulatory, Integrative, Comparative Physiology
1994-2004	Fellow Council of High Blood Pressure
1995-	Editorial Board American Journal of Physiology: Heart Circulatory Physiology
1998-	Editorial Board Microcirculation
2004-2005	President-elect Microcirculatory Society
2005-2011	Associate Editor for journal Cranio
2005-2006	President Microcirculatory Society
2006	Mentor: APS Professional Skills Course on Writing and Reviewing for Scientific Journals

2007	Mentor and speaker APS Professional Skills Course on Making Scientific Presentations: Critical First Skills
2008	Mentor: APS Professional Skills Course on Writing and Reviewing for Scientific Journals
2009	Mentor and speaker APS Professional Skills Course on Making Scientific Presentations: Critical First Skills
2010	Mentor: APS Professional Skills Course on Writing and Reviewing for Scientific Journals
2010	Chair, Cardiovascular Section, American Physiological Society
2011, 2013, 2014	Mentor: APS Professional Skills Course on Writing and Reviewing for Scientific Journals
2014	Chair , Joint Programming Committee, American Physiological Society
2015-2020	Billy S. Guyton Distinguished Professor, UMMC
2016	Associate Editor, American Journal of Physiology: Heart Circulatory Physiology

### **Committees:**

#### **American Heart Association**

Research Advisory and Policy Committee, Mississippi Heart Association 1986-1989  
 Research Advisory and Policy Committee, Mississippi Heart Association 1994-1997  
 Southern Research Consortium Steering Committee (AHA), 1999-2000  
 American Heart Association , Science Classification Task Force, 2005-2006  
 Council on Basic Cardiovascular Sciences, American Heart Association 1989-present.  
 AHA Region II Steering Committee 2007-2009  
 AHA Greater Southeast Affiliate Research Committee 2007-2009  
 Co-Chair AHA Vascular Biology Blood Pressure Regulation 2006-2007  
 Chair AHA Vascular Biology Blood Pressure Regulation 2008- 2009  
 AHA Unified Peer Review Panel 2009-2013

#### **American Physiological Society**

Education Committee, 2000-2003, 2006-2009  
 Awards Committee, Cardiovascular Section, 2006-2010  
 Chairman, Awards Committee, CV Section 2007-2010  
 Chair, Cardiovascular Section, 2010-2013  
 Science Policy Committee, 2010-2012  
 Section Advisory Committee, 2010-2013  
 Book Committee, 2011-  
 Chair, Joint Programming Committee, 2014-

**Experimental Biology**

Experimental Biology Board, 2014-  
Chair, Experimental Biology Board, 2015-2017

**IITSEC**

Human System Engineering Review Committee 2013-2015

**Microcirculatory Society**

Historical Committee 1993-1995  
Membership Committee, 1998-2001  
Liaison Committee Chairman, 2005-2006  
Programming Committee, 2005-2010  
Councilor, 2001-2004  
President, 2005-2006

Government Liaisons Committee, Mississippi Academy of Sciences 1994-1996

Membership Committee: Biomedical Engineering Society, 1995-1998

**Grant Reviewer**

Study Section, Alabama Heart Association 1995-1998

Vice-Chairman, American Heart Association Southern Research Consortium, 1997-1998

Southeast Affiliate American Heart Association Research Committee, 1997-2003

Southeast Affiliate American Heart Association Research Committee, Vice –Chair 1999-2002

Southeast Affiliate American Heart Association Research Committee, Chair 2003-2004

American Heart Association, Vascular Biology/Blood Pressure Review Committee 2004-2010,  
2014

Vice-Chair Vascular Biology/Blood Pressure Review Committee 2006-2007

Chair Vascular Biology/Blood Pressure Review Committee 2008-2010

NIH Bioengineering Research Partnership Grant Reviewer, 2005-2006

NIH Modeling and Analysis of Biological Systems (MABS) Study Section 2007

Hypertension and Microcirculation, NIH 2011

NIH Diabetes Center Review 2011-2012

NIBIB US/India Workshop on Developing Passive, Cuffless, and Noninvasive Blood Pressure  
Measurement Technologies

**Journal Reviewer:**

American Journal of Physiology

Advances in Physiological Education

Diabetes

Experimental Eye Research

Hypertension  
International Society of Hypertension  
Journal of Applied Physiology  
Journal of Biomechanical Engineering  
Journal of Toxicology and Environmental Health  
Journal of Physiology (London)  
Journal of Vascular Research  
Kidney International  
Microcirculation  
Microsurgery  
Microvascular Research  
PLoS One

**GRANT SUPPORT:**

Current

National Institutes of Health. "Cardiovascular Dynamics and Their Control". 2014-2019.  
Principal investigator Dr. John Hall. Program project grant. Co-Investigator

Previous

Mississippi Heart Association. "Measurement of Single Red Cell Hemoglobin Saturation"  
1987-1989. Principal Investigator.

National Institutes of Health. "Cardiovascular Dynamics and Their Control". 1988-1993.  
Principal investigator Dr. Arthur Guyton. Program project grant. Project VII Control of  
Microcirculation and Tissue and Lymph, Co-Principal Investigator.

Venular-Arteriolar Communication in the Microcirculation. National Institutes of Health. 1990-  
1995, Principal Investigator

Endothelial Derived Nitric Oxide and Vascular Control. American Heart Association. 1993-  
1996, Principal Investigator.

National Institutes of Health. "Cardiovascular Dynamics and Their Control". 1993-1999.  
Principal investigator Dr. John Hall. Program project grant. Co-Investigator.

UMMC director of Toyota Tapestry grant program 1995. This program brought high school  
students from scientifically disadvantaged areas in Mississippi to UMMC to expose these  
student as to how chemistry, mathematics, and physics are involved in biomedical research.

The students rotated through different laboratories at UMMC to explain how basic research is performed and all aspects of this research. Principal Investigator

American Heart Association, Mississippi Affiliate. Regulation of vasodilator release from venular endothelial cells by PO<sub>2</sub>: a mechanism for local control of blood flow. Principal investigator Dr. Louise Nuttle. 1998-2000 Co-Investigator

National Institutes of Health. "Cardiovascular Dynamics and Their Control". 1999-2004. Principal investigator Dr. John Hall. Program project grant. Co-Investigator

Venular-Arteriolar Communication in the Regulation of Blood Flow, American Heart Association, 1998-2000, Principal Investigator

Kidney Care Foundation Role of sex hormones on the neointimal growth following increased flow rate. 1999-2000 Principal investigator

National Institutes of Health, RO1, Metabolic Control of Blood Flow, 2001-2006 Principal Investigator

National Science Foundation. " EPSCoR: Improving computational infrastructure". 2006-2009, Project leader

National Institutes of Health. "Cardiovascular Dynamics and Their Control". 2005-2009. Principal investigator Dr. John Hall. Program project grant. Co-Investigator

NIH "The Microcirculation in Health and Disease", 2009-2014, Principal Investigator 5R01HL089581-04

National Institutes of Health. "Cardiovascular Dynamics and Their Control". 2009-2014. Principal investigator Dr. John Hall. Program project grant. Co-Investigator

Orthopedic Trauma Association The role hyperglycemia-mediated oxidative stress in the development of acute kidney injury after orthopaedic trauma in obese Zucker rats  
Principal Investigator 01/01/14-12/31/15

National Science Foundation. " EPSCoR: Modeling and Simulation of complex systems". 2009-2016, Project leader

FDA. SBIR Phase 1: A Computer Model of Renal Physiology for use as a FDA Medical Device Development Tool. 10-2016-3-2017, Investigator

**Postdoctoral grants as mentor:**

National Institutes of Health NRSA, Postdoctoral Fellowship Mary McKay Ph.D. 1995-1998, mentor, Currently Project Management Associate Director at ICON Clinical Research

American Heart Association, Southeast Consortium, Postdoctoral Fellowship, Mary McKay Ph.D. 1995-1998, mentor returned to AHA

American Heart Association, Southeast Consortium, Postdoctoral Fellowship, Leah Hammer, Ph.D. 2000-2002, Mentor. Currently Faculty at West Virginia University.

American Heart Association, Southeast Consortium, Postdoctoral Fellowship, Jaehwa Choi Ph.D., 2001-2002, Mentor, Currently Assistant Professor in the College of Pharmacy in the Southwestern Oklahoma State University

American Heart Association, Southeast Consortium, Postdoctoral Fellowship, Lusha Xiang, M.D., 2005-2007, Mentor, Assistant Professor at UMMC

American Heart Association, Southeast Consortium, Postdoctoral Fellowship, Jay Naik Ph.D., 2005-2007, Mentor, returned to AHA

National Institutes of Health NRSA, Postdoctoral Fellowship Jay Naik Ph.D. 2005-2008, Mentor, Currently Sr Research Scientist at University of New Mexico.

American Heart Association, Southeast Consortium, Predoctoral Fellowship, Ben Hodnett, MD/Ph.D, 2006-2008, Mentor, ENT Resident at University of Pittsburgh

American Heart Association, Southeast Consortium, Postdoctoral Fellowship, Silu Lu, M.D.,Ph.D., 2012-2014, Mentor, Instructor at UMMC.

American Heart Association, Southeast Consortium, Predoctoral Fellowship, Peter Mittwede, 2013-2015, Mentor

American Heart Association, Southeast Consortium, Predoctoral Fellowship, John Clemmer, 2014-2016, Mentor

### Publications:

1. **Hester, R.L.**, A.C. Guyton, and B.J. Barber. Reactive and exercise hyperemia during high levels of adenosine infusion. *Am. J. Physiol.* 243:H181-H186, 1982.
2. **Hester RL**, J.P. Granger, J. Williams, and J.E. Hall. Acute and chronic servo-control of renal perfusion pressure. *Am. J. Physiol.* 244:F455-F460, 1983.
3. Hall, J.E., J.P. Granger, **R.L. Hester**, T.G. Coleman, M. Smith, R. Cross. Mechanism of "escape" from sodium retention during angiotensin hypertension. *Am. J. Physiol.* 246:F627-F634, 1984.
4. Hall, J.E., J.P. Granger, and **R.L. Hester**. Interactions between adenosine and angiotensin II in control of glomerular filtration. *Am. J. Physiol.* 248:F340-F346, 1985.
5. Hall, J.E., J.P. Granger, **R.L. Hester**, and J-P. Montani. Mechanism of sodium balance in hypertension: Role of pressure natriuresis. *J. of Hypert.* 4 (suppl 4):S57-S65, 1986.
6. **Hester RL**, B.R. Duling. Constancy of red cell velocity during functional hyperemia: significance for rheology and oxygen transport. *Am. J. Physiol.* 255:H236-244, 1988.
7. **Hester RL**, and B.J. Barber. Drop interval flowmeter for low flow rate measurement. *Microvascular Research* 38:309-313, 1989.
8. **Hester RL** Venular-arteriolar diffusion of adenosine in the hamster microcirculation. *Am. J. Physiol.* 258 (Heart Circ. Physiol. 27): H1918-1924, 1990.
9. Shin, Y., T.E. Lohmeier, **R.L. Hester**, S.D. Kivlighn, and M.J. Smith. Hormonal and circulatory responses to chronically controlled increments in right atrial pressure. *Am. J. Physiol.* 261 (Regulatory Integrative Comp. Physiol. 30): R1176-R1187, 1991.
10. Huang, M., **R.L. Hester**, A.C. Guyton. Hemodynamic changes in rats following the opening of an A-V fistula. *Am. J. Physiol.* 262 (Heart Circ. Physiol. 31): H846-851, 1992.
11. Huang, M., **R.L. Hester**, A.C. Guyton, R.A. Norman. Hemodynamic studies in DOCA-salt hypertensive rats following the opening of an A-V fistula. *Am. J. Physiol.* 262 (Heart Circ. Physiol. 31): H1802-H1808, 1992.
12. **Hester RL**, D. Ashcraft, E. Curry, and J. Bower. Non-invasive measurement of recirculation in the dialysis patient. *Transactions of American Society of Artificial Internal Organs* 38:M190-193, 1992.
13. Huang, M., **R.L. Hester**, T.G. Coleman, M.J. Smith, and A.C. Guyton. Development of hypertension in animals with reduced total peripheral resistance. *Hypertension* 20:828-833, 1992.



14. **Hester RL**, E. Curry, and J. Bower. The measurement of recirculation is not accurate using BUN or creatinine measurements. *American J. Kidney Diseases* 20 (6):598-602, 1992
15. Mizelle, H.L., J.-P. Montani, **R.L. Hester**, R.H. Didlake, and J.E. Hall. Role of pressure natriuresis in long-term control of renal electrolyte excretion. *Hypertension*, 22:102-110, 1993.
16. **Hester RL**, A. Eraslan, and Y. Saito. Differences in EDNO contribution to arteriolar diameters at rest and during functional hyperemia in striated muscle. *Am. J. Physiol.* 265. (Heart Circ. Physiol.34): H146-H151, 1993.
17. Kirchner, K.A., P.H. Scanlon, D.J. Dzielak, and **R.L. Hester**. Endothelium-derived relaxing factor responses in DOCA-salt hypertensive rats. *Am. J. Physiol.*265 (Regulatory Integrative Comp. Physiol. 34): R568-R572, 1993.
18. **Hester RL** Uptake of metabolites by post-capillary venules: mechanism for the control of arteriolar diameter. *Microvas. Res.* 46:254-261, 1993.
19. Saito Y., A. Eraslan, and **R.L.Hester**. Importance of venular flow in the control of arteriolar diameter in the hamster cremaster muscle. *Am. J. Physiol.* 265 (Heart Circ. Physiol. 34):H1294-H1300, 1993.
20. Lohmeier, T.E., Y. Shin, G.A. Reinhart, and **R. L. Hester**. Angiotensin and ANP secretion during chronically controlled increments in atrial pressure. *Am. J. Physiol.* 266 (Regulatory Integrative Comp. Physiol. 35):R989-R996, 1994.
21. Huang, M., **R.L. Hester**, and M.H. LeBlanc. Systemic and regional hemodynamics following endothelial derived nitric oxide blockade: role of sympathetic nervous system. *Am. J. Physiol.* 267 (Regulatory Integrative Comp. Physiol. 36):R84-R88, 1994.
22. Saito Y., A. Eraslan, and **R.L.Hester**. Role of EDRF'S in the control of arteriolar diameter during increased metabolism of striated muscle. *Am. J. Physiol.* 267 (Heart Circ. Physiol. 36):H195-H200, 1994.
23. Huang, M., **R.L. Hester**, and M.H. LeBlanc. Evaluation of the needle technique for producing an arteriovenous fistula. *Journal of Applied Physiology* 77(6): 2907-2911, 1994
24. Saito Y., A. Eraslan, V. Lockard, and **R.L. Hester**. Role for venular endothelium in the control of arteriolar diameter during functional hyperemia. *Am. J. Physiol.* 267 (Heart Circ. Physiol. 36):H1227-H1231, 1994.
25. Saito Y., A. Eraslan, and **R.L. Hester**. Role of endothelial-derived relaxing factors in arteriolar dilation during muscle contraction elicited by electrical field stimulation. *Microcirculation* 3(1):195-201, 1994.
25. **Hester RL** Venular endothelium: metabolic sensors. *NIPS* 10:50, 1995.

26. Huang, M., R.D. Manning, M.H. LeBlanc, and **R.L. Hester**. Overall hemodynamics studies following the chronic inhibition on endothelial derived nitric oxide in rats. *American Journal of Hypertension* 8:358-364, 1995.
27. Carroll, J., M. Huang, **R.L. Hester**, K. Cockrell, H.L. Mizelle. Hemodynamic alterations in hypertensive obese rabbits. *Hypertension* 26:465-470, 1995.
28. Lohmeier, T.E., G.A. Reinhart, H.L. Mizelle, J.P. Montani, **R. L. Hester**, C. E. Hord, and D. A. Hildebrandt. Influence of renal nerves on sodium excretion during progressive reductions in cardiac output *Am. J. Physiol.* 269 (Regulatory Integrative Comp. Physiol.):R678-R690, 1995.
29. McKay, M. and **R.L. Hester**. Role of nitric oxide , adenosine, and ATP-sensitive potassium channels in insulin-induced vasodilation. *Hypertension* 28:202-208, 1996.
30. Saito, Y., M. McKay, A. Eraslan, and **R.L. Hester**. Functional hyperemia in striated muscle is reduced following blockade of ATP-sensitive potassium channels. *Am. J. Physiol.* 270 (Heart Circ. Physiol. 39): H1649-H1654, 1996.
31. Carroll, J.F., A.E. Jones, **R.L. Hester**, G.A. Reinhart, K. Cockrell, H.L. Mizelle. Reduced cardiac contractile responsiveness to isoproterenol in obese rabbits. *Hypertension* 30:1376-1381, 1997.
32. McKay, M., A. Gardner, D. Boyd, and **R.L. Hester**. Influence of venular prostaglandin release on arteriolar diameter during functional hyperemia. *Hypertension* 31 [Part2]: 213-217, 1998.
33. Kassab, S., T. Miller, J. Knovak, J.F. Reckelhoff, **R.L. Hester**, and J.P. Granger. Abnormal systemic hemodynamics and regional blood flows in a rat model of pregnancy-induced hypertension. *Hypertension* 31 [Part2]: 315-320, 1998.
34. Nuttle, L. C., A.L. Ligon, K.R. Farrell, and **R.L. Hester**. Inhibition of phospholipase A<sub>2</sub> attenuates functional hyperemia in the hamster cremaster muscle *Am. J. Physiol.* 276 (Heart Circ. Physiol. 45):H1289-H1294, 1999.
35. Hammer, L.W., A. L. Ligon and **R.L. Hester**. Differential inhibition of functional dilation of small arterioles by indomethacin and glibenclamide. *Hypertension* 37(2):599-603, 2001.
36. Hammer, L.W., A. L. Ligon and **R.L. Hester**. ATP-mediated release of arachidonic acid metabolites from venular endothelium causes arteriolar dilation. *Heart Circ Physiol* 280 H2616-H2622, 2001.
37. Choi J., Hammer L.W., **Hester R.L.** Calcium-dependent synthesis of prostacyclin in ATP-stimulated venous endothelial cells. *Hypertension* 39(2):581-5, 2002
38. **Hester RL**, and L.W. Hammer. Venular-arteriolar communication in the regulation of blood flow. *Am. J. Physiol.Regul.Integr.Comp.Physiol.* 282 (5):R1280-R1285, 2002.

39. **Hester RL**, and J. Choi. Blood flow control during exercise: role for the venular endothelium, *Exercise and Sports Sciences Reviews*, 30(4): 147-151, 2002
40. Hammer L.W., C.R. Overstreet, J. Choi, and **R.L. Hester**. ATP stimulates the release of prostacyclin from perfused veins isolated from the hamster hindlimb. *Am. J. Physiol.Regul.Integr.Comp.Physiol.* 285:R193-R199. 2003
41. **Hester RL** and G. Ordway. Refresher Course for Teaching Muscle Physiology, *Advances in Physiology Education*, 27(4). 170, 2003. (Editor)
42. Xiang L, Naik J, **Hester RL**. Exercise-induced increase in skeletal muscle vasodilatory responses in Obese Zucker rats. *Am J Physiol Regul Integr Comp Physiol.* 288(4):R987-91, 2005
43. Xiang L, Naik JS, Hodnett BL, **Hester RL**. Altered Arachidonic Acid Metabolism Impairs Functional Vasodilation in Metabolic Syndrome. *Am J Physiol Regul Integr Comp Physiol.* 2006 Jan;290(1):R134-8.
44. Naik JS, Xiang L, **Hester RL**. Enhanced role for RhoA-associated kinase in adrenergic-mediated vasoconstriction in gracilis arteries from obese Zucker rats. *Am J Physiol Regul Integr Comp Physiol.* 2006 Jan;290(1):R154-61.
45. Cain ML, **Hester RL**, Izevbigie EB. Related Articles, Links Ethanol abrogates Angiotensin II-stimulated vascular smooth muscle cell growth. *Med Sci Monit.* 2006 Apr 25;12(5):BR162-168
46. Xiang L, Naik JS, Abram SR, **Hester RL**. Chronic hyperglycemia impairs functional vasodilation via increasing thromboxane-receptor-mediated vasoconstriction. *Am J Physiol Heart Circ Physiol.* 2007 Jan;292(1):H231-6.
47. Abram SR, Hodnett BL, Summers RL, Coleman TG, **Hester RL**. Quantitative Circulatory Physiology: an integrative mathematical model of human physiology for medical education. *Adv Physiol Educ.* 2007 Jun;31(2):202-10.
48. Hodnett, BL, and **Hester RL** Regulation of Muscle Blood Flow in Obesity, *Microcirculation*: 14:273-288, 2007 Review
49. Dorsett-Martin, W. and **Hester RL**. Sex Hormones and Aortic Wall Remodeling in an Arteriovenous Fistula, *Gender Medicine* 4:157-169, 2007
50. Sholook MM, Gilbert JS, Sedeek MH, Huang M, **Hester RL**, Granger JP. Systemic hemodynamic and regional blood flow changes in response to chronic reductions in uterine perfusion pressure in pregnant rats. *Am J Physiol Heart Circ Physiol.* 2007;293(4):H2080-4.
51. Xiang L, Naik JS, and **Hester RL**. Functional vasodilation in the rat spinotrapezius muscle: role of nitric oxide, prostanoids, and EETs. *Clinical Experimental Physiology and Pharmacology, Clin Exp Pharmacol Physiol.* 2008; 35(5-6):617-24

52. Naik JS, Xiang L, Hodnett, BL, **Hester RL**.  $\alpha$ -adrenergic-mediated vasoconstriction is not involved in the impaired functional vasodilation in the obese Zucker rat. *Clin Exp Pharmacol Physiol*. 2008; 35(5-6):611-6
53. Xiang, L. Dearman, J., Abram, SR, Carter, C, **Hester RL**. Insulin resistance and impaired functional vasodilation in obese Zucker rats. *Am J Physiol Heart Circ Physiol*. 2008 Apr;294(4):H1658-66.
54. Hodnett BL, Xiang L, Dearman JA, Carter CB, **Hester RL**.  $K_{ATP}$ -mediated Vasodilation is Impaired in Obese Zucker Rats. *Microcirculation* 2008;15(6):485-94.
55. Hodnett BL, Dearman JA, Carter CB, **Hester RL**. Attenuated PGI<sub>2</sub> Synthesis in Obese Zucker Rats. *Am J Physiol Regul Integr Comp Physiol*. 2009 Mar;296(3):R715-21.
56. Xiang L, **Hester RL**. Adipocyte-derived factor reduces vasodilatory capability in ob-/ob- mice. *Am J Physiol Heart Circ Physiol*. 2009 Aug;297(2):H689-95.
57. Summers RL, Ward KR, Witten T, Convertino VA, Ryan KL, Coleman TG, **Hester RL**. Validation of a computational platform for the analysis of the physiologic mechanisms of a human experimental model of hemorrhage. *Resuscitation*. 2009;80:1405-10.
58. Summers RL, Coleman TG, **Hester RL**. An analysis of the interface between lunar habitat conditions and an acclimatized human physiology as defined by the Digital Astronaut Program. *Lunar Settlements*. Editor: Haym Benaroya. CRC Press 2010; 233-240, ISBN: 9781420083323.
59. **Hester RL**, RL Summers, R Iliescu, J Ester, and TG Coleman. DigitalHuman (DH): An Integrative model of Human Physiology, NASA/CP-2010-216205 MODSIM World Conference, p129-134, 2010.
60. Xiang L, **Hester RL**, Fuller WL, Sebai ME, Mittwede PN, Jones EK, Aneja A, Russell GV. Orthopedic trauma-induced pulmonary injury in the obese Zucker rat. *Microcirculation*. 2010 Nov;17(8):650-9. PMID: 21044219
61. Burgreen GW, **Hester R**, Soni B, Thompson D, Walters DK, Walters K. DigitalLung: application of high-performance computing to biological system simulation. *Adv Exp Med Biol*. 2010;680:573-84.
62. **Hester RL**, Iliescu R, Summers RL, Coleman TG. Systems Biology and Integrative Physiological Modeling. *J Physiol*. 2011;589(Pt 5):1053-60. PMID: 21135044
63. **Hester R**, Brown A, Husband L, Iliescu R, Pruett WA, Summers RL and Coleman T (2011). HumMod: A modeling environment for the simulation of integrative human physiology. *Front. Physio*. 2:12. doi: 10.3389/fphys.2011.00012 PMID: 21647209

64. Sebai M, Lu S, Xiang L, **Hester RL**. Improved Functional Vasodilation in Obese Zucker Rats following Exercise Training. *Am J Physiol Heart Circ Physiol*. 2011;301(3):H1090-6
65. Walters DK, Burgreen GW, Lavallee DM, Thompson DS, **Hester RL**., Efficient, physiologically realistic lung airflow simulations. *IEEE Trans Biomed Eng*. 2011;58(10):3016-9
66. Xiang L, Lu S, Fuller W, Aneja A, Russell GV, Jones LB, **Hester RL**. Impaired blood pressure recovery to hemorrhage in obese Zucker rats with orthopedic trauma. *Am J Physiol Heart Circ Physiol*. 2012;302(1):H340-8. PMID: PMC3334230
67. Pruet WA, **Hester RL**, Coleman TG. The apparent hysteresis in hormone-agonist relationships. *J Theor Biol*. 2011 Dec 3;296C:1-5
68. Lu S, Xiang L, Clemmer J, Gowdey A, Mittwede P, **Hester R**., Impaired Vascular KATP Function Attenuates Exercise Capacity in Obese Zucker Rats. *Microcirculation*. 2013 Oct;20(7):662-9. PMID: 23647569
69. Pruet WA, Husband L, Husband G, Dakhalla M, Bellamy K, Coleman, T, and **Hester RL**. A Population Model of Integrative Cardiovascular Physiology, *PLOS One*, 2013 Sep 13;8(9):e74329. PMID: 24058546
70. K. Wu, J. Chen, W. A. Pruet, and **R. L. Hester**. HumMod Browser: An Exploratory Visualization Tool for the Analysis of Whole-Body Physiology Simulation Data. *IEEE Symposium on Biological Data Visualization*. October, 2013
71. Karaaslan F, Denizhan Y, **Hester RL**. A Mathematical Model of Long-Term Renal Sympathetic Nerve Activity Inhibition During an Increase in Sodium Intake. *Am J Physiol Regul Integr Comp Physiol*. 2014;306(4):R234-47 PMID: 24285363
72. Mittwede PN, Xiang L, Lu S, Clemmer JS, **Hester RL**. A novel experimental model of orthopedic trauma with acute kidney injury in obese Zucker rats. *Physiol Rep*. 2013 Oct;1(5):e00097. Epub 2013 Oct 2. PMID: 24303169
73. Xiang L, Lu S, Mittwede PN, Clemmer JS, **Hester RL**. Inhibition of NADPH oxidase prevents acute lung injury in obese rats following severe trauma. *Am J Physiol Heart Circ Physiol*. 2014 Mar;306(5):H684-9.
74. Pruet WA, and **Hester RL** Parathyroid hormone secretion by multiple distinct cell populations, a time dynamic mathematical model *Physiological Reports* Volume 2, Issue 2, February 2014
75. Xiang L, Lu S, Mittwede P, Clemmer J, Husband GW, **Hester RL**.  $\beta_2$  adrenoreceptor blockade improves early post-trauma hyperglycemia and pulmonary injury in obese rats. *Am J Physiol Heart Circ Physiol*. 2014 Aug 15;307(4):H621-7. PMID: 24929860

76. Lu S, Xiang L, Clemmer JS, Mittwede PN, **Hester RL**. Oxidative stress increases pulmonary vascular permeability in diabetic rats through activation of transient receptor potential melastatin 2 (TRPM2) channels. *Microcirculation*. 2014 21(8):754-760, PMID: 25059284
77. Xiang L, Mittwede PN, **Hester RL**. Comment on Sato et al. Improving Type 2 Diabetes Through a Distinct Adrenergic Signaling Pathway Involving mTORC2 That Mediates Glucose Uptake in Skeletal Muscle. *Diabetes* 2014;63:4115-4129. *Diabetes*. 2014 Dec;63(12):e20-1. doi: 10.2337/db14-1187.
78. Clemmer JS, Xiang L, Lu S, Mittwede PN, **Hester RL**  $\beta$ 2-adrenergic regulation of stress hyperglycemia following hemorrhage in the obese Zucker rat. *Physiol Rep*. 2014 Dec 3;2(12). PMID: 25472607
79. Pruett, W, Husband LD and **Hester RL**. A Decision Support System Predicting Imminent Cardiovascular Shock. Paper # 14343 IITSEC Conference 2014
80. Mittwede PN, Xiang L, Lu S, Clemmer JS, **Hester RL**. Oxidative stress contributes to orthopedic trauma-induced acute kidney injury in obese rats. *Am J Physiol Renal Physiol*. 2015 Jan 15;308(2):F157-63. PMID: 25428128
81. Zhang, Song, Pruett, WA, and **Hester R**. "Visualization and classification of physiological failure modes in ensemble hemorrhage simulation", *Proc. SPIE 9397, Visualization and Data Analysis 2015*, February 8, 2015, San Francisco, CA; doi:10.1117/12.2080136; <http://dx.doi.org/10.1117/12.2080136>
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#### **Book or Book Chapters:**

- 1: Adair, T.H., W.J. Gay, R.L. Hester, and J.-P. Montani. Does adenosine have a regulatory role in the growth of blood vessels? Chapter 40, 443-455, 1991, In: *Role of adenosine and adenine nucleotides in the biological system*. Eds: Shoichi and M. Nakazawa. Elsevier Science Publishers
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**Invited Presentations:**

A role for the venular-arteriolar diffusion of vasoactive factors in coordinating blood flow Sixth World Congress for Microcirculation, Munich, Germany August, 1996

Regulation of muscle blood flow: a role for venules in the control of arteriolar diameter. Annual Fall Meeting, Biomedical Engineering Society October, 1996

Regulation of Muscle Blood Flow: A Role for Venules in the Control of Arteriolar Diameter, Department of Physiology, Texas A&M University, College Station, TX February, 1997

Venular control of arteriolar diameter and blood flow. International Union Physiological Sciences, St. Petersburg, Russia, July 1997

Regulation of muscle blood flow: release of arachidonic acid metabolites from venular endothelium in the control of arteriolar diameter, Department of Pharmacology, Michigan State University, January 2000.

Venular endothelial control of arteriolar diameter during functional hyperemia. Biomedical Engineering Society Meeting, Seattle, Washington, 2000

The Venular Endothelium as a Sensor for the Metabolic Control of Blood Flow. Cardiovascular Research Center, Milwaukee, WI, March 20, 2002

Physiological Research at UMMC to Science, Language Arts, and Mathematics (SLAM I) students, Jackson Heart Study, July 2003.

Metabolic Control of Blood Flow: Normal and Pathological Conditions. Center for Cardiovascular Interdisciplinary Studies, West Virginia University, February 2005.

Arachidonic Acid Metabolites and the Regulation of Muscle Blood Flow in Health and Disease. Department of Physiology, LSU Medical Center, Shreveport, LA, Oct 2006.

Regulation of functional muscle blood flow in obesity, European Society for Microcirculation, Budapest, Hungary, Aug 2008

DigitalHuman (DH): An Integrative Mathematical Model of Human Physiology\_Mathematical Modeling of Integrative Physiology at UMC. Department of Biomedical Engineering, University of Florida, Sept 2009, Robert Hester

Modeling and Simulation – An Introduction for Health and Medical Professionals MODSIM, Virginia Beach, VA October 2009

DigitalHuman (DH): An Integrative Mathematical Model of Human Physiology\_Mathematical Modeling of Integrative Physiology at UMC. MODSIM, Virginia Beach, VA October 2009

HumMod: An Open Source Integrative Mathematical Model of Human Physiology. Society for the Simulation in Healthcare, Phoenix, AZ, Jan 2010.

HumMod: An Integrative Mathematical Model of Human Physiology. Department of Physiology, SUNY Stonybrook, Sept 2010

HUMMOD; AN INTEGRATIVE MODEL OF INTEGRATIVE BIOMEDICINE, World Congress for Microcirculation, October 2010

HumMod: A Mathematical Model of Human Physiology. MODSIM, Hampton Roads, VA October 2010

HumMod: A Mathematical Model of Integrative Physiology. IITSEC2010, Orlando, FL, Nov 2010.

HumMod: A Multilevel Mathematical Model of Human Physiology for Medical Training Department of Anesthesiology, University of Pittsburgh, 2012

Creation of a Population of Simulated Patients, IITSEC Orlando, FL December 2013.

Wagner: A Real-Time Simulation for Continuity of Care Training, Society for Simulation in Healthcare, San Francisco, January 2014

Multiscale population models of integrative physiology. Experimental Biology, San Diego April 2014

Wagner: A Real-Time Simulation for Continuity of Care Training, HEATT, Orlando, FL August 2014.

Mathematical Simulation of Integrative Physiology: History and the Future. Julie Betschart Visiting Speaker, Center for Cardiovascular and Respiratory Sciences, West Virginia University February 2015

HumMod, A Computer Simulation of Integrative Physiology. Jan Beneken Conference, Nijmegen, Netherlands, April 2015.

The Role of Physiological Modelling in the Reduction, Refinement and Partial Replacement of Clinical Trials: Avicenna, A Strategy for in silico Clinical Trials, Barcelona , Spain. June 2-4, 2015

Can Simulation of Human Physiology be used for In Silico Clinical Trials, AJP Heart and Circulatory Physiology, **Cardiovascular Science at the Cutting Edge** Omaha Nebraska, Sept 8, 2016

Physiological Sensitivity to Salt and Nephrectomy, Virtual Physiological Human meeting, Amsterdam, Netherlands, Sept 26-28, 2016

## Professional Activities at UMMC

### 1. Teaching (University of Mississippi Medical Center)

- A. Medical Physiology: Respiratory Physiology, 1986-1991, 1992-present
- B. Medical Physiology: Hematology, 1996-2010
- C. Medical Physiology: Director of Student Laboratories, 1988- present
- D. Dental Physiology: Respiratory Physiology, 1989-1998, 2002-2009
- E. Dental Physiology: Cardiovascular Physiology, 1989-1992
- F. Dental Physiology: Renal Physiology, 1986-1987, 1988-1989
- G. Nursing Physiology, Director of Nursing Physiology Course, 1989-1990
- H. Nursing Physiology, Cardiovascular Physiology, 1985-1988
- I. Physical Therapy, Respiratory Physiology, 2006-2012

### 2. Mentoring Faculty

- Jared Knudson, MD. Assistant Professor in Pediatrics, UMMC 2010- present
- Carrie Freeman, MD. Assistant Professor in Pediatrics, UMMC 2014- present

### 3: Student Committees and Research Direction

#### A. Postdoctoral Fellows

- 1. Yuichiro Saito, M.D.
- 2. Mary McKay, Ph.D.
- 3. Leah Hammer, Ph.D.
- 4. Jaehwa Choi Ph.D.
- 5. Lusha Xiang 2003-2007
- 6. Jay Naik Ph.D. 2004-2006
- 7. Sean Abram Ph.D. 2004-2007
- 8. Sungho Oh Ph.D. 2010-2011
- 9. Drew Pruett Ph.D. 2010-2013
- 10. Fatih Karaaslan Ph.D. 2010- 2013
- 11. Silu Lu Ph.D. 2010-2015
- 12. John Clemmer 2015- present

#### B. Graduate Students

- 1. Min Huang, Ph.D. 1992: "Role of Total Peripheral Resistance in the Long-Term Control of Arterial Blood Pressure and The Pathogenesis of Hypertension". Currently Professor, School of Health Related Professions, UMMC.

2. Akin Eraslan, M.S., 1994: "Flow-Induced Dilation and Its Relative Role in the Regulation of Arteriolar Diameter". Currently practicing Endocrinologist, Orlando VA Medical Center
3. Benjamin Hodnett, MD, Ph.D. 2010: "Role of Altered PGI<sub>2</sub> Metabolism and Potassium Channel Function in the Impaired Vascular Reactivity in Obesity"
4. John Clemmer, Ph.D. Student 2009-2015
5. Peter Mittwede, MD/PhD student 2010-2015
6. Ph.D. Committee
  1. Jorge Valenzuela-Rendon Department of Physiology
  2. Hun Mo Yang Department of Physiology
  3. Huabao Lin Department of Physiology
  4. Jan Hang Department of Physiology
  5. Ma Ga Department of Physiology
  6. Char-Chang Shieh Department of Pharmacology
  7. Leslie Chaney Department of Pharmacology
  8. Wen Li Department of Physiology
  9. Andrew Hoy Univ of Wollongong, Australia
  10. Sydney Roberts Department of Physiology
  11. Silu Lu Department of Pharmacology
  12. Daniel Lyons Department of Biochemistry

#### C. Summer Medical Students

1. Del Ashcraft (1989)
2. Michael Holman (1992)
3. Rob Hamilton (1993)
4. John Hardwell (1996)
5. Alan Jones (1996)
6. Daniel Boyd (1997)
7. Tom Wood (1998)
8. Kelty Darnell (1999)
9. Amanda Ring (2000)
10. Cory Carter (2006)
11. Louis Jones (2009)
12. David Ray (2010)
13. Andrew Gowdy (2011)
14. William Fuller (2013)

15. Leland Husband (2012)
16. Edward Yang (2013)
17. Kyle Bellamy (2014)
18. Alex Mullen (2015)
19. Stephen Wahl (2015)
20. Evan Blair (2015)

### **3: University Membership and Committees**

1. Faculty Senate 1990-1992
2. Network Computing Committee 1992-1995
3. Institutional Technology Planning Committee 1995-2007  
Research Subcommittee (Chairman)
4. SACS Self Study Graduate Program Sub-Committee, 1999
5. Medical School Admissions Committee, 2000-2014
6. LCME Committee on Faculty, Chairman 2002-2003
7. Quality and Patient Safety Board, 2006- present
8. EPIC Steering Committee 2009-present
9. Web Committee 2010-present
10. IACUC, Chair, 2017-
11. Patent Committee, Chair, 2017-

### **4. High School**

UMMC director of Toyota Tapestry grant program: 1995. This program brought high school students from scientifically disadvantaged areas in Mississippi to UMMC to expose these students to show how chemistry, mathematics, and physics are involved in biomedical research. The students are rotated through different laboratories at UMMC to explain how basic research is performed and all aspects of this research.