

VITAE
CRAIG A. HARMS

Business Address:

Department of Kinesiology
1A Natatorium
Kansas State University
Manhattan, KS 66506

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University Education:

University of Wisconsin
Madison, WI
1994-1997

Cardiopulmonary Physiology Post-doctoral Fellow
Supervisor: Jerome A. Dempsey, Ph.D.

Indiana University
Bloomington, IN
1990-1994

Department of Kinesiology Ph.D.
Exercise Physiology
Advisor: Joel M. Stager, Ph.D.

Dissertation: Inadequate Hyperventilation as a Determinant of Exercise Induced Arterial Hypoxemia

Colorado State University
Fort Collins, CO
1988-1990

Department of Exercise and Sport Science M.S.
Exercise Physiology
Advisor: Loren Cordain, Ph.D.

Thesis: Influence of Body Fat Mass on Excess Post-exercise Oxygen Consumption

Nebraska Wesleyan University Department of Biological Sciences B.S.
Lincoln, NE Biology
1975-1979

Teaching, Research and Employment:

Kansas State University
Manhattan, KS

Department of Kinesiology
Undergraduate Coordinator
Associate Professor
Assistant Professor

July 2006 - present
July 2001 - present
Aug 1997- June 2001

Courses Taught:

Kin 220 Biobehavioral Bases of Exercise (*4.7); *Kin 335* Exercise Physiology (*4.6); *Kin 601* Cardiopulmonary Exercise Physiology (*4.8); *Kin 602* Gender Differences in Sport and Exercise (*4.5); *Kin 657* Therapeutic Use of Exercise in the Treatment of Disease (*4.8)

* represents average overall teacher effectiveness from student evaluations, 5 pt scale (5= highest).

<u>University of Wisconsin</u> Madison, WI	Department of Preventive Medicine 1997 1994-1997 1994-1997	Cardiopulmonary Research Cardiopulmonary Research Pulmonary Physiology Instructor (medical students; undergraduates)	Associate Scientist Postdoctoral Fellow
<u>Indiana University Medical School</u> Indianapolis, IN	Graduate School: Physical Therapy 1994 Department of Physical Therapy 1993	Clinical Exercise Physiology Exercise Physiology	Instructor Coordinator/Instructor
<u>Indiana University</u> Bloomington, IN	Department of Kinesiology 1990-1994 1990-1994 1990-1994	Exercise Physiology Lab Wt Control, Activities Exer., Environ., Temp Reg	Coordinator/Instructor Associate Instructor Research Assistant
<u>Colorado State University</u> Fort Collins, CO	Department of Exercise and Sport Science 1989-1990 1988-1990	Exercise Physiology Lab Activities	Graduate Assistant Graduate Assistant
<u>Dekalb-Pfizer Genetics</u> Glenvil, NE	1981-1988	Plant Genetics	Associate Researcher
<u>Greenway Foundation</u> Denver, CO	1980-1981	Park Development	Park Ranger/Naturalist

Major Research/Professional Interests

Human stress physiology, cardiopulmonary responses/interactions/limitations to exercise and the environment; factors affecting oxygen transport during exercise and physical training; physiological gender differences

Organizations and Awards

Leading Scientists of the World, International Biographical Center, Cambridge, England, 2005
William L. Stamey Teaching Award, Kansas State University, 2002
Golden Key International Honor Society, Honorary Member, 2001
Presidential Award for Outstanding Undergraduate Teaching, Kansas State University, 2000
American Lung Association, 2000-
Fellow, American College of Sports Medicine, 1999
American Heart Association, 1998-
Central States Chapter American College of Sports Medicine, 1997
American Physiological Society, 1992-
American College of Sports Medicine, 1990-
Phi Kappa Phi Academic Honorary Society, 1990
Beta Beta Beta National Biological Honorary Society, 1978

Research Students

PhD: Sara Rosenkranz*, Chris Bopp, Xiaoyang Sun, Robin Craig, Alastair Hodges, Sin-Ae Park, Xiao Yang, Leonardo Ferreira, Barbara Lutjemeier, Danielle Padilla, Anthony Rice, Tracy Bartel, Hyejin Cho, Tim Bauer, Brad Behnke, Casey Kindig

Masters: Sarah Corn, Kate, Swain*, Cari Mooneyham, Katie Schmidt, Carl Ade, Megan Kelly*, Ben Webb, Clay Greeson, Brian Snyder, Amy Flewelling*, Kaylene Wagner*, Kyle Herspring, Landa Colvin-Marion*, Brett Lingo*, Michael Durner*, Damon Motley, Amy Downey*, Leonie Chenoweth*, Allison Harper, Maria DeBoer, Serena McIntire*, Ekaterini Foutapolou, Emily Diederich, Kelly Brown*, Crystal Geer, Michael Koons, Amanda Forsyth, Jill Murphy*, Patricia Marteney, Eric Burgett*, Jeff Strom, Kristin Mathews, Tyler Barker, Barbara Lutjemeier, Brian Hoelting, Heather Brady*, Lori Krueger

Undergraduate Honors: *K-INBRE*: Bethany Beckman *, Katherine Swain*; *Howard Hughes Medical Institute*: Jacob Willis*, Alyson Adams*, Jennifer Ranum*, Holly Serk*, Michael Carter*; *Developing Scholar*: Katie Herrera*, Jannet Wright*; *McNairs Scholar*: Latisha Daniels*; Michael Roberts* (from Indiana Univ); *Morse Summer Scholarship*: Miriam Litfin-Salt*

* denotes major professor

Publications

Lutjemeier, B., Harms CA, Harper AJ., Ferreira L., Townsend DK., Barstow TJ. Pedal frequency does not alter the cardiac output: VO₂ relationship during cycling. In Preparation.

Chenoweth, L.M., C.S. Ferguson, A. Downey, J. Ranum, A. Flewelling, C.A. Harms. The effects of dietary antioxidant vitamins on pulmonary function at rest and during exercise. In Review.

McEntire, S.J., C.S. Ferguson, K.R. Brown, C.A. Harms. The effect of respiratory muscle training in combination with whole body exercise on exercise performance. *Medicine and Science in Sport and Exercise*. In Review.

Murphy, J.D., C.S. Ferguson, K.R. Brown, C.A. Harms. The effect of dietary antioxidants on lung function in exercise-induced asthmatics. *Respiratory and Critical Care Medicine*. In Review.

Wicker, R.J., Kelley, M.K., Harms, C.A., T.J. Barstow. The effects of N-Acetylcysteine on oxygen uptake kinetics. In Review.

Kelly, M.K., R.J. Wicker, T.J. Barstow, C.A. Harms, The effects of N-acetylcysteine on respiratory muscle fatigue during heavy exercise. In Review.

Harms, C.A., S.K. Rosenkranz. Sex differences in pulmonary function during exercise. *Medicine and Science in Sport and Exercise*. *Med Sci Sports Exerc*. Apr;40(4):664-8, 2008.

Harms, C.A. Insights into the role of the respiratory muscle metaboreflex. *J Physiol*. 584:711, 2007.

Downey, A.E., L.M. Chenoweth, D.K. Townsend, J.D. Ranum, C.S. Ferguson, C.A. Harms. Effects of inspiratory muscle training on exercise responses in normoxia and hypoxia. *Respir Physiol and Neurobiol*. 156, 137-146, 2007.

Harms, C.A. Does gender affect pulmonary function and exercise capacity? *Respir Physiol Neurobiol*, 151, 124-131, 2006.

Hopkins, S.R. & Harms, C.A. Gender and pulmonary gas exchange during exercise. *Exercise and Sports Science Reviews*. American College of Sports Medicine Series, 32 (2), 50-56. 2004.

Dempsey, J.A., Sheel, A.W., Haverkamp, H.C., Babcock, M.A., Harms, C.A. Pulmonary system limitations to exercise in health. *Canadian Journal of Applied Physiology*. 28: 2-24. 2003.

Babcock, M.A., D.F. Pegelow, C.A. Harms, and J.A. Dempsey. Effects of respiratory muscle unloading on exercise-induced diaphragm fatigue. *Journal of Applied Physiology*. 78: 201-206. 2002.

Gavin, T.P., J.P. Babington, C.A. Harms, M.E. Ardel, D.A. Tanner, and J.M. Stager. Clothing fabric does not effect thermoregulation during exercise in moderate heat. *Medicine and Science in Sports and Exercise*. 33:2124-2130, 2001

Harms, C.A., T.J. Wetter, C.M. St. Croix, D.F. Pegelow, J.A. Dempsey. Effects of respiratory muscle work on exercise performance. *Year Book of Sports Medicine*. (5) SM 40. Mosby-Year Book, Inc. St. Louis, MO. 2001

Dempsey, J.A., A.W. Sheel, P.A. Derchak, C.A. Harms. Two types of pulmonary system limitations to exercise. *German Journal of Sports Medicine*. 51:318-326, 2001.

Harms, C.A., T.J. Wetter, C.M. St. Croix, D.F. Pegelow, J.A. Dempsey. Effects of respiratory muscle work on exercise performance. *Journal of Applied Physiology*. 89: 131-138. 2000

Harms, C.A., S.R. McClaran, D.F. Pegelow, and J.A. Dempsey. Effect of exercise induced arterial O₂ desaturation on VO₂max in women. *Medicine and Science in Sports and Exercise*. 32(6):1101-1108. 2000

Richardson, R.S., C.A. Harms, B. Grassi, and R.T. Hepple. Skeletal muscle: Master or slave of the cardiovascular system? *Medicine and Science in Sports and Exercise*. 32(1):89-93. 2000

Harms, C.A. Effect of skeletal muscle demand on cardiovascular function. *Medicine and Science in Sports and Exercise*. 32(1):94-99. 2000

Wetter, T.J., C.A. Harms, W.B. Nelson, D.F. Pegelow, and J.A. Dempsey. Influence of respiratory muscle work on VO₂ and leg blood flow during submaximal exercise. *J. Appl. Physiol*. 87 (2):643-651. 1999

Harms, C.A., T. Wetter, S.R. McClaran, D.F. Pegelow, G. Nickele, W. Nelson, J.A. Dempsey. Effect of respiratory muscle work on cardiac output and its distribution during maximal exercise. *Year Book of Sports Medicine*. (5) SM 31. Mosby-Year Book, Inc. St. Louis, MO. 1999

St.Croix, C.M., C.A. Harms, S.R. McClaran, G.A. Nickele, D.F. Pegelow, W.B. Nelson and J.A. Dempsey. Effect of prior exercise on exercise-induced arterial hypoxemia. *Journal of Applied Physiology*. 85(4): 1556-1563. 1998

Harms, C.A., T. Wetter, S.R. McClaran, D.F. Pegelow, G. Nickele, W. Nelson, J.A. Dempsey. Effect of respiratory muscle work on cardiac output and its distribution during maximal exercise. *Journal of Applied Physiology*. 85(2): 609-618. 1998

McClaran, S.R., C.A. Harms, D.F. Pegelow, and J.A. Dempsey. Smaller lungs in women affect exercise

hyperpnea. *Journal of Applied Physiology*. 84(6): 1872-1881. 1998

Harms, C.A., S.R. McClaran, G. Nickele, D.F. Pegelow, W.B. Nelson, and J.A. Dempsey. Exercise induced arterial hypoxemia in healthy young women. *Journal of Physiology*. 507(2): 619-628. 1998

Harms, C.A., M.A. Babcock, S.R. McClaran, D.F. Pegelow, G. Nickele, W. Nelson, J.A. Dempsey. Respiratory muscle work compromises leg blood flow during maximal exercise. *Year Book of Sports Medicine*. (5) SM 34. Mosby-Year Book, Inc. St. Louis, MO. 1998

Curran, A. P. Eastwood, C.A. Harms, C.A. Smith, and J.A. Dempsey. Superior laryngeal nerve section alters responses to upper airway distortion in sleeping dogs. *Journal of Applied Physiology*. 83(3): 768-775. 1997

Harms, C.A., M.A. Babcock, S.R. McClaran, D.F. Pegelow, G. Nickele, W. Nelson, and J.A. Dempsey. Respiratory muscle work compromises leg blood flow during maximal exercise. *Journal of Applied Physiology*. 82(5): 1573-1583. 1997

Smith, C.A., C.A. Harms, K.S. Henderson, and J.A. Dempsey. Ventilatory effect of specific carotid body hypoxia and hypocapnia in dogs. *Journal of Applied Physiology*. 82(3): 791-798. 1997

Dempsey, J.A., C.A. Harms, and D.M. Ainsworth. 1996. Respiratory muscle perfusion and energetics during exercise. *Medicine and Science in Sports and Exercise*. 28(9): 1123-1128. 1996

Dempsey, J.A., C.A. Smith, C.A. Harms, C.M. Chow, and K.W. Saupe. State of the Art Review: Sleep induced breathing instability. *Sleep*. 19(3): 236-247. 1996

Harms, C.A., Y.J. Zeng, C.A. Smith, E.A. Vidruk, and J.A. Dempsey. Negative pressure-induced deformation of the upper airway causes central apnea in awake and sleeping dogs. *Journal of Applied Physiology*. 80(5): 1528-1539. 1996

Dempsey, J.A., A.M. Leever, C.R. Wilson, C.A. Harms, and C.A. Smith. Apnea prolongation via short-term inhibition. *Sleep*. 19(10): S160-S163. 1996

Raglin, J.S., D.M. Koceja, J.M. Stager, C.A. Harms. Mood, neuromuscular function, and performance during training in female swimmers. *Medicine and Science in Sports and Exercise*. 28(3): 372-377. 1996

Harms, C.A. and J. M. Stager. Low chemoresponsiveness and hyperventilation contribute to exercise induced hypoxemia. *Journal of Applied Physiology*. 79(2): 575-580. 1995

Morrell, M.J., M.S. Badr, C.A. Harms, and J.A. Dempsey. The assessment of upper airway patency during apnea using cardiogenic oscillations in the airflow signal. *Sleep*. 18(8): 651-658. 1995

Harms, C.A., L. Cordain, J.M. Stager, J. Sockler, and M. Harris. Body fat mass affects post-exercise metabolism in males of similar lean body mass. *Medicine, Exercise, Nutrition, and Health*. 4(1): 33-39. 1995

Book Chapters and Manuals

Harms, C.A. and W.M. Gold. 2004. Cardiopulmonary Exercise Physiology. *Textbook of Respiratory Medicine*. 4th Edition; Editor: J. Murray and J. Nadel. W.B. Saunders.

Harms, C.A. and J.A. Dempsey. 1999. Cardiovascular consequences of exercise hyperpnea. *Exercise and Sport Science Reviews*. Vol 27. Editor: J.O. Holloszy. Lippincott Williams & Wilkins, Philadelphia, PA

Harms, C.A., T.J. Wetter and J.A. Dempsey. 1999. Breathing in exercise. *Rehabilitation of the Patient with Respiratory Disease*. Editors. Cherniack, Altose, and Homma. McGraw-Hill Publishers, New York, NY. 87-96.

Harms, C.A. Biobehavioral Bases of Exercise (Laboratory Manual). Kendall Hunt Publishing Company, Dubuque, Iowa. First Edition (1998); Second Edition (2001); Third Edition (2005).

Dempsey, J.A., C.A. Harms, B.J. Morgan, M.S. Badr, and J.B. Skatrud. 1997. Sleep effects on breathing and breathing stability. *The Lung-scientific foundations*. Lippincott-Raven Publishers, Philadelphia. 2063-2072.

Harms, C.A. and J.A. Dempsey. 1996. Does ventilation ever limit human performance? *Advances in Experimental Medicine and Biology Series: The Physiology and Pathophysiology of Exercise Tolerance*. The Physiology and Pathophysiology of Exercise Tolerance. Plenum Press, New York, NY. 91-96.

Invited Presentations

Exercise induced pulmonary edema. June 2008. Symposium. American College of Sports Medicine, Indianapolis, IN.

Age and Sex Differences in Cardiovascular Responses to Exercise. June 2008. American College of Sports Medicine, Indianapolis, IN.

Are women's lungs built for exercise? May 2007. University of Wisconsin Medical School, Madison, WI.

Gender difference in pulmonary function during exercise. Sept, 2006. Symposium. Integrated Physiology of Exercise Conference, American College of Sports Medicine. Indianapolis, IN.

Inspiratory muscle training: too much hype? June, 2006. Symposium. American College of Sports Medicine, Denver, CO.

Exercise-induced arterial hypoxemia: mechanisms and consequences. February, 2006. University of Kansas Medical School, Kansas City, KS.

The ventilatory response to exercise in obese individuals. June, 2005. Symposium. American College of Sports Medicine, Nashville, TN.

Antioxidant supplementation and lung function in healthy individuals. June, 2005. Symposium. American College of Sports Medicine, Nashville, TN.

Redistribution of blood flow during exercise: competition between respiratory and skeletal muscles. May, 2005. Symposium. Asian Federation of Sports Medicine. Tokyo, Japan.

Exercise-induced hypoxemia revisited. May 2005. University of Tsukuba, Tsukuba, Japan.

Cardiopulmonary limitations to exercise tolerance. May 2005. Kobe University, Kobe, Japan.

Respiratory muscle work during exercise. May 2005. University of Nagoya, Nagoya, Japan.

Are women=s lungs built for exercise? February, 2005. University of British Columbia, Canada.

Respiratory muscles during exercise. June, 2004. Symposium. American College of Sports Medicine. Indianapolis, IN

Pulmonary limitations during exercise. April 2004. Kansas State Respiratory Therapy Association Annual Meeting. Topeka, KS.

Exercise ventilation: can we improve it? October, 2003. Central States Chapter American College of Sports Medicine. Kansas City, MO

Pulmonary limitations in healthy subjects. September, 2003. American Lung Association. Kansas Chapter. Topeka, KS

Exercise-induced arterial hypoxemia: Gender differences. June, 2002. Symposium. American College of Sports Medicine. St. Louis, MO.

Pulmonary system limitations to exercise performance in healthy women. October, 1998. Central States Chapter American College of Sports Medicine. Kansas City, MO.

Is the female lung built for exercise? October, 1998. Department of Anatomy and Physiology. Kansas State University. Manhattan, KS

Muscle perfusion: determined by muscular demand or cardiovascular supply? June, 1998. Symposium. American College of Sports Medicine. Orlando, FL.

Cardiopulmonary interactions in the healthy human during exercise. April, 1997. Department of Kinesiology. Kansas State University. Manhattan, KS.

Pulmonary limitations to human performance. March, 1997. Department of Exercise and Sport Science. Arizona State University. Tempe, AZ.

Reduced respiratory muscle work lowers cardiac output during max exercise in humans. June, 1997. 2nd Annual Meeting of Midwest Physiological Societies. Milwaukee, WI.

Pulmonary physiology & pulmonary limitations to exercise. February, 1997. Cardio-Pulmonary Update For the Athlete, Lake Placid Sports Medicine Society Annual Conference, Lake Placid, NY.

Negative pressure-induced deformation of the upper airway causes central apnea in the awake and sleeping dog. June, 1995. Midwest Respiratory Symposium, Minnaqua, WI.

Abstracts/Presentations

2008

64. Wicker, R.J., M.K. Kelly, C.A. Harms, T.J.Barstow. The effects of N-Acetylcysteine on oxygen uptake kinetics. American College of Sports Medicine International Conference. Indianapolis, IN .

63. Swain, K.E., S. K. Rosenkranz, B. Beckman, C.A. Harms. Pulmonary Limitations During Incremental Exercise in Healthy Prepubescent Trained Boys. American College of Sports Medicine International Conference. Indianapolis, IN.

62. Kelly, M.K., R.J. Wicker, T.J. Barstow, C.A. Harms. The Effects of N-Acetylcysteine on Respiratory Muscle Fatigue During Heavy Exercise. American College of Sports Medicine International Conference. Indianapolis, IN.

2007

61. Swain, K., A. Adams, S. Rosenkranz, C.A. Harms. Bronchodilatory effects on airway smooth muscle in sedentary vs active healthy subjects. American College of Sports Medicine International Conference. New Orleans, LA.

60. Rosenkranz, S.K., D.K. Townsend, S.E. Steffens, J. Wright, C.A. Harms. Effects of a high fat meal on pulmonary function in healthy subjects. American College of Sports Medicine International Conference. New Orleans, LA.

59. Adams, A., K. Swain, S. Rosenkranz, C. A. Harms. The effect of chronic endurance exercise on airway hyper-reactivity in healthy subjects. Central States Chapter American College of Sports Medicine. American College of Sports Medicine International Conference. New Orleans, LA.

2006

58. Rosenkranz, S.K., D.K. Townsend, S.E. Steffens, J. Wright, C.A. Harms. Effects of a high fat meal on pulmonary function in healthy subjects. (Doctoral Student Award Winner) Central States Chapter American College of Sports Medicine. Kansas City, MO.

57. Adams, A., K. Swain, S. Rosenkranz, C. A. Harms. The effect of chronic endurance exercise on airway hyper-reactivity in healthy subjects. Central States Chapter American College of Sports Medicine. Kansas City, MO.

56. Lutjemeier, B.J., Harms, C.A., Townsend, D.K., Ferreira, L.F., Harper, A.J., Barstow, T.J. The effect of contraction frequency on the central and peripheral blood flow/VO₂ relationship. Integrative Physiology of Exercise ACSM Conference. Indianapolis, IN.

55. Flewelling, A., C.A. Harms. Influence of Body Fat Mass on Exercise-Induced Bronchoconstriction. American College of Sports Medicine International Conference, Denver, CO.

2005

54. Flewelling, A., C.A. Harms. Influence of Body Fat Mass on Exercise-Induced Bronchoconstriction. Central States Chapter American College of Sports Medicine. Kansas City, MO.

53. Chenoweth, L.M., C.S. Ferguson, A. Downey, J. Ranum, A. Flewelling, C.A. Harms. The effects of dietary antioxidant vitamins on pulmonary function at rest and during exercise. American College of Sports Medicine International Conference, Nashville, TN

52. Lutjemeier, B., Harms CA, Harper AJ., Ferreira L., Townsend DK., Barstow TJ. Pedal frequency does not alter the cardiac output: VO₂ relationship during cycling. American College of Sports Medicine International Conference, Nashville, TN

51. Downey, A., L.M. Chenoweth, D. K. Townsend, J. Ranum, C.S. Ferguson, C.A. Harms. The effect of

inspiratory muscle training on hypoxic exercise. American College of Sports Medicine International Conference, Nashville, TN

50. Ranum, J., L.M. Chenoweth, C.S. Ferguson, C.A. Harms. Cardiopulmonary consequences of expiratory flow limitation during exercise. American College of Sports Medicine International Conference, Nashville, TN

2004

49. L.M. Chenoweth, S.E. Doerkson, C.S. Ferguson, P. Estabrooks, C.A. Harms. Improved pulmonary function following increased fruit and vegetable consumption in healthy subjects. Indianapolis, IN

2003

48. Lutjemeier, B.J., D.K. Townsend, S. Koga, S. Warren, C.A. Harms, T.J. Barstow. Oscillations in femoral venous blood flow during dynamic exercise. American College of Sports Medicine International Conference, San Francisco, CA

47. C.A. Harms, C.S. Ferguson. Dietary antioxidant effects on pulmonary function at rest and following exercise. American College of Sports Medicine International Conference, San Francisco, CA

46. L.M. Chenoweth, S.E. Doerkson, C.S. Ferguson, P. Estabrooks, C.A. Harms. Improved pulmonary function following increased fruit and vegetable consumption in healthy subjects. Central States Chapter American College of Sports Medicine. Kansas City, MO.

2002

45. B.J. Lutjemeier, K.K. Townsend, S. Koga, S. Warren, C.A. Harms, T.J. Barstow. Oscillations in femoral venous blood flow during dynamic exercise. Central States Chapter American College of Sports Medicine. Kansas City, MO.

44. S.J. McEntire, C.S. Ferguson, K.R. Brown, C.A. Harms. The effect of respiratory muscle training in combination with whole body exercise on exercise performance. Central States Chapter American College of Sports Medicine. Kansas City, MO.

43. J.D. Murphy, C.S. Ferguson, K.R. Brown, C.A. Harms. The effect of dietary antioxidants on lung function in exercise-induced asthmatics.

42. K.R. Brown, J.D. Murphy, C.S. Ferguson, C.A. Harms. The effect of menstrual cycle phase on ventilation and pulmonary gas exchange *Medicine and Science in Sports and Exercise* 34(5), American College of Sports Medicine. St Louis, MO.

2001

41. J.D. Murphy, C.S. Ferguson, K.R. Brown, C.A. Harms. The effect of dietary antioxidants on lung function in exercise-induced asthmatics. (Student Award Winner) Central States Chapter American College of Sports Medicine. Kansas City, MO.

40. K.R. Brown, J.D. Murphy, C.S. Ferguson, C.A. Harms. The effect of menstrual cycle phase on ventilation and pulmonary gas exchange (Best Poster Award Winner). Central States Chapter American College of Sports Medicine. Kansas City, MO.

39. Harms, C.A., C.S. Ferguson, K. Brown, J.D. Murphy. Gender difference in red blood cell pulmonary capillary transit time during exercise. *Medicine and Science in Sports and Exercise* 33(5), American College of Sports Medicine. Baltimore, MD.

38. Schwartzbeck, E.J., C.S. Ferguson, C.A. Harms. Reliability of the single breath exhalation technique for pulmonary diffusing capacity during exercise. *Medicine and Science in Sports and Exercise* 33(5), American College of Sports Medicine. Baltimore, MD.

37. Burgett, E.V., C.S. Ferguson, J.D. Murphy, K. Brown, C.A. Harms. Effect of hyperpnea on leg blood flow. *Medicine and Science in Sports and Exercise* 33(5), American College of Sports Medicine. Baltimore, MD.

36. Ferguson, C.S., J.D. Murphy, K. Brown, C.A. Harms. Effect of nedocromil sodium on pulmonary gas exchange and VO₂max. *Medicine and Science in Sports and Exercise* 33(5), American College of Sports Medicine. Baltimore, MD.

2000

35. Schwartzbeck, E., C.S. Ferguson, C.A. Harms. Repeatability and determination of adequate exhalation times in the single breath technique for DLCO during exercise. Central States Chapter American College of Sports Medicine. Kansas City, MO.

34. Harms, C.A. FACSM, E.V. Burgett, C.S. Ferguson. Pulmonary gender differences in the decrease in VO₂max in acute hypoxic exercise. *Medicine and Science in Sports and Exercise* 32(5), American College of Sports Medicine. Indianapolis, IN.

33. Murphy, J.D., C.A. Harms FACSM, M.R. Roberts, and C.S. Ferguson. Effect of nedocromil sodium on airways and pulmonary gas exchange during heavy exercise in fit men and women. *Medicine and Science in Sports and Exercise* 32(5), American College of Sports Medicine. Indianapolis, IN.

1999

32. Roberts, M.R., C.A. Harms, J.D. Murphy, and C.S. Ferguson. Effect of nedocromil sodium on pulmonary gas exchange and diffusion during heavy exercise in moderate to highly active young men and women. Indiana University Undergraduate Research Conference, Indianapolis, IN.

31. Murphy, J.D., C.A. Harms FACSM, M.R. Roberts, and C.S. Ferguson. Effect of nedocromil sodium on airways and pulmonary gas exchange during heavy exercise in fit men and women. (Student Award Winner) Central States Chapter American College of Sports Medicine. Kansas City, MO.

30. Dempsey, J.A., S. McClaran, C.A. Harms, T. Wetter. Mechanical constraint of exercise hyperventilation and its consequences. *Medicine and Science in Sports and Exercise* 31(5), American College of Sports Medicine. Seattle, WA.

29. Harms, C.A., L.B. Daniels, C. Ferguson, W.I. Marshall. Lung diffusion capacity during treadmill versus cycle exercise. *Medicine and Science in Sports and Exercise* 31(5), American College of Sports Medicine. Seattle, WA.

28. Daniels, L.B., C.A. Harms, W.I. Marshall, A.B. Harms. Lung diffusion capacity is compromised during incremental exercise in healthy active women. *Medicine and Science in Sports and Exercise* 31(5), American College of Sports Medicine. Seattle, WA.

27. Wetter, T.J., C.A. Harms, W.B. Nelson, D.F. Pegelow, J.A. Dempsey. Influence of respiratory muscle work on VO₂ and leg blood flow during submax exercise. *Medicine and Science in Sports and Exercise* 31(5), American College of Sports Medicine. Seattle, WA.

1998

26. Daniels, L.B., C.A. Harms, W.I. Marshall, A.B. Harms. Lung diffusion capacity is compromised during graded exercise in healthy active women. (Student Award Winner) Central States Chapter American College of Sports Medicine. Kansas City, MO.
25. Harms, C.A., T. Wetter, C. St. Croix, D.F. Pegelow, J.A. Dempsey. Increased power output at VO₂max with respiratory muscle unloading. *Medicine and Science in Sports and Exercise* 30(5), American College of Sports Medicine. Orlando, FL.
24. Wetter, T.J., C.A. Harms, C. St.Croix, D.F. Pegelow, J.A. Dempsey. Effects of respiratory muscle loading and unloading on time to exhaustion during cycle ergometry. *Medicine and Science in Sports and Exercise* 30(5), American College of Sports Medicine. Orlando, FL.
23. Dempsey, J.A., C.A. Harms, G.A. Nickele, T. Wetter, S.R. McClaran, D.F. Pegelow. Effects of respiratory muscle work on cardiac output and its distribution during max exercise. Experimental Biology. American Physiologic Society. San Francisco, CA.
22. St.Croix, C.M., C.A. Harms, S.R. McClaran, G. Nickele, D. Pegelow, W.B. Nelson, J.A. Dempsey. Effects of prior exercise on exercise-induced arterial hypoxemia in young women. Experimental Biology. American Physiologic Society. San Francisco, CA.
21. Eastwood, P.R., A.K. Curran, C.A. Harms, M. Satoh, M.T. Zayas, C.A. Smith, J.A. Dempsey. Apneagenic reflexes in the upper airway. Experimental Biology. American Physiologic Society. San Francisco, CA.

1997

20. St.Croix, C.M., C.A. Harms, S.R. McClaran, G. Nickele, D. Pegelow, P. Hanson, and J.A. Dempsey. Effects of prior exercise and test protocol on exercise-induced arterial hypoxemia in females. 2nd Annual Meeting of Midwest Physiological Societies. Milwaukee, WI.
19. Harms, C.A. G. Nickele, S.R. McClaran, D.F. Pegelow, T. Wetter, P. Hanson, and J.A. Dempsey. Respiratory muscle work lowers cardiac output during maximal exercise. *Medicine and Science in Sports and Exercise* 29(5), American College of Sports Medicine. Denver, CO.
18. Harms, C.A., S.R. McClaran, G. Nickele, D.F. Pegelow, and J.A. Dempsey. High prevalence of exercise induced arterial hypoxemia and expiratory flow limitation in healthy young women. *Respiratory and Critical Care Medicine* 152(5), American Thoracic Society. San Francisco, CA.
17. Babcock, M.A., C.A. Harms, D.F. Pegelow, and J.A. Dempsey. Effects of mechanical unloading of inspiratory muscles on exercise-induced diaphragm fatigue. *Respiratory and Critical Care Medicine* 152(5), American Thoracic Society. San Francisco, CA.
16. Curran, A. P. Eastwood, C.A. Harms, C.A. Smith, and J.A. Dempsey. Effect of superior laryngeal nerve (SLN) section on ventilation and the response to upper airway distortion in sleeping dogs. *Respiratory and Critical Care Medicine* 152(5), American Thoracic Society. San Francisco, CA.

1996

15. Harms, C.A., M.A. Babcock, S.R. McClaran, D.F. Pegelow, G. Nickele, W. Nelson, and J.A. Dempsey. Respiratory muscle work affects leg blood flow during maximal exercise. *The Physiologist* 37(5), American Physiological Society, Vancouver BC Canada.

14. McClaran, S.R., C.A. Harms, D.F. Pegelow, G. Nickele, W. Nelson, and J.A. Dempsey. Smaller lungs in trained females vs males affect ventilation and gas exchange during heavy exercise. *The Physiologist* 37(5), American Physiological Society, Vancouver BC Canada.

13. Harms, C.A., S.R. McClaran, G. Nickele, D.F. Pegelow, and J.A. Dempsey. Exercise induced arterial hypoxemia in highly trained endurance women. *Medicine and Science in Sports and Exercise* 28(5), American College of Sports Medicine, Cincinnati OH.

12. McClaran, S.R., C.A. Harms, D.F. Pegelow, and J.A. Dempsey. Effect of mechanical constraints on ventilation during intense exercise in women athletes. *Medicine and Science in Sports and Exercise* 28(5), American College of Sports Medicine, Cincinnati OH.

1995

11. Harms, C.A., Y.J. Zeng, C.A. Smith, and J.A. Dempsey. Upper airway negative pressure effects on breathing pattern and genioglossus EMG in the dog during sleep. *Respiratory and Critical Care Medicine*, 151(5), American Thoracic Society, Seattle WA.

10. Smith, C.A., K.S. Henderson, C.A. Harms, Y.J. Zeng, and J.A. Dempsey. Ventilatory effects of specific carotid body hypocapnia and hypoxia in the awake dog. *Respiratory and Critical Care Medicine*, 151(5), American Thoracic Society, Seattle WA.

9. Morrell, M.J., M.S. Badr, C.A. Harms, and J.A. Dempsey. The assessment of upper airway patency during apnea using cardiogenic oscillations in the airflow signal. *Respiratory and Critical Care Medicine*, 151(5), American Thoracic Society, Seattle WA.

8. Raglin, J.S., C.A. Harms, and J.M. Stager. Associations among selected anxiety and cardiorespiratory variables during high intensity exercise. *Medicine and Science in Sports and Exercise* 27(5), American College of Sports Medicine, Minneapolis MN.

1994

7. Harms, C.A. and J. M. Stager. Inadequate hyperventilation as a determinant of exercise induced arterial hypoxemia. *Medicine and Science in Sports and Exercise* 26(5), American College of Sports Medicine, Indianapolis IN.

6. De la Cruz, J., P. Babington, C.A. Harms, and J.M. Stager. Changes in blood resistivity over a submaximal exercise bout. *Medicine and Science in Sports and Exercise* 26(5), American College of Sports Medicine, Indianapolis IN.

1993

5. Harms, C.A. and J.M. Stager. Augmented peripheral chemosensitivity during early altitude exposure. *Medicine and Science in Sports and Exercise* 25(5), American College of Sports Medicine, Seattle, WA.

4. Gavin, T., P. Babington, C.A. Harms, M. Ardelt, and J.M. Stager. Investigation of the purported thermoregulatory advantages of polyester fabrics worn during exercise. *Medicine and Science in Sports and Exercise* 25(5), American College of Sports Medicine, Seattle, WA.

1992

3. Stager, J.M., J. Raglin, C.A. Harms, and P. Babington. Power as a determinant of swim performance in collegiate women swimmers. *Medicine and Science in Sports and Exercise* 24(5), American College of Sports Medicine, Dallas TX.

2. Foster, V., C.A. Harms, and P. Clarkson. Incidence of running injury in male and female racers. *Medicine and Science in Sports and Exercise* 24(5), American College of Sports Medicine, Dallas TX.

1991

1. Harms, C.A., L. Cordain , J. Sockler, and M. Harris. Influence of body fat mass on excess post-exercise oxygen consumption. *Medicine and Science in Sports and Exercise* 23(4), American College of Sports Medicine, Orlando FL.

Funding

American Lung Association. Effect of dietary antioxidants on exercise-induced airway inflammation. \$120,000. (Proposed). 2008.

University Small Research Grant. Kansas State University. The influence of a high fat meal on airway hyper-reactivity in healthy subjects. \$2,100. 2006.

United States Army. A Comprehensive Evaluation of Personal Cooling Systems (PCS) for Soldiers McCullough EA (PI), Eckels S, Harms CA, 9/19/05-9/28/06, \$128,772

Army Rapid Equipping Force. Evaluation of New Clothing Technologies for Military Applications , \$51,155 (Elizabeth McCullough, Principal Investigator; Steve Eckels and Craig Harms, Investigators). March 7, 2005- March 6, 2006

University Small Research Grant. Kansas State University. The effect of antioxidants on pulmonary function at rest and during exercise in normal subjects. \$2,000. 2004.

American Lung Association. Pulmonary limitations in healthy subjects during exercise. \$85,000. 2001-2003

American Heart Association. Cardiovascular consequences of ventilatory constraints during exercise. \$75,000. 2001-2003.

University Small Research Grant. Kansas State University. The effect of ventilation on peripheral blood flow. \$2,605. 1999.

American Heart Association. Mechanisms of interaction between hyperpnea and cardiovascular function. \$69,050. 1999-2001.

University Small Research Grant. Kansas State University. Impaired lung diffusion capacity during exercise in women. \$1,235.1998.

Parker B. Francis Fellowship of Pulmonary Research. Cardiopulmonary interactions during dynamic exercise. \$108,000. 1997-2000.

National Heart, Lung, and Blood Institute (RO1-15469) Co-Investigator (PI: J.A. Dempsey). Human ventilatory adaptation. \$1,150,377. 1997-2002.

National Institute of Health: National Heart Lung Blood Institute Post Doctoral Fellowship Grant. Cardiopulmonary limitations to exercise. \$87,750. 1994-1997.

Indiana University Graduate School Doctoral Student Grant in Research. Inadequate hyperventilation as a determinant of exercise induced arterial hypoxemia. \$750. 1993.

Service

Professional

Associate Editor Medicine and Science in Sports and Exercise, 2006-
Editorial Board. Journal of Applied Physiology 2005- ; Medicine and Science in Sports and Exercise. 2005-

External Examiner. Doctoral Dissertation. Alastair Hodges. University of British Columbia, Canada 2006; Anthony Rice. University of Adelaide, Australia. 1999.

American College of Sports Medicine (National) *Cardiovascular, Renal, and Respiratory Topical Representative for Program Committee 2006-2009; Research Awards Committee.* 1999-2002.

Grant Reviewer: The Irish Health Research Board. 1999, Natural Sciences and Engineering Research Council of Canada 2007.

American College of Sports Medicine (Central States Chapter): Audit Committee 2007-2008. *Nominating Committee 2004, 2005, State of Kansas Representative 2001-2003; Site Selection Committee (Chair) 2000, 2005, 2006; Student Research Award Committee 1998-00, 2006; Abstract Reviewer 1999-2002.*

Referee: Scandinavian Journal of Medicine and Science in Sport and Exercise, Comparative Biochemistry and Physiology, Journal of Physiology, Journal of Applied Physiology, Journal of Applied Clinical Medicine, American Journal of Physiology, ACTA Physiologica Scandanavica, Medicine and Science in Sport and Exercise, Journal of Swimming Research, European Journal of Applied Physiology and Occupational Physiology, Pediatric Pulmonology, International Journal of Physiology, Obesity Research, Respiratory Physiology and Neurobiology, Chest, British Journal of Sports Medicine, Canadian Journal of Applied Physiology, Respiratory Physiology, Journal of Physiology, Experimental Physiology, American Journal of Critical Care Medicine, High Altitude Medicine & Biology

Kansas State University: Presidential Lecture Series. Invited Presenter.

Department of Kinesiology: Undergraduate Coordinator 2006- ; Kinesiology Association of Graduate Students (KAGS) Faculty Advisor; Kansas State University. 2004-present

Kansas State University Athletic Department: Faculty Advisor for Recruiting. 2000-present

Kansas State University Committees: Institutional Review Board on the Use of Human Subjects. 1998-present.

Kansas State University Kinesiology Department Committees: Scholarship (chair), Faculty Search (1999, 2003, 2007, 2008), LIFE Fitness Advisory Committee, Kin 220 Task Force (chair), Kinesiology Laboratory Technician Search Committee (1998, 2004). Undergraduate Curriculum (chair), Student Association and Telefund, Community Physical Activity Program Advisory, Anatomy/Phys task force

Indiana University School of Health, Physical Education, and Recreation. 1993-94. Dean Appointed Advisory Council, Indiana University, Bloomington, IN.

Community

Invited Guest Speaker Manhattan Rotary Club, Manhattan, KS. *Exercise training advances*. 2008.

Walk Kansas Fitness Promotion Board of Directors. 2000-2007

Invited Guest Speaker Better Breathing Club, Manhattan, KS *Research in Pulmonary Medicine*. 2001, 2003, 2005, 2006, 2007

Invited Guest Speaker Kansas State University Physical Therapy Club. *Research Opportunities* 2000.

Invited Guest Speaker: Flint Hills Harriers Running Club. Manhattan, KS *Why do I get tired?* 1999.

Invited Presenter: Kansas State University News Service. Exercise and fitness advice. 1998-present.
Columnist (weekly): Manhattan Mercury Newspaper, On Fitness. Manhattan, KS 1998-present.

Invited Guest Speaker: Nova Care Rehabilitation Services. Madison, WI. 1995. Bloomington Hospital Dept of Physical Therapy. Bloomington, IN. 1993-1994, *Training effects on the cardiopulmonary system; Cardiopulmonary rehabilitation, Deconditioning. Bedrest and deconditioning.*

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