

CURRICULUM VITAE

Chester A. Ray, Ph.D.
Chair, Professor of Nutrition, Food and Exercise Sciences

Personal Information:

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College of Human Sciences
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Education:

1983	Ithaca College	B.S.	Health & Physical Ed.
1985	University of Georgia	M.A.	Exercise Physiology
1985-1986	University of Texas at Austin	Ph.D. Student	Exercise Physiology
1989	University of Georgia	Ph.D.	Exercise Physiology

Postdoctoral Training:

1989-1990	University of Iowa	Cardiovascular Research Center	Cardiovascular and Autonomic Physiology
1990-1992	University of Iowa	Department of Internal Medicine (Cardiovascular Division)	Cardiovascular and Autonomic Physiology

Academic Positions:

1992-1993	Assistant Professor	Department of Internal Medicine (Cardiovascular Division), University of Iowa, Iowa City, IA
1993-1998	Assistant Professor	Department of Exercise Science, University of Georgia, Athens, GA
1993-2000	Adjunct Professor	Department of Pharmaceutical and Biomedical Sciences, University of Georgia, Athens, GA

1994 (Spring)	Visiting Assistant Professor	Copenhagen Muscle Research Center, Department of Anesthesia, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark.
1994 (Summer)	Visiting Assistant Professor	Department of Internal Medicine (Cardiovascular Division), University of Iowa, Iowa City, IA
1998	Associate Professor (Tenure)	Department of Exercise Science, University of Georgia, Athens, GA
1998-2004	Associate Professor (Tenure)	Department of Medicine (Cardiology), The Pennsylvania State University College of Medicine, Hershey, PA
1998-2004	Associate Professor	Department of Cellular and Molecular Physiology, The Pennsylvania State University College of Medicine, Hershey, PA
2001-2016	Graduate Faculty	Neuroscience Graduate Program, The Pennsylvania State University, University Park, PA
2004-2016	Graduate Faculty	Integrative Biosciences Graduate Program, The Pennsylvania State University, University Park, PA
2004-2016	Professor	Department of Medicine (Cardiology), The Pennsylvania State University College of Medicine, Hershey, PA
2004-2016	Professor	Department of Cellular and Molecular Physiology, The Pennsylvania State University College of Medicine, Hershey, PA
2005-2011	Adjunct Professor	Department of Preventive Medicine & Community Health, The University of Texas Medical Branch, Galveston, TX
2010-2012	Co-Chair	Intercollege Degree Program in Physiology, The Pennsylvania State University, Hershey, PA
2011-2016	Graduate Faculty	Biomedical Sciences Graduate Program, Penn State University College of Medicine, Hershey, PA
2016-present	Professor and Chair	Department of Nutrition, Food and Exercise Sciences, College of Human Sciences, Florida State University, Tallahassee, FL
2016-present	Director	Institute of Sport Sciences and Medicine, College of Human Sciences, Florida State University

Other Professional Positions

1984-1985	Research Assistant	Human Performance Laboratory, University of Georgia, Athens, GA
1985-1986	Research Assistant	Human Performance Laboratory, University of Texas, Austin, TX
1987-1989	Research Assistant	Exercise Physiology Laboratory, University

1989-1992	Postdoctoral Research Fellow	of Georgia, Athens, GA University of Iowa Cardiovascular Center and Department of Internal Medicine, Iowa City, IA
1992-1993	Assistant Research Scientist	Veterans Affairs Medical Center, Iowa City, IA
2002	Administrative Fellow	Office of the Vice Dean for Research and Graduate Studies, The Pennsylvania State University College of Medicine, Hershey, PA

Research Interests:

Neural control of the circulation
 Vestibular control of sympathetic nerve activity
 Autonomic and cardiovascular adjustments to physical and mental stress
 Cardiovascular adaptations to exercise training
 Effect of microgravity on cardiovascular and autonomic function
 Hypertension and the sympathetic nervous system

Professional Affiliations:

1983 - 1989	American College of Sports Medicine - Southeast Chapter
1983 - present	American College of Sports Medicine, Fellow
1987 - 1994	American Heart Association - Basic Science Council
1989 - present	American Physiological Society
1992 - 1998	American Heart Association - Circulation Council
1994 - 1998	American College of Sports Medicine - Southeast Chapter
1998 - present	American Heart Association - Basic Cardiovascular Sciences Council
2000 - present	American College of Sports Medicine – Mid-Atlantic Chapter
2002 - present	American Autonomic Society

Honors and Awards:

1980 - 1983	Emerson Scholarship, Ithaca College
1980 - 1983	Truhn Scholarship, Ithaca College
1980 - 1983	Klein Scholarship, Ithaca College
1981	Oracle Honor Society, Ithaca College
1982	Phi Kappa Phi, Ithaca College
1983	Summa Cum Laude, Ithaca College
1983	Deans Award, Ithaca College
1983	Scholar-Athlete of the Year, Ithaca College
1993	Travel Award to the XXXII Congress of the International Union of Physiological Sciences, Glasgow, Scotland - National Research Council
1994 (Spring)	Visiting Assistant Professor, Copenhagen Muscle Research Center, Department of Anesthesia, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark
1994 (Summer)	Visiting Assistant Professor, Department of Internal Medicine (Cardiovascular Division), University of Iowa, Iowa City, Iowa

1995	Graduate Faculty, The University of Georgia
1995	Elected Fellow, American College of Sports Medicine
1996	University of Georgia Nominee for Oak Ridge Associated Universities Junior Faculty Enhancement Awards
1996-1997	Sarah H. Moss Fellowship, The University of Georgia
1999-2007	Editorial Board, <i>Journal of Applied Physiology</i>
2001	Travel Award to the XXXIV Congress of the International Union of Physiological Sciences, Christchurch, New Zealand - National Research Council
2002-2008	Editorial Board, <i>American Journal of Physiology: Heart and Circulatory Physiology</i>
2003-2006	Neural Control and Autonomic Regulation Steering Committee, American Physiological Society
2006-2009	Chair, Neural Control and Autonomic Regulation Section, American Physiological Society
2009-2010	Committee on Institutional Cooperation (CIC) – Academic Leadership Program Fellow (Big Ten)
2015-2016	Master Teacher Facilitator – Penn State

Instruction

Academic Courses	Exercise Physiology	undergraduate
	Metabolic and Cardiorespiratory Aspects of Exercise	graduate
	Oxygen Transport from Lung to Muscle During Exercise	graduate
	Autonomic Adjustments to Physical Stress (Developed)	graduate
	Human Physiology II	graduate
	PSIO 520- Advanced Physiology	graduate
	CMBMP 712 – Cellular & Molecular Basis of Medical Practice	Medical
	Introduction to Exercise Science	undergraduate
	Research Seminar in Exercise Science	graduate
	Problem-Base Learning	Cardiology
	Cellular & Molecular Processes	medical
	Respiratory Medicine	medical
	Gastrointestinal Medicine	medical
	Endocrinology	medical
	Reproduction	medical
	Neural and Behavioral	medical

Supervision of Student Research:

Supervisor: Graduate Trainees (The University of Georgia)

Dario Carrasco, Ph.D., 1996
 Anastasia Martin, M.A., 1996
 Kelly Ward, M.A. student, 1995

Kathryn Gracey, M.A., 1997
 Edward Mahoney, M.A., 1998
 Keith Hume, M.A., 1998
 Samuel Steele, M. A., 1999

Supervisor: Graduate Trainees (The Pennsylvania State College of Medicine)

Keith Hume, Ph.D. student, 1999
 Charity L. Sauder, M.S., 2005
 Carolyn Sacco, M.S., 2005
 Matthew Kearney, M.S, 2007
 Damian J. Dyckman, Ph.D., 2007
 Nathan T. Kuipers, Ph.D., 2008
 Jonathan S. Cook, Ph.D., 2010

Committee Member (The University of Georgia)

Shawn Youngstedt, Ph.D., 1994
 Dane Cook, M.A., 1995
 Mike Conley, Ph.D., 1996
 Mark Sloniger, Ph.D., 1996
 Barry Prior, Ph.D., 1996
 Dane Cook, Ph.D., 1998
 Ellen Evans, Ph.D., 1998
 Mike Castro, Ph.D., 1998
 Jerome Smith, Ph.D., 1998

Committee Member (Michigan Technical University)

Jason R. Carter, Ph.D., 2001 – 2003

Committee Member (University of Delaware)

Jody L. Greaney, M.S.

Committee Member (The Pennsylvania State University)

Sean Newcomer, Ph.D., 2004
 Matt Zahner, Ph.D., 2006
 Nu-Chu Liang, Ph.D., 2009
 Jennifer E. Nyland, Ph.D., 2014

Committee Member (Florida State University)

Ashley Lea, M.S., 2018
 Jake Blattner, M.S., 2018
 Christopher Burkett, M.S., 2018
 Yeojung Koh, M.S., 2018

Supervisor: Undergraduate Trainees (The University of Georgia)

Timothy L. Shortt	1996	Howard Hughes Summer Research Program
Robert Williams	1996	Summer Research Program for Minority Undergraduates
Ghada Hassan	1996	Summer Research Program for Minority Undergraduates
Chonte Williams	1996-97	Howard Hughes Undergraduate Research Apprentice Prog.
Felica Moody	1996-97	Howard Hughes Undergraduate Research Apprentice Prog.
April Benson	1996-97	Howard Hughes Undergraduate Research Apprentice Prog.
Diane Richardson	1997-98	Howard Hughes Undergraduate Research Apprentice Prog.
Andrea Corbin	1997-98	Howard Hughes Undergraduate Research Apprentice Prog.

Supervisor: Undergraduate Trainees (The Penn State Univ. College of Medicine)

Matthew Hui	2011	The American Heart Association – Summer Undergraduate Research Fellowship Program
Terrell Myers	2011	Introduction of a Novel Tiered Research Experience Promoting Inclusion and Diversity Summer Program

Supervisor: Medical Students Research (The Penn State Univ. College of Medicine)

Kelly Jo Doerzbacher, 1999 – 2002
 Chheany Ung, 1999 – 2002
 Nicole Osevala, 2000 – 2002
 Melissa Sharpe, 2001 – 2002
 Kim Swindell, 2001
 Daniel Mosley, 2004
 Michael Paronish, 2005
 Jordan Lichty, 2007 – 2008
 Justin Shaw, 2007-2008
 Erin Conboy, 2008
 Stephanie Chin-Sang, 2008
 Joshua Meyer, 2009
 Joelle Makon, 2009
 Alison Thompson, 2011

Supervisor: Postdoctoral Trainees

Stephen Schomer, M.D., 1992
 James Pawelczyk, Ph.D., 1993
 Dan Drury, Ph.D., 2001
 Kevin Monahan, Ph.D., 2001-2002, 2003-2005
 Thad Wilson, Ph.D., 2003
 Yuichiro Nishida, Ph.D., 2006

Student Advisee Research Awards

Timothy L. Shortt – Research Travel Award, Howard Hughes Research Program, University of Georgia, 1996.

Kathryn H. Gracey – First Place Student Research Award – Southeast Chapter of the American College of Sports Medicine, February 1997.

Edward Mahoney – Second Place Student Research Award – Southeast Chapter of the American College of Sports Medicine, January 1998.

Kelly J. Doerzbacher – First Place Student Research Award – Mid-Atlantic Chapter of the American College of Sports Medicine, November 2000.

Kevin D. Monahan – Caroline tum Suden/Frances A. Hellebrandt Professional Opportunity Award, American Physiological Society, April 2002.

Charity L. Sauder – Third Place Student Research Award – Annual Meeting of Faculty and Students, The Intercollege Graduate Degree Program in Physiology at The Pennsylvania State University, University Park and College of Medicine, University Park, PA, March 2003.

Jason R. Carter – Caroline tum Suden/Frances A. Hellebrandt Professional Opportunity Award, Proctor and Gamble Professional Opportunity Award, American Physiological Society, April 2003.

Nathan T. Kuipers – Selected Graduate Student Presentation, American Physiological Society, April 2003.

Kevin D. Monahan – Trainee Abstract Travel Award, Council on Basic Cardiovascular Sciences, American Heart Association, November 2003.

Kevin D. Monahan – Neural Control and Autonomic Regulation Research Recognition Award, American Physiological Society, April 2004.

Thad E. Wilson – Neural Control and Autonomic Regulation Research Recognition Award, American Physiological Society, April 2004.

Damian J. Dyckman – Environmental and Exercise Physiology Gravitational Physiology Predoctoral Award, American Physiological Society, April 2005.

Stephanie Chin-Sang – Medical Student Research Award, General Clinical Research Center, Penn State College of Medicine, June 2008.

Joelle Makon – Medical Student Research Award, General Clinical Research Center, Penn State College of Medicine, June 2009.

Jonathan S. Cook – NASA Pennsylvania Space Grant Fellowship Award, Penn State University, 2009-2011.

Jonathan S. Cook – Patrick G. Quinn Graduate Student Award, Department of Cellular & Molecular Physiology, Penn State College of Medicine, September 2009.

Jonathan S. Cook – Caroline tum Suden/Frances A. Hellebrandt Professional Opportunity Award, American Physiological Society, April 2010.

Jonathan S. Cook – Howard Morgan Travel Award, Department of Cellular and Molecular Physiology, Penn State College of Medicine, April 2010.

Alison E. Thompson – Medical Student Research Award, Medical Student Research Oral Presentation, Penn State College of Medicine, April 2014.

Other Professional Activities

Journal Editorial Boards

Journal of Applied Physiology, 1999 – 2007

American Journal of Physiology: Heart and Circulatory Physiology, 2002 – 2008

Journal Reviewer

American Journal of Physiology: Heart and Circulatory Physiology

Journal of Applied Physiology

American Journal of Physiology – Regulatory, Integrative and Comparative Physiology

Journal of Physiology (London)

Hypertension

Circulation

Circulation Research

Brain Research

Clinical Autonomic Research

Autonomic Neuroscience

Clinical and Experimental Hypertension

Experimental Brain Research

Journal of Vestibular Research

Medicine and Science in Sports and Exercise

American Journal of the Medical Sciences

Aviation, Space, and Environmental Medicine

Archives of Medical Research

Drugs & Aging

Bioelectromagnetics

Grant Reviewer

1998

National Aeronautics and
Space Administration

Life Sciences Division

1998-present

American College of Sports
Medicine

Research Awards Committee

1999, 2000	National Institutes of Health	National Institute of Neurological Disorders and Stroke (NSD-B)
1999	National Research Council	Twinning Program
2001, 2002, 2003	National Institutes of Health	Integrative, Functional and Cognitive Neuroscience 5 (IFCN-5)
2002	National Institutes of Health	National Heart, Lung and Blood Institute Special Emphasis Panel, ZHL1 CSR-B F1 (RFA-01-016, Innovative Research Grant Program)
2002	The Wellcome Trust, London, United Kingdom	Neurosciences Division
2003, 2007, 2008	National Sciences and Engineering Research Council of Canada (NSERC)	
2004	Canadian Space Agency	Space Life Sciences
2004	National Aeronautics and Space Administration	HHS Cardiovascular Alterations Panel – Flight grants (August)
2004	National Aeronautics and Space Administration	HHS Cardiovascular Alterations Panel – Ground base grants (Nov)
2005, 2006	National Institutes of Health	National Heart, Lung and Blood Institute Special Emphasis Panel, ZRG1 CFS-E
2008	National Institutes of Health	National Institute on Deafness and Other Communication Disorders – Research Core Center Review, ZDC1 SRB-L, Sessions 42 & 43 (Chairperson)
2008	National Institutes of Health	Center for Scientific Review Special Emphasis Panel, ZRG1 IFCN-A (Chairperson)
2009	National Institutes of Health	Center for Scientific Review Special Emphasis Panel, ZRG1 IFCN-E (04)
2010	National Institutes of Health	Center for Scientific Review Special Emphasis Panel, ZRG1 IFCN-L (03)

2010	American Heart Association	American Heart Association's Vascular Biology and Blood Pressure-Regulation – Basic Science Study Section
2011	National Institutes of Health	Center for Scientific Review Special Emphasis Panel, ZRG1 IFCN-B (05)
2011	National Institutes of Health	Center for Scientific Review Special Emphasis Panel, ZRG1 IFCN-B-02M
2016	National Aeronautics and Space Administration	Cardiovascular/VIIP (Visual Impairment and Intracranial Pressure) Panel
2018	National Aeronautics and Space Administration	HERO BPBA SANS Panel

at The University of Georgia

1997	Summer Research Program	College of Education
1997	Louis E. Kindig Research Award	School of Health and Human Performance

Activities for Scientific Societies

1992 – 1995	American College of Sports Medicine – Abstract Reviewer
1998 – 2004	American College of Sports Medicine – Research Awards Committee
2004 – 2007	American College of Sports Medicine – Chair, Research Awards Committee
2003-2006	American Physiological Society – Neural Control and Autonomic Regulation Section Steering Committee
2009-2012	American Physiological Society – Neural Control and Autonomic Regulation Section, Chair
2006-2009	American Physiological Society – Neural Control and Autonomic Regulation Section, Chair
2007-2009	American College of Sports Medicine – Research Advisory Committee
2009-present	American College of Sports Medicine – Science Integration and Leadership Committee
2010-2012	American Physiological Society – Finance Committee
2011-2015	FASEB Board of Directors – American College of Sports Medicine Representative
2011-2015	FASEB Finance Committee
2011-2015	FASEB Science Policy Committee
2011-2015	FASEB Membership Committee

External Evaluator for Promotion and Tenure

1994	Invited External Referee, Evaluation of faculty member for promotion, Allegheny-Singer Research Institute, Pittsburgh, PA
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2002	Invited External Referee, Evaluation of faculty member for promotion to Associate Professor, University of Texas Southwestern Medical Center, Dallas, TX
2002	Invited External Referee, Evaluation of faculty member for promotion to Associate Professor, Louisiana State University, Baton Rouge, LA
2005	Invited External Referee, Evaluation of faculty member for promotion and tenure to Associate Professor, University of Texas Southwestern Medical Center, Dallas, TX
2005	Invited External Referee, Evaluation of faculty member for promotion to Associate Professor, Medical of Wisconsin, Milwaukee, WI
2005	Invited Internal Referee, Evaluation of faculty member for promotion to Senior Research Associate, Pennsylvania State University College of Medicine, Hershey, PA
2006	Invited External Referee, Evaluation of faculty member for promotion to Professor, Iowa State University, Ames, IA
2008	Invited External Referee, Evaluation of faculty member for promotion to Associate Professor, Department of Health and Exercise Science, Colorado State University, Fort Collins, CO
2008	Invited External Referee, Evaluation of faculty member for promotion to Assistant Professor, Department of Critical Care, The University of Texas MD Anderson Cancer Center, Houston, TX
2017	Invited External Referee, Evaluation of faculty member for promotion to Associate Professor, Department of Kinesiology, University of Michigan, Ann Arbor, MI
2018	Invited External Referee, Evaluation of faculty member for promotion to Associate Professor, Department of Health and Human Performance, University of Houston, Houston, TX

Research Consultant

1995, 1997, 1998	National Aeronautic and Space Administration
2002	Texas A & M University
2004	Columbia University

Institutional Service

at Penn State College of Medicine

1999-2001, 2003, 2004, 2006, 2010	Graduate Student Research Forum	Evaluator
2000-present	General Clinical Research Center	Advisory Board
2001	Search Committee	Vice Dean for Research and Graduate Studies
2001	General Clinical Research Center	General Clinical Research Center

	Grant Reviewer	Incentive Grant
2001	Neuroscience Retreat	Planning team
2003	Search Committee	Chair, Department of Medicine
2003	Student Recruitment	Integrative Biosciences (IBIOS) Program
2003	General Clinical Research Center Scholarship Reviewer	Medical Student Research Program
2003	Research Team	Department of Medicine
2004-2009	Neuroscience Program Advisory Committee	College of Medicine
2004	Biomedical Sciences Seminar Series Planning Committee	College of Medicine
2005-2009	Student Recruitment	Neuroscience Program
2007-2010	Search Committee	Chief of the Division of Pulmonary, Allergy, and Critical Care Medicine
2007-2008	Promotion and Tenure Committee	Department of Medicine
2007-2008	Junior Faculty Development Program, Mentor	College of Medicine
2008-2010	Promotion and Tenure Committee	College of Medicine
2009-present	Academic Integrity Committee	College of Medicine
2009-2014	Faculty Senate	Penn State University
2010-2011	Promotion and Tenure Committee, Chair	College of Medicine
2010-2014	Cardiology Course (CAR 722), Co-director	College of Medicine
2011-2012	Admissions Requirements Task Force	College of Medicine
2011-2012	Promotion and Tenure Committee	College of Medicine
2013-2016	University Promotion and Tenure Committee	Penn State University

2013-2014	Faculty Senate Committee on Research, Chair	Penn State University
2013-2015	Faculty Advisory Committee to the President	Penn State University
2014-2015	Faculty Senate Committee on Intercollegiate Athletics, Chair	Penn State University

at The Pennsylvania State University Capital College

2003	Search Committee	Associate Dean for Research and Graduate Studies (Penn State Capital College)
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at The University of Georgia

1994-1997	Faculty Senate	College of Education
1995-1998	Institutional Review Board	The University of Georgia
1997-1998	Research Advisory Committee	College of Education

Grant Funding**Received:**

Title	Awarding Agency	Dates	Amount (Direct cost)
Effect of exercise training on sympathetic activity P.I. - C. A. Ray	Institutional Cardiovascular Research Fellowship Award Public Health Service HL07121-15	8/89-8/90	\$17,000
Effects of exercise training on sympathetic nerve activity P.I. - C. A. Ray	Research Fellowship Award American Heart Association - Iowa Affiliate	8/90-8/91	\$17,000
Effect of exercise training on sympathetic activity P.I. - C. A. Ray	National Research Service Award Public Health Service F32 HL08325	8/90-8/92	\$43,600
Cardiorespiratory fitness, blood pressure, anxiety, and autonomic activity in African-Americans with mild hypertension P.I. - R. K. Dishman Co.I. - C. A. Ray	American Heart Association - Georgia Affiliate	7/94-7/96	\$57,399
Baroreflex control of sympathetic nerve activity in blacks P.I. - C. A. Ray	The University of Georgia Research Foundation	1/95-1/96	\$4,854
Effect of isometric exercise training on sympathetic nerve activity P.I. - C. A. Ray	College of Education The University of Georgia	6/95-9/95	\$5,000
Role of Prostaglandins on Exercise-induced Sympathetic Nerve Activity P.I. - C. A. Ray	College of Education The University of Georgia	6/96-9/96	\$5,000
Effect of isometric exercise training on blood pressure and sympathetic nerve activity in mild hypertensive humans P.I. - C. A. Ray	American Heart Association - Georgia Affiliate	7/96-7/97	\$30,000

Title	Awarding Agency	Dates	Amount (Direct cost)
College of Education Joint Research/ Outreach Graduate Assistantship P.I. - C. A. Ray	College of Education The University of Georgia	9/96-6/96	\$6,600
Sarah H. Moss Fellowship P.I. - C. A. Ray	The University of Georgia	1996-1997	\$10,500
Interactive physiology software for exercise science P.I. - C. A. Ray	Office of Instructional Development The University of Georgia	1997	\$2,089
Muscle sympathetic activity to thermal stress in humans P.I. - C. A. Ray	National Institutes of Health National Institute of Arthritis and Musculoskeletal and Skin Diseases R15 AR44571	4/97-3/99	\$70,000
Vestibular control of sympathetic nerve activity in humans P.I. - C. A. Ray	College of Education The University of Georgia	6/97-8/97	\$5,000
Vestibulosympathetic reflexes in humans P.I. - C. A. Ray	National Institutes of Health National Heart, Lung, and Blood Institute R01 HL58503	4/98-3/03	\$280,000
Effect of aging on vestibular control of sympathetic nerve activity in humans P.I. - C. A. Ray	College of Education The University of Georgia	6/98-8/98	\$5,000
Effect of head movements on sympathetic nerve activity in humans: Role of the vestibular system P.I. - C. A. Ray	National Aeronautics and Space Administration Life Sciences Division NAG 9-1034	8/98-7/01	\$155,843
Vestibular regulation of blood pressure and sympathetic nerve activity in humans: effect of aging and vestibular deficiency P.I. - C. A. Ray	Dean's Feasibility Grant The Pennsylvania State University College of Medicine	7/99-6/00	\$25,000

Title	Awarding Agency	Dates	Amount (Direct cost)
Effect of age on the vestibulosympathetic reflex in humans P.I. - C. A. Ray	American Heart Association Established Investigator Grant 0140035N	1/01-12/04	\$300,000
Influences of age on vestibular sympathetic reflexes P.I. - K. D. Monahan Supervisor – C. A. Ray	National Institutes of Health National Heart, Lung, and Blood Institute National Research Service Award F32 HL67624	4/01-4/04	\$93,288
Effect of simulated microgravity on the vestibulosympathetic reflex in humans P.I. - C. A. Ray	National Space Biomedical Research Institute CA00207	5/01-8/04	\$450,000
Effect of aging on the vestibulosympathetic reflex in humans P.I. - C. A. Ray	American Heart Association – Pennsylvania & Delaware Affiliate Funded but returned	7/01-6/03	\$100,000
Interactive effects of cardiovascular and vestibular reflexes Effect of age on the vestibulosympathetic reflexes P.I. - D. G. Kirch Co.I. – C. A. Ray	National Institutes of Health General Clinical Research Center M01-RR10732	12/01-11/04	\$11,601,962
Integrative autonomic neuroscience P.I. - C. A. Ray	Pennsylvania Tobacco Settlement Formula Funded Research Program	6/02-6/04	\$199,288
Vestibulosympathetic reflexes in humans P.I. - C. A. Ray	National Institutes of Health National Institute of Deaf and Communication Disorder R01 DC006459 (Continuation of HL58503)	4/03-3/07	\$546,000
Ultrasonic bone stimulation: countermeasure to orthostatic intolerance P.I. - C. A. Ray	National Space Biomedical Research Institute CA00404	7/04-6/08	\$800,000

Title	Awarding Agency	Dates	Amount (Direct cost)
Efficacy of isometric handgrip training to reduce arterial blood pressure in older adults with “high normal” blood Pressure P.I. – K. D. Monahan Co-P.I. – C. A. Ray (min)	Dean’s Feasibility Grant The Pennsylvania State University College of Medicine	7/05-6/07	\$30,000
Sympathetic and cardiopulmonary regulation by vestibular reflexes P.I. – C. A. Ray Project 4	National Institutes of Health National Heart, Lung, and Blood Institute PPG - Autonomic neurovascular regulation P01 HL077670	7/04-6/10 1 yr no cost extension	\$1,171,515
Neurovascular control during exercise stress P.I. – L. I. Sinoway Co-P.I. – C. A. Ray (5%) Project 1	National Institutes of Health National Heart, Lung, and Blood Institute PPG - Autonomic neurovascular regulation P01 HL077670	7/04-6/10 1 yr no cost extension	\$1,200,331
Limb neurovascular control and aging P.I. – K. D. Monahan Mentor - C. A. Ray	National Institutes of Health K01 Award	7/06-6/11	\$498,187
Autonomic reflex control of renal hemodynamics in heart failure: Influence of exercise training P.I. – A. Momen Co-P.I. – C. A. Ray	American Heart Association – Scientist Development Grant	7/1/07-6/30/11	\$260,000
Effect of melatonin on the vestibulosympathetic reflex in humans Jonathan S. Cook, Ph.D. student Mentor: C. A. Ray	NASA Pennsylvania Space Grant Fellowship	9/09-9/11	\$10,000

Title	Awarding Agency	Dates	Amount (Direct cost)
Social networking for activity promotion with cell phones (SNAP-C) P.I. – L. S. Rovniak and J. L. Kraschnewski Co-P.I. – C. A. Ray	Collaborative Dean's Feasibility Grant	7/1/10-6/30/11	\$62,040
Clinical and Neuroendocrine Benefits of Exercise in Treatment Resistant Depression (TRD) P.I. – R. Singareddy Co-P.I. – C. A. Ray	Penn State Social Science Research Institute	2/1/11-1/31/12	\$20,140
Intermittent hypoxia: a model to study circulatory control in humans P.I. – U. A. Luenberger Co-P.I. – C. A. Ray (5%)	National Institutes of Health National Heart, Lung, and Blood Institute R01 HL098379	8/1/10-6/30/14 1 yr no cost extension	\$300,000
Vestibular Contributions to Orthostasis P.I. – C. A. Ray (25%)	National Institutes of Health National Heart, Lung, and Blood Institute R21 HL109952	4/1/12-3/31/15 1 yr no cost extension	\$275,000
The Effect of Transdermal CO2 Diffusion on Sympathetic Nerve Activity and Vascular Responses in Humans P.I. – C. A. Ray (30%)	InvisiDerm	1/1/2014-12/31/15	\$104,094

Future Grants Submissions:

Title	Awarding Agency	Dates	Amount (Direct cost)
Impact of Physical Activity on the Vestibulosympathetic Reflex P.I. – C. A. Ray (25%)	National Institutes of Health R21		\$275,000
Innovative Therapy for the Treatment of Orthostatic Hypotension in Humans P.I. – C. A. Ray (14%)	American Heart Association 15IRG21700000		\$150,000
Vestibular Contributions to Orthostasis P.I. – C. A. Ray (50%)	National Institutes of Health R01DC014499		\$1,457,721

Scholarly Activities

A. Publications

Chapters in Books

1. **RAY, C. A.**, and A. L. Mark. Sympathetic adjustments to exercise in humans: Insights from microneurographic recordings. In: *Cardiovascular Reflex Control in Health and Disease* (R. Hainsworth and A. L. Mark, Eds.) Saunders: London. pp. 137-164, 1993.
2. Secher, N. H., and **C. A. RAY**. Heart reflexes in adjustment to dynamic exercise. In: *International Society of Heart Research XV European Section Meeting* (S. Haunsø and K. Kjeldsen, Eds). Monduzzi Editore: Bologna, Italy. pp. 189-197, 1994.
3. **RAY, C. A.**, and M. Saito. The cardiopulmonary baroreflexes. In: *Exercise and the Circulation in Health and Disease*. (B. Saltin, N. H. Secher, J. H. Mitchell, R. Boushel, Eds). Human Kinetics, Champaign, Ill. pp. 43-51, 1999.
4. Levine, B. D., J. A. Pawelczyk, J. H. Zuckerman, R. Zhang, Q. Fu, K. Iwasaki, **C. A. Ray**, and C. G. Blomqvist. Neural Control of the Cardiovascular System in Space. In: *The Neurolab Spacelab Mission: Neuroscience Research in Space: Results from the STS-90, Neurolab Spacelab Mission*. (J. C. Buckey and J. L. Homick, Eds). Lyndon B. Johnson Space Center, Houston, TX. pp. 175-185, 2003.

Journal Articles, refereed

1. Millard-Stafford, M. L., K. J. Cureton, and **C. A. RAY**. Effect of glucose polymer diet supplement on responses to prolonged successive swimming, cycling, and running. *European Journal of Applied Physiology* 58:327-333, 1988.
2. Collins, M. A., K. J. Cureton, D. W. Hill, and **C. A. RAY**. Relation of plasma volume change to intensity of weight lifting. *Medicine and Science in Sports and Exercise* 21:178-185, 1989.
3. Warren, G. L., K. J. Cureton, J. W. Gilliam, D. R. Dengel, R. E. Graham, and **C. A. RAY**. Is the gender difference in peak VO_2 greater for arm exercise than leg exercise? *European Journal of Applied Physiology* 60:149-154, 1990.
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Manuscripts Submitted or Ready to Submit

1. Newcomer, S. C. L. Sauder, M. L. Kearney, D. Sitar, J. Bell, M. H. Laughlin, and **C. A. RAY**. Oscillatory shear is not changed in human brachial and superficial femoral arteries after eight weeks of endurance exercise training.
2. Kuipers, N. T., and **C. A. RAY**. Endurance training augments the sensitivity of the vestibulorespiratory reflex.
3. **RAY, C. A.** Comparison of the vestibulosympathetic reflex during dynamic and static head-down rotations.

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124. Hess, K. L., T. E. Wilson, Z. Gao, C. L. Sauder, **C. A. RAY**, and K. D. Monahan. Mild skin surface cooling does not increase arterial stiffness in humans. *The FASEB Journal* 23:788.10, 2009

125. Monahan, K. D., C. L. Sauder, and **C. A. RAY**. Effect of aging on arm and leg muscle sympathetic nerve activity in humans. *The FASEB Journal* 23: 786.2, 2009.
126. Wilson, T. E., K. D. Monahan, M. Kearney, A. Fogelman, C. L. Sauder, and **C. A. RAY**. Aerobic exercise training increases maximal in vivo cholinergic responsiveness but not sensitivity of eccrine sweat glands. *The FASEB Journal* 23: 788.8, 2009.
127. Hess, K. L., T. E. Wilson, **C. A. RAY**, and K. D. Monahan. Aging augments pressor responses to mild skin surface cooling in humans. *Medicine and Science in Sports and Exercise* 41:S223, 2009.
128. **RAY, C. A.**, and J. R. Carter. Effects of aerobic exercise training on sympathetic and renal responses to mental stress in humans. *Clinical Autonomic Research* 19:286, 2009.
129. Cook, J. S., and **C. A. RAY**. Melatonin attenuates the vestibulosympathetic reflex in humans. *Clinical Autonomic Research* 19:303, 2009.
130. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Effect of melatonin on the vestibulocollic reflex in humans. *The FASEB Journal* 24: 1020.1, 2010.
131. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Evidence of a circadian rhythm for muscle sympathetic nerve activity in humans. *The FASEB Journal* 24: 802.1, 2010.
132. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Is there diurnal variation with the vestibulosympathetic reflex? *The FASEB Journal* 24: 616.5, 2010.
133. **RAY, C. A.**, C. L. Sauder, and J. S. Cook. Muscle sympathetic nerve activity responses to plantar flexion in humans. *Medicine and Science in Sports and Exercise* 42:31, 2010.
134. Chin-Sang, S. A., H. Kemp, A. Morgan, C. L. Sauder, and **C. A. RAY**. Methodological issues related to blood flow measurements in obese subjects. *Medicine and Science in Sports and Exercise* 42:125-126, 2010.
135. Cook, J. S., C. L. Sauder, and **C. A. RAY**. Melatonin differentially affects vascular blood flow in humans. *Clinical Autonomic Research* 20:317, 2010.
136. **RAY, C. A.**, and C. L. Sauder. Endurance training reduces renal blood flow at rest in humans. *The FASEB Journal* 25:1057.2, 2011.
137. **RAY, C. A.** and C. L. Sauder. Vestibular-mediated sympathetic outflow and renal vasoconstriction is attenuated after endurance training. *Aviation, Space, and Environmental Medicine* 82:340, 2011.
138. Sauder, C. L., A. E. Thompson, T. Myers, and **C. A. RAY**. Effect of mental stress on coronary blood flow in humans. *The FASEB Journal* 26:1055.6, 2012.

139. **RAY, C. A.**, E. Conboy, and C. L. Sauder. Effect of endurance training on splanchnic circulation during head-up tilt. *The Integrative Biology of Exercise VI Meeting Program* 19.6, 2012.
140. **RAY, C. A.**, C. L. Sauder, and M. D. Muller. Melatonin does not alter skin sympathetic nerve response to mental stress. *Clinical Autonomic Research* 22:242, 2012.
141. **RAY, C. A.**, C. L. Sauder, and M. D. Muller. Mental stress elicits sustained and reproducible increases in skin sympathetic nerve activity. *The FASEB Journal* 27:1117.6, 2013.
142. **RAY, C. A.** and C. L. Sauder. Stimulation of the otolith organs by ultrasonic bone stimulation of the mastoid increased muscle sympathetic nerve activity in humans. *IUPS Abstract Book* 368, 2013.
143. **RAY, C. A.** Vestibulosympathetic reflexes in humans: Contributions to orthostasis. *ARO Abstracts* 37:122, 2014.
144. **RAY, C. A.**, C. L. Sauder, and D. J. Dyckman. Ultrasonic bone stimulation increases orthostatic tolerance after 24 hours of bed rest. *The FASEB Journal* 28:1171.6, 2014.
145. **RAY, C. A.**, C. L. Sauder, and N. T. Kuipers. Effects of short-term endurance training on the vestibulorespiratory reflex in humans. *Medicine and Science in Sports and Exercise* 46:407, 2014.
146. **RAY, C. A.**, H. E. Ray, and C. L. Sauder. Neurovascular responses to mental stress in aging humans. *Clinical Autonomic Research* 24:214, 2014.
147. **RAY, C. A.** Comparison of the Vestibulosympathetic Reflex During Dynamic and Static Head-Down Rotations. *Abstracts of the Association for Research in Otolaryngology* 38:248, 2015.
148. **RAY, C. A.**, S. Park, and C. L. Sauder. Effect of ultrasonic bone stimulation of the mastoid on renal and coronary blood flow in humans. *The FASEB Journal* 29:649.3, 2015.
149. **Ray, C. A.** Vestibulo-sympathetic reflexes in humans: Evidence from natural stimulation and its impact on orthostasis. *Autonomic Neuroscience: Basic and Clinical* 192:42, 2015.

B. Scientific Presentations

International

1. **RAY, C. A.**, and A. L. Mark. Autonomic adjustments to exercise in humans: Insights from microneurographic recordings. *International Congress of Physiological Sciences*, Glasgow, Scotland, August, 1993. (Symposium)

2. **RAY, C. A.** The effect of cardiopulmonary baroreflexes on muscle sympathetic nerve activity during exercise. Meeting on the centennial of the study of neural control of cardiovascular responses to exercise, *Danish Academy of Sciences*, Copenhagen, Denmark, October, 1995. (Symposium)
3. **RAY, C. A.**, Sympathetic nerve responses to vestibular stimulation via head movements in humans. *Control of Autonomic Function During Action*, Opio, France, September, 1999. (Symposium)
4. **RAY, C. A.** Vestibulosympathetic reflex in humans. Satellite Symposium, International Union of Physiological Societies. The Sympathetic Nervous System in Disease, Christchurch, New Zealand, August 2001. (Symposium)
5. **RAY, C. A.** Vestibulosympathetic reflex in humans. Sympathetic neural mechanisms in cardiovascular control: a tribute to Gunnar Wallin. Satellite Symposium of Hypertension Prague 2002: The 19th Scientific Meeting of the International Society of Hypertension and the 12th European Meeting on Hypertension. Goteborg University, Goteborg, Sweden, June 2002. (Symposium)
6. **RAY, C. A.** Effect of aging on vestibular regulation of sympathetic and respiratory responses. Barany Society XXIII International Congress, College de France, Paris, France, July 2004. (Symposium).
7. Sauder, C. L., Y. Nishida, D. J. Dyckman, M. L. Kearney, N. T. Kuipers, and **C. A. RAY**. Acute hyperthyroidism does not alter sympathetic responses during baroreceptor unloading in humans. Second Joint Meeting of the European Federation of Autonomic Societies & the American Autonomic Society. Palais Ferstel, Vienna, Austria, October 2007.
8. **RAY, C. A.** Vestibulosympathetic reflex in humans: Factors that modulate the reflex. The 21st Annual Meeting of Japan Microneurography Society. Tokyo, Japan, June 2008.
9. **RAY, C. A.** and C. L. Sauder. Stimulation of the otolith organs by ultrasonic bone stimulation of the mastoid increased muscle sympathetic nerve activity in humans. International Congress of Physiological Societies. Birmingham, UK, July 2013.
10. **RAY, C. A.** Vestibulo-sympathetic reflexes in humans: Evidence from natural stimulation and its impact on orthostasis. International Society for Autonomic Neuroscience. Stresa, Italy, September 2015.

National

1. **RAY, C. A.** Overview of the University of Georgia Adult Fitness and Cardiac Rehabilitation Program. Annual meeting of the *Southeast Chapter of the American Fitness in Business*, Gatlinburg, TN, January, 1984.
2. Millard, M., K. Cureton, J. Farris, and **C. RAY**. Maximum physiological responses to triathletes during cycle ergometer and treadmill exercise. Annual meeting of the

- Southeast Chapter of the American College of Sports Medicine*, Boone, NC, February, 1985.
3. Collins, M. A., K. J. Cureton, D. W. Hill, and **C. A. RAY**. Relation of plasma volume change to intensity of weight lifting. Annual meeting of the *American College of Sports Medicine*, Nashville, TN, May, 1985.
 4. Collins, M. A., D. W. Hill, K. J. Cureton, and **C. A. RAY**. Oxygen uptake/heart rate relationship during weight lifting. Annual meeting of the *Canadian Association of Sports Sciences*, Quebec City, Quebec, Canada, October, 1985.
 5. Collins, M. A., K. J. Cureton, D. W. Hill, and **C. A. RAY**. Relation of metabolic and cardiorespiratory responses to intensity of weight lifting. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Athens, GA, February, 1986.
 6. Millard, M., K. Cureton, and **C. RAY**. Effect of glucose-polymer dietary supplement on physiological responses during a simulated triathlon. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, May, 1986.
 7. **RAY, C. A.**, K. J. Cureton, J. J. DeMello, H. P. DuVal, and M. A. Collins. 2,3-Diphosphoglycerate response to submaximal and maximal exercise in trained and untrained men and women. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Winston-Salem, NC, January, 1988.
 8. Norton, K. I., D. A. Hayes, M. T. Jones, **C. A. RAY**, and R. B. Armstrong. Oxygen consumption as a function of laddermill climbing speed in rats. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Winston-Salem, NC, January, 1988.
 9. Warren, G., K. Cureton, J. Wyllie, D. Dengel, R. Graham, and **C. RAY**. Is the sex difference in peak Vo_2 greater for arm exercise than leg exercise? Annual meeting of the *American College of Sports Medicine*, Dallas, TX, May, 1988.
 10. Jones, M. T., K. I. Norton, **C. A. RAY**, and R. B. Armstrong. Rat hemodynamics during laddermill climbing. Annual meeting of the *American College of Sports Medicine*, Dallas, TX, May, 1988.
 11. Prusaczyk, W. K., K. J. Cureton, R. E. Graham, J. S. Gilliam, and **C. A. RAY**. Effects of substrate utilization on RPE at the lactate and ventilatory thresholds. Annual meeting of the *American College of Sports Medicine*, Dallas, TX, May, 1988.
 12. **RAY, C. A.**, M. D. Delp, D. K. Hartle, and H. P. DuVal. Atrial natriuretic peptide response to graded supine and upright cycle exercise. Annual meeting of the *Georgia Affiliate of the American Heart Association*, Athens, GA, August, 1988.
 13. **RAY, C. A.**, M. D. Delp, D. K. Hartle, and H. P. DuVal. Atrial natriuretic peptide response to graded supine and upright cycle exercise. Annual meeting of the *American Physiological Society*, Montreal, Canada, October, 1988.

14. Jones, M. T., K. I. Norton, **C. A. RAY**, and R. B. Armstrong. Rat hemodynamics during laddermill climbing. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Atlanta, GA, January, 1989.
15. Prusaczyk, W. K., K. J. Cureton, R. E. Graham, J. S. Gilliam, and **C. A. RAY**. Effects of carbohydrate intake on lactate and ventilatory threshold. Annual meeting of the *Federation of American Societies of Experimental Biology*, New Orleans, LA, April, 1989.
16. Cureton, K. J., G. Warren, J. Gilliam, D. Dengel, R. Graham, and **C. A. RAY**. Ratings of perceived exertion, hyperventilation and blood lactate during arm and leg exercise. Annual meeting of the *American College of Sports Medicine*, Baltimore, MD, May, 1989.
17. **RAY, C. A.**, K. J. Cureton, and H. G. Ouzts. Postural specificity of cardiovascular adaptations to supine exercise training. Annual meeting of the *Georgia Affiliate of the American Heart Association*, Athens, GA, August, 1989.
18. Warren, G., K. Cureton, W. Middendorf, **C. RAY**, and J. Warren. Validity and reliability of pulse oximetry in highly-trained athletes. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Columbia, SC, February, 1990.
19. Cureton, K., G. Warren, W. Middendorf, **C. RAY**, and J. Warren. Lung diffusing capacity in highly trained endurance athletes. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Columbia, SC, February, 1990.
20. Middendorf, W., G. Warren, K. Cureton, **C. RAY**, and J. Warren. Incidence of exercise induced hypoxemia in male and female athletes. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Columbia, SC, February, 1990.
21. **RAY, C. A.**, R. F. Rea, M. Clary, and A. L. Mark. Contralateral rhythmic handgrip attenuates sympathoexcitation secondary to the muscle metaboreflex. Annual meeting of the *Federation of American Societies of Experimental Biology*, Washington, D.C., April, 1990.
22. **RAY, C. A.**, K. J. Cureton, and H. G. Ouzts. Postural specificity of cardiovascular adaptations to supine and upright exercise training. Annual meeting of the *American College of Sports Medicine*, Salt Lake City, UT, May, 1990.
23. Warren, G., K. Cureton, W. Middendorf, **C. RAY**, and J. Warren. The role of diffusion limitation in exercise-induced hypoxemia. Annual meeting of the *American College of Sports Medicine*, Salt Lake City, UT, May, 1990.
24. **RAY, C. A.**, R. F. Rea, M. P. Clary, and A. L. Mark. Static and dynamic leg exercise decreases muscle sympathetic nerve activity. Annual meeting of the *American Heart Association*, Dallas, TX, November, 1990.

25. **RAY, C. A.**, R. F. Rea, M. P. Clary, and A. L. Mark. Contrasting responses of arm and leg muscle sympathetic nerve activity to static leg exercise and postexercise circulatory arrest. Annual meeting of the *Federation of American Societies of Experimental Biology*, Atlanta, GA, April, 1991.
26. **RAY, C. A.**, R. F. Rea, M. P. Clary, and A. L. Mark. Regulation of sympathetic nerve activity by the cardiopulmonary baroreflex during dynamic leg exercise. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, May, 1991.
27. Morgan, D. A., T. W. Balon, **C. A. RAY**, and A. L. Mark. Pressor responses to insulin depend on an interaction with insulin resistance and hypertension. Annual Fall Conference and Scientific Sessions of the *Council of High Blood Pressure Research of the American Heart Association*, Chicago, IL, September, 1991.
28. Morgan, D. A., T. W. Balon, **C. A. RAY**, and A. L. Mark. Pressor responses to insulin depend on an interaction with insulin resistance and hypertension. Annual Midwest meeting of the *American Federation for Clinical Research*, Chicago, IL, November, 1991.
29. **RAY, C. A.**, M. P. Clary, and A. L. Mark. Sympathetic nerve responses to static handgrip and static leg exercise at the same relative intensity in the sitting position. Annual meeting of the *American Heart Association*, Anaheim, CA, November, 1991.
30. **RAY, C. A.**, N. H. Secher, and A. L. Mark. Engagement of the arterial baroreflex and central command do not modulate sympathetic nerve activity during the isolated activation of the muscle metaboreflex. Annual meeting of the *American Heart Association*, Anaheim, CA, November, 1991.
31. **RAY, C. A.**, and A. L. Mark. Muscle sympathetic nerve activity to the active and nonactive limb during static exercise. Annual meeting of the *Federation of American Societies of Experimental Biology*, Anaheim, CA, April, 1992.
32. Morgan, D. A., A. L. Mark, T. W. Balon, and **C. A. RAY**. High fat diet evokes increases in sympathetic nerve responses to insulin in rats. Annual meeting of the *Federation of American Societies of Experimental Biology*, Anaheim, CA, April, 1992.
33. **RAY, C. A.** Prolonged leg exercise fails to increase muscle sympathetic nerve activity. Annual meeting of the *American College of Sports Medicine*, Dallas, TX, May, 1992.
34. **RAY, C. A.**, D. A. Morgan, T. W. Balon, and A. L. Mark. Obese, insulin resistant Zucker rats have augmented sympathetic responses to insulin. Annual Fall Conference and Scientific Sessions of the *Council of High Blood Pressure Research of the American Heart Association*, Cleveland, OH, September, 1992.
35. Morgan, D. A., **C. A. RAY**, T. W. Balon, and A. L. Mark. Metformin increases insulin sensitivity and lowers arterial pressure in spontaneously hypertensive rats. Annual Fall Conference and Scientific Sessions of the *Council of High Blood Pressure Research of the American Heart Association*, Cleveland, OH, September, 1992.

36. **RAY, C. A.**, W. M. Pace, and M. P. Clary. Sympathetic and cardiovascular adaptations to dynamic one-legged exercise training. *American Physiological Society Fall Conference*, Colorado Springs, CO, September, 1992.
37. Morgan, D. A., **C. A. RAY**, T. W. Balon, and A. L. Mark. Metformin increases insulin sensitivity and lowers arterial pressure in spontaneously hypertensive rats. Annual Midwest meeting of the *American Federation for Clinical Research*, Chicago, IL, November, 1992.
38. **RAY, C. A.**, and A. L. Mark. Withdrawal of muscle sympathetic nerve activity during graded two-legged cycling. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1993)*, New Orleans, LA, March, 1993.
39. **RAY, C. A.**, and A. L. Mark. Fatiguing isometric leg exercise increases muscle sympathetic nerve activity. Annual meeting of the *American College of Sports Medicine*, Seattle, WA, June, 1993.
40. **RAY, C. A.**, and A. L. Mark. Static leg exercise augments skin sympathetic nerve activity but does not produce skin vasoconstriction. Annual meeting of the *American Heart Association*, Atlanta, GA, November, 1993.
41. Rossen, J. D., **C. A. RAY**, and A. L. Mark. Mechanisms of reflex renal vasoconstriction during static exercise in humans. Annual meeting of the *American Heart Association*, Atlanta, GA, November, 1993.
42. **RAY, C. A.** Autonomic adjustments to exercise in humans: Insights from microneurographic recordings. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Greensboro, NC, January, 1994. (Tutorial)
43. **RAY, C. A.**, and J. A. Pawelczyk. Endogenous opiates do not modulate cardiovascular and autonomic responses to static exercise. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, June, 1994.
44. Rossen, J. D., **C. A. RAY**, and A. L. Mark. Mechanisms of reflex renal vasoconstriction during static exercise in humans. Annual Midwest meeting of the *American Federation of Clinical Research*, Chicago, IL, September, 1994.
45. **RAY, C. A.**, G. A. Hill, and E. A. Anderson. Morphine alters forearm vascular responses to isometric handgrip in humans. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Lexington, KY, February, 1995.
46. Carrasco, D. I., and **C. A. RAY**. Effect of mode of muscle contraction on sympathetic nerve activity. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Lexington, KY, February, 1995.
47. **RAY, C. A.**, G. A. Hill, and E. A. Anderson. Morphine does not alter muscle sympathetic nerve response to brief submaximal isometric handgrip in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1995)*, Atlanta, GA, April, 1995.

48. Carrasco, D. I., and **RAY, C. A.** Muscle sympathetic nerve activity is greater during submaximal concentric than eccentric muscle contractions. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1995)*, Atlanta, GA, April, 1995.
49. **RAY, C. A.** Naloxone augments muscle sympathetic nerve activity during fatiguing isometric handgrip. Annual meeting of the *American College of Sports Medicine*, Minneapolis, MN, May, 1995.
50. Carrasco, D. I., and **C. A. RAY.** Muscle sympathetic nerve activity during fatiguing concentric and eccentric muscle contractions. Annual meeting of the *American College of Sports Medicine*, Minneapolis, MN, May, 1995.
51. Carrasco, D. I., A. N. Martin, and **C. A. RAY.** The effect of isometric exercise training on resting muscle sympathetic nerve activity in humans. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Chattanooga, TN, February, 1996.
52. Martin, A. N., D. I. Carrasco, and **C. A. RAY.** Interaction of direct versus proximal muscle compression on sympathetic nerve activity during muscle ischemia. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Chattanooga, TN, February, 1996.
53. **RAY, C. A.** Effect of posture on muscle sympathetic nerve activity during isometric leg exercise. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1996)*, Washington, D.C., April, 1996.
54. **RAY, C. A.** Sympathetic efferent responses to exercise. Annual meeting of the *American College of Sports Medicine*, Cincinnati, OH, May, 1996. (Symposium)
55. **RAY, C. A.** Sympathetic adaptations to training. Annual meeting of the *American College of Sports Medicine*, Cincinnati, OH, May, 1996. (Symposium)
56. Martin, A. N., D. I. Carrasco, and **C. A. RAY.** The effect of muscle compression during posthandgrip muscle ischemia on muscle sympathetic nerve activity. Annual meeting of the *American College of Sports Medicine*, Cincinnati, OH, May, 1996.
57. Shortt, T. L., and **C. A. RAY.** Sympathetic and vascular responses to head-down neck flexion in humans. American Physiological Society/American College of Sports Medicine 1996 Intersociety Conference: *The Integrative Biology of Exercise*, Vancouver, B.C., October, 1996.
58. **RAY, C. A.,** D. I. Carrasco, and A. N. Martin. Effects of isometric training on blood pressure and muscle sympathetic nerve activity. American Physiological Society/American College of Sports Medicine 1996 Intersociety Conference: *The Integrative Biology of Exercise*, Vancouver, B.C., October, 1996.

59. **RAY, C. A.**, A. N. Martin, and D. I. Carrasco. Sympathetic and vascular responses in blacks and whites during lower body negative pressure. Annual meeting of the *American Heart Association*, New Orleans, LA, November, 1996.
60. Gracey, K. H., and **C. A. RAY**. Heat sensitizes skeletal muscle afferents during ischemic exercise in humans. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Atlanta, GA, February, 1997. (Student Research Award Winner – First Place)
61. Mahoney, E. T., K. M. Hume, K. H. Gracey, and **C. A. RAY**. Forearm vascular resistance is augmented during isometric knee extension following muscle damage. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Atlanta, GA, February, 1997.
62. **RAY, C. A.**, K. M. Hume, K. H. Gracey, E. T. Mahoney, and T. L. Shortt. Vestibular activation elicits differential sympathetic outflow in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1997)*, New Orleans, LA, April, 1997.
63. Gracey, K. H., and **C. A. RAY**. Heat sensitizes skeletal muscle afferents during ischemic exercise in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1997)*, New Orleans, LA, April, 1997.
64. Hume, K. M., E. T. Mahoney, K. H. Gracey, and **C. A. RAY**. Muscle damage augments forearm vascular resistance during isometric knee extension. Annual meeting of the *American College of Sports Medicine*, Denver, CO, May, 1997.
65. **RAY, C. A.**, and G. A. Dudley. Muscle use during dynamic knee extension: Implication for meeting the demand of aerobic exercise. Annual meeting of the *American College of Sports Medicine*, Denver, CO, May, 1997.
66. **RAY, C. A.** Vestibulosympathetic reflexes in humans. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Sandestin, FL, January, 1998. (Symposium)
67. Mahoney, E. T., K. M. Hume, and **C. A. RAY**. Reactive hyperemia is attenuated following exercise-induced muscle damage. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Sandestin, FL, January, 1998. (Student Research Award Winner – Second Place)
68. Steele, S. L., K. M. Hume, E. T. Mahoney, and **C. A. RAY**. Muscle sympathetic nerve activity increases with graded neck exercise. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Sandestin, FL, January, 1998.
69. Hume, K. M., and **C. A. RAY**. Neck afferents and the muscle sympathetic nerve activity: Implications for the vestibulosympathetic reflex. Annual meeting of the *Southeast Chapter of the American College of Sports Medicine*, Sandestin, FL, January, 1998.

70. **RAY, C. A.**, K. M. Hume, and S. L. Steele. Dynamic yaw head rotation does not elicit changes in sympathetic nerve activity. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1998)*, San Francisco, April, 1998.
71. Hume, K. M., S. L. Steele, E. T. Mahoney, and **C. A. RAY**. Muscle sympathetic nerve activity during prolonged head-down neck flexion. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1998)*, San Francisco, April, 1998.
72. Schrage, W. G., **C. A. RAY**, S. A. Friskey, E. M. Hasser, and M. H. Laughlin. Decreased physical activity blunts acetylcholine-induced increases in rat skeletal muscle blood flow. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, June 1998.
73. **RAY, C. A.**, W. G., Schrage, S. A. Friskey, J. L. Jasperse, E. M. Hasser, and M. H. Laughlin. Endurance training fails to increase acetylcholine-induced vasodilation in rat skeletal muscle. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, June, 1998.
74. Steele, S. L., K. M. Hume, and **C. A. RAY**. Comparisons of sympathetic nerve responses to graded neck and forearm isometric exercise. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, June, 1998.
75. Hume, K. M., E. T. Mahoney, and **C. A. RAY**. Calf reactive hyperemia is attenuated following exercise-induced muscle soreness. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, June, 1998.
76. Crabbe, J. B., E. M. Jackson, **C. A. RAY**, H.P. DuVal, and R. K. Dishman. Cardiovascular responses to mental arithmetic in African-American women with hypertension. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, June, 1998.
77. **RAY, C. A.**, and K. M. Hume. Interaction of the vestibular and cardiopulmonary reflexes on sympathetic nerve outflow in humans. Annual meeting of the *American Heart Association*, Dallas, TX, November, 1998.
78. Hume, K. H., and **C. A. RAY**. Effect of head-down neck extension on muscle sympathetic nerve activity: implications for the vestibulosympathetic reflex. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1999)*, Washington, D.C., April, 1999.
79. Hume, K. H., and **C. A. RAY**. Influence of gender on muscle sympathetic nerve activity during head-down neck flexion. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 1999)*, Washington, D.C., April, 1999.
80. **RAY, C. A.**, and K. M. Hume. Interaction of the vestibular and exercise pressor reflexes on muscle sympathetic nerve activity. Annual meeting of the *Federation of American*

- Societies of Experimental Biology (Experimental Biology 1999)*, Washington, D.C., April, 1999. (Invited)
81. **RAY, C. A.**, E. T. Mahoney, and K. M. Hume. Effect of forearm muscle injury on exercising forearm blood flow. Annual meeting of the *American College of Sports Medicine*, Seattle, WA, June, 1999.
 82. Schrage, W. G., **C. A. RAY**, S. A. Friskey, E. M. Hasser, and M. H. Laughlin. Acetylcholine-induced vasodilation in skeletal muscle from interval sprint trained rats. Annual meeting of the *American College of Sports Medicine*, Seattle, WA, June, 1999.
 83. **RAY, C. A.** Melatonin attenuates sympathetic nerve responses to orthostatic stress in humans. Annual meeting of the *American Heart Association*, Atlanta, GA, November, 1999.
 84. Wilkerson, M. K., P. C. Collieran, M. D. Delp, and **C. A. RAY**. Temperature induces alterations in rat aortic responsiveness. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2000)*, San Diego, CA, April, 2000.
 85. Doerzbacher, K. J., and **C. A. RAY**. Inhibition of the cyclooxygenase pathway does not alter muscle sympathetic nerve activity during exercise. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, June, 2000.
 86. Cook, D. B., P. J. O'Connor, and **C. A. RAY**. The effects of an opioid agonist and antagonist on muscle pain and sympathetic nerve activity during and after forearm exercise. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, June, 2000.
 87. Jackson, E. M., Y. Nakamura, **C. A. RAY**, and R. K. Dishman. Fitness is related to increased MSNA & vascular resistance during psychomotor challenge. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, June, 2000.
 88. Lott, M. E. J., N. P. Dahl, A. C. Ertl, and **C. A. RAY**. Muscle sympathetic nerve responses to exercise-induced muscle soreness. American Physiological Society/American College of Sports Medicine 2000 Intersociety Conference: *The Integrative Biology of Exercise*, Portland, ME, September, 2000.
 89. Dahl, N. P., A. C. Ertl, and **C. A. RAY**. Central modulation of exercise-induced muscle pain. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Lake Harmony, PA, November, 2000.
 90. Ertl, A. C., N. P. Dahl, and **C. A. RAY**. Interaction of muscle temperature and blood flow on muscle sympathetic outflow during rhythmic handgrip. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Lake Harmony, PA, November, 2000.
 91. Doerzbacher, K. J., and **C. A. RAY**. Muscle sympathetic nerve responses to physiological changes in prostaglandin production during exercise. Annual meeting of

- the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Lake Harmony, PA, November, 2000. (Student Research Award Winner – First Place)
92. **RAY, C. A.** The vestibulosympathetic reflex in humans: Neural interactions with cardiovascular reflexes. *Bioastronautics Investigators' Workshop*, Universities Space Research Association, Galveston, TX, January, 2001. (Invited)
 93. **RAY, C. A.** Interactive effect of hypoxia and otolithic stimulation on cardiovascular regulation. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2001)*, Orlando, FL, April, 2001. (Invited)
 94. Ertl, A. C., N. P. Dahl, and **C. A. RAY**. Interaction between muscle temperature and blood flow on muscle sympathetic outflow during forearm exercise. Annual meeting of the *American College of Sports Medicine*, Baltimore, MD, June, 2001.
 95. Dahl, N. P., A. C. Ertl, and **C. A. RAY**. Central modulation of exercise-induced muscle pain. Annual meeting of the *American College of Sports Medicine*, Baltimore, MD, June, 2001.
 96. Miller, T., M. Vasques, M. Wilkerson, **C. A. RAY**, R. Grindeland, and M. D. Delp. Effects of actual and simulated microgravity on cardiac mass and function in the rat. Annual meeting of the *American College of Sports Medicine*, Baltimore, MD, June, 2001.
 97. Sharpe, M. K., K. D. Monahan, D. Drury, A. C. Ertl, and **C. A. RAY**. Vestibular activation alters respiration in humans. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Bushkill, PA, November, 2001.
 98. **RAY, C. A.**, and K. D. Monahan. Aging attenuates the vestibulosympathetic reflex: mediator of orthostatic hypotension in the elderly. Annual meeting of the *American Heart Association*, Anaheim, CA, November, 2001.
 99. **RAY, C. A.**, and K. D. Monahan. Aging attenuates the vestibulosympathetic reflex in humans. Meeting of the *National Space Biomedical Research Institute*, Del Lego Conference Center, Montgomery, TX, January 2002.
 100. **RAY, C. A.** Effect of simulated microgravity on the vestibulosympathetic reflex in humans. Meeting of the *National Space Biomedical Research Institute*, Del Lego Conference Center, Montgomery, TX, January 2002.
 101. Monahan, K. D., and **C. A. RAY**. Differential limb neurovascular control during vestibular activation. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2002)*, New Orleans, LA, April, 2002.
 102. Sharpe, M. K., K. D. Monahan, D. Drury, A. C. Ertl, and **C. A. RAY**. Vestibular activation alters respiration in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2002)*, New Orleans, LA, April, 2002.

103. **RAY, C. A.** Vestibular reflexes. Effect of aging on cardiovascular reflexes in humans, Annual meeting of the *American College of Sports Medicine*, St. Louis, MO, June, 2002.
104. Carter, J., W. Cooke, and **C. RAY**. Vestibulosympathetic reflex during mental stress. Annual meeting of the *American Autonomic Society*, Hilton Head, SC, October, 2002.
105. Kuipers, N. T., C. L. Sauder, and **C. A. RAY**. Aging attenuates the vestibulorespiratory reflex in humans. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Bushkill, PA, November, 2002.
106. Sauder, C. L., N. T. Kuipers, and **C. A. RAY**. Increased sensitivity of the vestibulosympathetic reflex in the upright posture in humans. *Graduate Student Research Forum*, The Pennsylvania State University College of Medicine, Hershey, PA, March, 2003.
107. Kuipers, N. T., C. L. Sauder, and **C. A. RAY**. Aging attenuates the vestibulorespiratory reflex in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2003)*, San Diego, CA, April, 2002.
108. Carter, J. R., C. L. Sauder, N. T. Kuipers, W. H. Cooke, and **C. A. RAY**. Mental Stress and cardiovascular control: a comprehensive examination. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2003)*, San Diego, CA, April, 2002.
109. Weber-Peters, S. A., M. C. Zehner, W. R. Davidson, and **C. A. RAY**. Cardiovascular responses to exercise in post-operative tetralogy of fallot with pulmonic insufficiency. Annual meeting of the *American College of Sports Medicine*, San Francisco, CA, June, 2003.
110. Kuipers, N. T., C. L. Sauder, and **C. A. RAY**. Increased sensitivity of the vestibulosympathetic reflex in the upright posture in humans. Annual meeting of the *American Autonomic Society*, St. Thomas, U.S. Virgin Islands, November, 2003.
111. Kuipers, N. T., C. L. Sauder, and **C. A. RAY**. Static magnetic field does not alter muscle sympathetic nerve activity and hemodynamics at rest and during physical stress in humans. Annual meeting of the *American Autonomic Society*, St. Thomas, U.S. Virgin Islands, November, 2003.
112. Sacco, C.B. and **C. A. RAY**. Ultrasonic Bone Stimulation Augments Muscle Sympathetic Nerve Activity. Graduate Student Research Forum, The Pennsylvania State University College of Medicine, Hershey, PA, March, 2004
113. Sacco, C.B. and **C. A. RAY**. Ultrasonic Bone Stimulation Augments Muscle Sympathetic Nerve Activity. Graduate Student Exhibition, The Pennsylvania State University, University Park, PA, March, 2004
114. Monahan, K. D., and **C. A. RAY**. Prostaglandin inhibition does not impair baroreflex sensitivity in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2004)*, Washington, D.C., April, 2004.

115. Wilson, T. E., and **C. A. RAY**. Influence of heat stress on the vestibul sympathetic reflex. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2004)*, Washington, D.C., April, 2004.
116. **RAY, C. A.**, C. L. Sauder, N. T. Kuipers, and U. A. Leuenberger. Otolithic activation elicits differential vascular responses to the renal and mesenteric arteries in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2004)*, Washington, D.C., April, 2004.
117. Carter, J. R., N. T. Kuipers, W. H. Cooke, and **C. A. RAY**. Forearm vascular responses during mental stress and vestibular activation. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2004)*, Washington, D.C., April, 2004 (invited).
118. **RAY, C.A.**, and T. E. Wilson. Effect of heat stress on the vestibul sympathetic reflex in humans. Annual meeting of the *Aerospace Medical Association*, Anchorage, AK, May, 2004.
119. Wilson, T. E., N. T. Kuipers, E. A. McHugh, S. Newton, **C. A. RAY**. Is vestibular activation nonthermal modulator of skin blood flow or sweating? Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, June, 2004.
120. **RAY, C. A.** and C. W. Ung. Otolithic activation elicits a reduction in blood pressure in endurance runners. 2004 American Physiological Society Intersociety Meeting: *The Integrative Biology of Exercise*, Austin, TX, October, 2004.
121. Sauder, C. L., N. T. Kuipers, E. A. McHugh, U. A. Leuenberger, and **C. A. RAY**. Otolithic activation fails to elicit vasoconstriction in visceral arteries in older humans. *Joint Meeting of the European Federation of Autonomic Societies & American Autonomic Society*, Amsterdam, Netherlands, October, 2004.
122. **RAY, C. A.** Effect of age on the vestibul sympathetic reflex. *American Heart Association Research Symposium*, New Orleans, LA, November, 2004.
123. Sauder, C. L., N. T. Kuipers, E. A. McHugh, U. A. Leuenberger, and **C. A. RAY**. Otolithic activation elicits attenuated visceral vascular responses in older humans. *Annual meeting of the American Heart Association*, New Orleans, LA, November, 2004.
124. **RAY, C. A.** Ultrasonic mastoid bone stimulation: Possible countermeasure to postflight orthostatic intolerance. Bioastronautics Investigators' Workshop, Galveston, TX, January, 2005.
125. **RAY, C. A.**, N. T. Kuipers, and T. E. Wilson. Effect of thermal stress on the vestibul sympathetic reflex in humans. Bioastronautics Investigators' Workshop, Galveston, TX, January, 2005.

126. Kuipers, N. T., and **C. A. RAY**. Endurance training augments the sensitivity of the vestibulorespiratory reflex. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2005)*, San Diego, CA, April, 2005.
127. Dyckman, D. J., T. E. Wilson, and **C. A. RAY**. Effect of muscle mass on skin sympathetic nerve activity during fatiguing isometric forearm exercise. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2005)*, San Diego, CA, April, 2005. (student award winner)
128. Wilson, T. E., C. S. Sauder, N. T. Kuipers, M. L. Kearney, U. A. Leuenberger, and **C. A. RAY**. Effect of cold stress on visceral vascular conductance in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2005)*, San Diego, CA, April, 2005.
129. Wilson, T. E., D. J. Dyckman, and **C. A. RAY**. Comparison of arm and leg exercise intensity on skin sympathetic activity during fatiguing isometric exercise. Annual meeting of the *American College of Sports Medicine*, Nashville, TN, June, 2005.
130. Fogelman, A. E., C. L. Sauder, M. L. Kearney, D. J. Dyckman, N. T. Kuipers, and **C. A. RAY**. Endurance training reduces renal vasoconstriction to orthostatic stress. *Mid-Atlantic Chapter of American College of Sports Medicine*, Harrisburg, PA, October, 2005.
131. **RAY, C. A.** Vestibulosympathetic reflex in humans. Meeting of the *National Space Biomedical Research Institute*, Clear Lake, TX, February, 2006.
132. Dyckman, D. J., and **C. A. RAY**. Interaction of the vestibulosympathetic reflex and baroreceptors in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2006)*, San Francisco, CA, April, 2006.
133. Dyckman, D. J., M. L. Kearney, and **C. A. RAY**. The vestibulosympathetic reflex is attenuated after prolonged head-down bed rest. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2006)*, San Francisco, CA, April, 2006.
134. Kuipers, N. T., C. L. Sauder, and **C. A. RAY**. Divergent vascular responses to mental stress in the upright and supine postures. *Federation of American Societies of Experimental Biology (Experimental Biology 2006)*, San Francisco, CA, April, 2006.
135. Monahan, K. D., U. A. Leuenberger, D. J. Dyckman, and **C. A. RAY**. Aldosterone impairs baroreflex sensitivity in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2006)*, San Francisco, CA, April, 2006.
136. Fogelman, A. E., C. L. Sauder, M. L. Kearney, D. J. Dyckman, N. T. Kuipers, and **C. A. RAY**. Endurance training reduces renal vasoconstriction to orthostatic stress. Annual meeting of the *American College of Sports Medicine*, Denver, CO, June, 2006.

137. Monahan, K. D., U. A. Leuenberger, and **C. A. RAY**. Effect of repetitive hypoxic apneas on baroreflex sensitivity in humans. Annual meeting of the *American College of Sports Medicine*, Denver, CO, June, 2006.
138. **RAY, C. A.**, D. J. Dyckman, M. L. Kearney, and J. V. Meck. Effect of prolonged bed rest on the vestibulosympathetic reflex. The 7th Symposium on the Role of Vestibular Organs in Space Exploration, Amsterdam, Netherlands, June, 2006.
139. Nishida, Y., **C. A. RAY**, M. Yoshioka, and J. St-Amand. Regulation of pituitary gene expression by adrenalectomy. The 21st Scientific Meeting of the International Society of Hypertension, Fukuoka, Japan, October, 2006.
140. Carter, J. R. and **C. A. RAY**. Effect of dimenhydrinate on the vestibulosympathetic reflex and baroreflexes in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
141. **RAY C. A.**, D. J. Dyckman, A. E. Fogelman, C. L. Sauder. Endurance training attenuates the vestibulosympathetic reflex in runners. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
142. Dyckman, D. J., A. E. Fogelman, C. L. Sauder, and **C. A. RAY**. Endurance training attenuates renal artery vasoconstriction during vestibular stimulation in runners. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
143. Kuipers, N. T., C. L. Sauder, M. L. Kearney, and **C. A. RAY**. Muscle temperature alters renal vascular responses to exercise. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
144. Kuipers N. T., C. L. Sauder, M. L. Kearney, and **C. A. RAY**. Aging augments renal vasoconstriction during exercise and local muscle heating. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
145. Monahan, K. D., D. J. Dyckman, and **C. A. RAY**. Effect of blood lipids on autonomic control in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
146. Kearney, M. L., A. E. Fogelman, N. T. Kuipers, and **C. A. RAY**. Endurance training attenuates cardiovascular drift at the same absolute work rate. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
147. Kearney, M. L., A. E. Fogelman, N. T. Kuipers, and **C. A. RAY**. Endurance training does not affect cutaneous blood flow during prolonged exercise. Annual meeting of the

- Federation of American Societies of Experimental Biology (Experimental Biology 2007)*, Washington, DC, April, 2007.
148. Kearney, M. L., A. E. Fogelman, N. T. Kuipers, and **C. A. RAY**. Endurance training attenuates heart rate drift when exercising at the same relative intensity. Annual meeting of the *American College of Sports Medicine*, New Orleans, LA, May, 2007.
 149. Lott, M. E. J., C. Hogeman, M. D. Herr, A. Fogelman, L. I. Sinoway, and **C. A. RAY**. Effects of exercise training on brachial and femoral myogenic responses in young subjects. Annual meeting of the *American College of Sports Medicine*, New Orleans, LA, May, 2007.
 150. Dyckman, D. J., and **C. A. RAY**. Glycerol-induced fluid shift attenuates the vestibulosympathetic reflex in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2008)*, San Diego, CA, April, 2008.
 151. Kuipers, N.T., C. L. Sauder, M. L. Kearney, and **C. A. RAY**. Kinins do not alter cardiovascular and sympathetic responses to isometric exercise in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2008)*, San Diego, CA, April, 2008.
 152. Lawrence, J. E., A. K. Lucas, **C. A. RAY**, and J. R. Carter. Vestibulosympathetic reflex during the early follicular and mid-luteal phases of the menstrual cycle. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2008)*, San Diego, CA, April, 2008.
 153. **RAY, C. A.**, N. T. Kuipers, and M. L. Kearney. Maximal cutaneous blood flow is not affected by endurance training: implications for physiological interpretation of cutaneous blood flow. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2008)*, San Diego, CA, April, 2008.
 154. Lichty, J. J., Y. Nishida, M. L. Kearney, C. L. Sauder, N. T. Kuipers, and **C. A. RAY**. Muscle oxygenation and blood flow during dynamic handgrip with acute hyperthyroidism. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, May, 2008.
 155. Shaw, J. L., M. L. Kearney, D. J. Dyckman, C. L. Sauder, and **C. A. RAY**. Effects of endurance training on vascular responses to mental stress in humans. Annual meeting of the *American College of Sports Medicine*, Indianapolis, IN, May, 2008.
 156. Carter, J. R., and **C. A. RAY**. Muscle sympathetic nerve activity during mental stress: responders vs. nonresponders. Annual meeting of the *American Autonomic Society*, Kawaii, Hawaii, November, 2008.
 157. Cook, J. S., C. L. Sauder, and **C. A. RAY**. Endurance training attenuates the vestibulosympathetic reflex in runners. *Graduate Student Research Forum*, Penn State College of Medicine, Hershey, PA, March, 2009.

158. Hess, K. L., T. E. Wilson, Z. Gao, C. L. Sauder, **C. A. RAY**, and K. D. Monahan. Mild skin surface cooling does not increase arterial stiffness in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2009)*, New Orleans, LA, April, 2009.
159. Monahan, K. D., C. L. Sauder, and **C. A. RAY**. Effect of aging on arm and leg muscle sympathetic nerve activity in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2009)*, New Orleans, LA, April, 2009.
160. Wilson, T. E., K. D. Monahan, M. Kearney, A. Fogelman, C. L. Sauder, and **C. A. RAY**. Aerobic exercise training increases maximal in vivo cholinergic responsiveness but not sensitivity of eccrine sweat glands. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2009)*, New Orleans, LA, April, 2009.
161. Hess, K. L., T. E. Wilson, **C. A. RAY**, and K. D. Monahan. Aging augments pressor responses to mild skin surface cooling in humans. Annual meeting of the *American College of Sports Medicine*, Seattle, WA, May, 2009.
162. Greaney, J. L., **C. A. RAY**, A. V. Prettyman, and W. B. Farquhar. Interaction of chemoreceptors and osmoreceptors in the control of sympathetic outflow in healthy humans. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Harrisburg, PA, November, 2009.
163. **RAY, C. A.** Orthostatic stress. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Harrisburg, PA, November, 2009.
164. **RAY, C.A.**, and J. R. Carter. Effects of aerobic exercise training on sympathetic and renal responses to mental stress in humans. Annual meeting of the *American Autonomic Society*, St. Thomas, U.S. Virgin Islands, November, 2009.
165. Cook, J. S., and **C. A. RAY**. Melatonin attenuates the vestibulosympathetic reflex in humans. Annual meeting of the *American Autonomic Society*, St. Thomas, U.S. Virgin Islands, November, 2009.
166. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Evidence of a circadian rhythm for muscle sympathetic nerve activity in humans. *Graduate Student Research Forum*, Penn State College of Medicine, Hershey, PA, March, 2010.
167. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Effect of melatonin on the vestibulocollic reflex in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2010)*, Anaheim, CA, April, 2010.
168. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Evidence of a circadian rhythm for muscle sympathetic nerve activity in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2010)*, Anaheim, CA, April, 2010.

169. Cook, J. S., S. A. Chin-Sang, C. L. Sauder, and **C. A. RAY**. Is there diurnal variation with the vestibulosympathetic reflex? Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2010)*, Anaheim, CA, April, 2010.
170. **RAY, C. A.**, C. L. Sauder, and J. S. Cook. Muscle sympathetic nerve activity responses to plantar flexion in humans. Annual meeting of the *American College of Sports Medicine*, Baltimore, MD, May, 2010.
171. Chin-Sang, S. A., H. Kemp, A. Morgan, C. L. Sauder, and **C. A. RAY**. Methodological issues related to blood flow measurements in obese subjects. Annual meeting of the *American College of Sports Medicine*, Baltimore, MD, May, 2010.
172. **RAY, C. A.**, C. L. Sauder, and J. S. Cook. Neurovascular responses to plantar flexion in humans. *American College of Sports Medicine Integrative Physiology of Exercise*, Miami Beach, FL, September, 2010.
173. J. S. Cook, C. L. Sauder, and **C. A. RAY**. Melatonin differentially affects vascular blood flow in humans. Annual meeting of the *American Autonomic Society* Marco Island, FL, November, 2010.
174. **RAY, C. A.**, and C. L. Sauder. Endurance training reduces renal blood flow at rest in humans Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2011)*, Washington DC, April, 2011.
175. **RAY, C. A.** and C. L. Sauder. Vestibular-mediated sympathetic outflow and renal vasoconstriction is attenuated after endurance training. Annual meeting of the *Aerospace Medical Association*, Anchorage, AK, May, 2011.
176. **RAY, C. A.** Autonomic Adjustments to Mental Stress: Historical Perspectives and Future Directions. Annual meeting of the *American College of Sports Medicine*, Denver, CO, June, 2011.
177. Hui, M., C. L. Sauder, **C. A. RAY**. Leg vasculature responses to mental stress in humans. *Penn State Hershey College of Medicine Summer Undergraduate Research Symposium*, Hershey, PA, August, 2011.
178. Myers, T., C. L. Sauder, **C. A. RAY**. Effect of mental stress on coronary blood flow. *Penn State Hershey College of Medicine Summer Undergraduate Research Symposium*, Hershey, PA, August, 2011.
179. **RAY, C. A.** Autonomic adjustments to space. Annual meeting of the *Mid-Atlantic Chapter of the American College of Sports Medicine*, Harrisburg, PA, November, 2011.
180. Sauder, C. L., A. E. Thompson, T. Myers, and **C. A. RAY**. Effect of mental stress on coronary blood flow in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2012)*, San Diego, CA, April, 2012.

181. **RAY, C. A.**, E. Conboy, and C. L. Sauder. Effect of endurance training on splanchnic circulation during head-up tilt. Annual meeting of the *APS Intersociety Meeting: The Integrative Biology of Exercise VI*, Westminster, CO, October, 2012.
182. **RAY, C. A.**, C. L. Sauder, and M. D. Muller. Melatonin does not alter skin sympathetic nerve response to mental stress. Annual meeting of the *American Autonomic Society* Paradise Island, Bahamas, October 2012.
183. **RAY, C. A.**, C. L. Sauder, and M. D. Muller. Mental stress elicits sustained and reproducible increases in skin sympathetic nerve activity. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2013)*, Boston, MA, April, 2013.
184. **RAY, C. A.** Vestibulosympathetic reflexes in humans: Contributions to orthostasis. Annual midwinter meeting of the *Association for Research in Otolaryngology*, San Diego, CA, February, 2014. (Invited Speaker)
185. **RAY, C. A.**, C. L. Sauder, and D. J. Dyckman. Ultrasonic bone stimulation increases orthostatic tolerance after 24 hours of bed rest. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2014)*, San Diego, CA, April, 2014.
186. **RAY, C. A.**, C. L. Sauder, and N. T. Kuipers. Effects of short-term endurance training on the vestibulorespiratory reflex in humans. Annual meeting of the *American College of Sports Medicine*, Orlando, FL, June, 2014.
187. **RAY, C.A.**, and C. L. Sauder. Effect of melatonin on coronary blood flow in humans. Meeting of the *American College of Sports Medicine Conference on Integrative Physiology of Exercise*, Miami, FL, September, 2014.
188. **RAY, C. A.**, H. E. Ray, and C. L. Sauder. Neurovascular responses to mental stress in aging humans. Annual meeting of the *American Autonomic Society* Rio Grande, Puerto Rico, October 2014.
189. **RAY, C. A.** Comparison of the Vestibulosympathetic Reflex During Dynamic and Static Head-Down Rotations. Annual midwinter meeting of the *Association for Research in Otolaryngology*, Baltimore, MD, February, 2015.
190. **RAY, C. A.**, S. Park, and C. L. Sauder. Effect of ultrasonic bone stimulation of the mastoid on renal and coronary blood flow in humans. Annual meeting of the *Federation of American Societies of Experimental Biology (Experimental Biology 2015)*, Boston, MA, March, 2015.

Invited Presentations Other Than Professional Meetings

1. **RAY, C. A.** Effect of exercise on muscle sympathetic nerve activity. Department of Exercise Science, University of Georgia, Athens, GA, May, 1990.
2. **RAY, C. A.** Muscle sympathetic nerve responses during static leg exercise. Rigshospitalet, Department of Anesthesia, University of Copenhagen, Copenhagen, Denmark, October, 1990.
3. **RAY, C. A.** Muscle sympathetic responses to exercise. John B. Pierce Foundation, Yale University, New Haven, CT, May, 1991.
4. **RAY, C. A.** Normal cardiovascular responses to exercise. University of Iowa Hospitals and Clinics, Department of Physical Therapy, Iowa City, IA, July, 1991.
5. **RAY, C. A.** Sympathetic nerve responses to exercise. Applied Physiology Research Laboratories, School of Physical Education, Kent State University, Kent, OH, March, 1992.
6. **RAY, C. A.** Sympathetic nerve responses to exercise. Department of Exercise Science, University of Oregon, Eugene, OR, April, 1992.
7. **RAY, C. A.** Autonomic adjustments to exercise. Department of Manipulative Medicine, Texas College of Osteopathic Medicine, Fort Worth, TX, July, 1992.
8. **RAY, C. A.** Sympathetic neural adjustments to exercise. University of Iowa College of Medicine, Department of Internal Medicine, Iowa City, IA, July, 1992.
9. **RAY, C. A.** Autonomic adjustments to exercise in humans: Insights from microneurographic recordings. Department of Cardiovascular Pharmacology and Toxicology, University of Georgia, Athens, GA, November, 1993.
10. **RAY, C. A.** Modulation of muscle sympathetic activity by posture and exercise. Institute for Exercise and Environmental Medicine, Presbyterian Hospital of Dallas, University of Texas Southwestern Medical Center, Dallas, TX, February, 1994.
11. **RAY, C. A.** Regulation of muscle sympathetic nerve activity during exercise in humans. Department of Kinesiology, Kansas State University, Manhattan, KS, December, 1995.
12. **RAY, C. A.** Vestibulo-sympathetic reflexes in humans. Division of Cardiology, The Pennsylvania State University College of Medicine, Milton S. Hershey Medical Center, Hershey, PA, August, 1996.
13. **RAY, C. A.** New insights on autonomic regulation during physical stress. Department of Exercise Science, University of South Carolina, Columbia, SC, February, 1997.
14. **RAY, C. A.** Balancing the sympathetics? Vestibulosympathetic reflex in humans. Department of Veterinary Biomedical Sciences, University of Missouri, Columbia, MO, May, 1997.

15. **RAY, C. A.** Balancing the sympathetics? Vestibulosympathetic reflex in humans. Division of Cardiology, The Pennsylvania State University College of Medicine, Milton S. Hershey Medical Center, Hershey, PA, March, 1998.
16. Hume, K. M., and **C. A. RAY.** Effect of head-down neck extension on muscle sympathetic nerve activity: implications for the vestibulosympathetic reflex. Eleventh Annual Graduate Student Research Forum. The Pennsylvania State University College of Medicine, Milton S. Hershey Medical Center, Hershey, PA, March, 1999.
17. **RAY, C. A.** Vestibular autonomic regulation in humans. Department of Health and Kinesiology, Texas A&M University, College Station, TX, February, 2000.
18. **RAY, C. A.** The vestibulosympathetic reflex in humans. Department of Cellular and Molecular Physiology, The Pennsylvania State University College of Medicine, Hershey, PA, March, 2000.
19. **RAY, C. A.** Vestibular regulation of sympathetic nerve activity in humans. John B. Pierce Foundation, Yale University, New Haven, CT, October, 2000.
20. **RAY, C. A.** Vestibular regulation of sympathetic nerve activity in humans. Department of Kinesiology, The Pennsylvania State University, University Park, PA, November, 2000.
21. **RAY, C. A.** Vestibular regulation of sympathetic outflow: Clinical implications for aging and deconditioning. General Clinic Research Center, The Pennsylvania State University College of Medicine, Hershey, PA, December, 2000.
22. **RAY, C. A.** Vestibular regulation of sympathetic nerve activity in humans. Cardiology Grand Rounds. Division of Cardiology, Pennsylvania State University College of Medicine, Hershey, PA, January, 2001.
23. **RAY, C. A.** Neural control of the circulation: Regulation of sympathetic nerve activity in humans. Baylor University, Waco, TX, April, 2001.
24. **RAY, C. A.** Effect of simulated microgravity on the vestibulosympathetic reflex in humans. National Space and Biomedical Research Institute Cardiovascular Alterations Team Meeting, Massachusetts Institute of Technology, Boston, MA, April, 2001.
25. **RAY, C. A.** The vestibulosympathetic reflex in humans. Michigan Technological University, Houghton, MI, September, 2001.
26. **RAY, C. A.** Neural control of the circulation: Contribution of the vestibular system. Division of Exercise Physiology, West Virginia University, Morgantown, WV, April, 2002.
27. **RAY, C. A.** Advancing the research enterprise in the School of Health and Human Performance. School of Health and Human Performance, University of North Carolina at Greensboro, Greensboro, NC, May, 2002.

28. **RAY, C. A.** Vestibular regulation of autonomic function in humans: implications for aging and spaceflight. Neuroscience Day, The Pennsylvania State University, University Park, PA, May, 2003.
29. **RAY, C. A.** Effect of aging on vestibular-cardiorespiratory reflexes. General Clinical Research Center Lecture Series. The Pennsylvania State University College of Medicine, Hershey, PA, June, 2003.
30. **RAY, C. A.** Sympathetic and cardiopulmonary regulation by vestibular reflexes. The Department of Medical Pharmacology and Physiology, University of Missouri, Columbia, MO, October, 2003.
31. **RAY, C. A.** Effect of aging on vestibular regulation of sympathetic and respiratory responses. The Department of Health and Kinesiology, Texas A&M University, College Station, TX, November, 2003.
32. **RAY, C. A.** Effect of aging on vestibular regulation of sympathetic and respiratory responses. The John B. Pierce Laboratory, New Haven, CT, March, 2004.
33. **RAY, C. A.** Autonomic adjustments to stress: What happens when you wake up late for a test. Department of Health and Kinesiology, University of Texas at San Antonio, San Antonio, TX, March, 2006.
34. **RAY, C. A.** Vestibulo-cardiovascular reflexes. The University of Copenhagen, Copenhagen, Denmark, May, 2006.
35. **RAY, C. A.** Vestibular regulation of sympathetic nerve activity: Effect of aging, bed rest, and exercise training. Department of Applied Physiology and Kinesiology, University of Florida, Gainesville, FL, March, 2007.
36. **RAY, C. A.** Autonomic adjustments to stress. Department of Applied Health Sciences, Wheaton College, Wheaton, IL, November, 2007.
37. **RAY, C. A.** Effect of aging on vestibular regulation of sympathetic and respiratory responses. Department of Health, Nutrition, and Exercise Sciences, University of Delaware, Newark, DE, February, 2008.
38. **RAY, C. A.** Vestibular regulation of sympathetic nerve activity. Department of Kinesiology and Applied Physiology, University of Delaware, Newark, DE, January, 2011.
39. **RAY, C. A.** Autonomic adjustments to physical and mental stress. Department of Kinesiology and Applied Physiology, University of Delaware, Newark, DE, February, 2011.
40. **RAY, C. A.** Autonomic adjustments to stress: What happens when you wake up late for an exam. Biological Sciences Special Seminar Series, Messiah College, Grantham, PA, November, 2014.

41. Thompson, A. E., and **C. A. RAY**. The effects of mental stress on coronary blood flow in humans. Medical Student Research Symposium, Penn State College of Medicine, Hershey, PA, April 2014.

Symposium, Invited Participant

1. Cardiovascular control in health and disease. XXXII Congress of the International Union of Physiological Sciences, Glasgow, Scotland, August, 1993.
2. Autonomic adjustments to exercise in humans: Insights from microneurographic recordings. Annual meeting of the Southeast Chapter of the American College of Sports Medicine, Greensboro, NC, January, 1994. (Tutorial)
3. Meeting on the centennial of the study of neural control of cardiovascular responses to exercise, Cardiopulmonary Reflexes, Danish Academy of Sciences, Copenhagen, Denmark, October, 1995.
4. Cardiovascular control by reflexes from exercising muscles. Annual meeting of the American College of Sports Medicine, Cincinnati, OH, May, 1996.
5. Adaptations and the control of blood flow with training. Annual meeting of the American College of Medicine, Cincinnati, OH, May, 1996. (Chair)
6. Control of autonomic nervous system function during physical activity. Annual meeting of the Southeast Chapter of the American College of Sports Medicine, Sandestin, FL, January, 1998.
7. Sympathetic nerve responses to vestibular stimulation via head movements in humans. Control of Autonomic Function During Action, Opio, France, September, 1999.
8. Vestibulosympathetic reflex in humans. Satellite Symposium, International Union of Physiological Society. The Sympathetic Nervous System in Disease, Christchurch, New Zealand, August 2001.
9. Vestibular reflexes. Effect of aging on cardiovascular reflexes in humans, Annual meeting of the American College of Sports Medicine, St. Louis, MO, June, 2002. (Chair)
10. Vestibulosympathetic reflex in humans. Sympathetic neural mechanisms in cardiovascular control: a tribute to Gunnar Wallin. Satellite Symposium of Hypertension Prague 2002: The 19th Scientific Meeting of the International Society of Hypertension and the 12th European Meeting on Hypertension. Goteborg University, Goteborg, Sweden, June 2002.
11. Autonomic adaptations to space flight: neurovestibular interactions. Cardiovascular Adaptation to Space Flight: State of the Art and Future Directions. A special symposium in honor of C. Gunnar Blomqvist. Dallas, Texas, May 2004.
12. Effect of aging on vestibular regulation of sympathetic and respiratory responses. Barany Society XXIII International Congress, College de France, Paris, France, July 2004.

13. Ultrasonic mastoid bone stimulation: Possible countermeasure to postflight orthostatic intolerance. Human Health and Countermeasures Session: Countermeasures, Bioastronautics Investigators' Workshop, Galveston, TX, January, 2005.
14. Ultrasonic mastoid bone stimulation: Possible countermeasure to postflight orthostatic intolerance. 15th IAA Humans in Space Symposium, Graz, Austria, May, 2005.
15. Vestibulosympathetic reflex in humans: Factors that modulate the reflex. International Symposium on Current topics of muscle sympathetic nerve activity, Tokyo, Japan, June, 2008.
16. Vestibulosympathetic reflexes in humans: Contributions to Orthostasis. Central Vestibular Control of Essential Autonomic Functions. Annual midwinter meeting of the *Association for Research in Otolaryngology*, San Diego, CA, February, 2014.
17. Autonomic Adjustments to Physical Stress: Insights from Microneurographic Recordings. Annual Meeting of the Southeast Chapter of the American College of Medicine, Chattanooga, TN, February, 2018. (Tutorial)

Sessions Chaired at Scientific Meetings

1. Chair, Free Communication Session, Neural Control of Circulation III, Experimental Biology 93, New Orleans, Louisiana, 1993
2. Chair, Symposium, Adaptations and the Control of Blood Flow with Training, American College of Sports Medicine, Cincinnati, Ohio, 1996
3. Chair, Free Communication Session, Cardiovascular Control, American College of Sports Medicine, Denver, Colorado, 1997
4. Chair, Symposium, Effect of aging on cardiovascular reflexes in humans, American College of Sports Medicine, St. Louis, Missouri, June, 2002
5. Chair, Symposium, Orthostasis, 15th IAA Humans in Space Symposium Graz, Austria, May, 2005
6. Chair, Oral Poster Session, American Autonomic Society, Los Cabos, Mexico, October, 2005
7. Chair, Oral Poster Session, American Autonomic Society, St. Thomas, U.S. Virgin Islands, November, 2009
8. Chair, Symposium, Autonomic adjustments to stress, Experimental Biology 2010, Anaheim, California, April, 2010
9. Chair, Free Communication Session, Vascular function, American College of Sports Medicine, Baltimore, Maryland, June, 2010

10. Chair, Free Communication Session, Control of Sympathetic Nerve Activity & Blood Flow in Humans, American Autonomic Society, Marco Island, Florida, November, 2010
11. Chair, Symposium, Autonomic Adjustments to Mental Stress: Historical Perspectives and Future Directions. American College of Sports Medicine, Denver, CO, June, 2011.