

## CURRICULUM VITAE

**Name** Russell St John Richardson, Ph.D. D.Sc.

**Business Address:** Utah Vascular Research Laboratory (UVRL)  
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### Personal Information

**Date of Birth:** April 6, 1965  
**Place of Birth:** Barrow-in-Furness, England.  
**Marital Status:** Married

### TRAINING/EXPERIENCE:

#### 1. Academic Preparation

**Fellowship:** Department of Medicine,  
University of California San Diego,  
Post Doctoral Fellow (1992-1995)

**Graduate:** University of Utah, Salt Lake City, UT  
Doctor of Philosophy Degree (1992)  
Major: Exercise Physiology  
Minor: Computer Science  
Research Tool: Statistics

Colorado State University, Fort Collins  
Master of Science Degree (1989)  
Major: Physiology

Loughborough University, England  
Post Graduate Certificate of Education (1987)  
Major: Biology  
Minor: Physical Education

**Undergraduate:** West London Institute of Higher Education  
Bachelor of Arts (1986)  
Double Major: Physical Education and  
Educational Studies

#### 2. Honors and Awards

Research Fellowship, College of Health, University of Utah, Salt Lake City, UT, 1990-1992.

Dr. G. Arthur Brotein Young Scholars Award, Western College Physical Education Society,  
Washington State University, Pullman, WA, 1991.

N.P. Neilson Scholarship, Department of Exercise and Sport Science, College of Health, University of Utah, Salt Lake City, UT, 1991.

Trisphere Student Award Finalist, South West American College of Sports Medicine, San Diego, CA, 1992.

American Lung Association Research Training Fellowship, 1994-1996.

Parker B. Francis Training Fellowship, 1995-1998.

Journal of Applied Physiology Editorial Board 2000-2002, 2009-present.

Ad Hoc grant reviewer for National Institute of Health, the Canadian Institutes of Health Research, and the Wellcome Trust, 2000-present.

University of Milan, Facoltà di Scienze Motorie, Advisory Board, 2008-present.

Michael J. Joyner Teaching Award, Royal Danish Academy of Cardiovascular Sciences  
For outstanding teaching in cardiovascular physiology to international trainees, 2010.

American Journal of Physiology, Heart and Circulation Editorial Board, 2011-present.

Sport Sciences for Health Advisory Board, 2012-present.

VA Rehabilitation, Research, and Development, Aging and Degenerative Disease Grant Review Board,  
standing member 2010-present.

University of Utah, Department of Internal Medicine, Academic Excellence Award, 2013

American Federation for Aging Research, grant review board: National Scientific Advisory Council,  
2013-present.

University of Utah, Department of Internal Medicine, Academic Excellence Award, 2014

Goodman Endowed Distinguished Professor of Medicine, Division of Geriatrics, University of Utah  
2014-present.

University of Utah, Department of Internal Medicine, Academic Excellence Award, 2015

Senior Research Career Scientist Award Veterans Affairs Rehabilitation Research and Development  
Service 2015-2022.

University of Utah, Department of Internal Medicine, Academic Excellence Award, 2016.

University of Utah, Department of Internal Medicine, Academic Excellence Award, 2017.

John Hoidal Department of Internal Medicine Senior Investigator Award, 2018.

University of Utah, Department of Internal Medicine, Academic Excellence Award, 2018.

Brunel University, London, England, Doctor of Science (D.Sc.), 2018.

Senior Research Career Scientist Award Veterans Affairs Rehabilitation Research and Development Service 2022-2029.

The American Physiological Society Edward F. Adolph Distinguished Lectureship, 2022.

### 3. Professional Experience

#### Employment

2015 - Present	Senior Research Career Scientist, Salt Lake City VAMC, UT
2013 - Present	Professor of Nutrition and Integrative Physiology, University of Utah
2010 - Present	Adjunct Professor of Physical Therapy, University of Utah
2007 - Present	Professor of Medicine, Dept. Medicine, Division of Geriatrics, University of Utah
2007 - 2013	Professor of Exercise and Sport Science, Dept. Exercise and Sport Science, University of Utah
2007 - 2022	Associate Director for Research, Geriatric Research, Education and Clinical Center, Salt Lake City VAMC, UT
2006 - 2008	Professor of Medicine, Dept. of Medicine, UCSD, La Jolla, CA
2000 - 2006	Associate Professor of Medicine, Dept. of Medicine, UCSD, La Jolla
2003 - 2013	Professor of Medicine, Dept. of Medicine, Norwegian University of Science and Technology
1999 - 2007	Research Scientist VAMC, La Jolla, CA
1996 - 2007	Lecturer, Division of Biology, UCSD, La Jolla, CA
1997- 2000	Assistant Professor of Dept. of Medicine, UCSD, La Jolla, CA
1995-1997	Assistant Research Physiologist, Dept. of Medicine, UCSD, CA
1992-1995	Post Doctoral Fellow, Medicine, UCSD, La Jolla, CA
1992-1992	Visiting Researcher, Tom Landry Sports Medicine Research Center, UT South Western, Dallas, TX
1990-1992	Research Assistant, University of Utah, Salt Lake City, UT
1989-1990	Teaching Assistant, University of Utah, Salt Lake City, UT
1987-1989	Teaching Assistant, Colorado State University, Fort Collins, CO
1986-1987	High School Biology Teacher, Bluecoats Grammar School Nottingham, England

#### Administration

1995-2007	Founder and Director, Oxygen Utilization Research (OUR) group, UC, San Diego
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1995-2007	Standing Member Retention Promotion and Tenure Committees, UC San Diego, University of Utah, and External Review for other institutions.
1998-2004	Seminar Series Coordinator, Division of Physiology, UC, San Diego
2000-present	Faculty/Staff Search Committees, UC San Diego, University of Utah, Salt Lake City VAMC.
2007-2022	Founder and Director, Utah Vascular Research Laboratory (UVRL), Salt Lake City VAMC.
2007-2022	Associate Director for Research, Geriatric Research, Education and Clinical Center, Salt Lake City, VAMC.
2007-present	College of Health Advisory Committee, University of Utah.
2007-present	Department of Medicine Advisory Committee, University of Utah.
2008-present	American Federation for Aging Research (AFAR) National Scientific Advisory Council
2009-2022	Director, Advanced Fellowship in Geriatrics, Salt Lake City, VAMC.
2010-2014	VA RR&D Aging and Degenerative Disease Study Section Grant Review Panel
2013-present	Air Quality Program, University of Utah.
2015-2016	Chair, VA RR&D Aging and Degenerative Disease Study Section Grant Review Panel
2015-2016	Chair, VA RR&D Historically Black Colleges and Universities Research Scientist Training Program Career development Award 2 Study Section Grant Review Panel
2016-2017	VA RR&D Research Career Scientist Review panel
2019-present	SLC VA Research Service Promotions Committee

#### 4. **Journal Reviewer**

American Journal of Physiology, Journal of Applied Physiology, Circulation, Circulation Research, Medicine and Science in Sports and Exercise, Journal of Physiology, Journal of Clinical Investigation, Journal of Hypertension, Experimental Physiology, American Journal of Cardiology

### **TEACHING:**

#### 1. **Teaching Experience**

Sports medicine and exercise physiology (Medical School)  
 Respiratory physiology (Medical School)  
 Pulmonary Physiology and Oxygen Transport (Graduate)  
 Mammalian physiology (Undergraduate)  
 Integrative biology of exercise (Undergraduate)  
 Nutrition (Undergraduate)  
 Organ Physiology (Graduate)  
 Laboratory instrumentation (Graduate)  
 Computer applications (Undergraduate)

#### 2. **Mentorship**

## **Past Trainees:**

1. Haseler, Luke., Ph.D. 1995-2000

Position: Post Doctoral Fellow

Support: American Heart Association Grant in Aide (Haseler/Richardson),  
Tobacco Related Research Program (Haseler/Richardson)

Current Position: Associate Professor, Department of Physiotherapy and Exercise Science, and Director of Heart Foundation Research Center, Griffith University, Australia

2. Gavin, Timothy, Ph.D. 1998-2000

Position: Post Doctoral Fellow

Support: NIH/NHLBI 5 T32 HL07212-28 (Wagner)

Current Position: Assistant Professor, Department of Kinesiology, East Carolina University

3. Esposito, Fabio, M.D. 1998-2000

Position: Post Doctoral Fellow

Support: NATO (Esposito)

Current Position: Associate Professor, Department of Biomedical Sciences for Health, University of Milan, Milan, Italy

4. Leek, Bryan, M.D. 1998-2000

Position: Pre Doctoral Fellow

Support: NIH PO1 HL17731-29 Project 3 (Richardson)

Current Position: Orthopedic Surgeon, Sharp Memorial Hospital, San Diego, CA

5. Henderson, Patrick, M.D. 1999-2000

Position: Pre Doctoral Fellow

Support: American Heart Association Grant in Aide (Haseler and Richardson)

Current Position: Orthopedic Surgeon, Children's Orthopedic Specialists, Tucson, Arizona

6. Newcomer, Sean., Ph.D. 1999-2000

Position: Pre Doctoral Fellow

Support: NIH PO1 HL17731-29 Project 3 (Richardson)

Current Position: Assistant Professor, Department of Kinesiology, California State University, San Marcos, CA

7. Hoff, Jan., Ph.D. 1999-2001

Position Post Doctoral Fellow

Support: Norwegian Research Council (Hoff),  
NIH PO1 HL17731-29 Project 3 (Richardson)

Current Position: Professor, Department of Medical Imaging, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

8. Poole, Jennifer., D.O. 1999-2000

Position: Pre Doctoral Fellow:

Support: Stein Institute for Aging Research (Richardson)

Current Position: Hospitalist, Virginia Mason Hospital and Seattle Medical Center

9. Bailey, Damian, Ph.D. 2000-2001

Position: Post Doctoral Fellow  
Support: UCSD Academic Senate Grant (Richardson),  
Stein Institute for Aging Research (Richardson)  
Current Position: Professor, Exercise and Sport Science Department, University of Glamorgan.

10. Lawrenson, Lesley, M.D., Ph.D. 2000-2003  
Position: Pre Doctoral Fellow  
Support: Tobacco Related Disease Research Program (Gavin/Richardson),  
UCSD Academic Senate Grant (Richardson)  
Current Position: Radiation Oncologist, Ponce De Leon Hospital, San Juan, Puerto Rico

11. Kim, Jeannie, M.D. 2002-2004  
Position: Post Doctoral Fellow  
Support: NIH/NHLBI 5 T32 HL07212-28 (Wagner)  
Current Position: Pulmonary and Critical Care Physician, Paradise Valley Hospital, National City, CA

12. Manu, Uberoi, M.D., 2002-2005  
Position: Pre Doctoral Fellow  
Support: NIH PO1 HL17731-29 Project 3 (Richardson)  
Current Position: Cardiologist, Cedar Sinai Medical Center, West Hollywood, CA

13. Anthony J. Donato, Ph.D. 2004-2005  
Position: Postdoctoral Research Fellow  
Support: NIH PO1 HL17731-29 Project 3 (Richardson)  
Tobacco related Disease Research Program (Gavin/Richardson)  
Current Position: Assistant Professor of Medicine and GRECC Investigator, University of Utah and Salt Lake City VAMC, Salt Lake City, UT

14. David Walter Wray, Ph.D. 2004-2007  
Position: Post Doctoral Fellow  
Support: NIH/NHLBI 5 T32 HL07212-28 (Wagner),  
General Clinical Research Center Grant (Wray)  
Tobacco Related Disease Research Program 15RT-0100 (Richardson)  
Parker B. Francis Fellowship (Wray/Richardson)  
Current Position: Associate Professor of Medicine, University of Utah and GRECC Investigator, Salt Lake City VAMC, Salt Lake City, UT

15. Steve Nyshiana, D.O. 2005-2008  
Position: Doctoral Candidate  
Support: NIH PO1 HL17731-29 Project 3 (Richardson) and Tobacco Related Disease Research Program 15RT-0100 (Richardson)  
Current Position: Orthopedic Surgery Resident, Toro University, California

16. Kimberly BerkStresser, M.S. 2006-2008  
Position: Pre Doctoral Fellow  
Support: Tobacco Related Disease Research Program 15RT-0100 (Richardson)  
Current Position: Practitioner of Oriental Medicine, Maryland University of Integrative Health, Baltimore, MD

17. Ryan Harris, Ph.D. 2007-2010  
Position: Post Doctoral Fellow  
Support: Tobacco Related Disease Research Program 15RT-0100 (Richardson)  
Current Position: Assistant Professor, Georgia Regents University, Augusta, GA
18. Vince Tedjasaputra, M.S. 2006-2008  
Position: Pre Doctoral Fellow  
Support: Tobacco Related Disease Research Program Fellowship 15RT-0100 (Tedjasaputra/Richardson)  
Current Position: Ph.D. Student, Faculty of Physical Education and Recreation
19. Markus Amann, Ph.D. 2009-2011  
Position: Post Doctoral Fellow  
Support: Association Francaise Contre les Myopathies (Richardson), VA Merit Grant (Richardson) and NIH K99 (Richardson)  
Current Position: Associate Professor of Medicine, University of Utah and Research Scientist, Salt Lake City VAMC, Salt Lake City, UT
20. John McDaniel, Ph.D. 2007-2011  
Position: Post Doctoral Fellow  
Support: VA Special Fellowship in Geriatrics (McDaniel/Richardson) and VA Career Development 2 Award (McDaniel)  
Current Position: Assistant Professor, Kent State, Ohio; Research Investigator SLC VAMC
21. Anette Fjeldstad, Ph.D. 2007-2011  
Position: Post Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grant (Richardson)  
Current Position: Research Associate, Department of Neurology, University of Utah, Salt Lake City, UT
22. Jamie Conklin, M.D. 2009-2011  
Position: Pulmonary and Critical Care Fellow  
Support: Salt Lake City VAMC Fellowship  
Current Position: Pulmonary and Critical Care Physician, Saint Charles Medical Center, Bend, OR
23. Steven Ives, Ph.D. 2008-2013  
Position: Pre Doctoral Fellow and Post Doctoral Fellow  
Support: Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Advanced Fellowship in Geriatrics  
Current Position: Assistant Professor, Health, and Exercise Sciences Department, Skidmore College, Saratoga Springs, NY
24. Joel Trinity, Ph.D. 2009-14  
Position: Post Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Advanced Fellowship in Geriatrics  
Current Position: Assistant Professor of Medicine, University of Utah and Research Scientist, Salt Lake City VAMC, Salt Lake City, UT

25. Massimo Venturelli, Ph.D. 2011-2013  
Position: Post Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and University of Verona Fellowship support  
Current position: Assistant Professor, Department of Biomedical Sciences for Health, University of Milan, Milan, Italy
26. Melissa Witman (Hayman), Ph.D. 2008-2015  
Position: Pre Doctoral Fellow/Post Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grant (Richardson)  
Current position: Assistant Professor, Dept. of Kinesiology and Applied Physiology, University of Delaware
27. Matt Rossman, M.S. 2010-2015  
Position: Pre Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and University of Utah Support: Research Assistant Scholarship  
Current position: Post-Doctoral Fellow, Mentor Doug Seals, University of Colorado Boulder
28. Ryan Garten, Ph.D. 2012-2015  
Position: Post Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grant (Richardson)  
Current position: Assistant Professor, Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University
29. Song Young Park, M.S. 2011-2015  
Position: Pre Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grant (Richardson)  
Current position: Post-Doctoral Fellow, Mentor Noyan Gokce, Boston University
30. Jayson Gifford, M.S. 2011-2015  
Position: Pre Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3), VA Merit Grant (Richardson), and SPiRe Grant (Richardson)  
Current position: Post-Doctoral Fellow, Mentor Russ Richardson, University of Utah and Salt Lake City VAMC, UT.
31. Jon Groot, M.S. 2010-2015  
Position: Pre Doctoral Fellow  
Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grants (Richardson)  
Current Position: Assistant Professor, University of Utah, Department of Health, Kinesiology, and Recreation, Salt Lake City, UT.
32. Gwenael Layec, Ph.D. 2009-2018  
Position: Post Doctoral Fellow and Junior Faculty



Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3), VA Merit Grants (Richardson), and SPiRe Grant (Richardson)

Current position: Assistant Professor, Dept. of Kinesiology, University of Massachusetts Amherst, MA

33. Ashley Nelson, M.D. 2013-2018

Position: Pulmonary and Critical Care Fellow/Post Doctoral Fellow and Junior Faculty

Support: University of Utah, Pulmonary Division NIH T32 Training Grant

Current Position: Pulmonary and Critical Care Physician, St Marks Hospital, Salt Lake City, UT

33. Corey Hart, M.S. 2012-2016

Position: Pre Doctoral Fellow

Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grant (Richardson), SPiRe Grant (Richardson)

Current position: Post-Doctoral Fellow, Mentor Ian Lanza, Mayo Clinic, Rochester, Minnesota.

34. Jayson Gifford, Ph.D. 2015-2018

Position: Post Doctoral Fellow

Support: NIH National Institute of Health (P01 HL091830) (Wagner, Richardson Project 3) and VA Merit Grant (Richardson), SPiRe Grant (Richardson)

Current position: Assistant Professor, Department of Exercise Science, Brigham Young University, Provo, UT.

35. Oh Sung Kwon, Ph.D. 2015-Present

Position: Post Doctoral Fellow

Support: VA Merit Grant (Richardson), SPiRe Grant (Richardson)

Current position: Assistant Professor, Department of Kinesiology, University of Connecticut, Storrs, Connecticut.

36. Jay Hydren, M.S. 2015-2020

Position: Pre Doctoral Fellow

Support: VA Merit Grants (Richardson), SPiRe Grant (Richardson), NIH NHLBI T32 (Richardson, Supiano)

Current position: Post Doctoral Fellow, Cardiovascular Medicine T32, University of Utah

37. Ryan Broxterman Ph.D. 2015-2020

Position: Post Doctoral Fellow

Support: VA Merit Grant (Richardson), SPiRe Grant (Richardson), NIH NHLBI T32 (Richardson, Supiano)

Current position: Assistant Professor, Department of Internal Medicine, Division of Geriatrics University of Utah

38. Catherine Jarrett, Ph.D. 2017-2022

Position: Post Doctoral Fellow

Support: VA Merit Grant (Richardson), VA Advanced Fellowship in Geriatrics (Richardson)

Current Position:

39. Matt Lewis, Ph.D. 2019-2022

Position: Post Doctoral Fellow

VA Advanced Fellowship in Geriatrics (Richardson)

Current Position:

40. Jay Hydren, M.S. 2020-2022

Position: Post Doctoral Fellow

Support: VA Merit Grants (Richardson), NIH NHLBI T32 (Drakos)

Current Position:

41. Katherine Shields, M.S. 2017-2022

Position: Pre Doctoral Fellow

Support: VA Merit Grants (Richardson)

Current Position:

**Current Graduate Students:**

Jason Kofoed, B.S. 2021-Present

Position: Pre Doctoral Fellow

Support: VA Merit Grants (Richardson)

**Current Post Graduate Fellows:**

Valentina Bisconti, Ph.D. 2019-Present

Position: Post Doctoral Fellow

Support: VA Merit Grant (Richardson), Center on Aging Pilot Grant (Theilen, Richardson)

**RESEARCH:**

1. **Grants Awarded:**

Johnson, S.C., **Richardson, R.S. (Co-I)**, Seifert, J.G., and White, A.T. Physiological Assessment of the U.S. Ski Team. VISA Gold Medal Program, 1991. (\$5,000).

Seifert, J.G., **Richardson, R.S. (Co-I)**, Johnson, S.C., and White, A.T. Fluid Balance During Alpine Skiing. The Quaker Oats Company, Chicago, Illinois & Snowbird Ski Resort, UT 1991. (\$7,500).

**Richardson, R.S. (PI)** The Effect of a Triathlon Wet Suit on the Energy Cost of Swimming at a Constant Rate. Body Glove International Ltd, Hermosa Beach, CA, 1992. (\$15,000).

**Richardson, R.S. (PI)** Gradient from hemoglobin to myoglobin-associated PO<sub>2</sub> in man. American Lung Association of California, Oakland, CA, 1994. (\$28,000).

**Richardson, R.S. (PI)** Oxygen transport and utilization in health and disease. American lung association, New York, NY, 1995. (\$32,000).

**Richardson, R.S. (PI)** Limitations to oxygen transport in health and disease. Parker B. Francis Fellowship Foundation, Los Angeles, CA 1995-1998 (\$120,000).

**Richardson, R.S. (PI),** Poole, D.C. Diaphragm microgeometry and function: Impact of disease. National Institute of Health: Heart and Lung. Program Project (Project # 3) 1995-2000. (\$1,100,000).

**Richardson, R.S. (PI)** Oxygen transport and utilization: The effect of age. National Institute of Health: Heart and Lung. Program Project (Project # 3) 2000-2006. (\$1,250,000).

Haseler, L.J., **Richardson, R.S. (Co-I)** Skeletal muscle function in Chronic Heart Failure American Heart Association, 1999-2001. (\$120,000).

Gavin, T.P. Wagner, P.D., **Richardson, R.S. (Mentor)** Skeletal muscle structure and function in COPD Tobacco-Related Disease Research Program, 1999-2002. (\$220,000).

**Richardson, R.S. (PI)** The effect of age on the control of skeletal muscle blood flow and metabolism. UC, San Diego Academic Senate Research Grant, 2001-2002 (\$25,000).

**Richardson, R.S. (PI)** LX multi-nuclear spectroscopy package. National Institute of Health: Instrumentation Grant, 2000-2002. (\$265,000).

Haseler, L.J., Wagner, P.D., **Richardson, R.S. (Mentor)** Skeletal muscle function in COPD. Tobacco-Related Disease Research Program, 2001-2005. (\$220,000).

**Richardson, R.S. (PI)** Oxidative stress and vascular function: the role and impact of smoking and COPD. Tobacco Related Disease Research Program. 2006-2009. (\$650,000)

**Richardson, R.S. (PI)** Oxidative stress and vascular function: the role and impact of smoking and COPD. Tobacco Related Disease Research Program Student Supplement. 2007-2009. (\$30,000).

**Richardson, R.S. (PI/Mentor)** Statins, Exercise, and Oxidative Stress: an Integrative Approach for Improved Skeletal Muscle Function in Chronic Obstructive Pulmonary Disease Parker B. Francis Fellowship in Pulmonary Research (Wray - Fellow). 2007-2010. (\$250,000).

**Richardson, R.S. (PI)** MRI Assessment of Skeletal Muscle Perfusion and Metabolic Matching in Humans. Association Francaise contre les Myopathies. 2007-2010. (\$250,000).

Wray, D.W and **Richardson, R.S. (Mentor)** Non-adrenergic regulation of skeletal muscle blood flow in the elderly: a multi-parametric approach. AHA Scientist Development Grant. 2008-2012. (\$220,000)

**Richardson, R.S. (PI)** Skeletal muscle dysfunction in COPD: The role of oxidative stress. Project 3 Program Project Grant, 2009-2015. (Project 3 - \$2,500,000)

**Richardson, R.S. (PI)** Oxidative stress links aging, activity, and mobility limitations. VA Merit Grant, 2011-2016. (\$1,100,000)

**Richardson, R.S. (PI)** Fighting immObility in Rural Veterans with Exercise and Technology (FOR VETs) VA Office of Rural Health, 2009-2011 (\$1,855,000).

McDaniel, J. and **Richardson, R.S. (Mentor)** Muscle Function and Aging: Endogenous and Exogenous Antioxidants VA CDA-2. 2011-2015 (\$625,000)

Amann, M and **Richardson, R.S. (Mentor)** Respiratory muscle work and oxidative stress in COPD: Impact on leg blood flow and fatigue NIH NHLBI K99. 2010-2012 (\$257,000)

Amann, M., and **R.S. Richardson (Co-I)** Respiratory muscle work and oxidative stress in COPD: Impact on leg blood flow and fatigue NIH NHLBI R00. 2013-2016 (\$750,000).

Amann, M., and **R.S. Richardson (Co-I)** Premature Fatigue in Patients with Heart Failure: Neuronal Influences NIH NHLBI R01 2013-2018. (\$1,250,000).

Di Baldassarre, A., F. Schenna, **R.S. Richardson (Co-I)** Impact of physical activity on successful aging: multidisciplinary analysis of mechanisms and outcomes PRIN grant. Progetti di Ricerca di Interesse Nazionale by Ministry of University and Research MIUR a group project with 6 research teams from Chieti, Perugia, Roma La Sapienza, Padova, Roma Foro Italico, and Verona, Italy. 2013-2022. (\$1,050,000).

**Richardson R.S. (PI)** Rehabilitation for Hypertension: Exercise and skeletal muscle afferent feedback. VA SPiRe Award, 2014-2016 (\$200,000).

**Richardson, R.S. (PI)** Exercise and Nutrition Directed at CardioVascular Disease in Rural Veterans (END CVD) VA Office of Rural Health, 2013-2015. (\$630,000).

Trinity, J.D. and **R.S. Richardson (mentor)** Understanding the exercise-hypertension paradox: implication for rehabilitation VA CDA2 2014-2019 (\$960,000)

**Richardson, R.S. (PI)** Passive Leg Movement: A Tool to Assess Vascular Health and Guide Rehabilitation VA Merit Grant, 2015-2020. (\$1,100,000).

**Richardson, R.S. (PI)** VA Senior Research Career Scientist Award 2015-2022 (\$1,100,000).

Layec, G. and **R.S. Richardson (Mentor/Co-I)** Nitric oxide coupling and BH4 availability roles in muscle dysfunction with COPD: A Pilot Study FAMRI 2015-2020 (\$500,000).

Layec, G. and **R.S. Richardson (Mentor/Co-I)** Nitric oxide coupling and BH4 availability roles in muscle dysfunction with COPD NIH NHLBI K99/R00. 2015-2020 (\$758,000).

Zhang, L and **R.S. Richardson (Co-I)** Stress-rest calf muscle perfusion: a functional diagnostic test for peripheral arterial disease (PAD). NIH NHLBI RO1, 2016-2022 (\$1,813,000).

**Richardson, R.S. (PI)** Vascular endothelial function: A potential therapeutic target in Alzheimer's Disease VA Merit Grant, 2017-2024. (\$1,100,000).

**Richardson, R.S.** and M.A. Supiano (**Multi PI**) Cardiovasomobility Research Training Program. NIH NHLBI T32, 2018-2023 (\$1,500,000).

Drakos, S. and **R.S. Richardson. (Co-I)** Institutional Undergraduate Student Research Fellowship Program in Cardiovascular Research. 2018-2021 AHA (\$60,000).

**Richardson, R.S. (PI)** Exercise and Cognitive Function in Alzheimer's Disease Progression: Role of the Vascular Endothelium. NIH NIA R56 2018-2020 (\$450,000).

Amann, M and **R.S. Richardson. (Co-I)** Premature Fatigue in Patients with Heart Failure: Neuronal Influences. NIH NHLBI R01 2019-2023 (\$1,000,000).

Trinity, J.R. and **R.S. Richardson (Co-I)** Targeting Oxidative Stress to Prevent Vascular and Skeletal Muscle Dysfunction during Disuse. VA CSR&D Service Merit Award 2019-2024.

Trinity, J.R. and **R.S. Richardson (Co-I)** Targeting Oxidative Stress to Prevent Vascular and Skeletal Muscle Dysfunction during Disuse. NIH NHLBI R01 2019-2024 (\$2,500,000).

**Richardson, R.S. (PI)** Passive Leg Movement: A Tool to Assess Vascular Health and Guide Rehabilitation. VA Merit Grant, 2020-2026. (\$1,200,000).

Amann, M. and **R.S. Richardson (Co-I)** Efficacy of Exercise Training in Patients with HFpEF. VA Merit Grant, 2020-2026. (\$1,200,000).

Broxterman, R.M. and **R.S. Richardson (Mentor)** Mechanisms of systemic dysfunction responsible for exercise intolerance induced by cytotoxic chemotherapy and endocrine therapy for stage I-III breast cancer in Veterans 2022-2027. (\$1,060,000).

**Richardson, R.S. (PI)** VA Senior Research Career Scientist Award 2022-2029 (\$1,300,000).

**Richardson, R. S.** and J.D. Trinity (**Multi PI**) Evaluating the Long-term Health Consequences of COVID-19 and Rehabilitation Therapies to Speed Convalescence VA Merit Grant, 2023-2028. (\$1,500,000).

## 2. Publications

### Articles:

1. **Richardson, R.S.**, Johnson, S.C., and Walker, J.A. (1991). Heart rate and oxygen consumption relationship changes following intense training. Sports Med., Training, and Rehab, 3;105-111.
2. **Richardson, R.S.** & Tucker, A. (1993). Muscular strength capacity and altitude response. Japanese Journal of Physiology. 43;75-85.
3. **Richardson, R.S.**, Johnson, S.C., Porretta J.M., Seifert, J.G. & White, A.T. (1993) Capillary blood lactate concentrations in elite skiers during a series of on-snow downhill ski runs. The J. of Strength and Cond. Res. 7(3):168-171.
4. **Richardson, R.S.** (1993) The hazards of active and passive smoking N. Engl. J. Med. 328(21):1580-1581.

5. **Richardson, R.S.** Poole, D.C. Knight, D.R., Kurdak, S.S., Hogan, M.C., Grassi, B., Johnson, E.C. Kendrick, K., Erickson, B.K., & Wagner, P.D. (1993) High muscle blood flow in man: Is maximal O<sub>2</sub> extraction compromised? J. Appl. Physiol. 75(4):1911-1916.
6. Kendrick, K., Chance, B., & **Richardson, R.S.** (1993) Relative deoxygenation in the vastus lateralis. in Photon Migration and Imaging in Random Media and Tissues. Chance, B and Alfano, R (eds). The International Society for Optical Engineering (SPIE) Proceedings. 1888:473-478.
7. **Richardson, R.S.** & Johnson, S.C., (1994) The effect of aerodynamic handlebars on oxygen consumption while cycling at a constant Speed. Ergonomics 37(5):859-863.
8. Hogan, M.C., **Richardson, R.S.** & Kurdak, S.S. (1994) Initial fall in skeletal muscle force development during ischemia is related to O<sub>2</sub> availability. J. Appl. Physiol. 77(4) 2380-2384.
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280. Shankar T.S., D.K.A. Ramadurai, K. Steinhorst, S. Sommakia, R. Badolia, A. Thodou Krokidi, D. Calder, S. Navankasattusas, P. Sander, O.S. Kwon, A. Aravamudhan, J. Ling, A. Dendorfer, C. Xie, O. Kwon, E.H.Y. Cheng, K.J. Whitehead, T. Gudermann, **R.S. Richardson**, F.B. Sachse, J. Schredelseker, K.W. Spitzer, D. Chaudhuri, and S.G. Drakos SG. (2021) Cardiac-specific deletion of voltage dependent anion channel 2 leads to dilated cardiomyopathy by altering calcium homeostasis. Nat Commun. 12: 4583

281. Shields K.L., R.M. Broxterman, C.L. Jarrett, A.V. Bisconti, S.H. Park, and **R.S. Richardson RS.** (2021) The passive leg movement technique for assessing vascular function: the impact of baseline blood flow. *Exp Physiol.* 106: 2133-2147
282. Lewis M.T., G.M. Blain, C.R. Hart, G. Layec, M.J. Rossman, S.Y. Park, J.D. Trinity, J.R. Gifford, S.K. Sidhu, J.C. Weavil, T.J. Hureau, J.E. Jessop, A.D. Bledsoe, M. Amann, and **R.S. Richardson.** (2021) Acute high-intensity exercise and skeletal muscle mitochondrial respiratory function: role of metabolic perturbation. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* 321: R687-R698
283. Thurston T.S., J.C. Weavil, T.J. Hureau, J.R. Gifford, V.P. Georgescu, H.Y. Wan, D.T. La Salle, **R.S. Richardson,** and M. Amann. (2021) On the implication of dietary nitrate supplementation for the hemodynamic and fatigue response to cycling exercise. *J. Appl. Physiol.* 131: 1691-1700
284. Francisco M.A., J.F. Lee, Z. Barrett-O'Keefe, H.J. Groot, S.M. Ratchford, K. Bunsawat, J.K. Alpenglow, J.J. Ryan, J.N. Nativi, **R.S. Richardson,** and D.W. Wray. (2021) Locomotor Muscle Microvascular Dysfunction in Heart Failure with Preserved Ejection Fraction. *Hypertension* 78:1750-1759
285. Trinity J.D., M.J. Drummond, C.C. Fermoyle, A.I. McKenzie, M.A. Supiano, and **R.S. Richardson RS.** (2022) Cardiovasomobility: an integrative understanding of how disuse impacts cardiovascular and skeletal muscle health. *J. Appl. Physiol.* 132: 835-861
286. Bisconti A.V., R.S. Garten, R.M. Broxterman, C.L. Jarrett, S.H. Park, K.L. Shields, H.L. Clifton, S.M. Ratchford, V. Reese, J. Zhao, D.W. Wray, and **R.S. Richardson RS.** (2022) No effect of acute tetrahydrobiopterin (BH<sub>4</sub>) supplementation on vascular dysfunction in the old *J Appl Physiol.* 132: 773-784
287. Venturelli M., M.J. Rossman, S.J. Ives, J.C. Weavil, M. Amann, D.W. Wray, and **R.S. Richardson.** (2022) Passive leg movement-induced vasodilation and exercise-induced sympathetic vasoconstriction. *Auton Neurosci.* 239:102969
288. Groot H.J., R.M. Broxterman, J.R. Gifford, R.S. Garten, M.J. Rossman, C.L. Jarrett, O.S. Kwon, J.R. Hydren, and **R.S. Richardson.** (2022) Reliability of the passive leg movement assessment of vascular function in men. *Exp. Physiol.* 107:541-552.
289. Cho, J.M., S.K. Park, O.S. Kwon, D.T. La Salle, J. Cerbie, C.C. Fermoyle<sup>1</sup>, D. Morgan, A. Nelson, A. Bledsoe, L.P. Bharath, M. Tandar, S.P. Kunapuli, **R.S. Richardson,** P.V.A Babu<sup>1</sup>, S. Mookherjee, B.K. Kishore, F. Wang, T. Yang, S. Boudina, J.D. Trinity, and J.D. Symons. (2022) Activating P2Y<sub>1</sub> receptors improves function in arteries with repressed autophagy. *Cardiovasc. Res.* 119:252-267.
290. Fermoyle CC, R.M. Broxterman, D.T. La Salle, S.M. Ratchford, P.N. Hopkins, **R.S. Richardson,** and J.D. Trinity. (2022) Persistent vascular dysfunction following an acute nonpharmacological reduction in blood pressure in hypertensive patients. *J. Hypertens.* 1;40:1115-1125
291. Broxterman RM, D.T. La Salle, J. Zhao, V.R. Reese, O.S. Kwon, **R.S. Richardson,** and J.D. Trinity. (2022) Dietary Nitrate Supplementation and Small Muscle Mass Exercise Hemodynamics in Patients with Essential Hypertension. *J. Appl. Physiol.* 133:506-516.

292. Craig JC, C.R. Hart, G. Layec, O.S. Kwon, **R.S. Richardson**, and J.D. Trinity. (2022) Impaired hemodynamic response to exercise in patients with peripheral artery disease: evidence of a link to inflammation and oxidative stress. Am. J. Physiol. Regul. Integr. Comp. Physiol. 1;323:R710-R719.
293. Kwon OS, S.G. Noh, SH Park, R.H.I. Andtbacka, J.R. Hynstrom, and **Richardson RS**. (2022) Ageing and endothelium-mediated vascular dysfunction: the role of the NADPH oxidases. J. Physiol. (in press) 601:451-467.
294. Bunsawat K, and R.S. Richardson. (2023) Sex as a biological variable in exercise prescription: a critical consideration in developing a road map for sex-related differences in cardiovascular research. Am. J. Physiol. Heart Circ. Physiol. 324:H126-H128.
295. Kwon OS, S.T. Decker, J. Zhao, J.R. Hoidal, T. Heuckstadt, K.A. Sanders, **Richardson RS**, and G. Layec. (2023). The receptor for advanced glycation end products (RAGE) is involved in mitochondrial function and cigarette smoke-induced oxidative stress. Free Radic. Biol. Med. 195:261-269.
296. Fermoyle C.C., D.T. La Salle, J.K. Alpenglow, J.C. Craig, C.L. Jarrett, R.M. Broxterman, A.I. McKenzie, D.E. Morgan, N.M. Birgenheier, D.W. Wray, **Richardson RS**, and J.D. Trinity. (2023) Pharmacological modulation of adrenergic tone alters the vasodilatory response to passive leg movement in young but not in old adults. J. Appl. Physiol. (in press).
297. Shields KL, C.L. Jarrett, A.V. Bisconti, S.H. Park, J.C. Craig, R.M. Broxterman, and R.S. Richardson. (2023) Preserved endothelium-independent vascular function with aging in men and women: evidence from the peripheral and cerebral vasculature J. Appl. Physiol. (in press).

## Chapters:

1. **Richardson, R.S.** (1991) Testing the elite athlete, in United States Olympic Committee, Olympic USA: A Team Effort, Chapter 15: 149-153.
2. Wagner, P.D., Eldridge, Podolsky, A., **Richardson, R.S.**, Johnson, D.H., Knight, D.R., Johnson, E.C., Hopkins, S.R., Michimata, H., Grassi, B., Feiner, J., Kurdak, S.S., Bickler, P.E. and J. Severinghaus (1995). Elevated wedge pressure in HAPE-susceptible subjects during exercise. Hypoxia and the Brain. Eds. Sutton, J.R. Houston, C.S., and Coates, G. Queen City Printers, Inc., Burlington, VT., Chapter 21: 251-264.
3. **Richardson, R.S.** (2002) VEGF gene expression and exercise training adaptation. Exercise Nutrition and Environmental Stress Volume 2. Eds. Hiroshi Nose, Cooper Publishing Traverse City, MI. Chapter 5: 85-99.
4. **Richardson, R.S.** (2009) Exercise and decompression. The Future of Diving: 100 years of Haldane and Beyond. Eds. M.A. Lang and A.O. Brubakk. Smithsonian Institution Scholarly Press, Smithsonian, Washington D.C. Chapter: 8, 41-45.

## 3. Invited Lectures

1. Richardson, R.S. (1991). Physiological Testing of Elite Athletes. The International Olympic Committee (IOC) Academy XV. Colorado State University, Fort Collins, CO.

2. Richardson, R.S. (1991). Exercise: Membership has its Privileges! American Express, Salt Lake City, UT.
3. Richardson, R.S. (1991). Exercise Physiology for the Athlete. Spring Performance Clinic. Salt Lake City, UT.
4. Richardson, R.S. (1992). The "Link" Between Nutrition and Exercise. The Latter Day Saints 5. Church, Salt Lake City, UT.
6. Richardson, R.S. (1991). Nutrition and Fluid Balance: Concepts for the Athlete. Summer Performance Clinic. Salt Lake City, UT.
7. Richardson, R.S. (1993). Physiology of Performance. U.S.A. Visa Decathlon Team, Tempe, AZ.
8. Richardson, R.S. (1993) Human Muscle Blood Flow in Exercise: New Insights. Department of Exercise and Sport Research Institute, Arizona State University, Tempe, AZ.
9. Richardson, R.S. (1994) *In vivo* studies of oxygen supply and demand in human muscle. School of Medicine, The Johnson Research Foundation, Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, PA.
10. Richardson, R.S. (1995) Oxygen transport: Air to Muscle cell. American College of Sports Medicine, Minneapolis, MN. Symposium.
11. Richardson, R.S. (1998)  $VO_{2max}$ : Governed by oxygen delivery or demand? American College of Sports Medicine, Orlando, FL. Symposium.
12. Richardson, R.S. (1998) Oxygen Transport from Air to Cell. Southwest Chapter American College of Sports Medicine, La Vegas, Symposium.
13. Richardson, R.S. (1999) Skeletal muscle in chronic respiratory diseases European Respiratory Society Research Seminar, Rome, Italy.
14. Richardson, R.S. (1999) Myoglobin measurements: Access to intracellular  $PO_2$ . Oxygen transport and utilization, Acta Physiological Scandinavica Symposium, Copenhagen Denmark.
15. Richardson, R.S. (1999) Oxygen transport and metabolism in exercising human skeletal muscle. August Krogh Institute, Copenhagen, Denmark.
16. Richardson, R.S. (1999) Determinants of maximal oxygen uptake. Odense University, Odense, Denmark.
17. Richardson, R.S. (1999) Maximal oxygen uptake: limitations and determinants. University of Oslo, Oslo, Norway.
18. Richardson, R.S. (2000) Oxygen transport and blood flow during exercise in humans. University of Kobe, Kobe, Japan.
19. Richardson, R.S. (2000) Metabolism and blood flow during exercise in humans. University of Tokyo, Tokyo, Japan.
20. Richardson, R.S. (2001) Skeletal muscle intracellular  $PO_2$  and exercise. International Workshop: Non Invasive Investigation of muscle function. Marseilles, France.
21. Richardson, R.S. (2001) Exercise training adaptations and VEGF gene expression. University of Tskuba, Tskuba, Japan.
22. Richardson, R.S. (2001) VEGF gene expression and exercise training adaptation. International sports science network forum. Nagano, Japan.
23. Richardson, R.S. (2001) Evolving techniques for the investigation of bioenergetics and oxygenation. Royal Biochemical and Physiological Society joint meeting. York, England.
24. Richardson, R.S. (2002) Bioenergetics perfusion and oxygenation in skeletal muscle. Groupe Hospitalier Pitié-Salpêtrière, Paris, France.
25. Richardson, R.S. (2002) Skeletal muscle – master or slave of the cardiovascular system? University of Trondheim, Trondheim, Norway.
26. Richardson, R.S. (2002) The effect of CHF and COPD on the metabolic capacity of human skeletal muscle. University of Trondheim, Trondheim, Norway.
27. Richardson, R.S. (2002) The effect of CHF and COPD on the metabolic capacity of human skeletal muscle. Norwegian Sports Medicine and Occupational Therapy Conference, Trondheim, Norway.

28. Richardson, R.S. (2002) Skeletal muscle – master or slave of the cardiovascular system? Norwegian Sports Medicine and Occupational Therapy Conference, Trondheim, Norway.
29. Richardson, R.S. (2002) Exercise and aging: From bench to bedside. American College of Chest Physicians, San Diego.
30. Richardson, R.S. (2003) MRS AND MRI: Bioenergetics and oxygenation. University of Waterloo, Ontario, Canada.
31. Richardson, R.S. (2003) Vascular function during exercise and age. University of Guelph, Ontario, Canada
32. Richardson, R.S. (2003) Exercise and the integration of muscle systems. Experimental Biology, San Diego.
33. Richardson, R.S. (2003) Changes in intracellular PO<sub>2</sub> with exercise: Evidence from MRS Experimental Biology, San Diego.
34. Richardson, R.S. (2004) Aging, exercise and cardiovascular disease. Kaiser Hospital, Richmond, CA.
35. Richardson, R.S. Evolving techniques for the investigation of muscle bioenergetics and oxygenation (2004) TMJ Society Annual Meeting, Bethesda, MD.
36. Richardson, R.S. (2004) Skeletal muscle oxidative metabolism in heart failure patients: 31P-MRS assessment of O<sub>2</sub> supply and demand limitations. Cellular Biology of Exercise Training in Cardiovascular Disease Symposium. Trondheim, Norway.
37. Richardson, R.S. (2005) Oxygenation and exercising skeletal muscle. American College of Sports Medicine. Nashville, TN.
38. Richardson, R.S. (2005) Skeletal muscle in COPD: Evidence from human studies. American College of Sports Medicine. Nashville, TN.
39. Richardson, R.S. (2005) Sources of skeletal muscle metabolic heterogeneity. Non-Invasive Human Physiology Workshop. Nashville, TN.
40. Richardson, R.S. (2005) Skeletal muscle free radical generation with exercise and aging. Free Radical Research Society: Australia and Japan. Gold Coast, Australia.
41. Richardson, R.S. (2005) Limitations to maximal exercise: New insights. The School of Physiotherapy and Exercise Science, Griffith University, Australia.
42. Richardson, R.S. (2006) Muscle oxygenation: The role of exercise and aging. The Health Science Center, Fort Worth, TX.
43. Richardson, R.S. (2006) Dynamics of myoglobin desaturation during exercise in humans. American College of Sports Medicine. Denver, CO.
44. Richardson, R.S. (2006) Exercise, aging, and oxidative stress. Exercise in Medicine, NTNU, Trondheim, Norway.
45. Richardson, R.S. (2007) Vascular function: Aging, exercise and oxidative stress. University of Utah, Division of Geriatrics, Salt Lake City, UT.
46. Richardson, R.S. (2007) Skeletal muscle oxygenation state: Implications for exercise and aging. Copenhagen Muscle Research Center, Copenhagen, Denmark.
47. Richardson, R.S. (2007) Aging vascular function and free radicals. University of California, San Diego, Department of Medicine, La Jolla, CA.
48. Richardson, R.S. (2007) Exercise and intracellular oxygenation state. August Krogh Institute, Copenhagen, Denmark.
49. Richardson, R.S. (2007) Exercise, Aging and Oxidative Stress, South West America College of Sports Medicine, San Diego
50. Richardson, R.S. (2007) Aging and the limitations to exercise, Human Anatomy and Physiology Society National Meeting.
50. Richardson, R.S. (2008) Aging, Exercise, and Oxidative Stress, Department of Exercise and Sport Science, University of Utah.
51. Richardson, R.S. (2008) Aging, Exercise, and Oxidative Stress, Department of Medicine Grand Rounds, University of Utah.

52. Richardson R.S. (2008) Muscle metabolism, perfusion and oxygenation assessed by NMRI. Treat-NMD/MRI European Neuromuscular/NIH workshop Naarden, The Netherlands.
53. Richardson, R.S. (2008) Exercise and intracellular oxygenation state. Copenhagen Muscle Research Center, Copenhagen, Denmark.
54. Richardson, R.S. (2008) Human muscle blood flow and metabolic assessment applied to aging. American College of Sports Medicine. Indianapolis, IN.
55. Richardson, R.S. (2008) Skeletal muscle in COPD and CHF as targets for exercise training Exercise in Medicine, NTNU, Trondheim, Norway.
56. Richardson, R.S. (2008) Exercise and decompression at the future of Diving: 100 years of Haldane and beyond, NTNU, Trondheim, Norway.
57. Richardson, R.S. (2009) Exercise limitation in COPD: The role of skeletal muscle. Grand Rounds, Division of Pulmonary and Critical Care Medicine, University of Utah.
58. Richardson, R.S. (2009) Aging, exercise and intracellular oxygenation state. Panam Institute, Copenhagen, Denmark.
59. Richardson, R.S. (2009) Exercise hyperemia: Partitioning the peripheral and central factors. European College of Sports Sciences, Oslo
60. Richardson, R.S. (2009) Effects of obstructive pulmonary disease and heart failure on skeletal muscle. Scandinavian Research Network meeting, Oslo
61. Richardson, R.S. (2009) Oxidative stress, aging, and vascular function. University of Milan, School of Exercise Science, Milan, Italy.
62. Richardson, R.S. (2010) Intracellular oxygenation and age. Copenhagen Muscle Research Center, Copenhagen, Denmark.
63. Richardson, R.S. (2010) Exercise-induced hyperemia, the impact of age and oxidative stress. University of Verona, Italy.
64. Richardson, R.S. (2010) Oxidative-nitrosative stress and its impact on vascular O<sub>2</sub> transport to skeletal muscle, American College of Sports Medicine. Baltimore, MA.
65. Richardson, R.S. (2010) Antioxidants and exercise is there a paradox? Aging and antioxidants. American College of Sports Medicine, Baltimore, MA.
66. Richardson, R.S. (2010) Antioxidants and exercise is there a paradox? Rocky Mountain Geriatrics Conference, Park City, UT
67. Richardson, R.S. (2010) Exercise and aging vasculature: The role of oxidative stress. South West Chapter, American College of Sports Medicine, San Diego, CA.
68. Richardson R.S. (2010) Exercise and oxygen availability: The cellular impact. The Division of Endocrinology Metabolism Interest Group Guest Lecture series, University of Utah.
69. Richardson, R.S. (2010) Skeletal muscle blood flow assessment: Arterial spin labeling as an approach. Copenhagen Muscle Research Center, Copenhagen, Denmark.
70. Richardson, R.S. (2010) Tissue oxygenation during rest and exercise. Copenhagen Muscle Research Center, Copenhagen, Denmark.
71. Richardson, R.S. (2010) Exercise and oxygen availability: The Cellular impact. University of Milan, Italy.
72. Richardson, R.S. (2010) Intracellular oxygen availability: The impact of exercise and hypoxia. NTNU, Trondheim, Norway.
73. Richardson, R.S. (2011) Assessing intracellular oxygenation with a focus upon aging. Copenhagen Muscle Research Center, Copenhagen, Denmark.
74. Richardson, R.S. (2011) Oxygen: From mitochondria to medals. American College of Sports Medicine, Denver, CO.
75. Richardson, R.S. (2011) Antioxidants, aging, and exercise: Is there a paradox? University of Florida, VA Geriatric Research Education and Clinical Center, and the Institute on Aging



76. Richardson, R.S. (2011) The paradox of oxidative stress and exercise with advancing age, Norwegian University of Science and Technology (NTNU), Trondheim, Norway
77. Richardson, R.S. (2012) Determinants of  $VO_{2max}$  in health and disease, University of Utah, Exercise and Sport Science and Utah Vascular Research Laboratory Colloquium series.
78. Richardson, R.S. (2012) Intracellular oxygenation assessment, with a focus upon aging. Copenhagen Muscle Research Center, Copenhagen, Denmark.
79. Richardson R.S. (2012) Determinants of  $VO_{2max}$  in health and disease, The Division of Endocrinology Metabolism Interest Group Guest Lecture series, University of Utah.
80. Richardson, R.S. (2012) Imaging skeletal muscle blood flow and metabolism with NMR. Copenhagen Muscle Research Center, Copenhagen, Denmark.
81. Richardson, R.S. (2012) Skeletal muscle studied with NMR: What do we know and would like to know? Department of Radiology, University of Utah.
82. Richardson, R.S. (2012) Aging, exercise, and oxidative stress. University of Oregon, Eugene, OR.
83. Richardson, R.S. (2012) Determinants of  $VO_{2max}$  in health and disease, Department of Anatomy, Kinesiology, and Applied Physiology, Kansas State University, Manhattan, KS.
84. Richardson, R.S. (2013) Methods to assess intracellular oxygenation in vivo. Copenhagen Muscle Research Center, Copenhagen, Denmark.
85. Richardson, R.S. (2013) Assessing vascular function with active and passive exercise: is this the way of the future? American College of Sports Medicine, Indianapolis.
86. Richardson, R.S. (2013) Evidence of preserved vascular function in individuals with a spinal cord injury. American College of Sports Medicine, Indianapolis.
87. Richardson, R.S. (2013) Air Quality, oxidative stress, and vascular health. University of Utah, Air Quality, Health and Society Retreat.
88. Richardson, R.S. (2013) Assessing vascular function with active and passive exercise: is this the way of the future? Division of Geriatrics Research Conference, University of Utah.
89. Richardson, R.S. (2014) Intracellular oxygenation implications from in vivo measurements Copenhagen Muscle Research Center, Copenhagen, Denmark.
90. Richardson, R.S. (2014) Oxygen availability in health and disease during exercise. Experimental Biology, San Diego.
91. Richardson, R.S. (2014) Aging and efficiency during whole body non-weight bearing exercise. American College of Sports Medicine, Orlando.
92. Richardson, R.S. (2014) Presidents Lecture: Research Perspectives on Exercise and Aging. Scienze Motorie e Sportive Congresso Nazionale, Naples, Italy.
93. Richardson, R.S. (2014) Oxygen transport and Utilization: The impact of aging and immobility. Societa Italiana di Fisiologia Anacapri, Italy.
94. Richardson, R.S. (2014) Aging and Immobility: Differential effects in the old and oldest old, Department of Geriatric Medicine, University of Verona, Verona, Italy.
95. Richardson, R.S. (2014) Heart Failure: submaximal and maximal exercise limitations. School of Exercise Science, University of Milan, Milan, Italy.
96. Richardson, R.S. (2014) The Role of Skeletal Muscle Convective and Diffusive Oxygen Transport in HFrEF. Gerontological Society of America Annual Meeting, Washington D.C.
97. Richardson, R.S. (2014) Assessing vascular function with active and passive exercise: is this the way of the future? Department of Kinesiology, University of Georgia, Athens, GA.
98. Richardson, R.S. (2014) Maximal Respiration what are the limits? Department of Exercise and Sport Science, University of Utah, Salt Lake City, UT.
99. Richardson, R.S. (2015) Vascular consequences of inhaled particulate matter: vulnerability in health and disease. Air Quality in Utah: Science for Solutions Joint Workshop: Utah Division of Air Quality and University of Utah Program for Air Quality, Health, and Society. Salt Lake City, UT.

100. Richardson, R.S. (2015) Aging and skeletal muscle work efficiency. 29th Annual Update in Physical Medicine and Rehabilitation Conference, Park City, UT.
101. Richardson, R.S. (2015) Oxygen supply and mitochondrial function. Mitochondrial Physiology: From Organelle to Organism. University of Copenhagen, Denmark.
102. Richardson, R.S. (2015) Skeletal muscle function and aging. School of Medicine, Division of Geriatric Medicine, Colorado University
103. Richardson, R.S. (2015) Efficiency of Mobility with age. Department of Medicine, Division of Geriatrics, University of Utah.
105. Richardson, R.S. (2015) Muscle efficiency and aging. National Academy of Kinesiology National Meeting, Philadelphia.
105. Richardson, R.S. (2015) Vascular function assessment with passive limb movement: A clinically relevant approach. Department of Kinesiology and Applied Physiology, University of Delaware, Newark.
106. Richardson, R.S. (2015) Oxygen availability and skeletal muscle mitochondrial function in health and disease. Korean Physiological Society, Busan, South Korea.
107. Richardson, R.S. (2015) Passive Leg Movement as a Clinically Relevant Tool with which to Assess Vascular Function in Health and Disease. Korean National University, Busan, South Korea.
108. Richardson, R.S. (2016) Evolving methods to assess vascular function in health and disease. University of Milan, Italy.
109. Richardson, R.S. (2016) Exercise and healthy aging. University of Verona, Italy.
110. Richardson, R.S. (2016) Vascular aging and mobility: Implications from head to toe. Virtual All GRECC Conference.
111. Richardson, R.S. (2016) Vascular consequences of inhaled particulate matter: Vulnerability in health and disease, Mountain West Regional Chapter of the Society of Toxicology, University of Utah.
112. Richardson, R.S. (2016) Oxygen and Exercise Performance from Organism to Organelle, Aalborg University, Denmark
113. Richardson, R.S. (2016) Oxygen: Essential for life, important for exercise performance, South West American College of Sports Medicine, Orange County, CA.
114. Richardson, R.S. (2017) Peripheral vascular pulsatility and function in heart failure with mechanical circulatory assist. Utah Cardiac Recovery Symposium, Salt Lake City, Utah.
115. Richardson, R.S. (2017) Convective and Diffusive Oxygen Transport in Heart Failure: Partitioning the Contributors to Exercise Intolerance. American College of Sports Medicine, Denver, CO.
116. Richardson, R.S. (2017) Cardiovasomobility: Linking cardiovascular health and mobility, University of Milan, Milan, Italy
117. Richardson, R.S. (2017) Limitations to exercise with advancing age and age-related disease, University of Milan, Milan, Italy
118. Richardson, R.S. (2017) Exercise is the fountain of youth: Metabolic and vascular evidence, 7<sup>th</sup> Mountain Sports and Health Congress, Centro Ricerca Sport Montagna e Salute, Rovereto, Italy
119. Richardson, R.S. (2017) Vascular factors associated with healthy aging: New evidence in the brain and muscle, Il ruolo stile di vita per un invecchiamento di successo, Mazzali Foundation and University of Verona, Mantova, Italy.
120. Richardson, R.S. (2018) HFpEF and HFrEF: Distinct phenotypes or a continuum? Understanding the role of the periphery. Utah Cardiac Recovery Symposium (U-CARS), University of Utah, Salt Lake City, UT.
121. Richardson, R.S. (2018) Cardiovasomobility: A concept that should be close to our hearts and, oh yes, our brains. University of Verona, Verona, Italy.
122. Richardson, R.S. (2018) Reactive oxygen species and the vasculature: Implications for antioxidant and exercise treatment, Italian Physiological Society, Florence, Italy.
123. Richardson, R.S. (2018) Cardiovasomobility: A concept that should be close to our hearts and, oh yes, our brains. Brunel University, London England.

124. Richardson, R.S. (2019) Is it aging or inactivity that increases our risk of cardiovascular disease and decreases our exercise capacity as we get older? Brigham Young University, Provo, Utah.
125. Richardson, R.S. (2019) Exercise is the fountain of youth and important for the prevention of diabetes too! University of Utah Diabetes and Metabolism Research Center, Salt Lake City, UT.
126. Richardson, R.S. (2019) Cardiovasomobility: A concept that should be close to our hearts and, oh yes, our brains. University of South Wales, Cardiff, Wales.
127. Richardson, R.S. (2019) Intracellular oxygen availability and exercise. University of Verona, Verona, Italy.
128. Richardson, R.S. (2019) Research in the aging domain: old knowledge and future perspectives. Health through movement with aging: the 30<sup>th</sup> anniversary (1989-2019) of the University and City of Verona working together. Verona, Italy.
129. Richardson, RS (2021) Skeletal muscle with aging and physical activity. American College of Sports Medicine national meeting (virtual).
130. Richardson, R.S. (2021) Symmorphosis and exercise capacity. The role of exercise training. First International University of physical activity and exercise, University of Verona, Verona, Italy.
131. Richardson, R.S. (2022) Edward F. Adolph Distinguished Lectureship: The Symmorphosis of Aerobic Capacity in Health and Disease: Reason to Dys the Sym? The American Physiological Society, Philadelphia, PA.