

Jayson Gifford, Ph.D.

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Faculty Appointments

Assistant Professor, Brigham Young University **2017-Current**

- Department of Exercise Sciences
- Gerontology Program Affiliate

Education and Experience

Postdoctoral Fellowship in Geriatrics and Cardiovascular Medicine **2015-2017**

- United States Department of Veterans Affairs and University of Utah
Department of Internal Medicine

Doctoral Degree of Exercise Physiology **2011-2015**

- University of Utah
- Mentor: Russell Richardson
- Dissertation: *Cardiovascular and Metabolic Influences on Oxygen Supply and Demand in Humans*

Master's Degree of Exercise Physiology **2009-2011**

- Brigham Young University
- Mentor: Gary Mack

Bachelor's Degree of Exercise Science **2006-2009**

- Brigham Young University (Magna Cum Laude)

Publications

Published

*IF: Journal Impact Factor

1. Layec G, Blain GM,..**Gifford JR**,... Richardson RS. *Acute high intensity exercise impairs skeletal muscle respiratory capacity*. MSSE 2018. (IF 4.3)
2. Hart CR, Layec G, **Gifford JR**, Richardson RS. *Oxygen availability and skeletal muscle oxidative capacity in patients with peripheral arterial disease. Implications from in vivo and in vitro assessments*. AJP-Heart and Circ 2018. (IF 3.3)
3. Hart CR, Layec G, **Gifford JR**, Richardson RS. *Increased skeletal muscle mitochondrial free radical production in peripheral arterial disease despite preserved mitochondrial capacity*. Experimental Physiology. 2018. (IF 2.8)
4. **Gifford JR**, Trinity JD,..Richardson RS. *Altered skeletal muscle mitochondrial phenotype in COPD: Disease vs. Disuse*. Journal of Applied Physiology. 2017 (IF 3.4)
5. **Gifford JR**, Richardson RS. CORP: Ultrasound assessment of vascular function with the passive leg movement technique. Journal of Applied Physiology. 2017. (IF 3.4)
6. Broxterman RS, Trinity JD, **Gifford JR**...Richardson RS. Single passive leg movement assessment of vascular function: The contribution of nitric oxide. Journal of Applied Physiology. In Press. 2017 (IF 3.4)
7. Ives SJ...**Gifford JR**, Richardson RS. TRPV1 channels in human skeletal muscle feed arteries: implications for vascular function. Experimental Physiology. 102, 9, 2145-1258. 2017. (IF 2.8)
8. **Gifford JR**, Weavil JC, Nelson A. *Symmmorphosis in patients with heart failure?* Journal of Applied

- Physiology. In Press. (IF 3.4)
9. Machin DR, Clifton HL, Garten RS, **Gifford JR**, Donato JD. *Exercise-induced brachial artery blood flow and vascular function is impaired in systemic sclerosis*. *AJP Heart and Circ*. In Press (IF 3.6).
 10. **Gifford JR**, Garten RS, Trinity JD, Nelson A, Richardson RS. *Symmorphosis and skeletal muscle VO_2 max: In vivo and in vitro measures reveal differing constraints in the exercise-trained and untrained human*. *Journal of Physiology*. 594:1741-1751, 2016. (IF 5.0)
 11. Park SY, Trinity JD, **Gifford JR**, Diakos NA, Drakos S, Richardson RS. *Mitochondrial function in heart failure: The impact of ischemic and non-ischemic etiology*. *International Journal of Cardiology* 220, 711-717, 2016. (IF 4.0)
 12. Park SY, Ives S, **Gifford JR**, Richardson RS. *Impact of age on vasodilatory function in human skeletal muscle feed arteries*. *AJP Heart and Circ*. 310: H217-H225, 2016. (IF 3.6)
 13. **Gifford JR**, Trinity JD, Garten RS, Richardson RS. *Quadriceps exercise intolerance in patients with chronic obstructive pulmonary disease: The role of altered skeletal muscle mitochondrial respiration*. *Journal of Applied Physiology*. 119:882-888, 2015. (IF 3.4)
 14. Layec G, **Gifford JR**, Hart C, Richardson RS. *Accuracy and precision of quantitative 31P -MRS measurements of skeletal muscle mitochondrial function*. *AJP-Endo and Metab*, In Press. (IF 4.3)
 15. Park SY, Rossman MH, **Gifford JR**, Able D, Riehl C. *Exercise training improves vascular mitochondrial function*. *American J of Physiology. Heart and Circ*. 310:H821-H829, 2016. (IF 3.6)
 16. Witman MAH, Garten RS, **Gifford JR**, Stehlik J, Richardson RS. *Further peripheral vascular dysfunction in heart failure patients with a continuous-flow left ventricular assist device: The role of pulsatility*. *Journal of American College of Cardiology: Heart Failure*. 3: 703-711, 2015. (IF 7.2)
 17. **Gifford JR**, Ives SJ, Park SY, Andtbacka RHI, Hyngstrom JR, Mueller MT, Treiman GS, Ward C, Trinity JD, Richardson RS. *α_1 and α_2 adrenergic responsiveness in humans skeletal muscle feed arteries: the role of TRPV ion channels in heat-induced sympatholysis*. *American Journal of Physiology-Heart and Circulatory Physiology*. 307, H1288-H1297, 2014. (IF 3.6)
 18. Park SY, **Gifford JR**, Andtbacka RHI, Trinity JD, Hyngstrom JR, Garten RS, Diakos NA, Ives SJ, Dela F, Larsen S, Drakos S, Richardson RS. *Cardiac, skeletal and smooth muscle mitochondrial respiration: are all mitochondria created equal?* *American Journal of Physiology-Heart and Circulatory Physiology*. 307, 3, 346-352, 2014. (IF 3.6)
 19. Garten RS, Groot HJ, Rossman MJ, **Gifford JR**, Richardson RS. *The role of muscle mass in exercise-induced hyperemia*. *Journal of Applied Physiology*, 116(9), 1204-1209, 2014. (IF 3.4)
 20. Ives SJ, Andtbacka RHI, Noyes RD, Morgan RG, **Gifford JR**, Park S-Y, Symons JD, and Richardson RS. *α_1 -Adrenergic responsiveness in human skeletal muscle feed arteries: The impact of reducing extracellular pH*. *Experimental Physiology* 98: 256-267, 2013. (IF 2.8)
 21. **Gifford JR**, Heal C, Bridges J, Goldthorpe S, Mack, GW. *Changes in dermal interstitial ATP levels during local heating of human skin*. *The Journal of Physiology*, 590,6403-6411, 2012. (IF 5.0)
 22. Ives SJ, Andtbacka R, Park SY, **Gifford JR**, Noyes RD, et al. *Human skeletal muscle feed arteries: Evidence of regulatory potential*. *Acta physiologica*, 206, 2012. (IF 4.4)

Selected Abstracts and Presentations

1. Wallace T, Hafen P, Hyldahl R, **Gifford JR**. The impact of muscle disuse and heat therapy on vascular endothelial function. SWACSM 2018.
2. Hanson B ... **Gifford, JR**. The relationship between passive leg movement induced hyperemia and exercise blood flow. SWACSM 2018.
3. Gifford JR, Nelson AD, Garten RS, Trinity JD, Richardson, RS. *Peripheral Components of the Oxygen Cascade Contribute to the Age-related Decline in VO_{2max}*. ACSM, 2017.
4. **Gifford JR**, Garten RS, Richardson RS. *Enhancements in mitochondrial quality in endurance trained skeletal muscle*. Experimental Biology, 2016.
5. Clifton HL, Garten RS, **Gifford JR**, Wray DW. *Effect of BH4 supplementation on vascular function in heart failure with reduced ejection fraction*. Experimental Biology, 2016.
6. Witman MAH, Garten RS, **Gifford JR**, Groot HJ, Richardson RS. *Peripheral Vascular Dysfunction Following Left Ventricular Assist Device Implantation: Insight from Passive Leg Movement*. American College of Sports Medicine-Annual Conference. 2016.
7. **Gifford JR**, *Effect of Particulate Matter Air Pollution on Cardiopulmonary function of older adults and patients with COPD*. Utah Conference on Safety and Industrial Hygiene: 2015.
8. **Gifford JR**, Mangum T, Nelson A, Richardson RS. *Effect of Particulate Matter Air Pollution on Cardiopulmonary function of older adults*. Utah Air Quality Retreat: 2014.
9. **Gifford JR**, Garten RS, Trinity J, Park SY, Richardson RS. *Altered skeletal muscle respiration in patients with COPD: mitochondrial density or dysfunction?* Experimental Biology, 2013.
10. Garten RS, Groot HJ, Rossman MJ, **Gifford JR**, and Richardson RS. *Is Normalizing Exercise-Induced Blood Flow for Muscle Mass Necessary?* University of Utah. ACSM, May 2013.
11. **Gifford JR**, Bridges J, Heal C, Marshall B, Goldethorpe S, Mack GW. *Changes in interstitial ATP levels and blood flow during local heating of human skin*. Experimental Biology, 2012.

Funding and Awards

Funded

- VA Merit Grant (2017-2020) \$1,100,000**
- *Vascular Endothelial Function in Alzheimer's Disease: A Potential Therapeutic Target*
 - Role: Grant Author and Co-Investigator
 - This grant, which I designed and wrote on behalf of my post-doctoral mentor, recently scored in the 6th percentile is set to be funded starting January 2017. It is a four-year grant to investigate the role of cerebral vascular endothelial function, assessed with Doppler ultrasound, in the progression and treatment of Alzheimer's disease.
- VA Advanced Fellowship in Geriatrics (2015-2017) \$50,000/yr**
- *Lifestyle and Environmental Influences on Cardio-metabolic Function in Older Adults*
 - Role: Grant Author and Primary Investigator
 - With this competitive postdoctoral fellowship awarded by the Department of Veterans Affairs: Geriatric Research National Committee, I am exploring the impact of exercise training on the decrements in cardio-metabolic function that lead to decreased aerobic fitness (*i.e.* VO_{2max}) with age. A second aim of this fellowship is to detail the impact of exposure to ambient air pollution on cardiovascular function in older adults.
- Utah Program for Air Quality Seed Grant (2013-2015) \$25,000**
- *Effect of Particulate Matter Air Pollution on Vascular Function in COPD*
 - Role: Grant Author and Co-Primary Investigator
 - The purpose of this study was to determine if the deleterious cardiovascular effects of particulate matter air pollution are mediated through vascular endothelial dysfunction, with the hope of developing therapeutic strategies to mitigate the cardiovascular consequences of pollution exposure.
- University of Utah: Research Travel Award (2011-2015) \$800/yr**

University of Utah: Nielson Scholarship Recipient (2014-2015) **\$1,000**
Brigham Young University: Full Academic Scholarship (2006-2009) **\$7,000/yr**

Pending

NASA Human Research Program **\$145,000**

- *Disuse-Induced Muscle Dysfunction and Exercise Intolerance: A Potential Therapeutic Role for Passive Heat*
- Role: Primary Investigator
- This grant proposes to investigate the use of daily heat therapy to mitigate the impact of muscle disuse on cardiometabolic health and exercise tolerance.

NIH R01 **\$145,000**

- **The Impact of Repeated Exposure to Heat Stress on Mitochondrial Function**
- Role: Co-Investigator
- This grant proposes to investigate the use of daily heat therapy to improve mitochondrial function in various situations, including muscle disuse.

Unfunded

AHA Postdoctoral Fellow Award **\$45,000/yr**

- *Effect of Particulate Matter Air Pollution on Vascular Function in COPD*
- Role: Primary Investigator
- This fellowship, which was later funded by the Department of Veterans Affairs, was designed to investigate the effect of particulate matter air pollution on vascular endothelial function.

NIH Predoctoral Fellow Award (F31; 2013) **\$22,000/yr**

- *Effect of COPD on Skeletal Muscle Mitochondrial Function*
- Role: Primary Investigator
- This application sought funding for part of my doctoral dissertation, which sought to investigate the role of mitochondrial dysfunction in the skeletal muscle dysfunction exhibited by patients with chronic obstructive pulmonary disease (COPD).

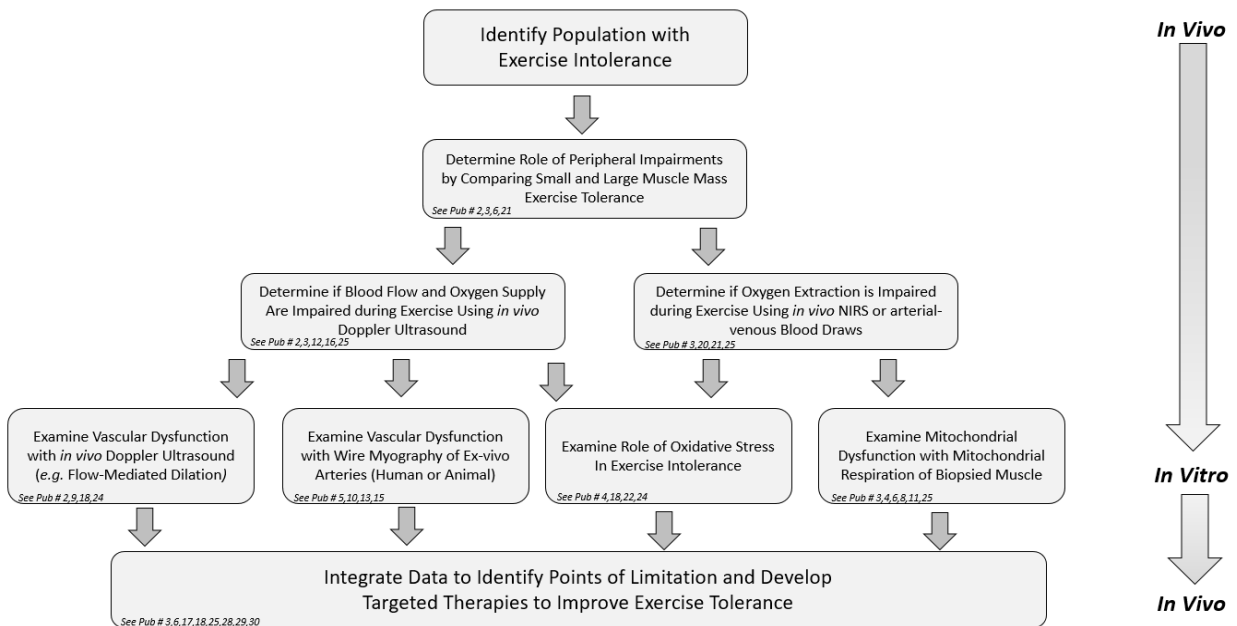
Research Experience

General Research Focus and Model

Aerobic exercise intolerance impairs quality of life and exacerbates disease progression in many different disease states. While much is known about the role of central components (*e.g.* cardiac output, lung function) of exercise intolerance, the role of peripheral components (*e.g.* vascular conductance, mitochondrial metabolism) is relatively understudied.

As illustrated below, utilizing an *in-vivo-to-in-vitro*, translational approach, my research focuses on identifying peripheral impairments contributing to diminished aerobic capacity and subsequently developing targeted therapies to improve function. Publications demonstrating each technique are noted in each box. Note, that while I have most often used this top-down, translational approach in the context of exercise intolerance for populations like patients with lung disease or heart failure, I have also successfully applied this research model to other arenas like vascular dysfunction following pollution exposure, and even cognitive impairment in Alzheimer's disease.

Translational Approach for the Identification of Peripheral Impairments Affecting Exercise Intolerance and Targeted Therapies to Restore Function



Research Experience and Training

BYU: Cardiovascular Research Lab and Human Performance Research Center 2017-Present

- I oversee the research conducted in the BYU Cardiovascular Research Laboratory. In this lab, we investigate the impact of physical (in)activity, age and air pollution on cardiovascular function during exercise. We use an integrative approach, using techniques like Doppler ultrasound, indirect calorimetry and near infra-red spectroscopy to simultaneously probe the coordinated function of the many systems involved in the performance of exercise.
 - ◆ Skills Developed:
 - Student Mentoring
 - Grant writing

Veterans Administration Postdoctoral Fellow 2015-2017

- My research fellowship for the Department of Veteran Affairs and University of Utah Department of Internal Medicine is focused on the effect of physical activity and environmental factors (*e.g.* air pollution) on the decrements in cardiovascular and metabolic health associated with age.
 - ◆ Skills Developed:
 - Grant writing
 - Exercise testing in aged and diseased populations
 - Exercise training in aged populations
 - Intravenous and intra-arterial drug infusions
 - *In vivo* assessment of exercise blood flow with Doppler ultrasound
 - *In vivo* assessment of cerebral blood flow with Doppler ultrasound
 - *In vivo* assessment of metabolism with Near Infrared Spectroscopy (NIRS)

Utah Vascular Research Lab Research Assistant 2011-2015

- My research at the Utah Vascular Research lab came under the direction of Dr. Russ Richardson and focused on the effect of lifestyle factors (*e.g.* physical activity, aging, diet) and disease (*e.g.* COPD, Heart Failure) on vascular function and mitochondrial function.
 - ◆ Skills Developed:
 - *In vivo* assessment of muscle mitochondrial respiration with combination of Doppler Ultrasound and blood oxygen saturation in arterial-venous catheters
 - *In vitro* assessment of mitochondrial respiration with biopsied muscle fibers
 - *In vivo* assessment of vascular health with Doppler Ultrasound
 - *In vitro* assessment of vascular function with isolated vessel wire myography
 - *In vivo* assessment of pulmonary function (*e.g.* FEV₁) with metabolic cart

BYU Exercise Physiology Research Assistant 2010-2011

- My research experience came under the direction of Dr. Gary Mack and focused on mechanisms involved in the thermoregulatory response of skin blood flow and sweating to heat stress.
 - ◆ Skills Developed:
 - Laser Doppler flowmetry
 - Localized and whole body heating and cooling
 - Microdialysis
 - Biochemical assays

BYU Biomechanics Research Assistant 2009-2010

- My research in the BYU Biomechanics Lab came under the direction of Dr. Iain Hunter and focused on the relationship between kinematics and performance in collegiate runners and professional hammer throwers
 - ◆ Skills Developed:
 - 3D motion capture (Vicon)
 - 2D motion analysis (Peak Motus and Dartfish)

Teaching Experience

BYU Exercise Physiology Assistant Professor

2017-Current

- As an Assistant Professor, I teach a section of undergraduate exercise physiology in the Department of Exercise Sciences at Brigham Young University (BYU)
 - ◆ My responsibilities include:
 - Syllabus Creation
 - Lesson Planning and Assessments
 - Student Mentoring

U. of Utah Exercise Physiology Teaching Assistant

2013-2016

- For the past several years, I have volunteered as a teaching assistant for Dr. Dave Symons for undergraduate and graduate level exercise and cardiopulmonary physiology classes.
 - ◆ My responsibilities include:
 - Teaching exercise and cardiopulmonary physiology classes
 - Tutoring students one-on-one to help students understand the material
 - Leading group review sessions

U. of Utah Muscle Physiology and Pulmonary Physiology Guest Lecturer

2013-2016

- For the past several years, I have served as a guest lecturer for graduate-level courses in muscle physiology and metabolism, and pulmonary physiology.
 - ◆ My responsibilities include:
 - Teaching classes when the course instructor is unavailable
 - Designing and creating lesson plans and presentations

University of Utah: Teaching Specialist Certification

2012-2015

- Throughout my doctoral training I completed the *Higher Education Teaching Specialist* (HETS) program at the University of Utah. This multi-year program, taught by experts in pedagogy, prepares graduate students and professors to teach college students of diverse backgrounds.
 - ◆ As part of this program I:
 - Learned to develop lesson plans and teach with effective pedagogical techniques
 - Taught several classes while being evaluated by an expert teacher
 - Developed skills in classroom management and syllabus development
 - Developed a functioning online physiology class on the CANVAS Platform

BYU Functional Anatomy and Kinesiology Lab Instructor

2009-2011

- During my masters training I taught the undergraduate-level functional anatomy and kinesiology cadaver lab.
 - ◆ My responsibilities included:
 - Instructing weekly anatomy labs (10-20 students)
 - Creating, proctoring and grading midterm and final exams
 - Holding weekly office hours
 - Performing human dissection

Mentoring Experience

BYU: Cardiovascular Research Lab Research Mentor

2017-Present

- I oversee the research conducted in the BYU Cardiovascular Research Laboratory. As part of my duties, I guide the work of several undergraduate students.
 - ◆ My responsibilities include:
 - Teaching students about the research process
 - Holding regular lab meetings and journal clubs
 - Mentoring students as they design, conduct and analyze cardiovascular research studies.

Mentored Graduate Students

Committee Chair:

1. Brady Hanson. MS student. 2017-Present

Committee Member

1. Mike Dehyle. Ph.D. Student. 2017-2018.
2. Kent Crossley. Ph.D. Student. 2017-Present.

Mentored Undergraduate Students

1. Travis Bloomfield. 2017-Present.
 - Presented at SWACSM.
2. Trevor Davis. 2017-2018.
 - Presented at SWACSM.
3. Erin McMullin. 2017-2018.
 - Admitted to Physical Therapy School
4. Taysom Wallace. 2018-Present.
 - CURA Grant Recipient
 - Presented at SWACSM.
5. Amy Addington. 2018.
6. Meagan Proffitt. 2018- Present.
 - CURA Grant Recipient
7. Jason Kofoed. 2018-Present.