



Candidate for At-Large Member



Kevin Zwetsloot, PhD

Appalachian State University

Having been a member (both as a graduate student and faculty member) of the Southeast ACSM Regional Chapter for over 20 years, I have experienced the storied tradition that SEACSM has established for bringing top-notch scientists and rising student research trainees together for outstanding annual meetings. If elected to serve as a SEACSM Executive Board Member, I wish to continue the rich history that SEACSM has founded by facilitating annual meetings that combine quality research presentations with a genuinely unique learning experience for student trainees. As a student-centered faculty member at App State, I customarily bring a group of students to the annual meeting because I believe attending conferences is one of the best ways to foster scientific development, not to mention the excellent networking opportunities quality scientific conferences, like the SEACSM annual meeting can provide. My research investigating the role inflammation/immune function plays in sarcopenia, skeletal muscle repair after injury, and the exercise response to the gut microbiome consistently involves student trainees, many of whom have presented their work at the SEACSM meetings over the years. For much of my 20+ years as a SEACSM member, I have served various informal roles for SEACSM, including session chair, abstract reviewer, poster judge, and Grad Fair representative. It would be an honor to serve the SEACSM in a more formal capacity as a Member-at-large on the Executive Committee.

Curriculum Vitae

Kevin A. Zwetsloot

Department of Public Health and Exercise Science (primary)
Department of Biology (secondary)
Appalachian State University
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Boone, NC 28608
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EDUCATION AND TRAINING

Post-Doctoral Research Fellowship University of Missouri – Columbia Department of Biomedical Sciences Mentor: Frank W. Booth, Ph.D. Research Area: Skeletal muscle biology and sarcopenia	2006 - 2009
Ph.D. in Bioenergetics East Carolina University - Greenville, NC Department of Exercise and Sport Science Mentor: Timothy P. Gavin, Ph.D. Research Area: Skeletal muscle angiogenesis	2006
M.A. in Physical Education (emphasis in Exercise Physiology) California State University, Chico – Chico, CA Department of Kinesiology Mentor: G. David Swanson, Ph.D. Research Area: Altitude Physiology	2001
B.S. in Exercise Physiology (cum laude) California State University, Chico – Chico, CA Department of Kinesiology	1998

ACADEMIC POSITIONS

Appalachian State University 2023 – current	Professor and Director of the Biochemistry Laboratory, Department of Public Health and Exercise Science (<i>Primary Appointment</i>)
2015 – 2023	Associate Professor and Director of the Biochemistry Laboratory, Department of Public Health and Exercise Science (<i>Primary Appointment</i>)
2019 – current	<i>Secondary Appointment</i> – Department of Biology

2009 – 2015 Assistant Professor and Director of the Biochemistry Laboratory,
Department of Health and Exercise Science

University of Missouri – Columbia

2006 – 2009 Postdoctoral Research Fellow, Department of Biomedical Sciences

East Carolina University

2001 – 2006 Graduate Research Assistant, Human Performance Laboratory, Department of Exercise
and Sport Science

California State University, Chico

1999 – 2001 Graduate Research Assistant, Department of Kinesiology

1999 – 2001 Graduate Teaching Assistant, Department of Kinesiology

HONORS AND HIGHLIGHTS

1999 Post-Baccalaureate Research Internship - National Institutes of Health

2006 – 2008 Post-Doctoral Research Fellowship
Health and Activity Rehabilitation Research and Training Center (HARRTC)
University of Missouri-Columbia

2009 - Present Graduate Faculty, Full Member - Appalachian State University

2009 Research Career Enhancement Award, American Physiological Society

2015 University of North Carolina – Board of Governors Excellence in Teaching Award

2022 Academy of Outstanding Graduate Mentors – Cratis D. Williams School of Graduate
Studies

PROFESSIONAL AFFILIATIONS

American College of Sports Medicine – Since 1999

Southeast Regional ACSM – Since 2001 (except 2006-09 while a post-doc)

American Physiological Society – Since 2002

MAJOR RESEARCH/PROFESSIONAL INTERESTS

My primary scholarly interests include investigating the mechanisms responsible for sarcopenia (the age-related loss of skeletal muscle mass and strength) and skeletal muscle repair/regeneration after injury. My laboratory seeks to develop exercise and/or nutritional interventions for the treatment/prevention of sarcopenia and enhanced recovery of skeletal muscle from damage. Furthermore, my laboratory focuses on the role inflammation plays in sarcopenia and the failed regrowth from atrophy in aged skeletal muscle, as well as in skeletal muscle repair and regeneration after injury. Additionally, my laboratory investigates the role of exercise on the gut microbiome.

PUBLICATIONS

Peer-Reviewed Research Papers:

- denotes student trainee

1. Gavin, T.P., H.W. Stallings III, **K.A. Zwetsloot**, L.M. Westerkamp, N.A. Ryan, R.A. Moore, W.E. Pofahl, and R.C. Hickner. Lower capillary density, but no difference in VEGF expression in obese versus lean young skeletal muscle in humans. *Journal of Applied Physiology*. 98(1). 315-21. 2005. [PubMed ID: 15298982](#)
2. Croley, A.N., **K.A. Zwetsloot**, L.M. Westerkamp, N.A. Ryan, A.M. Pendergast, R.C. Hickner, W.E. Pofahl, and T.P. Gavin. Lower capillarization, VEGF protein, and VEGF mRNA response to acute exercise in the vastus lateralis muscle of aged vs. young women. *Journal of Applied Physiology*. 99(5). 1872-1879. 2005. [PubMed ID: 16024519](#)
3. Ryan, N.A., **K.A. Zwetsloot**, L.M. Westerkamp, R.C. Hickner, W.E. Pofahl, and T.P. Gavin. Lower skeletal muscle capillarization and VEGF expression in aged versus young men. *Journal of Applied Physiology*. 100(1). 178-185. 2006. [PubMed ID: 16166239](#)
4. Gavin, T.P., L.M. Westerkamp, and **K.A. Zwetsloot**. Soleus, plantaris, and gastrocnemius VEGF mRNA responses to hypoxia and exercise are preserved in aged compared with young female C57BL/6 mice. *Acta Physiologica*. 188(2). 113-121. 2006. [PubMed ID: 16948798](#)
5. Gavin, T.P., R.S. Ruster, J.A. Carrithers, **K.A. Zwetsloot**, R.M. Kraus, C.A. Evans, D.J. Knapp, J.L. Drew, J.S. McCartney, J.P. Garry, and R.C. Hickner. No difference in the skeletal muscle angiogenic response to aerobic exercise training between young and aged men. *Journal of Physiology*. 585(1). 231-239. 2007. [PubMed ID: 17884919](#)
6. **Zwetsloot, K.A.**, L.M. Westerkamp, B.F. Holmes, and T. P. Gavin. "AMPK regulates basal skeletal muscle capillarization and VEGF expression, but is not necessary for the angiogenic response to exercise." *Journal of Physiology*. 586(24). 6021-6035. 2008. [doi: 10.1113/jphysiol.2008.159871](#).
7. Lees, S.J., **K.A. Zwetsloot**, and F.W. Booth. "Muscle precursor cells isolated from aged rats exhibit an increased TNF- α response" *Aging Cell*. 8(1). 26-35. 2009. [doi: 10.1111/j.1474-9726.2008.00445.x](#).
8. Jump, S.S., T.E. Childs, **K.A. Zwetsloot**, F.W. Booth, and S.J. Lees. "FGF2-stimulated proliferation is lower in muscle precursor cells from old rats." *Experimental Physiology*. 94(6). 739-748. 2009. [doi: 10.1113/expphysiol.2008.046136](#).
9. Shanley, R.A.* , **K.A. Zwetsloot***, T.E. Childs, S.J. Lees, and F.W. Booth. "IGF-I activates the mouse type IIb myosin heavy chain gene." *American Journal of Physiology – Cell Physiology*. 297(4). C1019-1027. 2009. * - denotes authors contributed equally to this work. [doi: 10.1152/ajpcell.00169.2009](#).
10. Hardee J.P. #, N.T. Triplett, A.C. Utter, **K.A. Zwetsloot**, and J.M. McBride. "Effect of inter-repetition rest on power output in the power clean." *Journal of Strength and Conditioning Research*. 26(4). 883-889. 2012. [doi: 10.1519/JSC.0b013e3182474370](#).
11. Hardee J.P.#, M.M. Lawrence#, A.C. Utter, N.T. Triplett, **K.A. Zwetsloot**, and J.M. McBride. "Effect of inter-repetition rest on ratings of perceived exertion during multiple sets of the power clean." *European Journal of Applied Physiology*. 112(8). 3141-3147. 2012. [doi: 10.1007/s00421-011-2300-x](#).
12. **Zwetsloot, K.A.***, A. Nedergaard*, T.E. Childs, and F.W. Booth. "Differences in transcriptional patterns of extracellular matrix, inflammatory, and myogenic regulatory genes in myofibroblasts, fibroblasts, and muscle precursor cells isolated from old male rat skeletal muscle using a novel cell isolation procedure." *Biogerontology*. 13(4). 383-398. 2012. * - denotes authors contributed equally to this work. [doi: 10.1007/s10522-012-9382-7](#).
13. **Zwetsloot, K.A.**, T.E. Childs, L.T. Gilpin, and F.W. Booth. "Zero-passaged muscle precursor cells from old skeletal muscle have delayed proliferation and differentiation." *Cell Proliferation*. 46(1). 45-57. 2013. [doi: 10.1111/cpr.12007](#).
14. Hardee J.P. #, M.M. Lawrence#, **K.A. Zwetsloot**, N.T. Triplett, A.C. Utter, and J.M. McBride. "Effect of cluster set configurations on power clean technique." *Journal of Sports Sciences*. 31(5). 488-496. 2013. [doi: 10.1080/02640414.2012.736633](#).

15. Root, M.M., S.R. Collier, **K.A. Zwetsloot**, K.L. West, and M.C. McGinn. "A randomized trial of fish oil omega-3 fatty acids on arterial health, inflammation, and metabolic syndrome in a young healthy population." *Nutrition Journal*. 12(1). 40-45. 2013. [PubMed ID: 23565815](#)
16. Goodman, A.* and **K.A. Zwetsloot***. "Reliability of a protocol to voluntarily induce muscle cramping." *International Journal of Athletic Therapy & Training*. 18(6). 40-43. 2013. * - denotes authors contributed equally to this work.
17. Shanely, R.A., D.C. Nieman, **K.A. Zwetsloot**, A.M. Knab, H. Imagita, B. Lao, B. Davis, and J.M. Zubeldia. "Influence of Rhodiola rosea supplementation on skeletal muscle damage and inflammation in runners following a competitive marathon". *Brain, Behavior, and Immunity*. 39: 204-10. 2014. [doi: 10.1016/j.bbi.2013.09.005](#).
18. **Zwetsloot, K.A.**, C.S. John[#], M.M. Lawrence[#], R.A. Battista, and R.A. Shanely. "High intensity interval training induces a modest inflammatory response in young active men." *Journal of Inflammation Research*. 7. 9-17. 2014. [doi: 10.2147/JIR.S54721](#).
19. Shanely, R.A., **K.A. Zwetsloot**, N.T. Triplett, M.P. Meaney, G.E. Farris, and D.C. Nieman. "Human skeletal muscle biopsy procedures using the modified Bergström technique." *Journal of Visualized Experiments*. (91) e51812. 2014. [doi:10.3791/51812](#)
20. Arthur, S.T., **K.A. Zwetsloot**, M.M. Lawrence[#], D.C. Nieman, M.A. Lila, R. Howden, I. Cooley, J. Tkach, M. Keith, J. Demick, S. Blanton, A. Gross, R. Greiner, A. Bradley, M. Davenport, V. Badmaev, and R.A. Shanely. "Ajuga turkestanica increases Notch and Wnt signaling in aged skeletal muscle." *European Review for Medical and Pharmacological Sciences*. 18(17): 2584-92. 2014. [PubMed ID: 25268108](#)
21. Nieman, D.C., R.A. Shanely, **K.A. Zwetsloot**, M.P. Meaney, and G.E. Farris. "Ultrasonic assessment of exercise-induced change in skeletal muscle glycogen content." *BMC Sports Science, Medicine, and Rehabilitation*. 7:9. 2015. [doi:10.1186/s13102-015-0003-z](#)
22. Goodman, A.*, **K.A. Zwetsloot***, and A.R. Needle. "Effect of Bacrobial[®] skin cleanser on the prevention of muscle cramps." *Journal of Sports Science*. 3. (2015) 219-222. * - denotes authors contributed equally to this work. [doi:10.17265/2332-7839/2015.05.003](#)
23. Nieman, D.C., **K.A. Zwetsloot**, M.P. Meaney, D.D. Lomiwes, S.M. Hurst, and R.D. Hurst. "Post-Exercise Skeletal Muscle Glycogen Related to Plasma Cytokines and Muscle IL-6 Protein Content, but not Muscle Cytokine mRNA Expression." *Frontiers in Nutrition*. 2:27. 2015. [PubMed ID: 26442273](#)
24. Nieman, D.C., **K.A. Zwetsloot**, D.D. Lomiwes, M.P. Meaney, and R.D. Hurst. "Muscle Glycogen Depletion Following 75-km of Cycling is not Linked to Increased Muscle IL-6, IL-8, and MCP-1 mRNA Expression and Protein Content." *Frontiers in Physiology*. 7:431. 2016. [PubMed ID: 27729872](#)
25. McDonnell, J., **K.A. Zwetsloot**, J.A. Houmard, P. Rider, J. Wilson, and P. DeVita. Gait Biomechanics of Skipping Are Substantially Different than Those of Running. *Journal of Biomechanics*. 64:180-185. 2017. [PubMed ID: 29074289](#)
26. McDonnell, J., **K.A. Zwetsloot**, J.A. Houmard, and P. DeVita. Skipping has lower knee joint contact forces and higher metabolic cost compared to running. *Gait and Posture*. 70:414-419. 2019. [PubMed ID: 30986589](#)
27. Rice, P.E. [#], A.R. Needle, Z.S. Leicht[#], **K.A. Zwetsloot**, and J.M. McBride. Bone Health, Muscle Properties and Stretch-Shortening Cycle Function of Young and Elderly Males. *Journal of Musculoskeletal and Neuronal Interactions*. 19(4):389-395. 2019. [PubMed ID: 31789290](#)
28. Shanely, R.A.* , Zwetsloot, J.J.* , T.J. Jurrissen[#], L.T. Hannan[#], **K.A. Zwetsloot**, A.R. Needle, A.E. Bishop[#], G. Wu, and P. Perkins-Veazie (* - authors contributed equally to this work). Daily watermelon consumption decreases plasma sVCAM-1 levels in overweight and obese postmenopausal women. *Nutrition Research*. 76:9-19. 2020. [PubMed ID: 32142970](#)
29. Godwin, J.S.[#], C.F. Hodgman[#], A.R. Needle, **K.A. Zwetsloot**, and R.A. Shanely. Whole-body Heat Shock Accelerates Recovery from Impact-Induced Skeletal Muscle Damage in Mice. *Conditioning Medicine*. 2(4): 184-191. August 2020. <http://www.conditionmed.org/Data/View/9543?type=300>
30. Nieman, D.C., **K.A. Zwetsloot**, A.J. Simonson, A.T. Hoyle, X. Wang, H.K. Nelson, C. Lefranc-Millot, and L. Guerin-Deremaux. Effects of Whey and Pea Protein Supplementation on Post-Eccentric Exercise Muscle Damage: A Randomized Trial. *Nutrients*. 12(8): 2382. August 2020. [PubMed ID: 32784847](#)

31. Lawrence, M.M.[#], **K.A. Zwetsloot**, S.T. Arthur, C.A. Sherman[#], J.R. Huot, V. Badmaev, M. Grace, M.A. Lila, D.C. Nieman, and R.A. Shanely. Phytoecdysteroids Do Not Have Anabolic Effects in Skeletal Muscle in Sedentary Aging Mice. *International Journal of Environmental Research and Public Health - Special Issue: Regulation of Muscle Mass, Exercise, and Metabolism*. 18, 370. January 2021. [PubMed ID: 33418916](#)
32. Travis, S.K.[#], **K.A. Zwetsloot**, I. Mujika, J.A. Gentles, M.H. Stone, and C.D. Bazyler. Skeletal Muscle Adaptations and Performance Outcomes Following a Step and Exponential Taper in Strength Athletes. *Frontiers in Physiology - New Horizons in Research Periodization and Methodology of Training in Individual Sports*. 12, 1-18. October 2021. [doi: 10.3389/fphys.2021.735932](#)
33. Rice, P.E.[#], K. Nishikawa, **K.A. Zwetsloot**, A.S. Bruce, C.D. Guthrie, and S. Nimphius. Stretch-shortening cycle performance and muscle-tendon properties in dancers and runners. *Journal of Applied Biomechanics*. 37(6). 547-555. November 2021. [doi.org/10.1123/jab.2021-0094](#)
34. **Zwetsloot, K.A.**, R.A. Shanely, J.S. Godwin, and C.F. Hodgman. Phytoecdysteroids Accelerate Recovery of Skeletal Muscle Function Following *in vivo* Eccentric Contraction-Induced Injury in Adult and Old Mice. *Frontiers in Rehabilitation Sciences - Exercise and Aging with Musculoskeletal Conditions*. 2. 1-13. November 2021. [doi: 10.3389/fresc.2021.757789](#)
35. Travis, S.K.[#], I. Mujika, **K.A. Zwetsloot**, J.A. Gentles, M.H. Stone, and C.D. Bazyler. The Effects of 3 vs 5 days of Training Cessation on Maximal Strength. *Journal of Strength and Conditioning Research*. 36(3). 633-640. March 2022. [doi: 10.1519/JSC.0000000000004183](#)
36. Rice, P.E.[#], S. Nimphius, C. Abbiss, **K.A. Zwetsloot**, and K. Nishikawa. Micro-biopsies: A less invasive technique for investigating human muscle fiber mechanics. *Journal of Experimental Biology*. 225(6). March 2022. jeb243643. [doi: 10.1242/jeb.243643](#)
37. Koopmans, P.J.[#] and **K.A. Zwetsloot**. A simple and inexpensive running wheel model for progressive resistance training in mice. *Journal of Visualized Experiments*. (182), e63933, April 2022. [doi:10.3791/63933](#)
38. Stewart, J.A.[#], E.K. Merritt, D.E. Lidstone, J.M. McBride, and **K.A. Zwetsloot**. Prolonged cycling lowers subsequent running mechanical efficiency in collegiate triathletes. *BMC Sports Science, Medicine, and Rehabilitation*. 14(149). August 2022. [doi: 10.1186/s13102-022-00543-w](#)
39. Koopmans, P.J.[#], T.K. Williams-Frey[#], and **K.A. Zwetsloot**. "Stuart has got the PoWeR! Skeletal muscle adaptations to a novel heavy progressive weighted wheel running exercise model in C57BL/6 mice." *Experimental Physiology*. 109:271-282. October 2023. [doi.org/10.1113/EP091494](#)

Invited Papers:

1. **Zwetsloot, K.A.**, M.J. Laye, and F.W. Booth. *Novel epigenetic regulation of skeletal muscle myosin heavy chain genes*. Focus on "Differential epigenetic modifications of histones at the myosin heavy chain genes in fast and slow skeletal muscle fibers and in response to muscle unloading". Editorial Focus. *American Journal of Physiology – Cell Physiology*. 296(7). C1-C3. 2009. [doi: 10.1152/ajpcell.00176.2009](#).
2. Booth, F.W. and **K.A. Zwetsloot**. Invited Review: "Basic concepts about Genes, Inactivity, and Aging." *Scandinavian Journal of Medicine & Science in Sports*. 20(1). 1-4. 2009. [doi: 10.1111/j.1600-0838.2009.00972.x](#).
3. **Zwetsloot, K.A.**, R.A. Shanely, E.K. Merritt, and J.M. McBride. Invited Review: "Phytoecdysteroids: A Novel, Non-Androgenic Alternative for Muscle Health and Performance." *Journal of Steroids & Hormonal Science*. 12:e001. 2014. [doi: 10.4172/2157-7536.S12-e001](#).
4. Koopmans, P.J.[#], **K.A. Zwetsloot**, and K.A. Murach. Invited Review: "Going Nuclear: Molecular adaptations to exercise mediated by myonuclei" - *Special Issue: "Molecular Mechanisms of Exercise-Induced Skeletal Muscle Health"*; *Sports Medicine and Health Science*. 5.1. March 2023. [doi: 10.1016/j.smhs.2022.11.005](#)
5. Brooks, C.N., M.E. Wight[#], O.E. Azeez[#], R.M. Bleich, and **K.A. Zwetsloot**. Invited Review: "Growing old together: What we know about the influence of diet and exercise on the aging host's microbiome." *Frontiers*

Manuscripts in preparation/review:

1. **Zwetsloot, K.A.**, L. van Onselen[#], P.J. Koopmans[#], E.S. Moorefield[#], and L.W. Hill[#]. "Effect of Phytoecdysteroids on Inflammation and Protein Synthesis in Skeletal Muscle of Young and Old Mice during Recovery from Eccentric Damage." Anticipated submission to *Experimental Physiology* in Summer/Fall 2024.
2. Azeez, O.E.[#], C.E. Gaillard, C.N. Brooks, C. Fiore, M.M. Opata, R.M. Bleich, and **K.A. Zwetsloot**. "Voluntary Wheel Running Beneficially Alters the Gut Microbiome of Young and Old Mice." Anticipated submission to *Journal of Physiology* in Summer/Fall 2024.
3. Jennifer A. Kurtz, Rafaela G. Feresin, Jeff Otis, Jacob Grazer, Kathryn Wilson, J. Andrew Doyle, Trisha A. VanDusseldorp, and **Kevin A. Zwetsloot**. "The effects of quercetin and citrulline on nitric oxide metabolites and antioxidant biomarkers in trained cyclists". Anticipated submission to *Nutrients* in November 2024.

PRESENTATIONS

Posters Presentations at Scientific Meetings:

[#] - denotes student trainee

1. **Zwetsloot, K.A.**, R.C. Hickner, C.B. Robinson, W.E. Pofahl, and T.P. Gavin. "Effect of acute exercise on KDR in human skeletal muscle." January 2003. Southeast Regional American College of Sports Medicine Annual Meeting. Atlanta, GA.
2. **Zwetsloot, K.A.**, T.D. Fahey, and G.D. Swanson. "Exercise magnifies acute mountain sickness during hypoxic conditions." *Medicine and Science in Sports and Exercise*. 35:S163. 2003. American College of Sports Medicine Annual Meeting, San Francisco, CA.
3. Gavin, T.P., H.W. Stallings III, **K.A. Zwetsloot**, L.M. Westerkamp, N.A. Ryan, R.A. Moore, W.E. Pofahl, and R.C. Hickner. "VEGF and VEGF Receptor expression are not altered in obese skeletal muscle." January 2004. Southeast Regional American College of Sports Medicine Annual Meeting, Atlanta, GA.
4. Gavin, T.P., A.N. Croley, **K.A. Zwetsloot**, L.M. Westerkamp, N.A. Ryan, A.M. Pendergast, W.E. Pofahl, and R.C. Hickner. "Skeletal muscle VEGF expression is lower in aged women." *FASEB Journal*. 22:2. 2004. Experimental Biology Annual Meeting, Washington DC.
5. **Zwetsloot, K.A.**, L.M. Westerkamp, and T.P. Gavin. "Effect of muscle fiber type on hypoxia-induced VEGF mRNA." *The Physiologist*. 47:4. p. 247. 2004. Integrative Biology of Exercise Meeting, Austin, TX.
6. Gavin T.P., N.A. Ryan, **K.A. Zwetsloot**, L.M. Westerkamp, W.E. Pofahl, and R.C. Hickner. "Skeletal muscle VEGF protein is lower in aged men." *The Physiologist*. 47:4. p. 247. 2004. Integrative Biology of Exercise Meeting, Austin, TX.
7. **Zwetsloot, K.A.**, L.M. Westerkamp, and T.P. Gavin. "VEGF mRNA expression in skeletal muscle of AMPK Dominant Negative mice." Doctoral Student Association Research Day. March 2005. East Carolina University, Greenville, NC.
8. **Zwetsloot, K.A.**, R.C. Hickner, R.S. Ruster, J.A. Carrithers, R.M. Kraus, C.A. Evans, D.J. Knapp, J.L. Drew, J.S. McCartney, and T.P. Gavin. "VEGF mRNA expression in young and aged skeletal muscle with 7 days and 8 weeks of endurance exercise training." *Medicine and Science in Sports and Exercise*. 37:5 Supplement. 2005. American College of Sports Medicine Annual Meeting, Nashville, TN.
9. Gavin T.P., N.A. Ryan, **K.A. Zwetsloot**, L.M. Westerkamp, W.E. Pofahl, and R.C. Hickner. "Skeletal muscle VEGF mRNA is lower in aged men." *Medicine and Science in Sports and Exercise*. 37:5 Supplement. 2005. American College of Sports Medicine Annual Meeting, Nashville, TN.
10. **Zwetsloot, K.A.** and T.P. Gavin. "AMPK differentially regulates the skeletal muscle VEGF mRNA responses to hypoxia and exercise." *FASEB Journal*. 20:5, #236.9. 2006. Experimental Biology Annual Meeting, San Francisco, CA.

11. Jump, S.S., T.E. Childs, **K.A. Zwetsloot**, F.W. Booth, and S.J. Lees. "Examination of FGF2-dependent proliferation in muscle precursor cells isolated from 3-mo-old and 32-mo-old rats: Implication for regrowth, repair, and regeneration of skeletal muscle." *FASEB Journal*. 22:1b146. 2008. Experimental Biology Annual Meeting, San Diego, CA.
12. **Zwetsloot, K.A.**, A.F. Nedergaard, T.E. Childs, and F.W. Booth. "TGF- β 1 and Delta mRNA and promoter activity differ in muscle stem cells isolated from young and old rat skeletal muscle." Phi Zeta Veterinary Society Research Day. University of Missouri-Columbia. 2009.
13. **Zwetsloot, K.A.**, R.A. Shanely, and F.W. Booth. "Activation of type IIb myosin heavy chain through IGF-I and β -catenin." International Biochemistry of Exercise Conference. Guelph, ON, Canada. 2009.
14. Naples, S.P., M.J. Laye, **K.A. Zwetsloot**, and F.W. Booth. "Daily Physical Activity Alters Energy Expenditure and Prevents Increased Adiposity in High-Fat Fed Mice." International Biochemistry of Exercise Conference. Guelph, ON, Canada. 2009.
15. Lawrence, M.M.[#], T.J. Kirby, J.M. McBride, N.T. Triplett, T.L. Haines, J.W. Skinner, and **K.A. Zwetsloot**. "Leucine Supplementation Does Not Reduce Circulating Inflammatory Cytokines Following Eccentric Exercise." February 2011. Southeast Regional American College of Sports Medicine Annual Meeting, Greenville, SC.
16. Hardee, J.P.[#], M.M. Lawrence[#], B. Pratt[#], J.P. Pierce Jr., R.C. Hickner, and **K.A. Zwetsloot**. "IL-6 Increases in Skeletal Muscle Interstitium of Untrained Young Men in Response to Resistance Exercise." February 2011. Southeast Regional American College of Sports Medicine Annual Meeting, Greenville, SC.
17. Elliott, J.L., M.M. Root, **K.A. Zwetsloot**, and M.D. Gutschall. "The Effect of Omega-3 Fatty Acids on Inflammatory Markers of Arterial Health." April 2011. North Carolina Dietetics Association Annual Meeting, Winston-Salem, NC.
18. Root, M.M., M. McGinn, S.R. Collier, and **K.A. Zwetsloot**. "The effect of an emulsified fish oil preparation on cardiovascular risk factors in an overweight young adult population." April 2011. Experimental Biology Annual Meeting, Washington D.C.
19. Hubner, M.L.[#], S.R. McAnulty, **K.A. Zwetsloot**, L.S. McAnulty, and S.R. Collier. "Systemic and Local Skeletal Muscle Antioxidant Capacity Increases with Resistance Exercise in Untrained Young Men." June 2011. American College of Sports Medicine Annual Meeting. Denver, CO.
20. Lacey S.A., J.P. Hardee[#], **K.A. Zwetsloot**, N.T. Triplett, A.C. Utter, and J.M. McBride. "Ratings of Perceived Exertion During Resistance Exercise in College Males". July 2011. National Strength and Conditioning Association National Conference. Las Vegas, NV.
21. Lawrence M.M.[#], J.P. Hardee[#], **K.A. Zwetsloot**, N.T. Triplett, A.C. Utter, and J.M. McBride. "Effect of Inter-Repetition Rest Periods on Power Clean Technique." July 2011. National Strength and Conditioning Association National Conference. Las Vegas, NV.
22. Lawrence, M.M.[#], **K.A. Zwetsloot**, S.T. Arthur, D.C. Nieman, M.A. Lila, M. Grace, B.A. Ray, J.R. Via, C.P. Romoda, D.K. Westbrook, K.E. Hargrove, P.M. Lederer, C.S. John, I. Cooley, P.C. Tessener, and R.A. Shanely. "Phytoecdysteroid treatment increases fiber size and PI3k-Akt signaling in aged skeletal muscle." *FASEB J*. April 2012. 26:1077.4. Experimental Biology Annual Meeting. San Diego, CA.
23. Arthur, S.T., **K.A. Zwetsloot**, M.M. Lawrence[#], D.C. Nieman, M.A. Lila, M. Grace, C.R. Nowicki, I.D. Cooley, and R.A. Shanely. "Phytoecdysteroid treatment reduces Notch signaling in aged skeletal muscle." April 2012. Experimental Biology Annual Meeting. San Diego, CA.
24. Arthur, S.T., **K.A. Zwetsloot**, M.M. Lawrence[#], D.C. Nieman, M.A. Lila, M. Grace, I.D. Cooley, C. Worley, A. Gross, and R.A. Shanely. "Effect of Phytoecdysteroid Treatment on Notch and Wnt Signaling in Aged Skeletal Muscle." Feb. 2013. Southeast Regional American College of Sports Medicine Annual Meeting, Greenville, SC.
25. **Zwetsloot, K.A.**, M.M. Lawrence[#], S.T. Arthur, D.C. Nieman, M.A. Lila, M. Grace, and R.A. Shanely. "Acute phytoecdysteroid treatment increases PI3k-Akt signaling in aged mouse skeletal muscle." *FASEB J*. April 9, 2013. 27:713.6. Experimental Biology Annual Meeting. Boston, MA.
26. John, C.S.[#], M.M. Lawrence[#], R.A. Battista, R.A. Shanely, and **K.A. Zwetsloot**. "High intensity interval training induces a modest inflammatory response in active young men." April 2013. Experimental Biology Annual Meeting. Boston, MA.

27. **Zwetsloot, K.A.**, D.C. Nieman, M.P. Meaney, R.A. Shanely, and G. Farris. “Validation of the MuscleSound® Ultrasound Device for Quantifying Change in Skeletal Muscle Glycogen Content.” September 2014. Integrative Physiology of Exercise Meeting. Miami Beach, FL.
28. Merritt, E.K., D. Arminavage, A. Coppedge, M.P. Meaney, R.A. Shanely, **K.A. Zwetsloot**, and D.C. Nieman. “Skeletal muscle cytokines immediately after an aerobic run to exhaustion.” September 2014. Integrative Physiology of Exercise Meeting. Miami Beach, FL.
29. Jurrissen, T.J.#, L.T. Carson#, A.E. Bishop#, **K.A. Zwetsloot**, R.A. Shanely, and J.J. Zwetsloot. Effects of a 6-week watermelon supplementation on insulin resistance and food intake signaling in overweight, post-menopausal women. Southeast ACSM Regional meeting. Jacksonville, FL. Feb. 12-14, 2015.
30. **Zwetsloot, K.A.**, R.A. Shanely, C.M. Zemmin#, J.L. Redman#, S.M. Woerner#, and J.A. Kesselring#. Phytoecdysteroids Do Not Activate PI3K/Akt/mTOR Signaling or Stimulate Protein Synthesis in Skeletal Muscle of Young Mice. Experimental Biology Annual Meeting. Boston, MA. Mar. 28-31, 2015.
31. Nieman, D.C., **K.A. Zwetsloot**, M.P. Meaney, D.D. Lomiwes, S.M. Hurst, and R.D. Hurst. Post-Exercise Skeletal Muscle Glycogen Related to Plasma Cytokines, but Not Muscle Cytokine mRNA Expression or Protein Content. ACSM Annual Meeting. San Diego, CA. May 26-30, 2015.
32. Lawrence, M.M.#, J.R. Huot, C.A. Sherman#, S.E. Gordon, S.T. Arthur, R.A. Shanely, and **K.A. Zwetsloot**. Effect of Phytoecdysteroid Treatment on Fiber Type Percentage, Myostatin and Atrogenes Expression in Aged Mouse Skeletal Muscle. Skeletal Muscle Biology Conference. Gainesville, FL. Jan. 11-13, 2016.
33. Nieman, D.C., **K.A. Zwetsloot**, D.D. Lomiwes, M.P. Meaney, and R.D. Hurst. Predictors of Change in Plasma Cytokines and Muscle Cytokine mRNA and Protein After 75-km Cycling. ACSM Annual Meeting. Boston, MA. May 31-June 4, 2016.
34. Stewart, J.A.#, **K.A. Zwetsloot**, P.E. Rice#, V.P. Georgescu, D. Lidstone, R.D. Gurchiek, C.C. Capps, and J.M. McBride. Mechanical Efficiency in Running is Decreased after 40-km of Cycling in Trained Triathletes. National Strength & Conditioning Association Annual Meeting. New Orleans, LA. July 7-11, 2016.
35. Perrin, E.C.#, B.S. Tolbert#, D.C. Nieman, and **K.A. Zwetsloot**. Myokine Response Following a 75-km Cycling Time Trial. Southeast ACSM Regional meeting. Greenville, SC. Feb. 16-18, 2017.
36. Rice, T.T.#, **K.A. Zwetsloot**, and R.A. Shanely. 20-hydroxyecdysone and anabolic signaling following in vivo eccentric skeletal muscle damage. Skeletal Muscle Biology Conference. Gainesville, FL. March 8-10, 2017.
37. Goslen, K.H.#, E.C. Perrin#, G.A. Garvick#, T.T. Rice#, C.E. Gaillard#, S.D. Rao#, R.A. Shanely, and **K.A. Zwetsloot**. Effect of phytoecdysteroids on protein synthesis and Akt/mTOR signaling after downhill running in skeletal muscle of mice. Experimental Biology Annual Meeting. Chicago, IL. Apr. 22-26, 2017.
38. **Zwetsloot, K.A.**, D.C. Nieman, A. Knab, C.S. John, D.D. Lomiwes, R.D. Hurst, N.D. Gillitt, M.A. Lila. Effect of 4 weeks of high-intensity interval training on exercise performance and markers of inflammation and oxidative stress. Experimental Biology Annual Meeting. Chicago, IL. Apr. 22-26, 2017.
39. Godwin, J.S.# C.F. Hodgman#, T.T. Rice#, **K.A. Zwetsloot**, and R.A. Shanely. Recovery From *In Vivo* Eccentric Skeletal Muscle Damage: Old versus Young. Experimental Biology Annual Meeting. San Diego, CA. Apr. 21-25, 2018.
40. Hodgman, C.F.#, Godwin, J.S.#, **K.A. Zwetsloot**, and R.A. Shanely. Phytoecdysteroids Enhance Skeletal Muscle Function Recovery Following In Vivo Eccentric Contraction-Induced Injury in Old Mice. Experimental Biology Annual Meeting. San Diego, CA. Apr. 21-25, 2018.
41. C.E. Gaillard#, S.D. Rao#, B.T. Klatt#, A.J. McKinley#, R.A. Shanely, B.E. Christian, and **K.A. Zwetsloot**. Exercise characteristics in manganese superoxide dismutase overexpressing mice. Experimental Biology Annual Meeting. San Diego, CA. Apr. 21-25, 2018.
42. Rao, S.D.#, C.E. Gaillard#, A.J. McKinley#, B.T. Klatt#, R.A. Shanely, B.E. Christian, and **K.A. Zwetsloot**. Exercise characteristics in mitochondrial catalase overexpressing mice. Experimental Biology Annual Meeting. San Diego, CA. Apr. 21-25, 2018.
43. McBride, J.M., P.E. Rice#, A.R. Needle, Z.S. Leicht#, and **K.A. Zwetsloot**. Lower leg morphology and stretch-shortening cycle performance in young and elderly males. International Society for Biomechanics in Sports. Auckland, NZ. Sept. 10-14, 2018.

44. **Zwetsloot, K.A.** C.F. Hodgman[#], J.S. Godwin[#], and R.A. Shanely. Phytoecdysteroids Accelerate Recovery of Skeletal Muscle Function Following In Vivo Eccentric Contraction-Induced Injury in Young and Old Mice. Barshop Symposium on Aging. Bandera, TX. Oct. 18-21, 2018.
45. Godwin JS[#], Hodgman CF[#], Klatt BT[#], Brownlee H[#], Needle AR, **Zwetsloot KA**, and Shanely, RA. Whole-body Heat Shock Accelerates Recovery from Impact-Induced Muscle Damage in Mice. Advances in Skeletal Muscle Biology in Health and Disease Conference, University of Florida, Poster #109, March 6-8, 2019.
46. Godwin J.S.[#], Hodgman C.F. [#], Klatt B.T. [#], Brownlee H. [#], Needle A.R., **Zwetsloot K.A.**, and Shanely, R.A. Whole-body Heat Shock Accelerates Recovery from Impact-Induced Muscle Damage in Mice. American College of Sports Medicine National Meeting, Orlando, FL, May 26-30, 2019.
47. Travis, S.K.[#], I. Mujika, **K.A. Zwetsloot**, J.A. Gentles, M.H. Stone, and C.D. Bazylar. Effects of Training Cessation on Isometric Maximal Strength. Southeast ACSM Regional meeting. *Virtual Conference*. Feb. 2021.
48. Travis, S.K.[#], **K.A. Zwetsloot**, I. Mujika, J.A. Gentles, M.H. Stone, and C.D. Bazylar. Preserving Isometric Maximal Strength using Short-Term Training Cessation. National ACSM meeting. *Virtual Conference*. May 2021.
49. Travis, S.K.[#], I. Mujika, **K.A. Zwetsloot**, J.A. Gentles, M.H. Stone, and C.D. Bazylar. Tapering for Enhanced Strength Induces MHC IIA Hypershift in Strength Athletes. National Strength & Conditioning Association annual meeting. *Virtual Conference*. July 2021.
50. Koopmans, P.J.[#] and **K.A. Zwetsloot**. Skeletal Muscle Adaptations to a Novel Progressive Weighted Wheel Running Model in C57BL/6 Mice. Integrative Physiology of Exercise meeting. Baltimore, MD. September 21-24, 2022.
51. **Zwetsloot, K.A.**, L. van Onselen[#], E.S. Moorefield[#], A. Rao[#], and L.W. Hill[#]. Effect of 20-hydroxyecdysone on the immune response following eccentric muscle injury in C57BL/6 mice. American Physiology Summit. Long Beach, CA. April 20-22, 2023. *Physiology* 38:S1. doi.org/10.1152/physiol.2023.38.S1.5732498
52. **Zwetsloot, K.A.**, O.E. Azeez[#], C.N. Brooks, and R.M. Bleich. "Voluntary Wheel Running Modifies the Gut Microbiome of Young and Old Mice". Integrative Physiology of Exercise Conference. State College, PA. November 20-22, 2024.

Oral Presentations at Scientific Meetings:

1. Hardee J.P., N.T. Triplett, A.C. Utter, **K.A. Zwetsloot**, and J. M. McBride. "Effect of Inter-Repetition Rest Periods on Power Output in the Power Clean." July 2011 (Oral Communication). National Strength and Conditioning Association National Conference. Las Vegas, NV.
2. **Zwetsloot, K.A.**, A. Goodman, E. Rabinowitz, J.J. Zwetsloot, M. Morton, and B. Bull. "Investigation of a Novel Therapy for the Prevention and Treatment of Muscle Cramps." Feb. 2013 (Oral Communication). Southeast Regional American College of Sports Medicine Annual Meeting, Greenville, SC.
3. **Zwetsloot, K.A.**, M.M. Lawrence, S.T. Arthur, D.C. Nieman, M.A. Lila, M. Grace, and R.A. Shanely. "Natural plant steroids as a countermeasure against sarcopenia." April 2013 (Oral Communication). Science in the Mountains Conference. Boone, NC.
4. Shanely, R.A., D.C. Nieman, B. Luo, M.P. Meaney, H. Imagita, **K.A. Zwetsloot**, D.A. Dew, and K.L. Pappan. "Glycogen Depletion is Related to Systemic Inflammation, Not Muscle IL-6, PGC-1 α , or Nrf2 Gene Expression." May 2013 (Oral Communication). American College of Sports Medicine Annual Meeting. Orland, FL.
5. **Zwetsloot, K.A.** "Phytoecdysteroids: Implications for Muscle Recovery and Enhanced Sports Performance." July 2016 (Invited Symposium). National Strength & Conditioning Association Annual Meeting. New Orleans, LA.

- DeVita, P, J. McDonnell, **K.A. Zwetsloot**, J.A. Houmard, P. Rider and J. Willson. "Skipping has Lower Knee Joint Loads and Higher Metabolic Cost Compared to Running." July 2017 (Oral Communication). International Society of Biomechanics Annual Meeting. South Brisbane, Australia.

Professional Seminar Presentations:

- "Sarcopenia: Is Physical Rehabilitation enough to rescue old, atrophied skeletal muscle?" Grand Rounds, Department of Physical Medicine and Rehabilitation, University of Missouri – Columbia. 2007.
- "IGF-1 promotes Myosin Heavy Chain IIb Expression: A Potential Intervention for Sarcopenia?" VA Hospital Research Seminar, Columbia, MO. 2008.
- "Is Exercise Enough to Prevent Frailty with Aging?" Watauga County, NC Rotary Club. 2011.
- "Alternative treatments for the recovery of skeletal muscle damage." Invited Symposium, Centre for Exercise and Sports Science Research, Edith Cowan University, Jundaloo, WA, Australia. 2018.

EXTRAMURAL AND INTRAMURAL FUNDING

(TOTAL DIRECT COSTS LISTED)

Current research support:

Pending research support:

Completed research support:

Webb International Inc. "Exercise-induced Acute Mountain Sickness" Role: PI Purpose: To determine if exercise increases the incidence and severity of acute mountain sickness during simulated altitude of 15,000 feet.	08/2000 – 07/2001 \$2,000
Gatorade Sports Science Institute "Regulation of Skeletal Muscle Capillarization by AMPK" Role: PI Purpose: To investigate the involvement of AMPK in the regulation of skeletal muscle capillarization in response to exercise training.	05/2005 – 04/2006 \$1,900
Phi Zeta Veterinary Society "TGF- β 1 promoter activity in old adult skeletal muscle stem cells" Role: PI Purpose: To investigate the mechanism(s) responsible for elevated TGF- β 1 expression in muscle precursor cells isolated from old skeletal muscle.	10/2008 – 09/2009 \$700
Targeted Capacity Building Travel Grant - Appalachian State University Office of Research and Sponsored Programs; Appalachian State University Purpose: To travel to Kannapolis, NC to meet with the director of the Proteomics Core Laboratory at the North Carolina Research Campus to discuss potential research collaborations.	01/2010 \$153.23
American Physiological Society - Research Career Enhancement Award "Analysis of the local skeletal muscle environment using microdialysis" Role: PI	11/2009 – 06/2010 \$3,175

Purposes: 1) obtain training to perform microdialysis techniques and 2) collect pilot data using microdialysis techniques to include as preliminary data in future grant applications.

University Research Council - Appalachian State University 11/2009 – 12/2010
“Analysis of inflammatory cytokines in young and old skeletal muscle” \$5,000

Role: PI

Purpose: To determine if inflammatory cytokine levels are different between young and old skeletal muscle environments at rest and in response to an acute bout of resistance exercise using microdialysis.

Reoxcyn Discoveries Group, LLC. 11/2012 – 12/2013
"Influence of ASEA on human running performance" \$140,204

Role: Co-I (PI: Nieman)

Purpose: To determine if ASEA versus water ingestion during a two-week period improves run time to exhaustion and if shifts in metabolites occur in the blood and if glycogen is spared in skeletal muscle biopsy samples.

Graduate Dean’s Fund for Research Enhancement – Appalachian State University 05/2013 – 04/2014
“Notch-mediated skeletal muscle inflammation” \$5,000

Role: PI

Purpose: To determine if Notch signaling influences inflammatory processes during skeletal muscle repair from damage.

North Carolina Biotechnology Center – Institutional Development Grant 3/2014 – 2/2015
“Non-invasive Bioanalysis of Bone and Skeletal Muscle Tissue” \$195,989

Role: Co-PI (Zwetsloot & Merritt)

Purpose: To acquire a quantitative Computer Tomography scanner to be utilized by several investigators for multidisciplinary research projects.

National Watermelon Promotion Board 06/2013 – 02/2015
“Watermelon supplementation to decrease arterial stiffness, oxidative stress, and systemic inflammation in overweight women” \$50,000

Role: Co-I (Co-PI’s: Shanely & Perkins-Veazie)

Purpose: To determine the extent to which six weeks of watermelon supplementation improves the vascular health (decreased arterial stiffness) of overweight pre-hypertensive and stage I and II hypertensive women.

PoliNat/PL Thomas 12/2013 – 12/2014
“Rhaponticum carthamoides: A preliminary study to determine an efficacious dose” \$25,497

Role: Co-PI (Shanely & Zwetsloot)

Purpose: To determine the precise minimal effective dose of R. carthamoides extract (RcE) that acutely elicits increases in PI3k/Akt/mTOR signaling and muscle protein synthesis and chronically induces skeletal muscle hypertrophy.

National Skeletal Muscle Research Center 08/2013 – 07/2015
“Aged Skeletal Muscle Inflammation Susceptibility using Microdialysis” \$11,574

Role: Co-PI (Zwetsloot & Merritt)

Purpose: To determine the time course for skeletal muscle inflammatory cytokine production following resistance exercise using microdialysis in young and aged individuals.

Roquette Freres 01/2018 – 06/2020
“Influence of Nutralys® pea protein supplementation on recovery from exercise-induced muscle damage” \$166,864
Role: Co-PI (Zwetsloot & Nieman)

Purpose: To determine if Nutralys® pea protein isolate is as effective as whey protein in promoting the recovery of skeletal muscle from eccentric muscle damage in active adults.

Health Interdisciplinary Research Seed Allocations (HIRSA) Award (Internal Grant: Funded by Appalachian State University's BCBSNC Institute for Health and Human Services) 2021

"Inflammation and Immunity Among Adults Recovering from SARS-CoV-2" \$4,834

Role: Co-Investigator (with Drs. Ratchford, J. Stickford, A. Stickford, and Oyata)

Purpose: To determine if SARS-CoV-2 infection activates innate and adaptive immune responses.

National Strength and Conditioning Association - Young Investigator Research Grant 06/2020 – 06/2022

"The Effects of Tapering on Strength and Power Performance, and Associated Muscular Adaptations in Strength Athletes" \$23,828.78

Role: Co-I (PI: Bazylar; ETSU)

Health Interdisciplinary Research Seed Allocations (HIRSA) Award (Internal Grant: Funded by Appalachian State University's BCBSNC Institute for Health and Human Services) 2022

"No microbiome ever reaches old age: Examining how exercise in young and old mice influences microbial composition, diversity, and function" \$4,999

Role: Co-PI (with Drs. Bleich, Brooks, and Oyata)

Purpose: To determine the impacts of exercise on microbial diversity and composition, as well as mucosal immune cells in the gut in young and old adult mice.

Harkrader Family Foundation Faculty Research Award (Internal Grant: Funded by Appalachian State University's Cratis D. Williams School of Graduate Studies) 2023

"Exercise and the Aging Microbiome" \$2,400

Role: PI

Purpose: To compare the composition and diversity of the gut microbiomes in young and old mice after 9 weeks of voluntary wheel running.

Submitted – Not funded:

American Heart Association – Predoctoral Fellowship Submitted Jan. 2004
"Regulation of VEGF mRNA Expression and Aging" \$40,000

Role: PI

Purpose: To investigate the mechanisms responsible for the attenuated VEGF response to stress in aged skeletal muscle.

American Heart Association – Predoctoral Fellowship Submitted Jan. 2005
"Skeletal Muscle Capillarization, VEGF, and AMPK" \$40,000

Role: PI

Purpose: To investigate the involvement of AMPK in the regulation of the capillary supply and VEGF expression in skeletal muscle at rest and in response to exercise.

Craig H. Neilsen Foundation Submitted July 2007
"Effect of testosterone replacement therapy on bone mineral density and skeletal muscle atrophy in patients with acute spinal cord injury" \$220,975

Role: Co-I (PI: Acuff)

Purpose: To determine if testosterone replacement therapy reduces loss of bone mineral density and muscle in male acute spinal cord injury patients with subnormal testosterone.

University of Missouri – Institute for Clinical and Translational Science “Human clinical application of ongoing rat muscle precursor cell biology” Role: Co-I (PI: Booth) Purpose: To engage interdisciplinary, collaborative research based on findings from Dr. Booth’s NIH-funded grant studying <i>muscle precursor cells (MPCs)</i> from rat skeletal muscle and to translate those findings to two clinical conditions of skeletal muscle atrophy with the ultimate goal of improving their therapy.	Submitted Mar. 2008 \$49,965
National Institutes of Health - Individual Post-doctoral Fellowship (F32) “TGF- β 1 expression and function in old adult skeletal muscle stem cells” Role: PI Purpose: To investigate upstream signaling mechanisms of TGF- β 1 induction in aged muscle and whether diminishing TGF- β 1 is sufficient to alter its function and rescue the aging phenotype.	Submitted Aug. 2008 \$85,224
National Institutes of Health – R01 “Satellite cells in Aging Skeletal Muscle” Role: Co-I (PI: Booth) Purposes: 1) determine mechanisms for delayed exit from cell cycle in MPCs from 32-mo-old rats, as compared to 1-mo-old rats, and the functional consequences on differentiation for this delay and 2) determine how the ECM derived from old skeletal muscle delays MPC’s exit from the cell cycle, and if so, by what protein secretion(s).	Submitted July 2009 \$1,250,000
University Research Council – Appalachian State University “Ajuga turkestanica as a countermeasure against sarcopenia” Role: Co-PI (Shanely & Zwetsloot) Purpose: To determine the efficacy of Ajuga turkestanica extract to increase strength and muscle mass, activate control points within the PI3K-Akt signaling pathway, and decrease systemic inflammation in aged mice.	Submitted Mar. 2011 \$5,000
Dyson Foundation “Omega-3/Vitamin D and Moderate Exercise Study” Role: Co-I (PI: Root) Purpose: To compare omega-3 fatty acids/vitamin D supplementation on a range of cardiovascular risk measures.	Submitted Aug. 2011 \$56,000
National Science Foundation – CAREER Award “Notch-mediated Skeletal Muscle Regeneration” Role: Co-I (PI: Arthur) Purpose: To investigate the role of Notch signaling on mechanisms of skeletal muscle regeneration after damage.	Submitted July 2012 \$849,526
National Science Foundation “STEM and ICT Instructional Worlds: The 3D Experience” Role: Consultant (PI: Matzen) Purpose: To further develop a successful Innovative Technology Experiences for Students and Teachers (ITEST) strategies project and study the effectiveness of the model as the program is modified in response to evaluation results.	Submitted: Oct. 2012 \$1,084,207
University Research Council – Appalachian State University “PGC-1a activation in sarcopenic skeletal muscle” Role: Co-PI (Shanely & Zwetsloot) Purpose: To measure PGC-1a activation in aged skeletal muscle following 28 days of Ajuga turkestanica extract treatment and one acute bout of a fatiguing low-frequency electrical stimulus applied to skeletal muscle.	Submitted Oct. 2012 \$5,000

- National Science Foundation – Major Research Instrumentation Grant Submitted Feb. 2013
 “Acquisition of Force-Sensing Tandem Belt Treadmill” \$193,351
 Role: Co-I (PI: McBride)
 Purpose: To acquire a force-sensing tandem belt treadmill to be utilized by several investigators for multidisciplinary research projects.
- North Carolina Biotechnology Center – Biotechnology Research Grant Submitted: Sept. 2013
 “Phytoecdysteroids as a countermeasure against sarcopenia” \$97,639
 Role: Co-PI (Zwetsloot & Shanely)
 Purpose: To determine the extent to which 20 hydroxyecdysterone activates the PI3K/Akt/mTOR signaling pathway and muscle protein synthesis in young and aged skeletal muscle of rats.
- NIH - Molecular Transducers of Physical Activity Consortium Clinical Centers (U01) Submitted: Mar 2016
 “Multi-Omics Exploration of the Molecular Linkage between Physical Activity and Health”
 Role: Co-PI (Nieman & Zwetsloot) \$4,435,475
 Purpose: The overall goal for the ASU Clinical Center is to contribute to the development of a molecular map of transducers that underlie the effects of physical activity in humans.
- BASF, Corp. Submitted: Jan. 2017
 “Influence of XYZ* Supplementation on Skeletal Muscle Protein Synthesis in the Elderly: an 8-week, Double Blind, Placebo-Controlled, Randomized Community Trial” \$275,220
 Role: PI
 Purpose: To determine if XYZ supplementation enhances skeletal muscle protein synthesis in elderly men and women. *Note: Due to nondisclosure agreements, the specific supplement name is withdrawn.
- U.S. Department of Agriculture - NIFA Agriculture and Food Research Initiative Submitted: July 2018
 “Appal Apple Study” \$276,140
 Role: Co-Investigator (PI: Root)
 Purpose: To assess the effect of an apple a day against markers of inflammation, endothelial function, blood lipids and glucose, anthropometrics, antioxidant status, and measures of lung function and hand grip strength.
- U.S. Department of Agriculture - NIFA Agriculture and Food Research Initiative Submitted: July 2019
 “Apple peels, Microbiome, Inflammation, and Glycemic Control” \$355,373
 Role: Co-Investigator (PI: Root)
 Purpose: To assess the effect of two apples a day on changes in the intestinal microbiome and markers of systemic inflammation and glycemic control.

TEACHING EXPERIENCE

Appalachian State University

- Introduction to Physiological Assessment (ES 2005); *Undergraduate*
- Concepts in Anatomy & Physiology (ES 2030); *Undergraduate*
- Exercise Physiology (ES 3002); *Undergraduate*
- Exercise Physiology Laboratory (ES 3003); *Undergraduate*
- Advanced Physiological Assessment (ES 3005); *Undergraduate*
- Advanced Exercise Physiology (ES 3450); *Undergraduate*
- Professional Development in Exercise Science (ES 3700); *Undergraduate*
- Advanced Topics in Exercise Science (ES 4100); *Undergraduate*

- Introduction to Research Principles and Design (ES 5000); *Graduate*
- Physiological Assessment (ES 5591); *Graduate*
- Exercise Physiology (ES 5624); *Graduate*

East Carolina University

- Exercise Physiology (EXSS 3805); *Undergraduate* – Fall 2002

Butte College – Oroville, CA

- Sports, Fitness, and Nutrition (PE 6); *Undergraduate* – Spring 2001

California State University, Chico

- Lifetime Fitness (PHED 067); *Undergraduate* – Fall 2000
- Biomechanics Laboratory (PHED 224); *Undergraduate* – Spring 2000
- Exercise Physiology Laboratory (PHED 180); *Undergraduate* – Spring & Fall 2000
- Clinical Exercise Physiology Laboratory (PHED 280); *Undergraduate* – Spring 2001

Service on Master's Thesis Committees

2009 – 2010	<u>Jenna Elliot</u> (Committee Member – Nutrition Graduate Student). “ <i>Effect of Omega-3 Fatty Acid Supplementation on Inflammatory Markers in the Blood.</i> ”
2010 – 2011	<u>Jared Skinner</u> (Committee Member – Exercise Science Graduate Student). “ <i>Kinetic and Kinematic Analysis of the Squat with and without Supportive Equipment.</i> ” <u>Brian Pratt</u> (Committee Chair; Exercise Science Graduate Student). “ <i>Using Microdialysis to Investigate the Local Muscle Inflammatory Response to Resistance Exercise.</i> ”
2011 – 2012	<u>Marcus Lawrence</u> (Committee Chair; Exercise Science Graduate Student). “ <i>Ajuga Turkestanica as a Countermeasure Against Sarcopenia.</i> ”
2012 – 2013	<u>Casey John</u> (Committee Chair; Exercise Science Graduate Student). “ <i>Inflammatory response to high-intensity interval training.</i> ” <u>Jennifer Arms</u> (Committee Member; Exercise Science Graduate Student). “ <i>Effect of acute dietary nitrate supplementation on arterial blood oxygen saturation and time trial performance during acute hypoxic exposure in male cyclists.</i> ”
2013 – 2015	<u>Betty Ann (BA) Ray</u> (Committee Co-chair; Biology Graduate Student). “ <i>Notch-mediated Skeletal Muscle Inflammation.</i> ” <u>Amanda Kosmata</u> (Committee Chair; Exercise Science Graduate Student). “ <i>Functional Training in a Dysfunctional Elderly Population.</i> ”
2014 – 2015	<u>Thomas Jurrissen</u> (Committee Member; Exercise Science Graduate Student). “ <i>Effects of Six Weeks of Watermelon Supplementation on Insulin Resistance and Peptides that Regulate Food Intake in Post-menopausal Overweight Women.</i> ” <u>Lauren Carson</u> (Committee Member; Exercise Science Graduate Student). “ <i>Effects of Six Weeks of Watermelon Supplementation on Markers of Cardiovascular Health and Oxidative Stress in Post-menopausal Overweight Women.</i> ”
2015 – 2016	<u>Justin Stewart</u> (Committee Chair; Exercise Science Graduate Student). “ <i>Examination of Gait Kinematics and Running Economy during the Bike-to-Run transition in Elite Triathletes.</i> ” <u>Chase Sherman</u> (Committee Chair; Exercise Science Graduate Student). “ <i>Effect of Phytoecdysteroid Supplementation on Myostatin Expression in Skeletal Muscle of Young and Old Mice.</i> ” <u>Jessica McDonnell</u> (Committee Member; East Carolina University, Kinesiology Masters Student). “ <i>A Biomechanical and Metabolic Comparison between Skipping & Running.</i> ”

- 2016 – 2017 Alan Garvick (Committee Member; Exercise Science Graduate Student). *“Effectiveness of a Pre-Race Opener Workout to Enhance Performance in Trained Cyclists”*.
Tyler Rice (Committee Member; Exercise Science Graduate Student). *“Effects of Phytoecdysteroids on Skeletal Muscle Contractile Function and Morphological Condition after Eccentric Contraction-Induced Damage”*.
- 2017 – 2018 Charles Hodgman (Committee Chair; Exercise Science Graduate Student). *“Influence of Blueberry Consumption on in vitro Macrophage function pre and post 75km Cycling Exercise Stress”*.
Zachary Leicht (Committee Chair; Exercise Science Graduate Student). *“Pea Protein vs. Whey Protein: Effects of Different Protein Sources on Measures of Oxidative Stress Following Eccentric Exercise”*.
Joshua Godwin (Committee Member; Exercise Science Graduate Student). *“Whole-body Heat Shock Accelerates Recovery from Impact-Induced Muscle Damage in Mice”*.
Jared Key (Committee Member; Exercise Science Graduate Student). *“Effects of Transcutaneous Electrical Nerve Stimulation on Proprioception and Cortical Activation Following Exercise-Induced Muscle Damage”*.
- 2019 – 2020 ***SARS-CoV2 Pandemic***
- 2020 – 2021 Lisha van Onselen (Committee Chair; Exercise Science Graduate Student). *“Effect of 20-Hydroxyecdysone on the Immune Response Following Eccentric Muscle Injury in Mice”*
Nina Stute (Committee Member; Exercise Science Graduate Student). *“Impact of Acute Antioxidant Supplementation on Neural Cardiovascular Control in Psoriatic Patients”*
- 2021 – 2022 PJ Koopmans (Committee Chair; Exercise Science Graduate Student). *“Stuart Little No More: Effects of High Resistance Wheel Running on Skeletal Muscle Hypertrophy and Strength in C57BL/6 Mice.”*
- 2021 – 2022 James Erny (Committee Member; Biology Graduate Student). *“Moderate Malnutrition Reduces the Functionality of Innate Lymphocytes During Plasmodium chabaudi-Infection in Mice.”*
Robert Onjiko (Committee Member; Biology Graduate Student). *“Effect of Moderate Malnutrition during Pregnancy on Neonatal Immunity to Malaria.”*
- 2022 – 2023 Tobi Azeez (Committee Co-Chair; Biology Graduate Student). *“The Impact of Exercise on the Gut Microbiome of Young and Old Mice”*
- 2023 – 2024 Charleston Gaillard (Committee Chair; Biology Graduate Student). *“Can Voluntary Wheel Running Accelerate the Recovery of the Gut Microbiome Following a Course of Antibiotics in C57BL/6 Mice?”*
Judge Bostian (Committee Chair; Exercise Science Graduate Student). *“Effect of Phytoecdysteroids on Skeletal Muscle Adaptations to Loaded Wheel Running in C57BL/6 Mice”*

Graduate Student Research Mentorship

- 2009 – 2010 Tyler Kirby and Justin Hardee
- 2010 – 2011 Justin Hardee, Brian Pratt, and Marcus Lawrence
- 2011 – 2012 Marcus Lawrence*, Casey John, Colton Tessener, Matthew Morton
 * - awarded a 2-year Kannapolis Scholar Graduate Student Research Fellowship funded by a Research Training Grant at the North Carolina Research Campus through the US Department of Agriculture
- 2012 – 2013 Casey John, Matthew Morton, BA Ray
- 2013 – 2014 BA Ray, Amanda Kosmata, Shaun Woerner, and Thomas Jurrissen
- 2014 – 2015 Shaun Woerner, Thomas Jurrissen, Lauren Carson, and Justin Stewart
- 2015 – 2016 Justin Stewart, Chase Sherman, Tyler Rice, George “Alan” Garvick

2016 – 2017	Tyler Rice, George “Alan” Garvick, Paige Rice, and Garrett Feimster
2017 – 2018	Charles Hodgman, Zachary Leicht, Josh Godwin, Paige Rice, and Jared Key
2018 – 2019	Charles Hodgman, Zachary Leicht, Josh Godwin, Paige Rice, and Jared Key
2019 – 2020	Paige Rice, PJ Koopmans, and Lisha van Onselen
2020 – 2021	Paige Rice, Lisha van Onselen, Jacob Hamby, Dristen Trate, and Nina Stute
2021 – 2022	Paige Rice, PJ Koopmans, and Levi Hill
2022 – 2023	Levi Hill, Noah Kaufman, and Tobi Azeez
2023 – 2024	Tobi Azeez, Charleston Gailliard, and Judge Bostian

Undergraduate Student Research Mentorship

2009 – 2010	Benjamin Boles, Kathryn Tune, Jarett Menzel, Leah Buck, Beth Cherveney, Ashley Edwards, and April Torres
2010 – 2011	Benjamin Boles, Kathryn Tune*, Leah Buck, Beth Cherveney, Ashley Edwards, April Torres, Colin Romoda, Richard Pollard, and Angela Osborne
2011 – 2012	Colin Romoda, Justin Via, Sina Tashakkori*, BA Ray, Alain Humblet, Matthew Jessee
2012 – 2013	Alain Humblet, Jennah Starr*, Dustin Westbrook, Thomas Jurrissen, James Johnson, and Stephen Gunderson
2013 – 2014	Elizabeth Poer, Jak Kesselring*, Chelsea Zemmin*, Chelsea Lineberger, Jaclyn Redman, Kevin Goslen, Jordan Cook, Aaron Altamirano, Josh Warren, Chase Sherman, and Nicolas Charron Chelsea Zemmin – Honors Thesis Director “Time course of Phytoecdysteroid-induced Protein Synthesis in Skeletal Muscles of Mice”
2014 – 2015	Kevin Goslen, Jordan Cook, Chase Sherman, Benz Sawhney, Benjamin Tan, and Jaclyn Redman Jaclyn Redman – Honors Thesis Director “Dose Response of Phytoecdysteroid-induced Protein Synthesis in Skeletal Muscles of Mice”
2015 – 2016	Kevin Goslen, Benz Sawhney, Benjamin Tan, Andrew Barsuhn, and Summer Jones Shane Tolbert – Honors Thesis Director “Exercise-Induced Myokine Response Following 75-km Cycling”
2016 – 2017	Charleston Gailliard, Shriya Rao*, Omar Hiekal, William Johnson, Benjamin Klatt, Zach Leicht, and Logan Oyler Kevin Goslen – Honors Thesis Director “Effect of Phytoecdysteroid Supplementation on Skeletal Muscle Protein Synthesis and Signaling following an Acute Bout of Downhill Running in Mice” Ella Perrin – Honors Thesis Director “Does an Apple a Day Keep the Inflammation at Bay?”
2017 – 2018	Charleston Gailliard, Shriya Rao, Haley Brownlee, Benjamin Klatt, Savannah Duncan, Alex McKinley, Julianna Roupas, Andy Mendoza, Kierstin Davis, Lindsay Martlock, and Zoe Ledford
2018 – 2019	Charleston Gailliard, Shriya Rao, Savannah Duncan, Julianna Roupas, Andy Mendoza, Kierstin Davis, Nick Medlock, and Lindsay Martlock
2019 – 2020	Julianna Roupas, Andy Mendoza, Lindsay Martlock, Emily Toohey, Hassan Atwy, Emily Garner, Cole McNeil, Nick Medlock, Kaela Reckard, and Lindsey Zipperer* Kierstin Davis – Honors Thesis Director “Effect of apple peel extract supplementation in skeletal muscle of aged mice - A Review of the Literature.”
2020 – 2021	Hassan Atwy, Emily Garner, and Therin Williams-Frey Andy Mendoza – Honors Thesis Director “Effect of Apple Peel Extract Supplementation on Muscle Function and Eccentric Damage”
2021 – 2022	Anika Rao and Erin Moorefield Therin Williams-Frey – Honors Thesis Director “Effect of Progressive Resistance Wheel Running on Muscle Contractile Function in Mice”

- 2022 – 2023 Anika Rao, Avery Hodgman, Josie Beasley, and Taytem Johnson
Erin Moorefield* – Honors Thesis Director “Effect of 20-Hydroxycosterone
Supplementation on Markers of Protein Synthesis During Recovery from Eccentric
Damage in Young and Old C57BL/6 Mice”
- 2023 – 2024 Anika Rao, Avery Hodgman, Taytem Johnson, and Kaitlyn Mills
Kaitlyn Mills – Honors Thesis Director “It’s Not All in Your Head: The Intersection of
Gut Dysbiosis and Eating Disorders”

* - awarded an Undergraduate Research Assistantship by the Office of Student Research
at Appalachian State University

SERVICE TO DEPARTMENT, UNIVERSITY, PROFESSION, AND COMMUNITY

- 2000 – 2001 *Undergraduate Exercise Physiology Major Advisor* – Department of Kinesiology, CSU,
Chico
- 2003 – 2005 *Member, Dean’s Graduate Advisory Council* – School of Health and Human
Performance, East Carolina University
- 2007 – 2009 *Member, Stakeholder Council* – Institute for Clinical and Translational Science,
University of Missouri – Columbia
- 2009 – current *Director, Interprofessional Biochemistry Laboratory* – Beaver College of Health Sciences
- 2010 – 2013 *Faculty Advisor, Exercise Science Majors Club* – Department of Health and Exercise
Science
- 2010 – 2012 *Member, Subcommittee on Biomedical Procedures* – Institutional Review Board (IRB),
Appalachian State University
- 2010 – 2011 *Member, Ad hoc Committee on Chemical Inventory & Material Safety Data Sheet
(MSDS) Management Systems* – Appalachian State University
- 2011 *Member, Review Committee for the Outstanding Thesis Award: Cratis D. Williams
Graduate School* – Appalachian State University
- 2012 *Member, Exercise Science Faculty Search Committee* - Department of Health and
Exercise Science
- 2012 – 2018 *Member, Chemical Management and Safety Committee* - Appalachian State University
- 2012 – 2020 *Presenter, Hardin Park School Science Day, Boone, NC*
- 2012 – 2015 *Member, Admissions Committee* - Appalachian State University (3-year term)
- 2012 – 2015 *Member, Gift Acceptance Committee (College of Health Sciences Representative) -
Appalachian State University (3-year term)*
- 2012 – 2014 *Member, Department Personnel Committee* – Department of Health and Exercise Science
(2-year term)
- 2013 – 2018 *Member, Institutional Animal Care and Use Committee (IACUC) - Appalachian State
University*
- 2013 *Member, Athletic Training Faculty Search Committee* - Department of Health and
Exercise Science
- 2013 – current *Reviewer, Competition Judge, and Session Chair, Southeast Regional Chapter of the
American College of Sports Medicine*
- 2013 – 2018 *Ad hoc Reviewer, Musculoskeletal Rehabilitation Sciences (MRS) Study Section,
National Institutes of Health*
- 2013 – current *Director, Bloodborne Pathogens Training and Regulated Waste Coordinator, Beaver
College of Health Sciences*
- 2014 *Member, Search Committee for the Associate Dean of Research and Graduate Studies,
College of Health Sciences*

- 2015 *Member*, Search Committee for the Director of Admissions, Appalachian State University
- 2015 *Member*, Exercise Science Faculty Search Committee - Department of Health and Exercise Science
- 2015 *Member*, Search Committee for the Chair of the Department of Health and Exercise Science, Appalachian State University
- 2015 *Member*, Faculty Search Committee – Appalachian State University Human Performance Laboratory, North Carolina Research Campus, Kannapolis, NC
- 2015 – 2016 *Member*, Teaching Enhancement Committee – Department of Health and Exercise Science
- 2016 – 2019 *Chair*, Teaching Enhancement Committee – Department of Health and Exercise Science
- 2016 *Member*, Research Manager Search Committee – Appalachian State University Human Performance Laboratory, North Carolina Research Campus, Kannapolis, NC
- 2016 – 2019 *Member*, University Planning and Priorities Committee – Appalachian State University
- 2016 *Member*, Beaver College of Health Sciences Dean Search Committee – Appalachian State University
- 2016 - 2019 *Peer Mentor*, Beaver College of Health Sciences Faculty Mentoring Program – Appalachian State University
- 2017 – 2019 *Member*, Promotion and Tenure Policy Review Committee – Department of Health and Exercise Science
- 2017 – 2020 *Member*, Advisory Board; Office of Student Research – Appalachian State University
- 2017 – 2018 *Member*, Exercise Science Faculty Search Committee - Department of Health and Exercise Science
- 2018 *Co-chair*, NCRC Research Scientist Faculty Search Committee – Departments of Health and Exercise Science & Nutrition and Healthcare Management
- 2018 – current *Chair*, Institutional Animal Care and Use Committee (IACUC) - Appalachian State University
- 2018 – current *Co-Coordinator*, Departmental Seminar: Seminar in Health, Activity, Rehabilitation, and Exercise (SHARE)
- 2019 *Member*, Laboratory Safety Manager Search Committee – Environmental Health and Safety & Emergency Management, Appalachian State University
- 2021 – current *Member*, Laboratory Safety Committee – Environmental Health and Safety & Emergency Management, Appalachian State University
- 2021 – current *Volunteer Coach*, National Interscholastic Cycling Association (NICA) – Watauga Pioneers Mountain Bike Team
- 2022 *Member*, Vivarium Manager Search Committee - College of Arts & Sciences, Appalachian State University
- 2024 – current *Member*, Appalachian Duck Committee – Appalachian State University
- 2023 – 2024 *International Grant Reviewer*, Ministry of Health-Singapore

EDITORIAL SERVICE

Ad Hoc Reviewer

Medicine and Science in Sports and Exercise

European Journal of Applied Physiology

International Journal of Biological Sciences

Journal of Visualized Experiments

BioMed Research International

Cytokine

Journal of Strength and Conditioning Research

American Journal of Lifestyle Medicine

Physical Medicine and Rehabilitation – International
Molecular and Cellular Endocrinology
Nutrients
The Journal of Physiological Sciences
Muscle and Nerve
Antioxidants
American Journal of Physiology – Regulatory, Integrative, and Comparative Physiology
Journal of Physiology & Behavior
International Journal of Molecular Sciences
Biogerontology
Cells

Editorial Board Membership

[*Frontiers in Nutrition*](#) (Review Editor 2015-current)
[*Journal of Aging and Physical Activity*](#) (Editorial Board Member 2018-current)
[*Frontiers in Sports and Active Living*](#) (Review Editor 2019-2022; Associate Editor 2022-current)
[*Frontiers in Physiology*](#) (Review Editor 2019-2022; Associate Editor 2022-current)
[*International Journal of Molecular Sciences*](#) (Associate/Topic Editor 2021-current)
[*Nutrients*](#) (Associate Editor 2023-current)