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EDUCATION AND TRAINING

Post-Doctoral Fellow, Molecular Physiology and Biophysics, 2001 - 2007, *University of Vermont*, Burlington, Vermont

Ph.D., Mechanical Engineering, 2002, *University of Vermont*, Burlington, Vermont
Dissertation: "Locomotor activity of *Drosophila melanogaster* (fruit flies) during microgravity and hypergravity exposure"

M.S., Aerospace Engineering, 1994, *University of Colorado*, Boulder, Colorado
Thesis: "Establishment of a wind turbine aerodynamic performance baseline"

B.S., Aerospace Engineering, 1992, *University of Colorado*, Boulder, Colorado

PROFESSIONAL POSITIONS

Assistant Professor, Kinesiology, 2014 - Present

Assistant Professor, Molecular & Cellular Biology Program, 2015 - Present
University of Massachusetts, Amherst, Massachusetts

Research Associate, Molecular Physiology and Biophysics, 2007 - 2014

Adjunct Lecturer/Teaching Faculty, Mechanical Engineering, 2001 - 2005
University of Vermont, Burlington, Vermont

Research Assistantships

Ph.D. *University of Vermont*, Burlington, Vermont 1995 - 2001

M.S. *National Renewable Energy Laboratory*, Golden, Colorado 1992 - 1994

M.S. *University of Colorado*, Boulder, Colorado 1992 - 1994

Visiting Researcher, Exercise Physiology Laboratory, Summer 1998, Summer 1997
NASA-Johnson Space Center, Houston, Texas

Engineering Intern, Flight Simulation Laboratory, Summer 1991, Summer 1990
NASA-Ames Research Center, Moffett Field, California

AWARDS AND HONORS

- 2017 **Butler-Williams Scholars Program**, National Institute on Aging
NIH Headquarters, Bethesda, MD
- 2011 **Ellison Medical Foundation Fellowship**, Molecular Biology of Aging Course
Marine Biological Laboratory, Woods Hole, MA
- 2003-2007 **Ruth L. Kirschstein National Research Service Award Individual Fellowship**
NIH Institutional Training Grant, University of Vermont
- 1998, 2000 **Graduate Award for Excellence in Performance and Greatest Promise of Success**
Mechanical Engineering, University of Vermont (presented yearly to one student)
- 1995-1998 **NASA Graduate Student Research Program Fellowship**
- 1991 **Tau Beta Pi** (Colorado Beta), *Academic Engineering Honor Society*
- 1990 **Golden Key National Honor Society**, *Undergraduate Academic Honor Society*

BIBLIOGRAPHY

Refereed Journal Articles

1. Straight CR, Toth MJ, **Miller MS**. Current perspectives on obesity and skeletal muscle contractile function in older adults. *Journal of Applied Physiology* 130(1), 10-16, 2021. PMID: In Progress
2. Straight CR, Ringham OR, Bartley JM, Keilich SR, Kuchel GA, Haynes L, **Miller MS**. Influenza infection has fiber type-specific effects on cellular and molecular skeletal muscle function in aged mice. *Journal of Gerontology, Biological Sciences* 75(12), 2333-2341, 2020. PMID: PMC7750940
3. Straight CR, Fedewa MV, Toth MJ, **Miller MS**. Improvements in skeletal muscle fiber size with resistance training are age-dependent in older adults: a systematic review and meta-analysis. *Journal of Applied Physiology* 129(2), 392-403, 2020. PMID: PMC7473942
4. Phung LA, Foster AD, **Miller MS**, Lowe DA, Thomas DD. Super-relaxed state of myosin in human skeletal muscle is fiber-type dependent. *American Journal of Physiology-Cell Physiology* 319(6), C1158-C1162, 2020. PMID: In Progress
5. Palmer BM, Swank DM, **Miller MS**, Tanner BCW, Meyer M, LeWinter MM. Enhancing diastolic function by strain-dependent detachment of cardiac myosin crossbridges. *Journal of General Physiology* 152(4), e201912484, 2020. PMID: PMC7141588
6. Straight CR, Voigt, TB, Jala AV, Chase JD, Ringham OR, Ades PA, Toth MJ, **Miller MS**. Quadriceps lipid content has sex-specific associations with whole-muscle, cellular and molecular contractile function in older adults. *Journal of Gerontology, Biological Sciences* 74(12), 1879-1886, 2019. PMID: PMC6853688
7. Straight CR, Bell KM, Slosberg JN, **Miller MS**, Swank DM. A myosin-based mechanism for stretch activation and its possible role revealed by varying phosphate concentration in fast and slow mouse skeletal muscle fibers. *American Journal of Physiology-Cell Physiology* 317(6), C1143-C1152, 2019. PMID: PMC6957385
8. Murach KA, Dungan CM, Kosmac K, Voight TB, Tourville TW, **Miller MS**, Bamman MM, Peterson CA, Toth MJ. Fiber typing human skeletal muscle with fluorescent immunohistochemistry. *Journal of Applied Physiology* 127(6), 1632-1639, 2019. PMID: PMC6957370
9. Hafer JF, **Miller MS**, Kent JA, Boyer KA. The role of sex and physical activity in gait and knee extensor function with age. *Journal of Applied Biomechanics* 35, 263-271, 2019.
10. Straight CR, Ades PA, Toth MJ, **Miller MS**. Age-related reduction in single muscle fiber calcium sensitivity is associated with decreased muscle power in men and women. *Experimental Gerontology* 102, 84-92, 2018. PMID: PMC6411279
11. Guigni BA, Callahan DM, Tourville TW, **Miller MS**, Fiske B, Voight T, Korwin-Mihavics B, Anathy V, Dittus K, Toth MJ. Skeletal muscle atrophy and dysfunction in breast cancer patients: Role for chemotherapy-derived oxidant stress. *American Journal of Physiology-Cell Physiology* 315(5), C744-C756, 2018. PMID: PMC6293050
12. **Miller MS**, Callahan DM, Tourville TW, Slauterbeck JR, Savage PD, Ades PA, Beynon BD, Toth MJ. Moderate-intensity resistance exercise alters skeletal muscle molecular and cellular structure and function in inactive, older adults with knee osteoarthritis. *Journal of Applied Physiology* 122(4), 775-787, 2017. PMID: PMC5407204
13. Toth MJ, Callahan DM, **Miller MS**, Tourville TW, Hackett SB, Couch ME, Dittus K. Skeletal muscle fiber size and fiber type distribution in human cancer: Effects of weight loss and relationship to physical function. *Clinical Nutrition* 35(6), 1359-1365, 2016. PMID: PMC6411286
14. **Miller MS**, Bedrin NG, Ades PA, Palmer BM, Toth MJ. Molecular determinants of force production in human skeletal muscle fibers: Effects of myosin isoform expression and cross-sectional area. *American Journal of Physiology - Cell Physiology* 308(6), C473-C484, 2015. PMID: PMC4360030
15. Callahan DM, Tourville TW, **Miller MS**, Hackett SF, Sharma H, Cruickshank NC, Slauterbeck JR, Savage PD, Ades PA, Maughan DW, Beynon BD, Toth MJ. Chronic disuse and skeletal muscle structure in older adults: Sex-specific differences and relationships to contractile function. *American Journal of Physiology - Cell Physiology* 308(11), C932-C943, 2015. PMID: PMC4451348
16. **Miller MS**, Callahan DM, Toth MJ. Skeletal muscle myofilament adaptations to aging, disease and disuse and their effects on whole muscle performance in older adult humans. *Frontiers in Physiology* 5:369, 1-15,

2014. (Also included in E-book: Ochala, J, editor. Myofilament Function in Health and Disease. Lausanne: Frontiers Media, 2017. p. 129-143) PMID: PMC4176476
17. Tanner BCW, McNabb M, Palmer BM, Toth MJ, **Miller MS**. Random myosin loss along thick-filaments increases myosin attachment time and the proportion of bound myosin heads to mitigate force decline in skeletal muscle. *Archives of Biochemistry and Biophysics*, 552-553, 117-127, 2014. PMID: PMC4043927
 18. Callahan DM, Bedrin NG, Subramanian M, Berking J, Ades PA, Toth MJ, **Miller MS**. Age-related structural alterations in human skeletal muscle fibers and mitochondria are sex-specific: Relationship to single-fiber function. *Journal of Applied Physiology* 116(12), 1582-1592, 2014. PMID: PMC4064376
 19. Callahan DM, **Miller MS**, Sweeny AP, Tourville TW, Slauterbeck JR, Savage PD, Maughan DW, Ades PA, Beynon BD, Toth MJ. Muscle disuse alters skeletal muscle contractile function at the molecular and cellular levels in older adult humans in a sex-specific manner. *Journal of Physiology* 592(20), 4555-4573, 2014. PMID: PMC4287744
 20. **Miller MS**, Bedrin NG, Callahan DM, Previs MJ, Jennings II ME, Ades PA, Maughan DW, Palmer BM, Toth MJ. Age-related slowing of myosin actin cross-bridge kinetics is sex specific and predicts decrements in whole skeletal muscle performance in humans. *Journal of Applied Physiology* 115(7), 1004-1014, 2013. PMID: PMC3798822
 21. **Miller MS**, Toth MJ. Myofilament protein alterations promote physical disability in aging and disease. *Exercise and Sport Sciences Reviews* 41(2), 93-99, 2013. PMID: PMC4171103
 22. Palmer BM, Tanner BCW, Toth MJ, **Miller MS**. An inverse power law distribution of molecular bond lifetimes predicts fractional derivative viscoelasticity in biological tissue. *Biophysical Journal* 104(11), 2540-2552, 2013. PMID: PMC3672888
 23. Toth MJ, **Miller MS**, Callahan DM, Sweeney AP, Nunez I, Grunberg SM, Der-Torossian H, Couch ME, Dittus K. Molecular mechanisms underlying skeletal muscle weakness in human cancer: Reduced myosin-actin cross-bridge formation and kinetics. *Journal of Applied Physiology* 114(7), 858-868, 2013. PMID: PMC3633441
 24. Tanner BCW, Farman GP, Irving TC, Maughan DW, Palmer BM, **Miller MS**. Thick-to-thin filament surface distance modulates cross-bridge kinetics in Drosophila flight muscle. *Biophysical Journal* 103(6), 1275-1284, 2012. PMID: PMC3447602
 25. Toth MJ, **Miller MS**, Ward K, Ades PA. Skeletal muscle mitochondrial density, gene expression and enzyme activities in human heart failure: Minimal effects of the disease and resistance training. *Journal of Applied Physiology* 112(6), 1864-1874, 2012. PMID: PMC3379153
 26. Toth MJ, **Miller MS**, VanBuren P, Bedrin NG, LeWinter MM, Ades PA, Palmer BM. Resistance training alters skeletal muscle structure and function in human heart failure: Effects at the tissue, cellular and molecular levels. *Journal of Physiology* 590(5), 1243-1259, 2012. PMID: PMC3381828
 27. **Miller MS**, Farman GP, Braddock JM, Soto-Adames FN, Irving TC, Vigoreaux JO, Maughan DW. Regulatory light chain phosphorylation and N-terminal extension increase cross-bridge binding and power output in Drosophila at *in vivo* myofilament lattice spacing. *Biophysical Journal* 100(7), 1737-1746, 2011. PMID: PMC3072621
 28. Palmer BM, Wang Y, **Miller MS**. Distribution of myosin attachment times predicted from viscoelastic mechanics of striated muscle. *Journal of Biomedicine and Biotechnology* 2011, Article ID 592343, 16 pgs, 2011. PMID: PMC3228685
 29. Tanner BCW, **Miller MS**, Miller BM, Lekkas P, Irving TC, Maughan DW, Vigoreaux JO. COOH-terminal truncation of flightin decreases myofilament lattice organization, cross-bridge binding, and power output in Drosophila indirect flight muscle. *American Journal of Physiology - Cell Physiology* 301(2), C383-C391, 2011. PMID: PMC3154556
 30. Savage P, Shaw AO, **Miller MS**, VanBuren P, LeWinter MM, Ades PA, Toth MJ. Effect of resistance training on physical disability in chronic heart failure. *Medicine and Science in Sports and Exercise* 43(8), 1379-1386, 2011. PMID: PMC3410739
 31. Toth MJ, Ward K, van der Velden J, **Miller MS**, VanBuren P, LeWinter MM, Ades PA. Chronic heart failure reduces Akt phosphorylation in human skeletal muscle: relationship to muscle size and function. *Journal of Applied Physiology* 110(4), 892-900, 2011. PMID: PMC3075129
 32. **Miller MS**, VanBuren P, LeWinter MM, Braddock JM, Ades PA, Maughan DW, Palmer BM, Toth MJ. Chronic heart failure decreases cross-bridge kinetics in single skeletal muscle fibers from humans. *Journal of Physiology* 588(20), 4039-4053, 2010. PMID: PMC3000591

33. **Miller MS**, Tanner BCW, Nyland LR, Vigoreaux JO. Comparative biomechanics of thick and thin filaments with functional consequences for muscle contraction. *Journal of Biomedicine and Biotechnology* 2010, Article ID 473423, 14 pgs, 2010. PMID: PMC2896680
34. Toth MJ, Shaw AO, **Miller MS**, VanBuren P, LeWinter MM, Maughan DW, Ades PA. Reduced knee extensor function in heart failure is not explained by inactivity. *International Journal of Cardiology* 143(3), 276-282, 2010. PMID: PMC3411851
35. **Miller MS**, VanBuren P, LeWinter MM, Lecker SH, Selby DE, Palmer BM, Maughan DW, Ades PA, Toth MJ. Mechanisms underlying skeletal muscle weakness in human heart failure: Alterations in single fiber myosin protein content and function. *Circulation: Heart Failure* 2(6), 700-706, 2009. PMID: PMC2782533
36. **Miller MS**, Dambacher CM, Knowles AF, Braddock JM, Farman GP, Irving TC, Swank DM, Bernstein SI, Maughan DW. Alternative S2 hinge regions of the myosin rod affect myofibrillar structure and myosin kinetics. *Biophysical Journal* 96(10), 4132-4143, 2009. PMID: PMC2712142
37. Farman GP, **Miller MS**, Reedy MC, Soto-Adames FN, Vigoreaux JO, Maughan DW, Irving TC. Phosphorylation and the N-terminal extension of the regulatory light chain help orient and align the myosin heads in *Drosophila* flight muscle. *Journal of Structural Biology* 168(2), 240-249, 2009. PMID: PMC2757514
38. **Miller MS**, Lekkas P, Braddock JM, Farman GP, Ballif BA, Irving TC, Maughan DW, Vigoreaux JO. Aging enhances indirect flight muscle fiber performance yet decreases flight ability in *Drosophila*. *Biophysical Journal* 95(5), 2391-2401, 2008. PMID: PMC2517049
39. **Miller MS**, Keller TS. *Drosophila melanogaster* (fruit fly) locomotion during a sounding rocket flight. *Acta Astronautica* 62(10-11), 605-616, 2008.
40. Palmer BM, Suzuki T, Wang Y, Barnes WD, **Miller MS**, Maughan DW. Two-state model of acto-myosin attachment-detachment predicts C-process of sinusoidal analysis. *Biophysical Journal* 93(3), 760-769, 2007. PMID: PMC1913148
41. **Miller MS**, Keller TS. *Drosophila melanogaster* (fruit fly) locomotion during the microgravity and hypergravity portions of parabolic flight. *Journal of Gravitational Physiology* 13(2), 35-48, 2006.
42. Hao Y, **Miller MS**, Swank DM, Liu H, Bernstein SI, Maughan DW, Pollack GH. Passive stiffness in *Drosophila* indirect flight muscle reduced by disrupting paramyosin phosphorylation, but not by embryonic myosin S-2 hinge substitution. *Biophysical Journal* 91(12), 4500-4506, 2006. PMID: PMC1779912
43. **Miller MS**, Palmer BM, Ruch S, Martin LA, Farman GP, Wang Y, Robbins J, Irving TC, Maughan DW. The essential light chain N-terminal extension alters force and fiber kinetics in mouse cardiac muscle. *Journal of Biological Chemistry* 280(41), 34427-34434, 2005.
44. Liu H, **Miller MS**, Swank DM, Kronert WA, Maughan DW, Bernstein SI. Paramyosin phosphorylation site disruption affects indirect flight muscle stiffness and power generation in *Drosophila melanogaster*. *Proceedings of the National Academy of Sciences USA* 102(30), 10522-10527, 2005. PMID: PMC1180758
45. **Miller MS**, Fortney MD, Keller TS. An infrared system for monitoring *Drosophila* motility during microgravity. *Journal of Gravitational Physiology* 9(2), 83-92, 2002.
46. **Miller MS**, Peach JP, Keller TS. Electromyographic analysis of a human powered stepper cycle during seated and standing riding. *Journal of Electromyography and Kinesiology* 11(6), 413-423, 2001.

Book Chapters

1. **Miller MS**, Debold EP, Toth MJ. Muscle: anatomy, physiology, and biochemistry. In: Firestein GS, Budd RC, Gabriel SE, McInnes IB, O'Dell JR, editors. *Kelley's Textbook of Rheumatology*, 11th edition. Philadelphia: Elsevier; 2020. p. 67-79.
2. **Miller MS**, Palmer BM, Toth MJ, Warshaw DM. Muscle: anatomy, physiology, and biochemistry. In: Firestein GS, Budd RC, Gabriel SE, McInnes IB, O'Dell JR, editors. *Kelley's Textbook of Rheumatology*, 10th edition. Philadelphia: Elsevier; 2017. p. 66-77.
3. **Miller MS**, Palmer BM, Toth MJ, Warshaw DM. Muscle: anatomy, physiology, and biochemistry. In: Firestein GS, Budd RC, Gabriel SE, McInnes IB, O'Dell JR, editors. *Kelley's Textbook of Rheumatology*, 9th edition. Philadelphia: Elsevier; 2013. p. 67-78.

Technical Papers

1. **Miller MS**, Shipley D, Young T, Robinson M, Luttges M, Simms D. Combined experiment phase II data characterization. *National Renewable Energy Laboratory* (NREL/TP-442-6916), Golden, CO, 116 p., 1995.
2. **Miller MS**, Shipley DE, Young TS, Robinson MC, Luttges MW, Simms DA. The baseline data sets for phase II of the combined experiment. *National Renewable Energy Laboratory* (NREL/TP-442-6915), Golden, CO, 25 p., 1995.
3. Shipley DE, **Miller MS**, Robinson MC, Luttges MW, Simms DA. Techniques for the determination of local dynamic pressure and angle of attack on a horizontal-axis wind turbine. *National Renewable Energy Laboratory* (NREL/TP-442-7393), Golden, CO, 56 p., 1995.

National/International Conference Papers and Abstracts

1. Swank DM, Straight CR, Bell KM, Slosberg JN, **Miller MS**. Does stretch activation contribute to slow-twitch muscle endurance? *American Physiological Society Intersociety Meeting*, Integrative Physiology of Exercise, Virtual Meeting (due to COVID-19), November 11-13, 2020.
2. Straight CR, Gordon JA, Foster AD, Remillard NM, Nagarajan R, Damon BM, Chipkin SR, Kent JA, **Miller MS**. Sex-dependent effects of quadriceps fat content on single muscle fiber size in older adults. *Gerontological Society of America (GSA) Annual Scientific Meeting*, Virtual Meeting (due to COVID-19), November 4-8, 2020.
3. Gordon JA, Remillard NM, Straight CR, Nagaraja R, Damon BM, Chipkin SR, **Miller MS**, Kent JA. Age-related changes in molecular and whole muscle function: Role of fat content? *Gerontological Society of America (GSA) Annual Scientific Meeting*, Virtual Meeting (due to COVID-19), November 4-8, 2020.
4. Straight CR, Bell KM, Slosberg JN, **Miller MS**, Swank DM. A novel mechanism to reduce force loss during prolonged use of slow-twitch muscle fibers. *Biophysical Society 64th Annual Meeting*, San Diego, CA, February 15-19, 2020.
5. Phung LA, Foster AD, **Miller MS**, Lowe DA, Thomas DD. Detection of super-relaxed myosin in specific human skeletal muscle fiber types. *Biophysical Society 64th Annual Meeting*, San Diego, CA, February 15-19, 2020.
6. Groom DJE, Black EC, Deakin JE, Desimone JG, Lauzau MC, Pedro BP, Straight CR, Unger KP, **Miller MS**, Gerson AR. The impact of lean mass loss during migratory flight on muscle energetics and contractile properties in the Yellow-rumped Warbler (*Setophaga coronata*). *International Congress of Comparative Physiology and Biochemistry Meeting*, Ottawa, Canada, August 5-9, 2019.
7. Straight CR, Bell KM, Slosberg JN, **Miller MS**, Swank DM. A myosin based mechanism for stretch activation and its possible purpose revealed by varying phosphate concentration in mammalian skeletal muscle fibers. *Rocky Mountain Muscle Symposium*, Canmore, Canada, July 27-29, 2019.
8. Foster AD, Straight CR, Debold EP, **Miller MS**. Skeletal muscle fatigue: Mechanisms and mitigation at the cellular and molecular levels in older adults. *American College of Sports Medicine Annual Meeting*, Orlando, FL, May 28-June 1, 2019. (Note: Aurora Foster won a Basic Science of Exercise, Circadian Rhythms and Sleep Abstract Student Travel Award)
9. Gordon JA, Nagarajan R, **Miller MS**, Damon BM, Kent JA. Amount and variability of adipose tissue content in human quadriceps muscles of older adults. *American College of Sports Medicine Annual Meeting*, Orlando, FL, May 28-June 1, 2019.
10. Groom DJE, Black EC, Deakin JE, Desimone JG, Lauzau MC, Pedro BP, Straight CR, Unger KP, **Miller MS**, Gerson AR. The impact of lean mass loss during migratory flight on muscle energetics and contractile properties in the Yellow-rumped Warbler (*Setophaga coronata*). *Canadian Society of Zoologists*, Windsor, Canada, May 13-17, 2019.
11. Straight CR, Chase JD, Ades PA, Toth MJ, **Miller MS**. Reduced quadriceps muscle attenuation correlates with reduced cellular and whole muscle function in older women. *American College of Sports Medicine Annual Meeting*, Minneapolis-St. Paul, MN, May 29-June 2, 2018.
12. Straight CR, Chase JD, Ades PA, Toth MJ, **Miller MS**. Quadriceps fat content correlates with cellular and whole muscle function in older women. *ObesityWeek*, Washington, DC, October 29-November 2, 2017.
13. Foster AD, Ades PA, Maughan DW, Toth MJ, **Miller MS**. Restitution of *in vivo* myofibrillar ultrastructure strengthens relationships between age-related molecular contractile dysfunction and decreased muscle power

- output. *Advances in Skeletal Muscle Biology in Health and Disease Abstract Book*, Gainesville, FL, March 8-10, 158, 2017.
14. **Miller MS**, Callahan DM, Slauterbeck JR, Savage PD, Maughan DW, Ades PA, Beynnon BD, Toth MJ. Sex-specific molecular and cellular functional adaptations to resistance training in inactive older adults. *Medicine & Science in Sports & Exercise* 48(5), S388, 2016.
 15. **Miller MS**, Callahan DM, Slauterbeck JR, Savage PD, Maughan DW, Ades PA, Beynnon BD, Toth MJ. Skeletal muscle cellular and molecular function adapt to resistance training in a sex-specific manner in inactive older adults. *Advances in Skeletal Muscle Biology in Health and Disease Abstract Book*, Gainesville, FL, January 20-22, 124, 2016.
 16. Toth MJ, Callahan DM, **Miller MS**, Dittus K. Skeletal muscle structural and functional adaptations to breast cancer treatment in humans: possible role for oxidative stress. *Advances in Skeletal Muscle Biology in Health and Disease Abstract Book*, Gainesville, FL, January 20-22, 85, 2016.
 17. Straight CR, Bedrin NG, Ades PA, Toth MJ, **Miller MS**. Age-related changes in the calcium response of single skeletal muscle fibers from men and women. *Advances in Skeletal Muscle Biology in Health and Disease Abstract Book*, Gainesville, FL, January 20-22, 115, 2016.
 18. Callahan DM, **Miller MS**, Maughan DW, Toth MJ. Chemical modification of protein thiols mimics contractile dysfunction observed at the single fiber and molecular level with muscle disuse. *43rd European Muscle Conference*, Salzburg, Austria, September 10-14, 2014.
 19. Callahan DM, **Miller MS**, Beynnon BD, Slauterbeck J, Toth MJ. Physical inactivity promotes contractile dysfunction at the whole tissue, cellular and molecular levels in older adults. *Experimental Biology 2014 Meeting Program*, San Diego, CA, April 26-30, 371, 2014.
 20. Tanner BCW, McNabb M, Palmer BM, Toth MJ, **Miller MS**. Random myosin loss along thick-filaments increases myosin attachment time and the proportion of bound myosin heads to mitigate force decline in skeletal muscle. *Biophysical Journal*, 58th Annual Meeting Abstracts Supplement, 2014.
 21. **Miller MS**, Bedrin NG, Callahan DM, Ades PA, Maughan DW, Palmer BM, Toth MJ. Age-related decrements in human whole muscle performance correlate with slower myosin-actin cross-bridge kinetics. *American Physiological Society Intersociety Meeting, The Integrative Biology of Exercise VI*, Westminster, CO, October 10-13, 28, 2012.
 22. Toth MJ, **Miller MS**, Callahan DM, Sweeny AP, Ward K, Braddock J, Couch ME, Der-Torossian H, Grunberg SM, Dittus K. Molecular mechanisms underlying reduced knee extensor function and walking endurance in cancer patients: diminished myosin-actin cross-bridge kinetics. *Cancer Cachexia Conference: Molecular Mechanisms and Therapeutic Approaches*, Boston, MA September 21-23, 60, 2012.
 23. Tanner BCW, **Miller MS**, Toth MJ, Palmer BM. Cross-bridge kinetics slow with random myosin loss from thick filaments. *Society for Experimental Biology Annual Main Meeting Programme and Abstract Book*, Salzburg, Austria, June 29-July 2, 107, 2012.
 24. Palmer BM, Tanner BCW, **Miller MS**. An inverse power law distribution of molecular bond lifetimes predicts the fractional derivative description of relaxed muscle viscoelasticity. *Myofilament Proteins as Structural Scaffolds and Mediators of Function*, Madison, WI, June 2-5, 76, 2012.
 25. **Miller MS**, Bedrin NG, Ades PA, Maughan DW, Palmer BM, Toth MJ. Effects of aging on human skeletal muscle structure and function: Measurements at the tissue, cellular and molecular levels. *Advances in Skeletal Muscle Biology in Health and Disease Program and Abstract Book*, Gainesville, FL, March 22-24, 32, 2012.
 26. Toth MJ, **Miller MS**, VanBuren P, Bedrin NG, LeWinter MM, Ades PA, Palmer BM. Resistance training alters skeletal muscle structure and function in human heart failure: Effects at the tissue, cellular and molecular levels. *Advances in Skeletal Muscle Biology in Health and Disease Program and Abstract Book*, Gainesville, FL, March 22-24, 38-39, 2012.
 27. **Miller MS**, Braddock JM, Ward KA, VanBuren P, LeWinter MM, Ades PA, Maughan DW, Palmer BM, Toth MJ. Myosin-actin cross-bridge kinetics explain variation in single skeletal muscle fiber function in humans. *Experimental Biology 2011 Meeting Program*, Washington, DC, April 9-13, 359, 2011.
 28. Toth MJ, Ward K, van der Velden J, **Miller MS**, VanBuren P, LeWinter MM, Ades PA. IGF-1/Akt/mTOR-GSK-3 β signaling in skeletal muscle in human heart failure. *Experimental Biology 2011 Meeting Program*, Washington, DC, April 9-13, 364, 2011.

29. Toth MJ, Ward K, van der Velden J, **Miller MS**, Matthews DE, VanBuren P, LeWinter MM, Ades PA. Circulating factors potentiate muscle atrophy in human heart failure by impairing the anabolic response to feeding. *Experimental Biology 2011 Meeting Program*, Washington, DC, April 9-13, 365, 2011.
30. Tanner BCW, Farman GP, Irving TC, Maughan DW, **Miller MS**. Frequency of maximal power output at *in vivo* myofilament lattice spacing matches *Drosophila* wing beat frequency. *Biophysical Journal*, 55th Annual Meeting Abstracts Supplement, 2011.
31. Tanner BCW, **Miller MS**, Miller BM, Lekkas P, Irving TC, Maughan DW, Vigoreaux JO. Truncating the C-terminus of flightin disrupts flight muscle ultrastructure and reduces mechanical performance in *Drosophila*. *Society for Integrative and Comparative Biology Annual Meeting*, Salt Lake City, UT, January 3-7, 2011.
32. **Miller MS**, Braddock JM, Moulton DG, Ward KA, VanBuren P, LeWinter MM, Ades PA, Maughan DW, Toth MJ. Passive properties of single skeletal muscle fibers are altered in heart failure patients. *Biophysical Journal*, 54th Annual Meeting Abstracts Supplement, 2010.
33. Tanner BCW, **Miller MS**, Miller BM, Lekkas P, Maughan DW, Vigoreaux JO. A C-terminal truncation of flightin slows actomyosin cycling, elevates passive tension and decreases power output in *Drosophila* flight muscle fibers. *Biophysical Journal*, 54th Annual Meeting Abstracts Supplement, 2010.
34. **Miller MS**, Braddock JM, Moulton DG, Ward KA, VanBuren P, LeWinter MM, Ades PA, Maughan DW, Toth MJ. Qualitative and quantitative changes in skeletal muscle from heart failure patients. *Experimental Biology 2009 Meeting Program*, New Orleans, LA, April 18-22, 298, 2009.
35. Toth MJ, Shaw AO, Ades PA, **Miller MS**. Decrease knee extensor torque and power production in human heart failure. *Experimental Biology 2009 Meeting Program*, New Orleans, LA, April 18-22, 298, 2009.
36. **Miller MS**, Braddock JM, Moulton DG, Ward KA, VanBuren P, LeWinter MM, Ades PA, Maughan DW, Toth MJ. Single skeletal muscle fiber performance is altered in heart failure patients. *Biophysical Journal*, 53rd Annual Meeting Abstracts, 213a, 2009.
37. **Miller M**, Shaw A, Ward K, Moulton D, Ades P, Maughan D, Toth M. Loss of myosin from single muscle fibers in heart failure patients reduces force production without altering myofilament ultrastructure. *American Physiological Society Intersociety Meeting*, The Integrative Biology of Exercise V, Hilton Head, SC, September 24-27, 41, 2008.
38. **Miller MS**, Braddock JM, Maughan DW, Toth MJ. Single skeletal muscle fiber mechanics and myosin kinetics in humans. *Biophysical Journal*, 52nd Annual Meeting Abstracts, 131a, 2008.
39. Palmer BM, Wang Y, **Miller MS**, Maughan DW. A second population of ATP-dependent myosin crossbridges arises with acidosis in human skeletal muscle. *Biophysical Journal*, 52nd Annual Meeting Abstracts, 131a, 2008.
40. Maughan DW, **Miller MS**, Soto-Adames FN, Braddock JM, Wang Y, Robbins J, Vigoreaux JO. Phylogenetic and functional analysis of the myosin light chain amino terminal extensions. *Biophysical Journal*, 52nd Annual Meeting Abstracts, 185a, 2008.
41. **Miller MS**, Soto-Adames FN, Farman GP, Braddock JM, Wang Y, Robbins J, Irving TC, Vigoreaux JO, Maughan DW. Dual evolution of the myosin light chain amino terminal extensions. In: *The XXXVIth European Muscle Conference Meeting Program*, Stockholm, Sweden, September 8-12, 46, 2007.
42. **Miller MS**, Palmer BM, Okada Y, Wang Y, Martin LA, Robbins J, LeWinter MM, Maughan DW. The essential light chain extension increases beta-myosin heavy chain performance in mouse cardiac muscle. *Biophysical Journal*, 51st Annual Meeting Abstracts, 481a, 2007.
43. **Miller MS**, Farman GP, Soto-Adames FN, Reedy MC, Braddock J, Irving TC, Vigoreaux JO, Maughan DW. Additive roles of phosphorylation and the extended N-terminus of the regulatory light chain in *Drosophila* flight muscle function. In: *American Society of Cell Biology 46th Annual Meeting Program*, San Diego, CA, December 9-13, 62, 2006.
44. **Miller MS**, Brown EG, Lekkas P, Braddock JM, Farman GP, Irving TC, Maughan DW, Vigoreaux JO. Age impairs flight and increases muscle stiffness in *Drosophila*. In: *American Society of Cell Biology 46th Annual Meeting Program*, San Diego, CA, December 9-13, 165, 2006.
45. **Miller MS**, Farman GP, Soto-Adames FN, Braddock JM, Vigoreaux JO, Maughan DW. Functional consequences of regulatory light chain mutations in *Drosophila* flight muscle. *Biophysical Journal*, 50th Annual Meeting Abstracts, 105a-106a, 2006.
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48. **Miller MS**, Palmer BM, Ruch S, Farman GP, Wang Y, Robbins J, Irving TC, Maughan DW. Role of myosin essential light chain extension in mouse heart performance. *Biophysical Journal* 86(1), 565a, 2004.
49. Farman GP, **Miller MS**, Maughan DW, Irving TC. Structural consequences of myofibril lattice compression in *Drosophila* indirect flight muscle. *Biophysical Journal* 86(1), 214a, 2004.
50. Farman, GP, **Miller MS**, Costello J, Maughan DW, Irving TC. X-ray diffraction of intact and skinned indirect flight muscle in *Drosophila melanogaster* lacking an RLC N-terminal extension. *Biophysical Journal* 86(1), 214a, 2004.
51. Hao Y, **Miller MS**, Swank DM, Liu H, Bernstein SI, Maughan DW, Pollack GH. Mutation of paramyosin phosphorylation sites affects the passive stiffness of *Drosophila* indirect flight muscle. *Biophysical Journal* 86(1), 184a, 2004.
52. **Miller MS**, Suggs JA, Swank DM, Braddock J, Bernstein SI, Maughan DW. Alternative myosin S2 hinge regions influence on *Drosophila* indirect flight muscle kinetics. *American Society of Cell Biology 43rd Annual Meeting*, San Francisco, CA, December 13-17, 2003.
53. Keller T, **Miller M**, Prabhu R, Kosmopoulos V, Fortney M. Musculoskeletal modeling and countermeasures for space flight. *National NASA EPSCoR Conference*, Washington, DC, March 16-18, 2003.
54. **Miller MS**, Farman GP, Irving TC, Maughan DW. Effect of lattice spacing change on power generation in chemically skinned *Drosophila* indirect flight muscle. *Biophysical Journal* 84(2), 448a, 2003.
55. Liu H, Swank DM, **Miller M**, Mardahl-Dumesnil M, Sweeney ST, O'Kane CJ, Maughan DW, Bernstein SI. Paramyosin is important for muscle development, myofibrillogenesis, and muscle contraction. *Molecular Biology of the Cell* 13, 460a, 2002.
56. **Miller MS**, Swank DM, Suggs JA, Bernstein SI, Maughan DW. Effects of an alternative myosin S2 hinge region on *Drosophila* indirect flight muscle. *Gordon Research Conference (Muscle: Contractile Proteins)*, New London, NH, June 9-14, 2002.
57. Liu H, Swank D, **Miller M**, Maughan D, Bernstein S. Paramyosin is important for muscle structure and function. In: *Proceedings of the 43rd Annual Drosophila Research Conference*, San Diego, CA, April 10-14, A79, 2002.
58. **Miller MS**, Swank DM, Suggs JA, Bernstein SI, Maughan DW. Alternative myosin S2 hinge regions influence *Drosophila* indirect flight muscle power generation. *Biophysical Journal* 82(1), 369a-370a, 2002.
59. Keller TS, **Miller MS**, Jordan J. Musculoskeletal modeling and countermeasures to space flight. In: *Texas Space Grant Consortium Spring Meeting Program*, Houston, TX, May 17-18, Sec. 3, 9-10, 2001.
60. **Miller MS**, Keller TS. Effects of short duration microgravity on *Drosophila melanogaster* (fruit fly) activity. *Gravitational and Space Biology Bulletin* 14(1), 17, 2000.
61. **Miller MS**, Keller TS. Measuring *Drosophila* (fruit fly) activity during microgravity exposure. *Journal of Gravitational Physiology* 6(1), 99-100, 1999.
62. **Miller MS**, Martin JA, Peach JP, Lindsay S, Keller TS. Electromyographic analysis of a human powered stepper bike. In: *Proceedings of the IEEE 25th Annual Northeast Bioengineering Conference*, University of Hartford, West Hartford, CT, April 8-9, 120-121, 1999.
63. **Miller MS**, Keller TS. Measuring *Drosophila* (fruit fly) activity during microgravity exposure. In: *Final Program and Abstracts of the 20th Annual International Gravitational Physiology Meeting*, Orlando, FL, June 6-11, 78, 1999.
64. Ayers R, **Miller M**, Simske S, Norrdin R. Correlation of flexural structural properties with bone physical properties: a four species survey. In: *Biomedical Sciences Instrumentation*, Vol. 32, Proceedings of the 33rd Annual Rocky Mountain Bioengineering Symposium, Colorado Springs, CO, April 12-13, 251-260, 1996.
65. Nathan M, Keller TS, Wessberg P, Beliveau JG, **Miller MS**. Dynamic response of the lumbar spine: measurement and modelling. In: *Transactions of the Orthopaedic Research Society 42nd Annual Meeting*, Atlanta, GA, February 19-22, 649, 1996.
66. Shipley DE, **Miller MS**, Robinson MC. Dynamic stall occurrence on a horizontal-axis wind turbine blade. In: *Wind Energy 1995: Proceedings of the Energy and Environmental Expo '95*, Energy-Sources Technology Conference and Exhibition, Houston, TX, January 29 - February 1, SED-Vol. 16, 167-173, and *National Renewable Energy Laboratory (NREL/TP-442-6912)*, Golden, CO, 7 p., 1995.
67. Robinson MC, Galbraith RA, Shipley DE, **Miller MS**. Unsteady aerodynamics of wind turbines. Presented at *AIAA 33rd Aerospace Sciences Meeting and Exhibit*, Reno, NV, January 9-12, AIAA 95-0526, 23 p., 1995.

68. Robinson MC, Luttges MW, **Miller MS**, Shipley DE, Young TS. Wind turbine blade aerodynamics: the combined experiment. Presented at the *Windpower '93 Conference*, San Francisco, CA, July 12-16, and *National Renewable Energy Laboratory* (NREL/TP-441-7107), Golden, CO, 8 p., 1994.
69. Shipley DE, **Miller MS**, Robinson MC, Luttges MW, Simms DA. Evidence that aerodynamic effects, including dynamic stall, dictate HAWT structural loads and power generation in highly transient time frames. In: *Windpower '94: Proceedings of the AWEA Conference*, Minneapolis, MN, May 9-13, 615-626, and *National Renewable Energy Laboratory* (NREL/TP-441-7080), Golden, CO, 12 p., 1994.
70. **Miller MS**, Shipley DE. Structural effects of unsteady aerodynamic forces on horizontal-axis wind turbines. Presented at the *AIAA Region V Student Conference*, St. Louis, MO, April 8-11, 1992, and *National Renewable Energy Laboratory* (NREL/TP-441-7078), Golden, CO, 9 p., 1994.
71. Robinson MC, Luttges MW, **Miller MS**, Shipley DE, Young TS. Wind turbine blade aerodynamics: the analysis of field test data. Presented at the *13th ASME/ETCE Wind Energy Symposium*, New Orleans, LA, January 23-26, and *National Renewable Energy Laboratory* (NREL/TP-441-7108), Golden, CO, 8 p., 1994.
72. Fleet ML, **Miller MS**, Shipley DE, Smith JD. Autonomous support for microorganism research in space. In: *Abstract book of the 8th NASA/USRA Summer Conference*, Washington, DC, June 15-19, 7, 1992.

Regional Conference Abstracts

1. Foster AD, Straight CR, Debold EP, **Miller MS**. Skeletal muscle fatigue: Mechanisms and mitigation at the cellular and molecular levels in older adults. *New England American College of Sports Medicine Fall Meeting*, Providence, RI, November 8-9, 2018. (Note: Aurora Foster took 1st place in the Master's Degree Presentation Competition)
2. Foster AD, Ades PA, Maughan DW, Toth MJ, **Miller MS**. Aging reduces whole muscle and myosin-actin cross-bridge performance in a sex-specific manner. *New England American College of Sports Medicine Fall Meeting*, Providence, RI, October 13-14, 2016.

University of Massachusetts Abstracts (Graduate and Undergraduate Honors Students)

1. Corkill AE, Miller BM, **Miller MS**. Identification of myosin heavy chain isoforms in human skeletal muscle using fluorescent immunohistochemistry. *26th Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 24, 2020 (cancelled due to COVID-19 pandemic).
2. Donovan EP, Miller BM, **Miller MS**. Quantification of intramyocellular lipid content in human skeletal muscle fibers. *26th Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 24, 2020 (cancelled due to COVID-19 pandemic).
3. Murphy PJ, Gordon JA, Kent JA, **Miller MS**. Power and resistance training effects on leg strength and power in older adults. *26th Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 24, 2020 (cancelled due to COVID-19 pandemic).
4. Stanley SL, Sian NA, **Miller MS**. Power and resistance training effects on skeletal muscle fiber type distribution and size in older men and women. *26th Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 24, 2020 (cancelled due to COVID-19 pandemic).
5. Ringham OR, Straight CR, Miller BM, **Miller MS**. Effect of influenza (flu) on cellular and molecular skeletal muscle function in older mice. *25th Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 26, 2019.
6. Foster AD, Straight CR, Chipkin SR, Debold EP, **Miller MS**. Skeletal muscle fatigue and its partial reversal in single fibers of older adults. *22nd Annual School of Public Health and Health Sciences Research Day*, Amherst, MA, April 2, 2019.
7. Foster AD, Straight CR, Debold EP, **Miller MS**. Skeletal muscle fatigue and its partial reversal at the cellular and molecular levels in older adults. *UMOVE University of Massachusetts Student Organized Research Symposium*, Lowell, MA, January 12, 2019. (Note: Aurora Foster received the Outstanding Scientific Talk Award)
8. Jala A, Miller BM, Groom D, Gerson AR, **Miller MS**. Effects of starvation and migration on myofibrillar protein composition in avian skeletal muscle. *24th Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 27, 2018.

9. Straight CR, Chase JD, Ades PA, Toth MJ, **Miller MS**. Increased quadriceps lipid content is associated with impaired cellular and molecular muscle function in older women, but not men. *21st Annual School of Public Health and Health Sciences Research Day*, Amherst, MA, April 3, 2018.
10. Unger KP, Straight CR, Groom DJ, Gerson AR, **Miller MS**. Effects of flight and humidity on molecular and cellular function of pectoralis muscle in yellow-rumped warblers. *21st Annual School of Public Health and Health Sciences Research Day*, Amherst, MA, April 3, 2018.
11. Chase JD, Nagarajan R, Kent JA, Damon BM, **Miller MS**. Quantification of knee extensor fat mass, fat-free mass and fat fraction using 6-point Dixon magnetic resonance imaging. *21st Annual School of Public Health and Health Sciences Research Day*, Amherst, MA, April 3, 2018.
12. Choudhary J, Miller BM, **Miller MS**. Determination of myofibrillar protein and myosin heavy chain isoform expression in avian skeletal muscle. *23rd Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 28, 2017.
13. Doza D, Miller BM, **Miller MS**. Measuring Regulatory Light Chain (RLC) phosphorylation in human skeletal muscle fibers. *23rd Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 28, 2017.
14. Foster AD, Ades PA, Maughan DW, Toth MJ, **Miller MS**. Age-related decreases in whole muscle performance are sex-specific and predicted by molecular level alterations at *in vivo* myofilament lattice spacing. *20th Annual School of Public Health and Health Sciences Research Day*, Amherst, MA, April 4, 2017. (Note: Aurora Foster took 2nd place in school-wide poster competition)
15. Foster AD, Ades PA, Maughan DW, Toth MJ, **Miller MS**. Aging reduces whole muscle and myosin-actin cross-bridge performance in a sex-specific manner. *6th Annual Life Sciences Graduate Research Symposium*, Amherst, MA, December 2, 2016.
16. Merritt C, Miller BM, **Miller MS**. Measuring Regulatory Light Chain (RLC) phosphorylation in mouse skeletal muscle fibers. *22nd Annual Massachusetts Statewide Undergraduate Research Conference*, Amherst, MA, April 22, 2016.
17. Straight CR, Ades PA, Toth MJ, **Miller MS**. Age-related changes in the calcium response of single skeletal muscle fibers from men and women. *19th Annual School of Public Health and Health Sciences Research Day*, Amherst, MA, April 5, 2016.

Invited Seminars/Lectures

1. Sex-specific changes in human skeletal muscle function with age and exercise. Department of Biological Sciences, School of Science, *Rensselaer Polytechnic Institute*, Troy, NY, January 13, 2020.
2. Human skeletal muscle function from the whole muscle to the myosin molecule: Effects of aging, sex and exercise. Investigations into Metabolism, Aging, Gender and Exercise (IMAGE) Scientific Advancement Seminar (Wendy Kohrt, Director), *University of Colorado*, Denver, CO, September 17, 2019.
3. Human skeletal muscle function from the whole muscle to the myosin molecule: Effects of aging, sex and exercise. Minnesota Muscle Club (Laboratories of Drs. Dawn Lowe and David Thomas), *University of Minnesota*, Minneapolis, MN, May 20, 2019.
4. Sex-specific changes in human skeletal muscle function with age and exercise. Mary Elizabeth Dickason King M.D. Annual Lecture Series in the Life Sciences, *Smith College*, Northampton, MA, January 28, 2019.
5. Aging and exercise: Differences between men and women. *Amherst Senior Center in the Bangs Community Center*, Amherst, MA, September 20, 2018.
6. Aging and exercise: Differences between men and women. Keynote Talk at Active Aging in the Valley, Campus Center Auditorium, *University of Massachusetts*, Amherst, MA, November 18, 2017.
7. Skeletal muscle structure and function from the molecular to whole muscle level. University of Massachusetts Movement Research Center (UMOVE) Research Retreat, *University of Massachusetts*, Lowell, MA, September 8, 2017.
8. Sex-specific alterations in human skeletal muscle function with age and exercise. Hormones for Breakfast Seminar, Center for Neuroendocrine Studies, *University of Massachusetts*, Amherst, MA, March 1, 2017.
9. Human skeletal muscle function from the whole muscle to the myosin molecule: Effects of aging, sex and exercise. Chemistry Department Seminar, *University of Massachusetts*, Lowell, MA, February 23, 2017.

10. Skeletal muscle function changes with aging and exercise: From the myosin molecule to the whole muscle. 6th Annual Research Retreat for the University of Massachusetts Center for Clinical and Translational Science, *University of Massachusetts*, Worcester, MA, May 20, 2016.
11. Human skeletal muscle function from the whole muscle to the myosin molecule: Effects of aging, sex and exercise. Molecular and Cellular Biology Colloquium Series, *University of Massachusetts*, Amherst, MA, November 23, 2015.
12. Human skeletal muscle function from the whole muscle to the myosin molecule: Effects of aging and exercise. New England American College of Sports Medicine (NEACSM) Tutorial Lecture, *Rhode Island Convention Center*, Providence, RI, October 16, 2015.
13. Age-related changes in human skeletal muscle from the myosin molecule to the whole muscle. Biology of Aging Laboratory Meeting (Laboratories of Drs. George Kuchel and Laura Haynes), *University of Connecticut Health Center*, Farmington, CT, July 2, 2015.
14. Age-related changes in human skeletal muscle from the myosin molecule to the whole muscle. Department of Kinesiology Seminar, *University of Massachusetts*, Amherst, MA, February 3, 2014.
15. Age-related changes in human skeletal muscle from the myosin molecule to the whole muscle. Past Noll Physiology Research Seminar, *Pennsylvania State University*, State College, PA, January 31, 2014.
16. Age-related changes in human skeletal muscle from the myosin molecule to the whole muscle. Department of Health and Kinesiology Seminar, *Purdue University*, West Lafayette, IN, January 23, 2014.
17. Age-related changes in human skeletal muscle from the myosin molecule to the whole muscle. Brown-bag Seminar Series in the School of Applied Physiology, *Georgia Institute of Technology*, Atlanta, GA, February 22, 2013.
18. Chronic heart failure decreases cross-bridge kinetics in single skeletal muscle fibers from humans. Workshop on Muscle Function at the Cellular and Molecular Levels (“Musclepalooza”), *Rensselaer Polytechnic Institute*, Troy, NY, August 15, 2010.
19. Alterations in human skeletal muscle mechanics and myosin kinetics due to heart failure. Kinesiology Graduate Seminar, *University of Massachusetts*, Amherst, MA, March 8, 2010.

CURRENT AND PAST RESEARCH SUPPORT

Government Funding

1. **NIH R01 Research Project** (AG058607): “Muscle Fatigue and its Impact on Mobility Function in Aging”, Direct costs: ~\$1,600,000, August 15, 2019 - May 31, 2024. Co-Investigator (Jane Kent, Principal Investigator).
2. **NIH R21 Research Project** (AR073511): “Mechanical Disruption of Force Transmission by Adipose Tissue in Human Skeletal Muscle”, Direct costs: ~\$242,000, August 1, 2018 - July 31, 2020. Co-Investigator (Jane Kent, Principal Investigator).
3. **NIH R01 Research Project** (AG047245): “Sex-Specific Adaptation to Different Exercise Programs in Older Adults”, Direct costs: ~\$1,600,000, September 1, 2017 - May 31, 2022. Principal Investigator.
4. **NIH K01 Mentored Research Scientist Development Award** (AG031303): “Single Skeletal Muscle Fiber Mechanics and Myosin Kinetics in Human Aging”, Direct costs: ~\$565,000, September 1, 2008 - August 31, 2014. Principal Investigator.
5. **NASA Student Launch Program** (NASA NGT-5135): “Effects of a Sounding Rocket Flight on *Drosophila* - Test Bed for Motility and Metabolism Experiments During Microgravity”, ~\$35,000, June 1, 1997 - October 31, 2000. Program Manager (Tony S. Keller, Principal Investigator).
6. **NASA Graduate Student Researchers Program** (NASA NGT5-60000 and NASA NGT-60012): “Musculoskeletal Countermeasures to Space Flight”, ~\$66,000, August 1, 1995 - July 31, 1998. Graduate Student (Tony S. Keller, Principal Investigator).

University/Foundation Funding

1. **Charles A. King Postdoctoral Research Fellowship Award from The Medical Foundation**: “Sex-Specific Mechanisms of Obesity-Induced Muscle Weakness in Older Adults”, \$102,500, September 1, 2018 - August 31, 2020. Mentor (Chad Straight, Principal Investigator).

2. **University of Massachusetts Movement Research Center (UMOVE) Seed Grant Program:** “Exploring Differences in Muscle Protein Expression Levels as a Function of Age and Exercise”, \$5,000, November 30, 2017 - December 31, 2018. Co-Investigator (Matthew Gage, UMass-Lowell Co-Investigator).
3. **University of Massachusetts Movement Research Center (UMOVE) Seed Grant Program:** “Understanding the Repeated Bout Effect by Linking Genetic Regulation of Protein Function with Muscle Mechanical Phenomena via Isolated Muscle Geometry”, \$5,000, November 30, 2017 - December 31, 2018. Co-Investigator (Nicolai Konow, Jeffery Moore, Matthew Gage, UMass-Lowell Co-Investigators).
4. **Human Magnetic Resonance Center Pilot Grant:** “Skeletal Muscle Composition in Healthy Older Men and Women”, \$7,494, March 19, 2017 - June 30, 2018. Principal Investigator.
5. **Human Magnetic Resonance Center Pilot Grant:** “Mechanical Disruption of Force Transmission by Adipose Tissue in Human Skeletal Muscle”, \$7,433, March 13, 2017 - March 31, 2018. Co-Investigator (Jane Kent, Principal Investigator).
6. **Commonwealth Honors College Research Grants:** \$5,802 Total, Seven undergraduate students have received these grants in support of their Honors Thesis research performed in my laboratory (2015: Chelsea Merritt, \$740, 2016: Daniel Doza, \$865; Jamal Choudhary, \$900, 2017: Anudeep Jala, \$855; Olivia Ringham, \$912, 2019: Emily Donovan, \$810; Anastasia Corkill, \$720).

PROFESSIONAL SOCIETIES

2017	The Obesity Society (TOS)
2015 - Present	American College of Sports Medicine (ACSM)
2010 - Present	American Physiological Society (APS)
2002 - 2017	Biophysical Society
1995 - 2008	American Society of Mechanical Engineers (ASME)

UNIVERSITY TEACHING EXPERIENCE

Graduate Courses (Instructor / Organizer), *University of Massachusetts*

1. **Exercise Physiology Seminar - KIN 675**, Fall 2014 - 2017, Spring 2018 - 2020, Fall 2020
Presentation and discussion of current literature in exercise physiology (~10 students). Critical evaluation of research questions, experimental design, data analysis and interpretation emphasized.
2. **Kinesiology Graduate Seminar - KIN 891**, Fall 2017
Organized the weekly series that features a variety of experts in the field of kinesiology both locally and beyond, including presentations by current Ph.D. students (31 students).
3. **Molecular Determinants of Skeletal Muscle Function (Special Topic) - KIN 697MP**, Fall 2019
Presentation and discussion of current literature in skeletal muscle biology (4 students). Cellular and molecular mechanisms behind force and velocity production as well as experimental techniques emphasized. Students also wrote two grants appropriate for their future endeavors based upon a self-selected topic.
4. **Skeletal Muscle Biology (Special Topic) - KIN 597MM**, Spring 2020
Course designed to provide information on skeletal muscle biology from the molecular to whole body levels, including exposure to multiple laboratories within the Kinesiology Department (4 students).
5. **Skeletal Muscle Physiology (Special Topic) - KIN 597K**, Fall 2017
Course that provides knowledge of multiple aspects of human skeletal muscle physiology from the molecular level to whole body performance, including alterations due to disease, disuse and aging (8 students).

Undergraduate Core Courses (Instructor), *University of Massachusetts*

1. **Biomechanics - KIN 430**, Fall 2014, Spring 2015, Spring 2016, Fall 2016
Senior-level course and laboratory (~120 students) that introduces mechanics and its application to human motion, including linear and angular kinematics and kinetics and elementary analysis of human motion.
2. **Physical Activity in Health and Disease - KIN 247**, Spring 2017 (selected lectures), Fall 2017, Fall 2018, Fall 2020

Sophomore-level course (~120 students) that provides fundamental knowledge underlying the health benefits of exercise and physical activity, with emphasis on heart failure, obesity and cancer.

3. **Principles and Practice of Skeletal Muscle Experimentation - KIN 397L**, Spring 2016
Course (3 students) designed to provide students with theoretical and practical knowledge of current techniques in skeletal muscle experimentation at the whole muscle, tissue, cellular and molecular levels.

Undergraduate Core Courses (Instructor), *University of Vermont*

1. **Design of Elements - ME 171**, Spring 2002, Spring 2003, Spring 2004, Spring 2005
Junior-level course (30-40 students) that covers the design of machine elements in terms of fundamentals (Load Analysis, Materials, Stress, Strain, Failure Criteria, Reliability, and Fatigue) and applications (Shafts, Bearings, Gears, Clutches, Springs, Power Screws, and Fasteners).
2. **Mechanical Engineering Laboratory IV - ME 183**, Fall 2001, Fall 2002
Senior-level course (20-30 students) that covers the fundamentals of engineering design in class (Design Process, Design Guidelines, Design for Manufacturing and Assembly, Design for the Environment, and Cost Analysis) as well as laboratory work. Students obtained hands-on experience by designing and building their own creations for the American Society of Mechanical Engineer's (ASME) Student Design Competition. The two years I taught the course, my students won the Region I Division (No University of Vermont team had previously won) and took 3rd (2002) and 10th (2003) place at the National Competition.

Undergraduate Design Courses (Instructor / Advisor), *University of Vermont*

1. **Designing and Building for the ASME Student Design Competition - ME 195**, Spring 2002
Instructor for two senior-level engineering teams that competed in the ASME Student Design Competition. These two teams took 1st and 2nd place in the Region I Division, with the Regional 1st place team placing 3rd at the National Competition.
2. **Designing and Building of a Sounding Rocket Payload ("Student Launch Program") - ME 195 / 295**
Fall 1997, Spring 1998, Fall 1998, Spring 1999, Fall 1999, Spring 2000
Advisor and Program Manager for 30 Electrical, Civil, and Mechanical engineering students that designed, built, and launched a payload onboard a NASA Nike-Orion Sounding Rocket. Received the Vermont Space Grant Consortium Excellence Award for this project.
3. **Designing and Building of a Human Powered Lunar Rover - ME 195 / 295**
Spring 1996, Fall 1996, Spring 1997
Advisor and Project Leader for two groups that designed and manufactured a two-person human powered lunar rover for entry in the NASA Moon Buggy competition. The first group of 11 engineers placed 6th out of 19 teams (1996). The second group of 10 engineers placed 4th out of 21 teams (1997).
4. **General Dynamics Design Process Documentation - ME 295**, Spring 2003, Fall 2003
Instructor for four engineering students that worked on documenting General Dynamics' design process by following a specific part through the process and developing various flow-charts.

MENTORING AND SUPERVISORY EXPERIENCE (UNIVERSITY OF MASSACHUSETTS)

Postdoctoral

Chad Straight, Postdoctoral Fellow, 2015 - 2020

Graduate Students - Primary Advisor and Committee Chair (Kinesiology)

Philip Woods, M.S. student, 2020 - present

Brent Momb, Ph.D. student, 2019 - present

Aurora Foster, Ph.D. student, 2019 - 2020

Kimberly Unger, M.S. student, 2017 - 2019, Measuring the effects of Regulatory Light Chain phosphorylation on cellular and molecular function in human skeletal muscle fibers

John Chase, Ph.D. student, 2016 - 2018

Aurora Foster, M.S. student, 2016 - 2019, Mechanisms and mitigation of skeletal muscle fatigue in single fibers from older adults

Graduate Students - Ph.D. Dissertation Committee Member (Kinesiology)

Miles Bartlett, 2018 - 2019, Mechanisms that limit oxidative phosphorylation during high-intensity muscle contractions in vivo

Corinna Serviente, 2017 - 2018, Cardiovascular disease risk and menopause: Effects of aerobic fitness, exercise and follicle stimulation hormone

Liam Fitzgerald, 2016 - 2019, Bioenergetic mechanisms of age-related differences in muscle fatigue

Jocelyn Hafer, 2015 - 2017, Physical activity and age-related mechanical risk factors for knee osteoarthritis

Thomas Longyear, 2015 - 2017, Observing the molecular basis of thin filament activation with a three bead laser trap assay

Katherine Hayes, 2014 - 2017, The effect of pericyte cell therapy on postischemic neovascularization in wild type and type 2 diabetic mice

Graduate Students - Ph.D. Comprehensive Exam Committee Member

Michael Woodward, Kinesiology, 2020

Stephen Decker, Kinesiology, 2020

Joseph Gordon, Kinesiology, 2020

Miles Bartlett, Kinesiology, 2017

Liam Fitzgerald, Kinesiology, 2016

Fuu-Jiun Hwang, Molecular and Cellular Biology, 2016

Thomas Longyear, Kinesiology, 2015

Albert Mendoza, Kinesiology, 2015

Graduate Students - M.S. Thesis Committee Member (Kinesiology)

Eric Eberl, 2020 - present

Matthew Unger, 2018 - 2019, The effects of acidosis on calcium dependent binding of a single crossbridge

Ben Hoffmann, 2015 - 2016, Does age influence dynamic stability and muscular power following neuromuscular fatigue in women?

Graduate Students - Regional and National Awards and Honors

Aurora Foster (Advisor), 2019, Received Student Travel Award from ACSM for her abstract at the 2019 ACSM World Congress on the Basic Science of Exercise, Circadian Rhythms and Sleep, Orlando, FL, May 30.

Aurora Foster (Advisor), 2019, Received the Outstanding Scientific Talk Award at the UMOVE University of Massachusetts Student Organized Research Symposium, Lowell, MA, January 12.

Aurora Foster (Advisor), 2018, 1st place in Master's Degree Presentation Competition at the New England American College of Sports Medicine Fall Meeting, Providence, RI, November 8.

Aurora Foster (Advisor), 2017, 2nd place in School-Wide Poster Competition at 20th Annual School of Public Health and Health Sciences Research Day, Amherst, MA, April 4.

Graduate Students - University and Departmental Awards

Aurora Foster (Advisor), 2019, Graduate School Predissertation Research Grant (\$1,000)

Aurora Foster (Advisor), 2018, Travel Award (\$500)

Postbaccalaureate Research Education Program (PREP) - Committee Member

Samuel Montgomery, 2015 - 2016

Undergraduate Students - Honors Thesis - Chair

Shayelia Stanley, Biology, 2020 - present

Anastasia Corkill, Biochemistry and Molecular Biology, 2019 - 2020, Identification and analysis of myosin heavy chain isoforms using fluorescent immunohistochemistry

Emily Donovan, Kinesiology, 2019 - 2020, Quantification of intramyocellular lipid content in human skeletal muscle fibers

Olivia Ringham, Biology, 2018 - 2019, Effects of the influenza virus on skeletal muscle function in older mice

Anudeep Jala, Biology, 2017 - 2018, Effects of starvation and migration on myofibrillar protein composition in avian skeletal muscle

Jamal Choudhary, Biochemistry and Molecular Biology, 2016 - 2017, Determination of myofibrillar protein and myosin heavy chain isoform expression in avian skeletal muscle

Daniel Doza, Biochemistry and Molecular Biology, 2016 - 2017, Measuring Regulatory Light Chain phosphorylation in human skeletal muscle fibers

Chelsea Merritt, Kinesiology, 2015 - 2016, Measuring Regulatory Light Chain phosphorylation in mouse skeletal muscle fibers

Undergraduate Students - Honors Thesis - Committee Member

Ellen Chow, Kinesiology, 2016 - 2017, Skeletal muscle metabolism during fatigue of the knee extensor muscles using ³¹P phosphorus magnetic resonance spectroscopy in men and women

Undergraduate Students - Honors Independent Study - Faculty Sponsor

Nader Jaafar, Biochemistry and Molecular Biology, 2020 - present

Shayelia Stanley, Biology, 2020

Undergraduate Students - Research Projects

Joseph Burzynski, Kinesiology, 2020 - present

Gabriel Zangirolani, Biochemistry and Molecular Biology, 2020 - present

Nader Jaafar, Biochemistry and Molecular Biology, 2020

Nicholas Sian, Kinesiology, 2020

Matthew Adolph, Kinesiology, 2019 - 2020

Peter Murphy, Kinesiology, 2019 - 2020

Emily Donovan, Kinesiology, 2019

Grace Pettengill, Kinesiology, 2019

Sarah Park, Kinesiology, 2018 - 2020

Shayelia Stanley, Biology, 2018 - 2019

Anastasia Corkill, Biochemistry and Molecular Biology, 2018 - 2019

Alan Lu, Kinesiology, 2018 - 2019

Erica Vozzella, Kinesiology, 2018 - 2019

Kelly McAleer, Biochemistry and Molecular Biology, 2018

Denny Tran, Kinesiology, 2017

Kimberly Unger, Kinesiology, 2017

Olivia Ringham, Biology, 2016 - 2018

Anudeep Jala, Biology, 2016 - 2017

Jamal Choudhary, Biochemistry and Molecular Biology, 2016

Daniel Doza, Biochemistry and Molecular Biology, 2016

Aurora Foster, Kinesiology, 2015

Undergraduate Students - Research Laboratory Assistants (non-project)

Julia Pakey, Biology, 2019 - 2020

Nicholas Sian, Kinesiology, 2019

Matthew Adolph, Kinesiology, 2019

Samantha Napolitano, Biochemistry and Molecular Biology, 2019

Philip Woods, Nutrition, 2018 - 2019

Elizabeth Murphy, Biochemistry and Molecular Biology, 2018

Sarah Park, Kinesiology, 2018

Anna Gunst, Kinesiology, 2018

Denny Tran, Kinesiology, 2017 - 2018

Erica Vozzella, Kinesiology, 2017 - 2018

Christine Abraham, Kinesiology, 2017

Kelly McAleer, Biochemistry, 2017

Undergraduate Students - Internships

Karl St. Phard, Kinesiology, 2020, Exercise Trainer for CHAMP Study (R01 AG047245)

Peter Murphy, Kinesiology, 2019, Institute of Applied Life Sciences Summer Program
Olivia Ventra, Kinesiology, 2019, Exercise Trainer for CHAMP Study (R01 AG047245)

Undergraduate Students - Awards and Honors

Olivia Ringham (Advisor), Biology, 2018 - 2019, UMass Amherst Rising Researcher (Student achievement award for exceptional undergraduate students who excel in research, scholarship or creative activity)

Project Coordinator or Laboratory Technician

Brayden Woods, Project Coordinator, 2019 - 2020
Philip Woods, Laboratory Technician, 2019 - 2020
Varija Shah, Laboratory Technician, 2019
Caroline Pellegrini, Project Coordinator, 2018 - 2019
Anudeep Jala, Laboratory Technician, 2018 - 2019
Stefani Pagoulatos, Project Coordinator, 2017 - 2018

MENTORING AND SUPERVISORY EXPERIENCE (UNIVERSITY OF VERMONT)

Graduate Students - Committee Chair

Alexandra Beattie, M.S., Biology, 2013 - 2014, The effects of β -Hydroxy- β -Methylbutyrate (HMB) on *Drosophila Melanogaster* lifespan and health
Pedro Alvarez-Ortiz, Ph.D., Biology, 2010 - 2014, Expression and function of flightin and glutactin, two taxonomic restricted proteins in the arthropods with broad functional roles
Samya Chakravorty, Ph.D., Biology, 2009 - 2013, Role of the *Drosophila Melanogaster* indirect flight muscles in flight and male courtship song: Studies on flightin and myosin light chain-2

Undergraduate Students - Honors Thesis

Katie Bedard (Chair), Biology, 2013 - 2014, The effects of aging on the number and spacing of myonuclei in human skeletal muscle fibers
Samuel Paskin-Flerlage (Committee Member), Biology, 2009 - 2010, Characterization of the spatial expression of flightin within basal arthropods: An evolutionary investigation of the specialization of flight

Undergraduate Students - Research Projects

Katie Bedard, Biology, 2013
Nicholas Bedrin, Biology, 2009 - 2013
Scott Teuscher (General Dynamics group project), Mechanical Engineering, 2005
Brandon Johnson (General Dynamics group project), Mechanical Engineering, 2005
John Marking (General Dynamics group project), Mechanical Engineering, 2005
Thomas Jablonski II (General Dynamics group project), Mechanical Engineering, 2005
Stewart MacLean (General Dynamics group project), Mechanical Engineering, 2005
Payson Ayer-Dufner, Biology, 2003
Denise Lackey, Nutritional Sciences, Pennsylvania State University, 2001
Wendal Chaffee (KC-135 Flight Group #3), Electrical Engineering, 2000
Michael Fortney (KC-135 Flight Group #3), Electrical Engineering, 2000
Jessica Kopczynski (KC-135 Flight Group #3), Engineering, Norwich University, 2000
Martha Price (KC-135 Flight Group #2 and #3), Engineering, Norwich University, 1999 - 2000
Geoff Gaida (KC-135 Flight Group #2), Mechanical Engineering, 1999
Marko Rosenfeldt (KC-135 Flight Group #2), Mechanical Engineering, 1999
Robert Sewell (KC-135 Flight Group #2), Engineering, Norwich University, 1999
Dan Barnett (KC-135 Flight Group #1), Mechanical Engineering, 1999
Megan Carroll (KC-135 Flight Group #1), Mechanical Engineering, 1999
Daniel Cheung (KC-135 Flight Group #1), Mechanical Engineering, 1999
Noel Nutting (KC-135 Flight Group #1), Mechanical Engineering, 1999

Research Laboratory Assistants (non-project)

Christopher Bernard, Biology, 2013 - 2014

Juliana Yellin, Biology, 2013

James Berking, Environmental Sciences, 2012

Andrew Sweeney, Biology, 2010 - 2012

Mariel Maling, Political Science, 2011

Hilary Kulakowski, Biochemistry, 2010

OUTREACH ACTIVITIES (UNIVERSITY OF VERMONT)

Science Mentor (2010 - 2011), Mentor for an 8th grade student for his science fair project. Helped him design, perform and analyze experiments examining the velocity versus voltage relationship of various model trains.

Student Launch Program Outreach (1999 - 2009), Gave over 40 half-hour to hour long presentations to a variety of students (from 3rd graders to college seniors) and the general public about spaceflight, rocketry, and experiments flown onboard a Nike-Orion sounding rocket and KC-135 reduced gravity aircraft.

Vermont EPSCoR / Howard Hughes HELiX Program (2004 - 2005), “Building and Launching of CricketSats to Measure Various Atmospheric Conditions” - Hosted four high school students and two teachers (two teams) during a week long workshop during the summer. Acted as mentor/advisor for the research component of their project during the following academic year. Using this project, the team from Boston, MA won 1st place in the Massachusetts State Fair and 2nd place in the Boston Regional Science Fair (along with an achievement award from the Navy). The team from Milton, VT won the HELiX outreach symposium poster contest.

Science Mentor (2003 - 2004), Mentor for a sophomore-level high school student during the school year. Helped her set up, perform, and analyze an experiment examining the effects of music on human exercise performance.

Vermont EPSCoR / Howard Hughes HELiX Program (2003 - 2004), “Building and Launching of CricketSats to Measure Various Atmospheric Conditions” - Hosted three high school students and their teacher during a week long workshop. Acted as mentor/advisor for the research component of their project during the academic year following the workshop. Received a Vermont Space Grant Consortium Achievement Award for this project.

University of Vermont / Governor’s Institute of Vermont 20th Anniversary Celebration (2003), Taught grade to high school students to build and launch temperature probes onboard helium-filled atmospheric balloons.

High School Engineering Internship (2000 - 2002), Advisor for a high school student that worked at the University of Vermont. The student designed and built electronics and mechanical components for two projects: (1) a centrifuge to test effects of gravity on fruit flies and (2) a device to mechanically test muscle myofibrils.

Engineering, Mathematics, and Computer Sciences Summer Program (2000), Advisor for 60 high school students that designed, built, and broke balsa wood trusses to learn about engineering.

Vermont EPSCoR/Howard Hughes HELIX Program (1999 - 2000), “Far Out Rocket sScience and Engineering (FORCE)” - Hosted two high school students and their teacher during a week long workshop. Acted as mentor/advisor for the research component of their project during the academic year following the workshop.

KC-135 Reduced Gravity Research Outreach Program (2000), Helped a 7th grade class design and build 5 experiments to fly with undergraduate students onboard the KC-135 reduced gravity aircraft.

Middle School Engineering Internship (2000), Advisor for 8th grade student that worked at the University of Vermont on various portions of the KC-135 and Nike-Orion sounding rocket projects.

KC-135 Reduced Gravity Research Outreach Program (1999), Helped 7th and 8th grade students design and build an experiment to fly with the undergraduate students onboard the KC-135 reduced gravity aircraft.

INSTITUTIONAL SERVICE (UNIVERSITY OF MASSACHUSETTS)

Kinesiology Department

Research During a Pandemic (Operating Laboratories during COVID-19), Chair, 2020 - present
Reopening Research Committee (Opening Laboratories during COVID-19), Chair, Summer 2020
Strategic Planning Committee, Member, 2020
Undergraduate Awards Committee, Member, 2020
Faculty Search Committee (three positions in Movement Science and Biomechanics), Member, 2019 - 2020
Departmental Personnel Committee, Member, 2016 - 2017, 2018 - 2019
Departmental Graduate Award Committee, Member, 2018 - 2019
Lecturer Search Committee (Anatomy & Physiology), Chair, 2018
Faculty Search Committee (Metabolism), Member, 2017 - 2018
Department Chair Search Committee, Member, 2017
Faculty Search Committee (Metabolism), Member, 2016 - 2017
Curriculum Committee, Member, 2015 - 2017

School of Public Health and Health Sciences

Research Administration Office Coordinator Search Committee, Member, 2020
School Wide By-Laws Committee, Member, 2017 - 2018, 2020 - present

Institute of Applied Life Sciences

Human Magnetic Resonance Center Steering Committee, Member, 2018 - present
Exercise Intervention and Outcomes Core Board, Member, 2016 - 2019

Others

Executive Committee, Member, Univ. of Massachusetts Movement Research Center (UMOVE), 2018
Reviewer, UMass-Amherst Commonwealth Honors College Research Grants, 2015 - present

PROFESSIONAL SERVICE

Professional Societies

American College of Sports Medicine, Member, Research Awards Committee, 2019 - present

Reviewing Activities (Ad-Hoc)

Aging, American Journal of Physiology - Cell Physiology, Biology, Biophysical Journal, European Biophysics Journal, European Journal of Applied Physiology, Experimental Gerontology, Experimental Physiology, GeroScience, Journal of Applied Physiology, Journal of Gerontology: Biological Sciences, Journal of Physiology, Methods, Scientific Reports