Curriculum Vitae
Andrew Todd Ludlow, Ph.D.

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University of Michigan
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EDUCATION

2011- 2017	Postdoctoral training – Cell Biology, Department of Cell Biology, University of Texas Southwestern Medical School, Dallas, TX 75309. W. E. Wright and J. W. Shay, mentors.
2011	Ph.D. – Kinesiology (Exercise Physiology), Department of Kinesiology, School of Public Health, University of Maryland, College Park, MD 20742. S.M. Roth, advisor.
2007	M.A. – Kinesiology (Exercise Physiology), Department of Kinesiology, School of Public Health, University of Maryland, College Park, MD 20742. S.M. Roth, advisor.
2005	B.S. Dept. of Exercise Science and Athletics (Exercise Science major, Chemistry minor), Bloomsburg University, Bloomsburg, PA 17815. E.S. Rawson, advisor.

PROFESSIONAL EXPERIENCE

2017 – present	Assistant Professor, University of Michigan, Kinesiology
2015 - 2017	Assistant Instructor, Pathway to Independence Award, UTSWMC Cell Biology
2014 - 2015	Postdoctoral Research Fellow, UTSWMC Cell Biology
2011 - 2014	NIH Postdoctoral Training Fellowship (T32 CA124334)
2007 - 2011	NIH Predoctoral Training Fellowship (T32 AG000268)
2005 - 2007	Teaching Assistant Department of Kinesiology, University of Maryland
Summer 2005	Internship in Exercise Physiology at USARIEM working in the Military Performance Division under Dr. Ed Zambraski and Jeff Stabb, M.S.
2004 – 2005	Undergraduate Research Assistant, Dept. of Exercise Science and Athletics, Bloomsburg University.

PUBLICATIONS:

Refereed Research Papers: 35 total publications (12 first author, 7 corresponding author), as of 02/24/2023
https://www.ncbi.nlm.nih.gov/myncbi/1HipbJg8ak8QU/bibliography/public/

8 Publications from independent laboratory at the University of Michigan (September 2017-present)

8. Slusher AL**, Kim JJ**, Ribick M, Pollens-Voigt J, Bankhead A, Palmbos PL, **Ludlow AT**. Intronic Cis-Element DR8 in hTERT Is Bound by Splicing Factor SF3B4 and Regulates hTERT Splicing in Non-Small Cell Lung Cancer. Mol Cancer Res. 2022 Oct 4;20(10):1574-1588. doi: 10.1158/1541-7786.MCR-21-0058. PubMed PMID: 35852380; PubMed Central PMCID: PMC9532359.
***Corresponding author. Highlighted article in the issue.**
****co-first authors**

7. Slusher, AL, Kim, JJ, Ribick, M, **Ludlow AT**. Acute exercise regulates hTERT gene expression and alternative splicing in the hTERT BAC transgenic mouse model. Med Sci Sports Exerc. 2022 Jun 1;54(6):931-943. doi: 10.1249/MSS.0000000000002868. Epub 2022 Feb 8. PubMed PMID: 35135999; PubMed Central PMCID: PMC9117413.
***Corresponding author**

6. Chaves, AB, Miranda, ER, Mey, JT, Blackburn, BK, Fuller, KNZ, Stearns, B, **Ludlow, A**, Williamson, DL, Houmard, JA, Haus, JM. Exercise Reduces the Protein Abundance of TXNIP and Its Interacting Partner REDD1 in Skeletal Muscle: Potential Role for a PKA-Mediated Mechanism. J Appl Physiol (1985). 2022 Feb 1;132(2):357-366. doi: 10.1152/japplphysiol.00229.2021. Epub 2021 Dec 23. PubMed PMID: 34941434; PubMed Central PMCID: PMC8791844.

5. Noureen N, Wu S, Lv Y, Yang J, Alfred Yung WK, Gelfond J, Wang X, Koul D, **Ludlow A**, Zheng S. Integrated analysis of telomerase enzymatic activity unravels an association with cancer stemness and proliferation. Nat Commun. 2021 Jan 8;12(1):139. doi: 10.1038/s41467-020-20474-9. PubMed PMID: 33420056; PubMed Central PMCID: PMC7794223.

4. Slusher AL, Kim JJ, **Ludlow AT.** The Role of Alternative RNA Splicing in the Regulation of hTERT, Telomerase, and Telomeres: Implications for Cancer Therapeutics. Cancers (Basel). 2020 Jun 10;12(6):1514. doi: 10.3390/cancers12061514. PMID: 32531916 PMCID: PMC7352778
*__Corresponding author__

3. **Ludlow AT**, Slusher AL, Sayed ME. Insights into Telomerase/hTERT Alternative Splicing Regulation Using Bioinformatics and Network Analysis in Cancer. Cancers (Basel). 2019 May 14;11(5). doi: 10.3390/cancers11050666. Review. PubMed PMID: 31091669; PubMed Central PMCID: PMC6562651.
*__Corresponding author__

2. Sayed ME, Slusher AL, **Ludlow AT**. Droplet Digital TRAP (ddTRAP): Adaptation of Telomere Repeat Amplification Protocol to droplet digital PCR. JoVE
*__Corresponding author__

1. Sayed ME, Yuan L, Robin JD, Tedone E, Batten K, Dahlson N, Wright WE, Shay JW, **Ludlow AT**. NOVA1 directs PTBP1 to hTERT pre-mRNA and promotes telomerase activity in cancer cells. Oncogene. 2019; PubMed [journal] PMID: 30568224
*__Corresponding author__

<u>27 Publications from postdoctoral and graduate training</u>

27. Sayed ME, Cheng A, Yadav GP, **Ludlow AT**, Shay JW, Wright WE, Jiang QX. Catalysis-dependent inactivation of human telomerase and its reactivation by intracellular telomerase-activating factors (iTAFs). J Biol Chem. 2019 Jun 11;. doi: 10.1074/jbc.RA118.007234. [Epub ahead of print] PubMed PMID: 31186347.

26. Tedone E, Huang E, O'Hara R, Batten K, **Ludlow AT**, Lai TP, Arosio B, Mari D, Wright WE, Shay JW. Telomere length and telomerase activity in T cells are biomarkers of high-performing centenarians. Aging Cell. 2019 Feb;18(1):e12859. doi: 10.1111/acel.12859. Epub 2018 Nov 28. PubMed PMID: 30488553; PubMed Central PMCID: PMC6351827.

25. **Ludlow AT**, Wong MS, Robin JD, Batten K, Yuan L, Lai TP, Dahlson N, Zhang L, Mender I, Tedone E, Sayed ME, Wright WE, Shay JW. NOVA1 regulates hTERT splicing and cell growth in non-small cell lung cancer. Nature communications. 2018; 9(1):3112. PubMed [journal] PMID: 30082712, PMCID: PMC6079032
*__Corresponding author__

24. **Ludlow AT**, Shelton D, Wright WE, Shay JW. ddTRAP: A Method for Sensitive and Precise Quantification of Telomerase Activity. Methods in molecular biology (Clifton, N.J.). 2018; 1768:513-529. NIHMSID: NIHMS978467 PubMed [journal] PMID: 29717462, PMCID: PMC6046637

23. Huang EE, Tedone E, O'Hara R, Cornelius C, Lai TP, **Ludlow A**, Wright WE, Shay JW. The Maintenance of Telomere Length in CD28+ T Cells During T Lymphocyte Stimulation. Scientific reports. 2017; 7(1):6785. PubMed [journal] PMID:

28754961, PMCID: PMC5533788

22. **Ludlow AT**, Gratidão L, Ludlow LW, Spangenburg EE, Roth SM. Acute exercise activates p38 MAPK and increases the expression of telomere-protective genes in cardiac muscle. Experimental physiology. 2017; 102(4):397-410. NIHMSID: NIHMS848079 PubMed [journal] PMID: 28166612, PMCID: PMC5378631

21. Liu J, Hu J, **Ludlow AT**, Pham JT, Shay JW, Rothstein JD, Corey DR. c9orf72 Disease-Related Foci Are Each Composed of One Mutant Expanded Repeat RNA. Cell chemical biology. 2017; 24(2):141-148. NIHMSID: NIHMS840451 PubMed [journal] PMID: 28132891, PMCID: PMC5316317

20. Kim W#, **Ludlow AT#**, Min J, Robin JD, Stadler G, Mender I, Lai TP, Zhang N, Wright WE, Shay JW. Regulation of the Human Telomerase Gene TERT by Telomere Position Effect-Over Long Distances (TPE-OLD): Implications for Aging and Cancer. PLoS biology. 2016; 14(12):e2000016. PubMed [journal] PMID: 27977688, PMCID: PMC5169358
#**Co-first authors.**

19. Schäfer C, Mohan A, Burford W, Driscoll MK, **Ludlow AT**, Wright WE, Shay JW, Danuser G. Differential Kras^{V12} protein levels control a switch regulating lung cancer cell morphology and motility. Convergent science physical oncology. 2016; 2(3):035004. NIHMSID: NIHMS824098 PubMed [journal] PMID: 29057096, PMCID: PMC5648346

18. Gelsomino L, Gu G, Rechoum Y, Beyer AR, Pejerrey SM, Tsimelzon A, Wang T, Huffman K, **Ludlow A**, Andò S, Fuqua SAW. ESR1 mutations affect anti-proliferative responses to tamoxifen through enhanced cross-talk with IGF signaling. Breast cancer research and treatment. 2016; 157(2):253-265. NIHMSID: NIHMS882375 PubMed [journal] PMID: 27178332, PMCID: PMC5510243

17. Walsh S, **Ludlow AT**, Metter EJ, Ferrucci L, Roth SM. Replication study of the vitamin D receptor (VDR) genotype association with skeletal muscle traits and sarcopenia. Aging clinical and experimental research. 2016; 28(3):435-42. NIHMSID: NIHMS994285 PubMed [journal] PMID: 26415498, PMCID: PMC6223620

16. Robin JD, **Ludlow AT**, LaRanger R, Wright WE, Shay JW. Comparison of DNA Quantification Methods for Next Generation Sequencing. Scientific reports. 2016; 6:24067. PubMed [journal] PMID: 27048884, PMCID: PMC4822169

15. Fleisig HB, Hukezalie KR, Thompson CA, Au-Yeung TT, **Ludlow AT**, Zhao CR, Wong JM. Telomerase reverse transcriptase expression protects transformed human cells against DNA-damaging agents, and increases tolerance to chromosomal instability. Oncogene. 2016; 35(2):218-27. PubMed [journal] PMID: 25893297

14. Robin JD, **Ludlow AT**, Batten K, Gaillard MC, Stadler G, Magdinier F, Wright WE, Shay JW. SORBS2 transcription is activated by telomere position effect-over long distance upon telomere shortening in muscle cells from patients with facioscapulohumeral dystrophy. Genome research. 2015; 25(12):1781-90. PubMed [journal] PMID: 26359233, PMCID: PMC4665000

13. Robin JD, **Ludlow AT**, Batten K, Magdinier F, Stadler G, Wagner KR, Shay JW, Wright WE. Telomere position effect: regulation of gene expression with progressive telomere shortening over long distances. Genes & development. 2014; 28(22):2464-76. PubMed [journal] PMID: 25403178, PMCID: PMC4233240

12. **Ludlow AT**, Spangenburg EE, Chin ER, Cheng WH, Roth SM. Telomeres shorten in response to oxidative stress in mouse skeletal muscle fibers. The journals of gerontology. Series A, Biological sciences and medical sciences. 2014; 69(7):821-30. PubMed [journal] PMID: 24418792, PMCID: PMC4111633

11. **Ludlow AT**, Robin JD, Sayed M, Litterst CM, Shelton DN, Shay JW, Wright WE. Quantitative telomerase enzyme activity determination using droplet digital PCR with single cell resolution. Nucleic acids research. 2014; 42(13):e104. PubMed [journal] PMID: 24861623, PMCID: PMC4117742

10. **Ludlow AT**, Ludlow LW, Roth SM. Do telomeres adapt to physiological stress? Exploring the effect of exercise on telomere length and telomere-related proteins. BioMed research international. 2013; 2013:601368. PubMed [journal] PMID: 24455708, PMCID: PMC3884693

9. Guth LM, **Ludlow AT**, Witkowski S, Marshall MR, Lima LC, Venezia AC, Xiao T, Ting Lee ML, Spangenburg EE, Roth SM. Sex-specific effects of exercise ancestry on metabolic, morphological and gene expression phenotypes in multiple generations of mouse offspring. Experimental physiology. 2013; 98(10):1469-84. NIHMSID: NIHMS498738 PubMed [journal] PMID: 23771910, PMCID: PMC3783594

8. **Ludlow AT**, Lima LC, Wang J, Hanson ED, Guth LM, Spangenburg EE, Roth SM. Exercise alters mRNA expression of telomere-repeat binding factor 1 in skeletal muscle via p38 MAPK. Journal of applied physiology (Bethesda, Md. : 1985). 2012; 113(11):1737-46. PubMed [journal] PMID: 23042912, PMCID: PMC3544504

7. **Ludlow AT**, Witkowski S, Marshall MR, Wang J, Lima LC, Guth LM, Spangenburg EE, Roth SM. Chronic exercise modifies age-related telomere dynamics in a tissue-specific fashion. The journals of gerontology. Series A, Biological sciences and medical sciences. 2012; 67(9):911-26. PubMed [journal] PMID: 22389464, PMCID: PMC3436090

6. McKenzie JA, Witkowski S, **Ludlow AT**, Roth SM, Hagberg JM. AKT1 G205T genotype influences obesity-related metabolic phenotypes and their responses to aerobic exercise training in older Caucasians. Experimental physiology. 2011; 96(3):338-47. NIHMSID: NIHMS253653 PubMed [journal] PMID: 21097644, PMCID: PMC3075436

5. **Ludlow AT**, Roth SM. Physical activity and telomere biology: exploring the link with aging-related disease prevention. Journal of aging research. 2011; 2011:790378. PubMed [journal] PMID: 21403893, PMCID: PMC3043290

4. Hanson ED, **Ludlow AT**, Sheaff AK, Park J, Roth SM. ACTN3 genotype does not influence muscle power. International journal of sports medicine. 2010; 31(11):834-8. PubMed [journal] PMID: 20830656

3. **Ludlow AT**, Zimmerman JB, Witkowski S, Hearn JW, Hatfield BD, Roth SM. Relationship between physical activity level, telomere length, and telomerase activity. Medicine and science in sports and exercise. 2008; 40(10):1764-71. NIHMSID: NIHMS71804 PubMed [journal] PMID: 18799986, PMCID: PMC2581416

2. Deeny SP, Poeppel D, Zimmerman JB, Roth SM, Brandauer J, Witkowski S, Hearn JW, **Ludlow AT**, Contreras-Vidal JL, Brandt J, Hatfield BD. Exercise, APOE, and working memory: MEG and behavioral evidence for benefit of exercise in epsilon4 carriers. Biological psychology. 2008; 78(2):179-87. NIHMSID: NIHMS102191 PubMed [journal] PMID: 18395955, PMCID: PMC2739983

1. Charbonneau DE, Hanson ED, **Ludlow AT**, Delmonico MJ, Hurley BF, Roth SM. ACE genotype and the muscle hypertrophic and strength responses to strength training. Medicine and science in sports and exercise. 2008; 40(4):677-83. NIHMSID: NIHMS240578 PubMed [journal] PMID: 18317377, PMCID: PMC2984550

Manuscripts in review (as of 2/24/2023)

1. Exercise as a therapy to maintain telomere function (ESSR invited review)

Manuscripts in preparation (as of 2/24/2023)

2. Dynamics of TERT isoform expression in stem and cancer cells. Jeongjin J. Kim, Mohammad E. Sayed, Alexander Ahn, Aaron L. Slusher, Mark Ribick, Jeffrey Ying, and Andrew T. Ludlow. In preparation. Likely to be submitted by the end of March 2023.

RESEARCH PRESENTATIONS:

National/ International:

36. Kim, J., Ahn A., Slusher, A. L., **Ludlow, A. T**.. Investigation of Skeletal Muscle Alternative Splicing Following Aerobic Exercise Using Long Read RNA Sequencing. September 2022. American College of Sports Medicine – Integrative Physiology of Exercise Conference. **J. Kim presented a poster**.

35. Kim, J., Magnuson, B., Narayanan, I. V., Ljungman, M., **Ludlow, A. T**.. Using targeted sequencing approaches and bioinformatics to discover approaches to targeting telomerase in cancer. April 2022. Symposia presentation at Telomeres and Cancer Biology meeting. **ATL** gave the oral presentation.

34. Kim, J., Magnuson, B., Narayanan, I. V., Ljungman, M., **Ludlow, A. T**.. Long read single molecule sequencing of TERT mRNA isoforms reveals differential usage across human cell lines - Potential regulatory role of deep intronic elements. Symposia presentation at Cold Spring Harbor Laboratory in December 2021 at bi-annual Telomeres and Telomerase meeting. **ATL** gave the oral presentation.

33. Kim, J., Slusher, A. L., Ribick, M., Bankheaad, A., Palmbos, P. L., **Ludlow, A. T**.. Intronic cis-elements DR8 in telomerase/hTERT regulates hTERT splicing in non-small cell lung cancer and is bound by splicing factor SF3B4. J. Kim gave poster presentation at Cold Spring Harbor Laboratory in December 2021 at bi-annual Telomeres and Telomerase meeting.

32. **Ludlow, A. T.**, Sayed, M. E., Slusher, A. L., Ribick, M., Pancholi, A., Sereni, B., Qui, Y., Tseng, E., Ashby, M., Corney, D.C. A combination of short-read and long-read RNA sequencing reveals NOVA1's role in telomere biology. Symposia presentation at AACR Annual Meeting in April 2019. **ATL** gave the oral presentation.

31. Sayed, M. E.*, Yuan, L*, Tedone, E, Wright, W. E., Shay, J. W.1, **Ludlow, A. T.** NOVA1 directs PTBP1 to hTERT pre-mRNA and promotes telomerase activity in cancer cells. Poster presentation at EMBO: Telomeres and Telomerase in health and disease meeting 2018. * co-first authors. Sayed, M.E. presented poster.

30. Tedone, E., Huang, E., O'Hara, R., Lai, T., Cornelius, C., Ludlow, A. T., Arosio, B., Mari, D., Wright, W. E., Shay, J. W. Telomere Length and Telomerase Activity as Markers of Healthy Aging in Centenarians. Poster presentation at Cold Spring Harbor Laboratories: Telomeres and Telomerase meeting 2017.

29. Tedone, E., Sayed, E. M., Cheng, A., **Ludlow, A. T.,** Wright, W.E., Shay, J.W. Telomere Lengthening by Delivery of Active Telomerase Holoenzyme Complex to Telomerase Negative Cells. Poster presentation at Cold Spring Harbor Laboratories: Telomeres and Telomerase meeting 2017.

28. **Ludlow, A. T.,** Wong, S., Robin, J. D., Batten, K., Yuan, L., Dahlson, N., Mender, I., Zhang, L., Shay, J. W., Wright, W. E. Regulation and manipulation of hTERT splicing in cancer cells. Poster presentation at Keystone Symposia: Epigenetic and Metabolic Regulation of Aging and Aging Related Disease meeting 2016.

27. Sayed, E. M., Cheng, A., Ludlow, A. T., Robin, J. D., Wright, W.E., Shay, J.W, Jiang, Q. Unique kinetic properties of the human telomerase holoenzyme suggests a catalysis dependent brake on its activity. Poster presentation at Cold Spring Harbor Laboratories: Telomeres and Telomerase meeting 2015.

26. **Ludlow, A. T.,** Robin, J. D., Batten, K., Yuan, L., Dahlson, N., Shay, J. W., Wright, W. E. Regulation and manipulation of hTERT splicing in cancer cells. Poster presentation at Cold Spring Harbor Laboratories: Telomeres and Telomerase meeting 2015.

25. Robin, J. D., **Ludlow, A.T.,** Stadler, G., Magdinier, F., Wright, W.E., Shay, J.W. Length dependent telomere looping affects long-distant gene expression (5Mb). Poster presentation at Cold Spring Harbor Laboratories: Telomeres and Telomerase meeting 2013.

24. **Ludlow, A.T.**, Robin, J.D., Shay, J.W., Wright, W.E. Accurate detection and quantitation of rare transcripts (hTERT) and enzyme activity (telomerase) using droplet digital PCR. Oral presentation at Cold Spring Harbor Laboratories: Telomeres and Telomerase meeting 2013.

23. **Ludlow A.T.,** Spangenburg, E.E., Chin, E.R., Cheng, W.H., Roth, S.M. Adult skeletal muscle fiber telomere dynamics following oxidative stress treatment: A comparison between short (CAST/ Ei) and long (C57/Bl6) telomere strains of mice. Poster presentation at ACSM annual meeting 2013.

22. **Ludlow A.T**., Witkowski, S., Marshall, M.R., Wang, J., Guth, L.M., Spangenburg, E.E., Roth, S.M. Exercise modifies age-related telomere dynamics in multiple tissues of CAST/Ei mice. Late-breaking abstract accepted for a poster presentation at Experimental Biology, Washington D.C., 2011.

21. Guth L.M., **Ludlow**, **A.T.,** Witkowski, S., Marshall, M.R., Lima, L., Venezia, A.C., Xiao, T., Lee, M.T., Spangenburg, E.E., and Roth, S.M. Exercise ancestry decreases lipogenesis-related gene expression in skeletal muscle of male offspring. Abstract accepted for a poster and a slide presentation at Experimental Biology, Washington D.C., 2011.

20. Soni N., Jenkins, N.T., **Ludlow**, **A.T.,** Hagberg, J.M. *KLOTHO* KL-VS Genotype is Associated with Cardiovascular Disease Risk Factors and Adaptations to Exercise Training. Abstract accepted for a poster presentation at Experimental Biology, Washington D.C., 2011.

19. Lima L, **Ludlow**, **A.T.,** Spangenburg, E.E., Roth, S.M. MAPK signaling is associated with acute exercise-induced changes in mRNA levels of telomere-related genes. Abstract accepted for a poster presentation at Experimental Biology, Washington D.C., 2011.

18. **Ludlow A.T.**, Lima, L., Spangenburg, E.E., Roth, S.M. Telomere binding protein mRNA expression in response to an acute exercise bout. Abstract presented at American College of Sports Medicine Integrative Physiology of Exercise Meeting, Miami Beach, FL, 2010.

17. Venezia A.C., **Ludlow**, **A.T.,** Witkowski, S., Marshall, M.R., Spangenburg, E.E., Roth, S.M. Effect of one year of voluntary wheel running on transcript specific hippocampus Bdnf gene expression. Abstract presented at American College of Sports Medicine Integrative Physiology of Exercise Meeting, Miami Beach, FL, 2010.

16. Guth, L.M., **Ludlow**, **A.T.,** Witkowski, S., Marshall, M.R., Lima, L., Perret, K., Caffes, N., Venezia, A.C., Spangenburg, E.E., and Roth, S. M. Abstract presented at American College of Sports Medicine Integrative Physiology of Exercise Meeting, Miami Beach, FL, 2010.

15. Kayes, M. K, Zimmerman, J.B., Rietschel, J.C., Deeny, S.P., Roth, S.M., **Ludlow**, **A.T.,** Hatfield B.D. Cognitive Performance In Relation To APOE Genotype, Physical Activity, And Cardiovascular Fitness. Slide presentation for the American College of Sports Medicine Annual Meeting, Baltimore, MD, 2010. *Med. Sci. Sports & Exer.,* 42(5 Supp):71, 2010.

14. Marshall, M. R. **Ludlow**, **A.T.,** Witkowski, S., Wang, J., Guth, L.M., Frank, S., Spangenburg, E.E., Roth, S.M. Chronic Wheel Running Alters Telomere Length and Telomere-related Gene Expression In Cast/ei

Mouse Liver Tissue. Poster presentation for the American College of Sports Medicine Annual Meeting, Baltimore, MD, 2010. *Med. Sci. Sports & Exer.,* (5 Supp):463, 2010.

13. **Ludlow, A.T.**, Witkowski, S., Marshall, M.R., Wang, J., Guth, L.M., Spangenburg, E.E., Roth, S.M. Year Long Wheel Running Alters Telomere Dynamics and Markers of DNA Damage in Mice. Poster presentation for the American College of Sports Medicine Annual Meeting, Baltimore, MD, 2010. *Med. Sci. Sports & Exer.,* 42 (5 Supp.): S375, 2010.

12. **Ludlow, A.T**., Marshall, M., Witkowski, S., Spangenburg, E.E., Roth S.M. High levels of physical activity accelerate telomere shortening in Cast/ei J mice. Poster presentation for the Keystone Symposium, Telomere Biology and DNA Repair, Ashmore, Queensland, Australia, 2009.

11. Hanson, E.D., **Ludlow**, **A.T.,** Sheaff, A.K., Park, J., Roth, S.M. *ACTN3* R577X genotype is not associated with muscle fatigue performance. Poster presentation for the American College of Sports Medicine Annual Meeting, Seattle WA, 2009. *Med. Sci. Sports Exerc.*, 41 (5 Supp.): S583, 2009.

10. McKenzie, J.A., Witkowski, S., **Ludlow**, **A.T.,** Roth, S.M., Hagberg, J.M. Visfatin genotypes influence glucose and obesity-related variables and their aerobic exercise training responses. Poster presentation for the American College of Sports Medicine Annual Meeting, Seattle WA, 2009. *Med. Sci. Sports Exerc.*, 41 (5 Supp.): S583, 2009.

9. Zimmerman, J.B., **Ludlow**, **A.T.,** Witkowski, S., Kayes, M., Poeppel, D., Roth, S.M., Hatfield, B.D. APOE genotype, aerobic fitness, and cerebral cortical activation during working memory challenge in middle-aged adults. Slide presentation for the American College of Sports Medicine Annual Meeting, Seattle WA, 2009. *Med. Sci. Sports Exerc.*, 41(5 Supp.): S52, 2009.

8. **Ludlow, A.T**., Nadendla, P., Witkowski, S., Wohlers, L.M., Spangenburg, E.E., Roth, S.M. Physical activity ancestry affects body composition phenotypes and gene expression in mice offspring. Poster presentation for the American College of Sports Medicine Annual Meeting, Seattle WA, 2009. *Med. Sci. Sports Exerc.*, 41 (5 Supp.): S584, 2009.

7. **Ludlow, A.T**., Auriemma, M., Nadendla, P., Ngai, K.Y., Spangenburg, E.E., Roth, S.M. Does DNA methylation of the myosin heavy chain IIb gene promoter regulate expression during skeletal muscle differentiation? Poster presentation for the Integrative Biology of Exercise meeting, Hilton Head, SC, Sept 2008. *The Physiologist*. 51: 66-67, 2008.

6. McKenzie J. A., Witkowski, S., **Ludlow**, **A.T.,** Roth, S. M., and Hagberg, J.M. *AKT1* G205T genotype influences the response of glucose and insulin variables to aerobic exercise training. Poster presentation for the American College of Sports Medicine Annual Meeting, Indianapolis, IN. *Med. Sci. Sports Exerc.*, 40 (5 Supp.): S185, 2008.

5. Savin-Murphy, J. Zimmerman, J.B., Deeny, S.P., **Ludlow**, **A.T.,** Poeppel, D., Roth, S.M., Contreras-Vidal, J., Hatfield, B.D. Fitness and cognitive decline of the aging brain – a preliminary investigation. Slide presentation for the American College of Sports Medicine Annual Meeting, Indianapolis, IN. *Med. Sci. Sports Exerc.*, 40 (5 Supp.): S90, 2008.

4. Zimmerman, J.B., Hearn, J.W., **Ludlow**, **A.T.,** Savin-Murphy, J., Rietschel, J.C., Conery, R., Deeny, S.P., Roth, S.M., Hatfield, B.D. Executive and memory performance is moderated by *APOE* and physical activity in middle-aged adults. Slide presentation for the American College of Sports Medicine Annual Meeting, Indianapolis, IN. *Med. Sci. Sports Exerc.*, 40 (5 Supp.): S89, 2008.

3. **Ludlow, A.T**., Metter, E.J., Ferrucci, L., Roth. S.M., The vitamin D receptor (*VDR*) FokI polymorphism is associated with muscle mass and strength in men. Slide presentation for the American College of Sports Medicine Annual Meeting, Indianapolis, IN. *Med. Sci. Sports Exerc.*, 40 (5 Supp.): S44-45, 2008.

2. **Ludlow, A.T.**, Liu, D., Metter, E.J., Ferrucci, L., Roth S.M. *AKT1* G205T polymorphism associated with muscle strength. Slide presentation for the 2007 American College of Sports Medicine Annual Meeting, New Orleans, LA. *Med. Sci. Sports Exerc.*, 39 (5 Supp.): S13, 2007.

1. **Ludlow, A.T**., Zimmerman, J.B.,Witkowski, S., Hearn J.W., Hatfield, B.D., Roth, S.M. Relationship between physical activity level, telomere length, and telomerase activity in peripheral blood mononucleocytes. Late-breaking poster presentation for the 2007 Experimental Biology meeting, Washington D.C.

INVITED LECTURES/WEBINARS:

17. 2023 Houston Methodist RNA therapeutics (invited by Dr. John Cooke). February 17, 2023.

16. Featured presentation at "Telomeres and Cancer" conference. April, 2022 (virtual).

15. 2020 Wisconsin Medical College. Invited Presentation to Cardio-Oncology group (Invited by Dr. Andreas Beyer, Ph.D.). September 3, 2020.

14. 2020 Cancer Biology/Cancer Genetic – Rogel Cancer Center faculty meeting Cancer Genetics seminar. Manipulation and regulation of telomerase alternative splicing in lung cancer. May

13. 2019 – Rogel Cancer Center Grand Rounds - Manipulation and regulation of telomerase alternative splicing in lung cancer. December.

12. 2019 - Bone and Joint Research Center at the Henry Ford Hospital in Detroit. Manipulation and regulation of hTERT/telomerase alternative splicing in aging and cancer. October.

11. 2019 – Cancer Basic Science Retreat - Manipulation and regulation of telomerase alternative splicing in lung cancer. June.

10. 2019 – Cancer Biology/Cancer Genetic – Rogel Cancer Center faculty meeting Cancer Genetics seminar. Manipulation and regulation of telomerase alternative splicing in lung cancer. February.

9. 2019 - UMICH Thoracic and Lung Oncology Research seminar. Manipulation and regulation of telomerase alternative splicing in lung cancer. January.

8. 2018 - UMICH Hematology/Oncology Research Conference seminar. Manipulation and regulation of telomerase alternative splicing in lung cancer. October.

7. CXR 2018 - Manipulation and regulation of telomerase alternative splicing in aging and cancer. November.

6. CXR 2017 - Manipulation and regulation of telomerase alternative splicing in aging and cancer. September.

5. Invited lecture at UT Southwestern Medical Center, Hamon Cancer center Lecture series. Title: Manipulation and regulation of telomerase alternative splicing in lung cancer. April 27, 2017.

4. Invited lecture at UT Arlington Biomedical Engineering seminar series. Title: Opportunities for Discovery Using droplet digital PCR: Telomeres/Telomerase, Gene Expression, and Next Generation Sequencing. September 21, 2016

3. Bio-Rad digital PCR Road Show - Invited lectures at UTSWMC Cell Biology. Title: Opportunities for Discovery Using ddPCR: Telomeres/Telomerase, Gene Expression and Next Generation Sequencing. July 2015.

2. The Scientist Webinar Series – PCR-Moving beyond traditional methods. December 4, 2014. http://www.the-scientist.com/?articles.view/articleNo/41267/title/PCR--Moving-Beyond-Traditional-Methods/

1. Bio-Rad digital PCR Road Show - Invited lectures at UTSWMC Cell Biology and MD Anderson, Houston Texas. Presented digital PCR techniques on developing enzyme assays and gene expression assays using digital PCR. July 2014.

GRANTS:

Funded:

June 2021	UM Rogel Cancer Center Cancer biology/Cancer genetics pilot grant ($20K). Long-read RNA sequencing to define alternative splicing variants of hTERT in cancer"
April 2021	Marie Hartwig School of Kinesiology Research award. Title: 'Role of exercise-related signaling in alternative RNA splicing in skeletal muscle'. $40,000.
January 2020	Rogel Cancer Center: Cancer Genetics and Cancer Biology Junior Faculty Mentorship committee award ($4000)
July 2018	Marie Hartwig School of Kinesiology Research award. Title: Role of Exercise in Alternative Splicing Regulation of Telomerase'. $25,000.
April 2018	NIA Junior Faculty Summer Workshop – annual NIA grant writing and aging workshop. Fully funded by NIA provides junior faculty with exposure to cutting edge aging research. Also provides NIH style grant review process and opportunity to present grant aims to experts and colleagues to receive constructive feedback on ideas.
September 2017	NIH/NCI R00 Pathway to Independence award (1K99CA197672-01). Title: Manipulating hTERT splicing in lung cancer cells.
November 1, 2016	SPORE Lung Cancer – Career Development Award Manipulating hTERT splicing in lung cancer cells. $25,000.
May 1, 2016	NIH/NCI K99/R00 Pathway to Independence award (1K99CA197672-01). Title: Manipulating hTERT splicing in lung cancer cells. Impact score of 20.
April, 2010	Dept. Kinesiology Graduate Research Initiative Project (GRIP) grant: The role of shelterin and DNA damage response elements in C2C12 muscle cells. $2500
April 1, 2008	Dept. Kinesiology Graduate Research Initiative Project (GRIP) grant: Comparison of telomere length, telomerase enzyme activity and running endurance in CAST/Ei mice. $2500
2004-2005	Kozloff Undergraduate Research Grant Award. $300

Submitted awaiting decision:

October 2022	NIH R21 (NAIMS SMEP). Impact of exercise on alternative splicing isoform expression as determined by long-read RNA sequencing
December 2022	MiMHC pilot grant submitted. Impact of exercise on alternative splicing isoform expression as determined by long-read RNA sequencing

Submitted but unfunded:

October 2022	Hevolution Letter of intent submitted. Not progressed.
April 2022	The Sagol Network GerOmic Award for Junior Faculty. Submitted full proposal but not funded.
March 2022	NIH RO1 (1R01CA272495-01) Submitted *Function and regulation of telomerase/hTERT alternative splicing.* Discussed – Impact score – 68 Percentile - 51
December 2021	AFAR/Glenn Young investigator LOI –Selected out of 113 applications Submitted full proposal but not funded.
November 2020	Rogel Cancer Center Discovery Award. Not awarded but invited for resubmission.
December 2020	AIRC Investigator Initiated Proposal LOI – full proposal invitation notification March 2021. Jan. 2021 – for 2021 award. NOT PROGRESSED
July 2020	1R01CA247918-01A1 NCI – reviewed in Cancer Genetics 1 – Resubmission – not discussed. Early-stage investigator status, New investigator status eligible. Regulation and manipulation of hTERT alternative splicing in lung cancer cells
December 2020	AFAR/Glenn Young investigator LOI – full proposal submitted but not funded
December 2019	MiMHC pilot grant submitted LOI – not funded
June 2019	1R01CA247918-01 NCI – reviewed in Cancer Genetics 1 – Impact score 46, percentile 38. Early-stage investigator status, New investigator status eligible. Regulation and manipulation of hTERT alternative splicing in lung cancer cells

December 2019	AFAR/Glenn Young investigator LOI – not invited for full proposal
December 2012	Submitted NRSA Individual NIH post-doctoral training application (1F32CA180686-01).
October 2012	Submitted American Cancer Society Postdoctoral Fellowship (125223).
August 2009	Submitted revised NRSA Individual NIH pre-doctoral training application (1F31 AG034012-01A1) – final application received a priority score of 36, no percentile assigned (1/22/10).

HONORS AND AWARDS

2018	NIA Junior Faculty Summer Workshop on Basic Biology of Aging
2016	UT Southwestern Post-Doctoral Association travel award recipient
2015	Simmons Cancer Center Post-Doctoral travel award – awarded for oral presentation of work completed at UTSWMC – Title of talk - Regulation and manipulation of hTERT (telomerase) splicing in cancer cells
2011	NIH/NCI Postdoctoral Training Fellowship (T32 CA124334)
2009	Goldhaber Graduate Student Travel Award ($600) for travel to Keystone Symposia on Molecular and Cell Biology – Telomere Biology and DNA Repair to present an abstract entitled, “High levels of physical activity accelerate telomere shortening in Cast/Ei J mice”. Conference located in Ashmore, Queensland, Australia, 2009.
2008	Department of Kinesiology Humphery Award recipient for outstanding graduate student publication for ‘Relationship between physical activity, telomere length, and telomerase activity in peripheral blood mononucleocytes.’ *Medicine and Science in Sports and Exercise*, 40 (10): 1764-71, 2008.
2007	NIH Predoctoral Training Fellowship (T32 AG000268).
2005	Bill Sproule Award for senior exercise science major with highest GPA. Bloomsburg University of Pennsylvania.
2002	Bloomsburg University Wrestling Scholar Athlete Representative
2001	Stroudsburg High School wrestling team scholar athlete representative to district XI
2001	Cap Curtis Scholarship: one of five scholarships awarded to outstanding scholar athletes

SERVICE

2020-2022	Search committee member: School of Kinesiology Exercise Oncology search
2019	Tom Templin course – served as guest speaker in course about writing manuscript describing research results.
2019	Co-Wrote ExOUT Cancer synergy hiring plan for SOK
2018	Participated/Presented research poster in School of Kinesiology event; Kinesiology Moves the World.
2009-2010	Member, Graduate Committee to the Graduate Coordinator
2007-2008	Member, Department Chair’s Graduate Student Advisory Committee
2007-2008	Member, Search Committee for Exercise Physiology Faculty
2006-2011	Functional Genomics Laboratory Coordinator
2006-2011	Mentored several (7 plus) undergraduate students in the Functional Genomics Laboratory

Graduate Student

Jeongjin Kim M.A., MVS Ph.D. proram - 2019 –
Jung Alexandar Ahn – 2021 fall master’s degree; Accepted into Kinesiology MVS Ph.D. program with a GSI position for fall 2022.

Ph.D. Committee Chair –

Jeongjin Kim M.A., 2019 –
Jung Alex Ahn M.S., 2022 –

<u>School of Kinesiology MVS Ph.D. Committee Member-</u>

Edwin Miranda M.A., 2018-2022
James Shadiow M.A., 2019 –

Corey Mazos M.A., 2019 -

Michigan Medicine Graduate Program in Biomedical Sciences - Cancer Biology preliminary exam committee
Dana Messinger March 4, 2022

Undergraduate Students (at University of Michigan)
Evan Hickman – October 2022 -
Jeffery Ying – February 2022 –
Andrew Phillips - September 2022-May 2023
Sam Russo – September 2022-May 2023
Olivia Rodriguez – January 2022 – May 2022
Jesse Pollens-Viogt May 2021-December 2021
Anisha Pancholi January 2018 – April 2020
Neelesh Peddireddy January 2018 – June 2018
CaRSIP summer program
Rachel Choate June 2018 – July 2018

Postdoctoral Researchers
Mohammed E. Sayed 2017 – 2019 – went on to start his own Biotechnology company (Telos) in September 2019.
Aaron L. Slusher 2018 – 2021 (April) – went on to a second postdoctoral experience at Yale Medical School (NIH funded in the Laboratory of Dr. Sonia Caprio in Pediatric Endocrinology studying obesity and adipocyte biology).

Staff Members
Mark Ribick M.S. Senior Laboratory Associate – 2018 – September 2021

Courses Taught
MOVESCI340 – Undergraduate Exercise Physiology course with a human physiology laboratory (4 credits)
MOVESCI/KINES 443 – Exercise and Successful Aging. Mixed undergraduate and graduate course about basic mechanisms of aging and how exercise impacts these mechanisms.

DIVERSITY, EQUITY, AND INCLUSION ACTIVITIES
2023
Annual MLK Health Sciences Lecture
2022
01-24-22 - Annual MLK Health Sciences Lecture entitled “This is America: Confronting Health Disparities…Writing Prescriptions for Change,” featuring Dr. Lakesha Butler, PharmD.

2021
01-18-21 **–** U-M Health Sciences MLK Keynote, "Where Do We Go From Here: Body Politics and Movement Towards Racial Empowerment," with MVS alum Dr. Monique (Roberts) Butler, MD.

09-29-2021 – CRLT Players session, "Moving the Needle: Shifting the Conversation around Sexual Harassment"

10-11-2021 **–** DEI Summit 2021 Community Assembly and Discussion
SOK DEI summit reflection lunch

2020
06-26-2020 - Cancer Biology discussion about racism – Host: Dr. David Lombard

2019
STRIDE faculty recruitment seminar December 2019
Teaching – presented inclusive material and pointed out where diversity and inclusion could be improved in specific research areas relevant to class topics.

MANUSCRIPTS REVIEWED FOR

2023
Microgravity
MSSE
Cancer Research
Journal of Clinical Investigation
Methods and Molecular Biology
Stem cells
The CRISPR Journal

2022
Nutritional biochemistry
MSSE (multiple times)
RNA Biology
Stem cells
Cancer Research
Methods in Molecular Biology

2021
Molecular Cell
Biosensors and Bioelectronics
Cell reports (same article as Molecular Cell)
E clinical medicine a Lancet journal.
iSCIENCE

2020
Nature Communication
Analytical Chemistry
TCR
IJMS
Heliyon
ACS
Cancers
Cancer research
Gene
Molecular Cell

2019
Molecular Cancer
Molecular Cell Research
Oxidative Medicine and Cellular Longevity
Journal of Biological Chemistry (JBC)
Journal of Cancer Research and Clinical Oncology
Cancer Management and Research
EJ Hematology
Cancers
ZUSB
Comparative Exercise Physiology
Oncogenesis
Nature Communications

2018
MSSE
Journal of Cancer Research and Clinical Oncology
F1000

2017
NAR
AJP – cell
Aging Cell
Journal of Sports Science Reviews
Biomedical and Environmental Sciences
Physiological Genomics

GRANTS REVIEWED

2021

NIH Early career reviewer – 2020- 2021

Reviewed for Cancer Genetic Study section ECR at Feb. 2021 Meeting.

2018
Hong Kong Research Grants Council
The French National Research Agency
2017
Hong Kong Research Grants council

THESIS REVIEWED

2018
University of the Sunshine Coast – Australia
"The independent and interactive effects of exercise and diet on biological ageing"
Doctor of Philosophy candidate Ms. Karen Birkenhead.
External Thesis Committee member for Ph.D. dissertation titled,' The relationships between lifetime physical activity and diet on telomere length in current ultra-endurance exercisers' by Karen L. Birkenhead.
The University of the Sunshine Coast.
School of Health and Sport Sciences, Faculty of Science, Health, Education and Engineering.

R01 CANCER CENTER REVIEW COMMITTEE 2020 - 2021

Sami Malek
Mats Ljungman
Laura Kresty
Jun Li

REFERENCES

References available upon request.