Eric Andrew Kirk, PhD

Curriculum Vitae

2 April 2025

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Case Western Reserve University School of Medicine, Cleveland, OH 44106

Work email: eak152@case.edu

Date of birth: 10 May 1991

Place of birth: London, Canada

Citizenship: Canadian

Education

Postdoctoral Fellow, Case Western Reserve University School of Medicine, Neurosciences (with BA Sauerbrei)	2022-2025
PhD, Western University, Kinesiology (with CL Rice)	2017-2022
Visiting Scholar, Northwestern University, Neuroscience (with CJ Heckman)	2021
MSc, Western University, Kinesiology (with CL Rice)	2015-2017
BSc, Western University, Biology, Genetics (with CL Rice and SM Singh)	2010-2015

Scholarships

Postdoctoral Fellowship, Natural Sciences and Engineering Research Council of Canada	2023-2025
Trainee and Professional Development Award, Society for Neuroscience	2021
Michael Smith Foreign Study Supplement, Natural Sciences and Engineering Research Council of Canada	2021
Faculty of Health Sciences Fellowship, Western University	2021
Alexander Graham Bell PhD Award, Natural Sciences and Engineering Research Council of Canada	2018-2021
Ontario Graduate MSc and PhD Scholarships, Province of Ontario	2016-2018

Mentoring

K. Cai, Neurosciences, PhD student in the Sauerbrei lab	2024+
A. Zero, Kinesiology, MSc and PhD student in the Rice lab	2018-2022
K. Hali, Kinesiology, MSc student in the Rice lab	2017-2019

Teaching

Lecture, Methods in Neuroscience Research (NEUR 303/ANAT 403), Case Western Reserve University	2023-2025
Advanced Professional Development for University Teaching Course, Case Western Reserve University	2022

Lecture, Techniques muscle physiology (6375), York University	2021
Lecture, Muscle Function and Metabolism (4430), Western University	2018
Graduate teaching assistant, Western University	
General Physiology (2nd year course)	2020
Muscle Function and Metabolism (4th year course)	2015-2018
Exercise Biochemistry (3rd year course)	2016, 2020

Service

Reviewer for Elife, Acta Physiologica, Journal of Physiology, Journal of Applied Physiology, Journal of Electromyography and Kinesiology, Scientific Reports, Journal of Clinical Medicine, and Applied Physiology, Nutrition, and Metabolism.	2020+
Co-reviewer (with BA Sauerbrei) for Nature Neuroscience, Nature Communications, Elife, and the Proceedings of the National Academy of Sciences.	
Poster judge, CWRU STEM undergraduate intersection conference.	2023
Science curriculum development, neuroscience education topic bundle, IndigeSTEAM (Canada)	2022-2023
Volunteer, Canadian Science Policy Center, Evaluation and Reports Committee	2022-2023
Mentor, Provost Scholars Program at Case Western Reserve University	2022-2023
First graduate student member, Health Sciences Research Ethics Board for Human Experimentation, Western University	2018-2022

Publications

1. Wrobel J, Sauerbrei BA, Kirk EA, Guo JZ, Hantman A, Goldsmith J. Modeling trajectories using functional linear differential equations. The Annals of Applied Statistics 18(4)3425-3443, 2024.
2. Kirk EA, Hope KT, Sober SJ, Sauerbrei BA. An output-null signature of inertial load in motor cortex. Nature Communications 15(1),7309, 2024.
3. Kirk EA and Sauerbrei BA, Electromyography: Accessing populations of motor units. eLife.94764, 2024. Insight editorial article.
4. Zero AM*, Kirk EA*, Gilmore KJ, Rice CL, Motor unit firing rates in young and very old adult males during an isokinetic fatiguing task and short-term recovery in the anconeus muscle. Journal of Neurophysiology 130:179-188, 2023.
5. Kirk EA, Castellani CA, Doherty TD, Rice CL, Singh SM, Local and systemic transcriptomic responses from acute exercise induced muscle damage of the human knee extensors. Physiological Genomics 52:305-315, 2022.
6. Zero AZ, Kirk EA, Rice CL, Firing rate trajectories of human motor units during activity-dependent muscle potentiation. Journal of Applied Physiology 132:402-412, 2022.

7. Kirk EA, Zero AZ, Rice CL, Firing rate trajectories of human occipitofrontalis motor units in response to triangular voluntary contraction intensity. Experimental Brain Research 239:3661-3670, 2021.
8. Kirk EA, Gilmore KJ, Rice CL, Anconeus motor unit firing rates during isometric and muscle shortening contractions comparing young and very old adults. Journal of Neurophysiology 126:1122-1136, 2021.
9. Zero AM, Kirk EA, Hali K, Rice CL, Firing rate trajectories of human motor units during isometric ramp contractions to 10, 25 and 50% of maximal voluntary contraction. Neuroscience Letters. 762:March:136118, 2021.
10. Kirk EA and Rice CL, The relationship of agonist muscle single motor unit firing rates and elbow extension limb movement kinematics. Experimental Brain Research 239:2755-2766, 2021.
11. Kirk EA, Christie AD, Knight CA, Rice CL, Motor unit firing rates during constant isometric contraction: establishing and comparing an age-related pattern among muscles. Journal of Applied Physiology. 1:130(6):1903-1914, 2021.
12. Arbuckle SA, Weiler J, Kirk EA, Rice CL, Schieber MH, Pruszynski JA, Ejaz N, Diedrichsen J, Structure of population activity in primary motor cortex for single finger flexion and extension. Journal of Neuroscience 40(48):9210-9223, 2020.
13. Gilmore KJ, Kirk EA, Doherty TH, Kimpinski K, Rice CL, Abnormal motor unit firing rates in chronic inflammatory demyelinating polyneuropathy. Journal of Neurological Sciences 15:414:166859, 2020.
14. Hali K, Kirk EA, Rice CL, Effect of knee joint position on triceps surae motor unit recruitment and firing rates. Experimental Brain Research 9:2345-5352, 2019.
15. Kirk EA, Gilmore KJ, Stashuk DW, Doherty TJ, Rice CL, Human motor unit characteristics of the superior trapezius muscle with age-related comparisons. Journal of Neurophysiology 122:823-832, 2019.
16. Kirk EA, Singh SM, Rice CL, The ATP2A2 rs3026468 does not associate with quadriceps contractile properties and acute muscle potentiation in humans. Physiological Genomics 1:51:10-11, 2019.
17. Kirk EA, Gilmore KJ, Rice CL, Neuromuscular changes of the aged human hamstring. Journal of Neurophysiology 120:480-488, 2018.
18. Gilmore KJ, Kirk EA, Doherty TJ, Rice CL, Effect of very old age on anconeus motor unit loss and compensatory remodeling. Muscle Nerve 4:659-663, 2018.
19. Kirk EA, Rice CL, Contractile functions and motor unit firing rates of the human hamstring. Journal of Neurophysiology 117:243-250, 2017.
20. Kirk EA, Copithorne DB, Dalton BH, Rice CL, Motor unit firing rates of the gastrocnemii during maximal and sub-maximal isometric contractions in young and old men. Neuroscience 330:376-385, 2016.
21. Kirk EA, Moore CW, Chater-Diehl EJ, Singh SM, Rice CL, Human COL5A1 polymorphisms and quadriceps muscle-tendon mechanical stiffness in vivo. Experimental Physiology 101:1581-1592, 2016.

Conferences

1. Kirk EA, Hope KT, Sauerbrei BA, Motor cortical dynamics reveal rhythmic and transient dimensions during voluntary gait modification in the mouse. Society for Neuroscience. Chicago, USA (poster).
2. Kirk EA, Hope KT, Sauerbrei BA, Motor cortical dynamics during voluntary gait modification in the mouse. Society for the Neural Control of Movement, Dubrovnik, Croatia (poster).
3. Kirk EA, Hope KT, Sauerbrei BA, Cortical representation of inertial loads during locomotion. Society for Neuroscience, Washington, United States (poster).
4. Kirk EA, Rice CL, Motor unit firing rate trajectories in agonist muscles during elbow extension movements. Society for Neuroscience, Chicago, United States (poster).
5. Zero AZ, Kirk EA, Rice CL, Firing rate response of human motor units during muscle potentiation. Society for Neuroscience, Chicago, United States (poster).
6. Paish AD, Kirk EA, Rice CL, Stimulated disruption of cortical or spinal activity during voluntary movement preparation. Society for Neuroscience, Chicago, United States (poster).
7. Kirk EA, CL Rice, Motor unit firing frequencies are muscle dependent during static contraction: importance of axon distance? Neuromatch 3.0 (presentation).
8. Kirk EA, Rice CL, Dynamic contraction dependence on the instantaneous motor unit firing rates. Experimental Biology. Supplemental issue 34:S1. San Diego, United States (poster).
9. Kirk EA, Gilmore KJ, Rice CL, Motor unit firing rates during dynamic isokinetic fatiguing contractions in young and old men. Canadian Society Exercise Physiology. Niagara Falls, Canada (presentation).
10. Kirk EA, Gilmore KJ, Stashuk DW, Doherty TJ, Rice CL, Ageing, it's a trap! Neuromuscular properties of the superior trapezius. Motor disorders and neurophysiology, International Society of Electrophysiology and Kinesiology. University College Dublin, Dublin, Ireland (poster).
11. Arbuckle SA, Weiler J, Kirk EA, Saikaley M, Rice CL, Schieber M, Diedrichsen J, Ejaz N, Representation of fingers and finger movement direction in the primary motor cortex. Society for the Neural Control of Movement. Santa Fe, USA (presentation).
12. Arbuckle SA, Weiler J, Kirk EA, Saikaley M, Rice CL, Schieber M, Diedrichsen J, Ejaz N, Representation of fingers and finger movement direction in primary motor cortex. Mechanisms of Dexterous Behaviour. Howard Hughes Medical Institute, Janelia, USA (poster).
13. Gilmore KJ, Kirk EA, Kimpinski K, Doherty TJ, Rice CL, Chronic inflammatory demyelinating polyneuropathy: weakness associated with reductions in motor unit discharge rates. Canadian Society Exercise Physiology, Winnipeg, Canada (poster).
14. Arbuckle SA, Weiler J, Kirk EA, Saikaley M, Rice CL, Schieber M, Diedrichsen J, Ejaz N, Extension and flexion representations in M1 spatially cluster around the moving finger. Society for Neuroscience satellite symposium. Washington DC, USA (presentation).
15. Gilmore KJ, Kirk EA, Rice CL, Is there a cessation of motor unit remodeling as a compensatory strategy to age-related motor unit loss? American College of Sports

Medicine, Denver, USA (poster).

16. Kirk EA, Rice CL, Characterization of neuromuscular properties of the human hamstring muscle group at two knee-joint angles. Canadian Society Exercise Physiology, Victoria, Canada (poster).