Kayla M. Fewster, PhD
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Western University
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1. General Information

1.1 – Academic Positions

Assistant Professor - October 2024 – Present
Western University, School of Kinesiology, Faculty of Health Sciences, London ON.

1.2 Past Academic Positions

Assistant Professor - September 2021 – September 2024
The University of British Columbia, School of Kinesiology, Faculty of Education, Vancouver BC.

Leaves of Absence - August 2023 – May 2023
Maternity/Parental Leave

Post-Doctoral Research Fellow (Mitacs Accelerate) - September 2020 to August 2021
University of Guelph, Spine & Muscle Biomechanics Lab, Department of Human Health and Nutritional Sciences, Guelph, ON.

Project: The Influence of Degeneration on Lumbar Spine Muscle Mechanics and Neurogenic Inflammation

Supervisors: Dr. Steve M.H. Brown & Dr. John Z. Srbely
Note: Initial Start Date – May 2020, Delayed start due to COVID-19

Research Associate for the MSD Prevention Guideline - May 2020 to January 2021
Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD), *University of Waterloo,* Waterloo (ON)

1.3 - Education

Doctor of Philosophy (Ph.D.) – Kinesiology, Biomechanics - September 2013 to April 2020
University of Waterloo, Waterloo (ON)

Thesis: Exploring low to moderate velocity motor vehicle rear impacts as a viable injury mechanism in the lumbar spine

Advisor: Dr. Jack P. Callaghan

Masters of Science (M.Sc.) – Kinesiology, Biomechanics - September 2011 to August 2013
McMaster University, Hamilton (ON)

Thesis: An investigation of leaning behaviours during one-handed submaximal exertions with extended reached

Advisor: Dr. Jim R. Potvin

Honours Bachelor of Science (B.Sc.) – Biomedical Biology - September 2006 to April 2010
Laurentian University, Sudbury (ON)

Thesis: Emotion affects torso force production during flexion and extension movements: implications for spine loading

Advisor: Dr. Sylvain Grenier

1.4 - Professional Affiliations

2021 – Present	Investigator, ICORD (International Collaboration on Repair Discoveries) Research Centre
2021 – Present	Present Origins of Balance Deficits and Falls Research Cluster
2017 – Present	American Society of Biomechanics
2016 – Present	Canadian Society for Biomechanics
2016 – Present	Association of Canadian Ergonomists

1.5 - Academic Scholarships, Awards & Distinctions

2020-2021 **Mitacs Accelerate Fellowship ($55,000)**

2020 **Doctoral Thesis Completion Award ($5,000)**

2016-2017 **NSERC Industrial Partnership Scholarship ($42,000)**

2016 **ACE Founders' Doctoral Award,** Annual Meeting for the Association of Canadian Ergonomists, Niagara Falls, Ontario **(Research Award at National Conference)**

- Competition for best doctoral student paper submission.
- October 20th, 2016

2014 **Provost Doctoral Entrance Award (PDEA) for Women ($5,000)**

2013 **Ontario Graduate Student Scholarship (OGS) ($15,000)**, University of Guelph (Declined)

2014 **Award for Top Presentation**, Applied Health Sciences Graduate Student Research Conference

- Awarded to a Kinesiology graduate student with the most outstandingresearch presentation

2014 **Conference Travel Award ($150),** Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD)

2013 **Conference Travel Award ($150)** Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD)

2012 **3rd Prize, Toyota of Canada Automotive Research Poster Competition ($1500)**, Auto21 Centres of Excellence National Conference, Montreal, Quebec
- Awarded to HQP posters displaying excellence in automotive research.

2012 **McMaster Kinesiology Travel Scholarship ($500)**, Department of Kinesiology, McMaster University

2. Research

2.1 Research Funding

2023-2024	**WorkSafe BC – Applied Innovation** "Exoskeleton uses in under-represented workplaces" Role: PI Co-applicant: Abigail Overduin	$50,000
2023-2024	**NSERC Research Tools and Infrastructure Grant (RTI)** "A high-speed pressure mapping system for non-invasive force distribution characterization" Role: PI Co-applicant: Dr. Michael Hunt	$76,395
2022-2023	**B.C. Knowledge Development Fund (BCKDF)** "Infrastructure for advanced spine mechanics research"	$184,580
2022-2023	**Canada Foundation for Innovation (CFI)** "Infrastructure for advanced spine mechanics research"	$184,580
2022-2023	**Research Facilities Support Grant (RFSG)**, The University of British Columbia. "A force plate and amplifier for collaborative research across biomechanics, physiology and neuromechanics" Role: PI Co-Applicants: Dr. Mark Carpenter, Dr. Romeo Chua, Dr. Tim Inglis, Dr. Cameron Mitchell	$44,887.50
2022-2026	**NSERC Discovery Grant**, "Relating the mechanical responses of the lumbar spine during sudden impacts to preceding mechanical exposures"	$160,000
2022-2023	**NSERC Discovery Grant – Discovery Launch Supplement**, "Relating the mechanical responses of the lumbar spine during sudden impacts to preceding mechanical exposures"	$12,500

2021 **UBC Start Up Funds** $150,000

2.2 Publications

Peer-Reviewed Journal Publications (Total = 33):
Submitted (Total = 3), Published (Total = 30)

1) Barrett, J.M., Rahamn, F.A., Zehr, J.D., **Fewster, K.M.,** Quadrilatero J., Callaghan, J.P. (2024). Static Creep Loading of Intervertebral Discs Does Not Trigger a Remodelling Response. *Spine.* Submitted,

2) Trevorrow R., Zehr J.D., Barrett, J.M., Callaghan, J.P., **Fewster K.M.** (2024) The association between facet joint structural parameters and neutral zone properties – a porcine versus human cadaver comparison. *Journal of Biomechanical Engineering. Accepted.*

3) **Fewster, K.M.,** Gallagher, K.M., Callaghan, J.P. (2024). Prolonged standing induced low back pain is linked to extended lumbar spine postures: A study linking lumped lumbar spine passive stiffness to standing posture. *Applied Biomechanics*. *In Press.*

4) Pinto, B.L., **Fewster, K.M.,** Callaghan, J.P. (2023). Lumbar Spine Movement Profiles Uniquely Characterize Postural Variation During Simulated Prolonged Driving. *Theoretical Issues in Ergonomics Science*. 1-2.

5) Buchman-Pearle, J.M., **Fewster, K.M.,** Pinto, B.L., Callaghan, J.P. (2023). Moving towards participant-specific automotive seat design: How subject characteristics and time alter the selected lumbar support prominence. *The Journal of the Human Factors and Ergonomics.* 00187208211042776.

6) **Fewster, K.M.,** Zehr, J.D., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2022). Characterizing Lumbar Spine Kinematics and Kinetics During Simulated Low Speed Rear Impact Collisions. *Applied Biomechanics*. 38(3) 155-163.

7) Barrett, J.M., **Fewster, K.M.,** Callaghan, J.P. (2022). Are Rotational Passive Stiffness and Translational Passive Stiffness Correlated? A Porcine *in-vitro* study. *Clinical Biomechanics.* 94, 105610.

8) **Fewster, K.M.,** Guo J., Zehr, J.D., Barrett, J.M., Laing, A.C., Callaghan, J.P. (2022). StrainResponse in the Facet Joint Capsule During Physiological Joint Rotation and Translation Following a Simulated Impact Exposure: An In Vitro Porcine Model. *Journal of Biomechanical Engineering.* 144 (5), 051010.

9) **Fewster, K.M.,** Barrett, J.M., Callaghan, J.P. (2022). Characterizing the Mechanical and Viscoelastic Response of the Porcine Facet Joint Capsule Ligament in Response to a Simulated Impact. *Journal of Biomechanical Engineering*. 144 (5), 051013.

10) **Fewster, K.M.,** Barrett, J.M., Callaghan, J.P. (2021). Passive Stiffness Changes in the Lumbar Spine Following Simulated Automotive Low Speed Rear-End Collisions. *Clinical*

Biomechanics. 90 (2021), 105507.

11) **Fewster, K.M.,** Barrett, J.M., Callaghan, J.P. (2021). The Influence of Impact Severity and Posture on Intervertebral Joint Mechanics. *Spine*. *In-press*. 47 (8), E362-E369.

12) **Fewster, K.M.,** Zehr, J.D., Barrett, J.M., Laing, A.C., Callaghan, J.P. (2021). Exploring the Influence of Impact Severity and Posture on Vertebral Joint Mechanics in an *in-vitro* porcine model. *Journal of Biomechanics*. 122 (2021), 110479.

13) Zehr, J.D., **Fewster, K.M.,** Kingston, D.C., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2020). Examining seat-occupant interfaces during a rear-impact collision and method for quantifying seat back reaction forces *in-vivo*. *International Journal of Vehicle Design.* 85(1) 32-47.

14) Barrett, J.M., **Fewster, K.M.,** Callaghan, J.P. (2020). Model-Aided Design of a Rear-Impact Collision Testing System for in-vivo Investigations. *Journal of Biomechanical Engineering*. Accepted. 143 (9), 094502.

15) Barrett, J.M., **Fewster, K.M.,** Gruevski, K.M., Callaghan, J.P. (2020). A novel least-squares approach to characterize *in-vivo* joint passive stiffness. *Human Movement Science*. 76 (2021), 102765.

16) Barrett, J.M., **Fewster, K.M.,** Cudlip A.C., Dickerson, C.R., Callaghan, J.P. (2020). Modelling Collagen Failure as a Function of Strain Rate. *Journal of the* Mechanical *Behavioof Biomedical Materials*. 115 (2021), 104273.

17) **Fewster, K.M.,** Mayberry, G., Callaghan, J.P. (2020). An evaluation of office chair backrest height on physiological demands. *IIE Transactions on Occupational Ergonomics and Human Factors*. 8(1), 50-59

18) **Fewster, K.M.,** Noguchi, N., Gooyers, C.E., Wong, A., Callaghan, J.P. (2020). Exploring the regional response of the intervertebral disc under postural varying loads. *Journal of Biomechanics*. 104 (2020), Article 109713.

19) Zehr, J.D., Barrett, J.M., **Fewster, K.M.,** Laing, A.C., Callaghan, J.P. (2019). Strain of the facet joint capsule during rotation and translation passive range-of-motion tests: A porcine model as a human surrogate. *The Spine Journal*. 20 (3), 475-487.

20) **Fewster, K.M.,** Haider, S., Gooyers, C.E., Callaghan, J.P., Wong, A. (2019). A computerized system for measurement of the radial displacement of the intervertebral disc using a laser device. *Computer Methods in Biomechanics and Biomedical Engineering*. 8 (3), 287-293

21) Zehr, J.D., **Fewster, K.M.,** Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2019).

Partitioning the total seat back reaction force amongst the lumbar spine motion segments during rear impact collision analyses. *International Journal of Occupational Safety and Ergonomics*. 1-7.

22) **Fewster, K.M.**, Riddell, M., Callaghan, J.P. (2019). The Need to Accommodate Monitor Height Changes Between Sitting and Standing: The Influence of Lumbar Spine Posture. *Ergonomics*. 62(12), 1515-1523.

23) **Fewster, K.M.,** Riddell, M., Gallagher, K.M., Callaghan, J.P. (2019). Does proactive cyclic usage of a footrest prevent the development of standing induced low back pain? *Human Movement Science*. 66, 84-90

24) **Fewster, K.M.,** Parkinson, R.J., Callaghan, J.P. (2019). Low Velocity Motor Vehicle Collision Characteristics Associated with Claimed Low Back Pain. *Traffic Injury Prevention*. 20 (4), 419-423.

25) **Fewster, K.M.,** Viggiani, D., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2019). Characterizing *in-vivo* exposures of the lumbar spine during simulated low-speed rear impact collisions. *Traffic Injury Prevention*. 20 (3), 314-319.

26) Viggiani, D., Barrett, J.M., **Fewster, K.M.,** Callaghan, J.P. (2018). A Versatile Approach to Determine Instantaneous Coactivation: Development, Implementation and Comparison to Existing Measures. *Computer Methods in Biomechanics and Biomedical Engineering*. 21 (11), 625-634

27) **Fewster, K.M.,** Potvin J.R. (2018). The Effect of Task Characteristics on the Choice to Lean, Upper Body Postures and Joint Loading During Simulated Automotive Manufacturing Tasks with One-Handed, Submaximal Exertions. *International Journal of Human Factors Modelling and Simulation*. 6(4), 2018

28) **Fewster, K.M.**, Gallagher, K.M., Howarth, S.J., Callaghan, J.P. (2017). Low Back Pain Development Differentially Influences Centre of Pressure Regularity Following Prolonged Standing. *Gait and Posture*. 78, 1-6. DOI: https://doi.org/10.1016/j.gaitpost.2017.06.005

29) **Fewster, K.M.**, Gallagher, K.M., Callaghan, J.P. (2017). The effect of standing interventions on acute low-back postures and muscle activation patterns. *Applied Ergonomic*s. 58, 281-286.

30) **Fewster, K.M.**, Potvin J.R. (2015). An Investigation of leaning behaviours during one-handed submaximal exertions with extended reaches. *IIE Transactions on Occupational Ergonomics and Human Factors*. 3(3-4), 188-196

31) **Fewster, K.M.,** Potvin J.R. (2014). Maximum forces and joint stability implications during in-line arm pushes. *Theoretical Issues in Ergonomics Science*. 16 (3), 314-325

32) Cashaback J.G.A., **Fewster, K**., Potvin J.R., Pierrynowski M.R. (2013). Musculotendon translational stiffness and muscle activity are modified by shear forces. *Clinical Biomechanics*. 29 (5), 494-499.

33) **Fewster, K**., and Grenier, S. (2011). Emotion affects torso force production during flexion and extension movements: implications for spine loading. *Theoretical Issues in Ergonomics Science*. DOI:10.1080/1464536X.2011.573014

2.3 Technical Reports and Other Authored Material (Total = 8)

1) **Fewster, K.M.,** Dickerson, C.R., Overhead Work — Reduce the Injury Risk. CRE-MSD Position Paper, April 2021.
2) **Fewster, K.M.,** Callaghan, J.P. Sit-Stand Workstations – Are They Equal to the Hype? CRE-MSD Position Paper, April 2020.

3) **Fewster, K.M.,** Callaghan, J.P. Literature review of low back exoskeletons - Name withheld due to NDA. 37 Pages. August 2020.

4) **Fewster, K.M.,** Viggiani, D., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2019). Author response: Re: Re: Fewster et al. Characterizing trunk muscle activations during simulated low-speed rear impact collisions. *Traffic Injury Prevention*.

5) Callaghan, J.P., **Fewster, K.M.** Objectively defining design parameters associated with automotive seat comfort – FCA Canada. 9 Pages. September 2019.

6) Callaghan, J.P., McKinnon, C.D., **Fewster, K.M.** Evaluation of fibreglass and aluminum ladder stability during a simulated tethered operator fall event – Ministry of Labour. 15 Pages. January 2019.

7) Callaghan, J.P., **Fewster, K.M**., Mayberry, G. Flying Carpet: Chair Backrest Height Evaluation; CrossOver: Muscular Responses and Off-Loading - Name withheld due to NDA. 32 Pages. January 2018.

8) Potvin, J.R., Cappelletto, J., **Fewster, K.,** Ibrahim, E., Jones, M., Liebregts, J. Biomechanical Assessment of Leaning/Bracing in Simulated Lab Tasks & Assessment of whole Body Postures for Exertions with Constrained Reaches, submitted to United States Council for Automotive Research LLC, 2015 (224 pages) September 2015.

2.4 Peer-Reviewed Conference Proceedings (Total = 36)
(*presenter)

1) *McIntosh BA., **Fewster, K.M.** Exploring the effect of task design on the flexion-relaxation response in the lumbar spine during a cumulative load-matched lifting task. Annual Association of Canadian Ergonomists Conference, Calgary, Alberta, Canada.

2) *Conway, E.J., Lowery, I.D., Evens, I.D., Overduin., A., **Fewster, K.M.** Upper Body

Exoskeleton use in Cleaners. Annual Association of Canadian Ergonomists Conference, Calgary, Alberta, Canada.

3) *Lowery, I.D., **Fewster, K.M.** The Effect of Physical Activity Lifestyle on *in-vivo* Passive Stiffness of the Lumbar Spine In proceedings of the 2024 Canadian Society of Biomechanics Conference. Edmonton, Alberta, Canada.

4) *Evans, I.D., McIntosh BA., Carpenter MG., **Fewster, K.M.** The effects of lumbar creep on balance control. In proceedings of the 2024 Canadian Society of Biomechanics Conference. Edmonton, Alberta, Canada.

5) *Conway, E.J., Overduin., A., **Fewster, K.M.** Upper Body Exoskeleton in Animal Care Technicians. Annual Association of Canadian Ergonomists Conference, Burlington, Ontario, Canada

6) *Soetaert K.A., Lange J.E., Gooyers C.E., **Fewster K.M.** (2023). Occupant Characteristic Risk Factors for Whiplash Complaints in Motor Vehicle Collisions. American Society of Biomechanics Regional Conference, Nashville, TN, USA

7) *Dumasal C.M., **Fewster K.M.** (2023). Exploring the Effect of Physical Activity Lifestyle on in-vivo Passive Stiffness. American Society of Biomechanics Regional Conference, Nashville, TN, USA

8) ***Fewster, K.M.,** Larson DJ., Brown SMH. (2022). The Influence of Back Muscle Fatigue on Training Approaches to Reduce Lumbar Spine Motion During Occupational Lifting Tasks. North American Congress on Biomechanics, Ottawa, Canada

9) ***Fewster, K.M.,** Zehr, J.D., Callaghan, J.P. (2022). Porcine versus Human Cadaver Vertebral Joint Properties: A Comparison of Rotational and Translational Neutral Zone Characteristics. North American Congress on Biomechanics, Ottawa, Canada

10) **Fewster, K.M**., *Barrett, J.M., Callaghan, J.P.. (2021). Exploring the Correlation Between Rotational and Translational Joint Passive Stiffness – A Porcine in-vitro Investigation. XXVIII Congress of the International Society of Biomechanics, Stockholm, Sweden

11) *Buchman-Pearle J.M., **Fewster, K.M.,** Pinto P.M., Callaghan, J.P. (2021). Objectively Defining Design Parameters Associated with Self-Selected Lumbar Support Prominence. XXVIII Congress of the International Society of Biomechanics, Stockholm, Sweden

12) ***Fewster, K.M.,** Barrett, J.M., Callaghan, J.P. (2021). Exploring the Influence of Impact Severity on Vertebral Joint Mechanics. In proceedings of the 2021 Canadian Society of Biomechanics Conference. Montreal, Quebec, Canada.

13) Zehr, J.D., **Fewster, K.M.,** Barrett, J.M., Callaghan, J.P. (2021). Joint Rotation and Translation Influence the Strain Response in the Facet Joint Capsule Ligament: A Porcine *in vitro* Model. In proceedings of the 2021 Canadian Society of Biomechanics

Conference. Montreal, Quebec, Canada.

14) *__Fewster, K.M.,__ Barrett, J.M., Callaghan, J.P. (2019). Mechanical testing of porcine cervical facet capsular ligaments. In proceedings of the 2019 International Society of Biomechanics Conference, Calgary, Alberta, Canada

15) *__Fewster, K.M.,__ Zehr, J.D., Barrett, J.M., Gooyers, C.E., Callaghan, J.P. (2019). Exploring Passive Stiffness Changes in the Lumbar Spine in Response to Low Velocity Rear Impact Collisions. In proceedings of the 2019 International Society of Biomechanics Conference, Calgary, Alberta, Canada

16) *Barrett, J.M., **Fewster, K.M.,** Cudlip, A.C., Dickerson, C.R., Callaghan, J.P. (2019). Modelling tendon failure as a function of strain rate. In proceedings of the 2019 International Society of Biomechanics Conference, Calgary, Alberta, Canada.

17) *__Fewster, K.M.,__ Mayberry, G., Callaghan, J.P. (2018). An evaluation of office chair backrest height of muscular demands. In proceedings of the 49th Annual Conference of the Association of Canadian Ergonomists, Sudbury, ON, Canada.

18) *Glinka, M., Mayberry, G., Noguchi, M., **Fewster, K.M.,** Callaghan, J.P. (2018). Chair Design Challenges for Accommodating Postures Between Traditional Sitting and Standing. In proceedings of the 49th Annual Conference of the Association of Canadian Ergonomists, Sudbury, ON, Canada.

19) ***Fewster, K.M.**, Riddell, M., Callaghan, J.P. (2018). The Influence of Lumbar Spine Postures on Workstation Accommodations When Using Sit to Stand Workstations. In proceedings of the 2018 Canadian Society of Biomechanics Conference. Halifax, Nova Scotia, Canada.

20) *Zehr, J.D., **Fewster, K.M.,** Kingston, D.C., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2018). The Influence of Lumbar Support on the Seat-Occupant Interface During a Moderate Velocity Rear-Impact Collision In proceedings of the 2018 Canadian Society of Biomechanics Conference. Halifax, Nova Scotia, Canada.

21) McKinnon, C.D., *__Fewster, K.M.,__ Dickerson, C.R., Callaghan, J.P. (2018). The Influence of Hand Location and Exertion Parameters on Lumbar Axial Twist Posture During Simulated Industrial Tasks. In proceedings of the 2018 Canadian Society of Biomechanics Conference. Halifax, Nova Scotia, Canada.

22) *Zehr, J.D., **Fewster, K.M.,** Kingston, D.C., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2018). The Influence of Lumbar Support on the Seat-Occupant Interface During a Moderate Velocity Rear-Impact Collision. In proceedings of the 2018 Ohio State Injury Biomechanics Symposium. Columbus, OH, USA.

23) *Barrett, J.M., **Fewster, K.M.,** Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2018).

Model-Aided Design of a Rear-Vehicle Impact Testing System for *in-vivo* Investigations. In proceedings of the 2018 Ohio State Injury Biomechanics Symposium. Columbus, OH, USA.

24) ***Fewster, K.M.,** Parkinson, R.J., Callaghan, J.P. (2017). Low Velocity Collision Characteristics Associated with Claimed Low Back Pain. American Society of Biomechanics Regional Conference, Boulder, CO, USA

25) ***Fewster, K.M.**, Riddell, M., Callaghan, J.P. (2017). The Influence of Lumbar Spine Postures on Monitor Location When Using Sit to Stand Workstations. American Society of Biomechanics Regional Conference, Boulder, CO, USA

26) ***Fewster, K.M**., Viggiani, D., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2017). Characterizing in-vivo exposures of the lumbar spine during simulated low-speed rear impact collisions. In proceedings of the 2017 Ohio State Injury Biomechanics Symposium. Columbus, OH, USA.

27) ***Fewster, K.M.**, Riddell, M., Gallagher, K.M., Callaghan, J.P. The impact of an elevated standing intervention on low back pain development and muscle activation patterns. In proceedings of the 47th Annual Conference of the Association of Canadian Ergonomists, Niagara Falls, ON, Canada.
    - Note: Winner of Founder's Doctoral Award Competition.

28) ***Fewster, K.M.,** Gallagher, K.M., Howarth, S.J., Callaghan, J.P. Changes in centre of pressure regularity following prolonged standing. In proceedings of the Canadian Society for Biomechanics Conference. Hamilton, ON, Canada.

29) ***Fewster, K.M.**, Gallagher, K.M., Callaghan, J.P. The effect of standing aides on low-back posture and muscle activation patterns. In proceedings of the 46th Annual Conference of the Association of Canadian Ergonomists, Waterloo, ON, Canada.

30) *Riddell, M., **Fewster, K.M.**, Gallagher, K.M., Callaghan, J.P. Early and consistent leg movement during prolonged standing, via a standing aid, to reduce the development of low back pain. In proceedings of the 46th Annual Conference of the Association of Canadian Ergonomists, Waterloo, ON, Canada.

31) ***Fewster, K.M.,** Noguchi, M., Gooyers, C.E., Wong, A., Callaghan, J.P. (2014). Exploring the Regional Response of the Intervertebral Disc Under Postural Varying Loads. American Society of Biomechanics Regional Conference, Columbus, OH, USA

32) ***Fewster, K.M**., Potvin, J.R., (2014). An investigation of leaning behaviours during one-handed submaximal exertions with extended reaches. 7th World Congress of Biomechanics, Boston, MA.

33) ***Fewster, K**., Potvin, J.R. (2013). Maximum Inline Forces During Simulated Occupational

Leaning. 44th Annual Conference of the Association of Canadian Ergonomists (national), Whistler, BC

34) *Sonne, M., Ebata, S., Kociolek, A., La Delfa, N., Cappelletto, J., **Fewster, K**., Inman, J., Wilson, K., McDonald, A., MacDonald V. (2012). Improved Ergonomics With Proactive Digital Human Modelling. AUTO21 Network *Navigating the Road Ahead* (national), Montreal, Quebec

35) **Fewster, K**., *Grenier, S. (2011). Emotion affects torso force production during flexion and extension movements: implications for spine loading. 42nd Annual Conference of the Association of Canadian Ergonomists (national), London, ON (B.Sc Thesis).

2.5 Invited Talks (Total = 3)
(*presenter)

2022	**'From Human to Tissue – Spine Biomechanics'** ICORD Annual Research Meeting The University of British Columbia, Vancouver, BC
2021	**'Current Research in Facet Joint Mechanics'** Research Seminar, University of Minnesota, College of Science and Engineering
2019	'**Objectively defining design parameters associated with automotive seat comfort'** Fiat Chrysler Automotive, Automotive Research and Development Centre, Windsor, Canada.

2.6 Non-Peer Reviewed Conference Proceedings (Total = 16)
(*presenter)

1) *Soetaert K.A., Lange J.E., Gooyers C.E., **Fewster K.M.** (2024). Occupant Characteristic Risk Factors for Whiplash and Low Back Complaints in Motor Vehicle Collisions. In proceedings of the 2024 North West Biomechanics Symposium. Eugene OR, United States

2) *Evens, I.D., McIntosh BA., Carpenter MG., **Fewster, K.M.** The effects of lumbar creep on balance control. In proceedings of the 2024 North West Biomechanics Symposium. Eugene OR, United States

3) *Conway, E.J., Overduin., A., **Fewster, K.M.** Upper Body Exoskeleton in Animal Care Technicians. In proceedings of the 2024 North West Biomechanics Symposium. Eugene OR, United States.

4) *Dumasal, C.M, **Fewster, K.M.** (2023). Exploring the effect of physical activity on in vivo passive stiffness in the lumbar spine. In proceedings of the 2023 North West Biomechanics Symposium. Seattle WA, United States.

5) Evens, I.D., Barrett, J.M., **Fewster, K.M.** (2023). Quantifying facet joint capsule strain in the cervical spine. In proceedings of the 2023 North West Biomechanics Symposium. Seattle

WA, United States

6) *__Fewster, K.M.,__ Barrett, J.M., Callaghan, J.P. (2019). Mechanical testing of porcine cervical facet capsular ligaments. In proceedings of the 2019 Ontario Biomechanics Conference. Nottawasaga, Ontario, Canada.

7) *Barrett, J.M., __Fewster, K.M.,__ Cudlip, A.C., Dickerson, C.R., Callaghan, J.P. (2019). Modelling tendon failure as a function of strain rate. In proceedings of the 2019 Ontario Biomechanics Conference. Nottawasaga, Ontario, Canada.

8) ***Fewster, K.M.,** Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. (2018). Exploring Passive Stiffness Changes in the Lumbar Spine in Response to Low Velocity Rear Impact Collisions. In proceedings of the 2018 Ontario Biomechanics Conference. Nottawasaga, Ontario, Canada.

9) *Zehr, J.D., __Fewster, K.M.,__ Kingston, D.C., Gooyers, C.E., Callaghan, J.P. (2018). The Influence of Lumbar Support on the Seat-Occupant Interface During a Moderate Velocity Rear-Impact Collision. In proceedings of the 2018 Ontario Biomechanics Conference. Nottawasaga, Ontario, Canada.

10) ***Fewster, K.M.**, Riddell, M., Callaghan, J.P. (2017). The Influence of Lumbar Spine Postures on Monitor Location When Using Sit to Stand Workstations. In proceedings of the 2017 Centre for Research Expertise for the Prevention of Musculoskeletal Disorders Research Day. St. Catherines, Ontario, Canada.

11) ***Fewster, K.M.,** Parkinson, R.J., Callaghan, J.P. (2017). Exploring low velocity collision characteristics with claimed low back pain. In proceedings of the 2017 Ontario Biomechanics Conference. Nottawasaga, Ontario, Canada.

12) ***Fewster, K.M.,** Viggiani, D., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. Characterizing *in-vivo* mechanical exposures of the lumbar spine during simulated low-speed rear impact collisions. In proceedings of the 2016 Centre for Research Expertise for the Prevention of Musculoskeletal Disorders Research Day. Waterloo, Ontario, Canada.

13) *Viggiani, D., Barrett, J.M., __Fewster, K.M.,__ Callaghan, J.P. The development of an adaptable index of muscular cocontraction. In proceedings of the 2016 Centre for Research Expertise for the Prevention of Musculoskeletal Disorders Research Day. Waterloo, Ontario, Canada.

14) ***Fewster, K.M.,** Viggiani, D., Gooyers, C.E., Parkinson, R.J., Callaghan, J.P. Characterizing *in-vivo* mechanical exposures of the lumbar spine during simulated low-speed rear impact collisions. In proceedings of the 2016 Ontario Biomechanics Conference. Barrie, Ontario, Canada.

15) *__Fewster, K.M.,__ Noguchi, M., Gooyers, C.E., Wong, A., Callaghan, J.P. Exploring the

regional response of the intervertebral disc under varying loads. In proceedings of the 2015 Centre for Research Expertise for the Prevention of Musculoskeletal Disorders Research Day. Waterloo, Ontario, Canada.

16) ***Fewster, K.M.,** Gallagher, K.M., Howarth, S.J., Callaghan, J.P. Can Lyapunov Exponents Identify Low Back Pain Developers Prior to Prolonged Standing? In proceedings of the 2015 Ontario Biomechanics Conference. Barrie, Ontario, Canada.

17) *Riddell, M., **Fewster, K.M.**, Gallagher, K.M., Callaghan, J.P. Does proactive cyclic movement during prolonged standing prevent the development of low back pain when imposed early. In proceedings of the 2015 Ontario Biomechanics Conference. Barrie, Ontario, Canada.

18) ***Fewster, K.M.,** Noguchi, M., Gooyers., C.E., Callaghan, J.P. Exploring the regional response of the intervertebral disc under postural varying loads. In proceedings of the 2014 Ontario Biomechanics Conference. Barrie, Ontario, Canada.

19) ***Fewster, K.,** Potvin, J.R. Maximum Inline Forces During Simulated Occupational Leaning. In proceedings of the 2013 Ontario Biomechanics Conference. Barrie, Ontario, Canada.

3. Teaching

3.1 Course Instruction and Development

2022-2023 — **Kinesiology 216: Introduction to Biomechanics, The University of British Columbia** (class sizes: Winter 2022 – 178 students, Fall 2023 – 120 students, Winter 2023 – 133 students)

- A second-year mandatory core course in Kinesiology.
- Teaching students the application of elementary principles of physics and math to the analysis of human movement.
- Analysis focuses on the development of forces within muscles and their effect on initiating and controlling human movement.

2022 — **Kinesiology 316: The Biomechanics of Tissues, The University of British Columbia** (class size = 118 students)

- A third-year elective course in Kinesiology designed to to provide students with the opportunity to explore the mechanics of biological tissues and to examine how the mechanical properties of the muscle work synergistically with tendons, bones and ligaments.
- Practical applications of tissue biomechanics (i.e. workplace safety, training & clinical applications) are discussed in class through injury biomechanics case studies.

2019 — **Kinesiology 470: The Biomechanics of Injury, University of Waterloo** (class size = 12 students)

- A seminar course designed to encourage the application of knowledge and skills acquired in 100-300 level kinesiology courses.
- Skills including literature searching, appraisal and interpretation, oral and writing skills and peer evaluation are developed while focusing on the topic of injury biomechanics.

3.2 Student Supervision

3.2.1 MSc Student Supervision:

2024-present — Emma Conway, MSc Student
University of British Columbia
- Thesis: The role of spine stability in lower extremity injury risk in varsity volleyball

2023-2024 — Kjeryn Soetart, MSc Student
University of British Columbia
- Withdrew, accepted into University of Alberta, Medical School

2023-2024 — Kiana Bonamin, MSc Student (WorkSafe BC Funded 2023-2024)
University of British Columbia
- Withdrew.

2023-present — Isabel Evans, MSc Student
University of British Columbia
- Thesis: The use of maximal footware to reduce low back pain in health care workers.

2022-present — Benjamin McIntosh, MSc Student
University of British Columbia
- Thesis: Exploring the effects of lifting load and frequency on the flexion-relaxation response in the lumbar spine during repetitive lifting.

3.2.2 Undergraduate Student Supervision:

2024-2025 — Max Redman, Work Integrated Learning Student in Neuromechanics

2024-2025 — Rohin Kanwal, Work Integrated Learning Student in Neuromechanics

2024 — Emma Conway, NSERC USRA Student

2023 — Joshua Lowery, Directed Studies Undergraduate Student – The University of British Columbia

- The influence of passive stiffness magnitude on mechanical creep responses – a rat model

2023-2024 Alex Sanchez, Directed Studies Undergraduate Student – The University of British Columbia
- The effect of prolonged lumbar flexion on injury risk during the deadlift

2023-2024 Sam Hillen, Work Integrated Learning Student in Neuromechanics

2023-2024 Joshua Lowery, Work Integrated Learning Student in Neuromechanics

2023 Jamie Coukell, NSERC USRA Summer Student

2023 Joshua Lowery, School of Biomedical Engineering Synergy Summer Scholarship Program, Summer Student

2022-2023 Chelsea Dumasal, Undergraduate Thesis Student – University of British Columbia
- Exploring the influence of physical activity on lumbar spine passive stiffness

2022-2023 Isabel Evens, Undergraduate Thesis Student – University of British Columbia
- Quantifying facet joint capsule strain in the cervical spine

2022-2023 Eric Franks, Undergraduate Thesis Student – University of British Columbia
- Exploring the influence of creep in the lumbar spine on sudden perturbations and dynamic balance responses

2022-2023 Emma Conway, Undergraduate Thesis Student – University of British Columbia
- The effect of an upper extremity exoskeleton intervention in animal care workers

2023 Collin Seto, Directed Studies Undergraduate Student – The University of British Columbia
- An evaluation of observational ergonomic assessment tools with respect to tasks using exoskeletons

2023 Yekta Saremi, Directed Studies Undergraduate Student – The University of British Columbia
- Exploring the relationship between age and whiplash associated disorder

2022 Kjeryn Soetart, Directed Studies Undergraduate Student – The

University of British Columbia
- Exploring the relationship between spine degeneration and claimed injury in motor vehicle accidents

2022 Daniel Fan, Directed Studies Undergraduate Student – The University of British Columbia
- Non-Specific Low Back Pain and Anterior Cruciate Ligament Injury: Are They Related?

2022 Chelsea Dumasal, NSERC USRA Summer Student

2022 Rory Trevorrow, Directed Studies Undergraduate Student – The University of British Columbia
- Exploring the relationship between facet joint angle and mechanical response

2022 Alison Babichuk, Directed Studies Undergraduate Student– The University of British Columbia
- The influence of low back pain on dynamic balance control

3.3 Guest Lectures

2023 **'The Lumbar Spine – Clinical Biomechanics & Low Back Pain"**
KIN 316 Lecture, University of British Columbia

2022 **'Quantifying 3D Kinematics"**
Neuromechanics Graduate Student Seminar, University of British Columbia

2021 **'The Ethics of Animal Use in Research'**
BMCH 1100 Lecture, University of Nebraska Omaha

2019 **'Low Back Pain and Motor Vehicle Accidents – Exploring Injury Mechanisms'**
Kinesiology 427 Lecture, University of Waterloo, Kinesiology

2015 **'Net Joint Moment and EMG Driven Modeling'**
Kinesiology 221 Lecture, University of Waterloo, Kinesiology

3.4 Teaching Assistantships

2017 **Research Design and Statistics**
Kinesiology 630, University of Waterloo
- Marking

2016 **Introduction to Neuroscience**
Kinesiology 155, University of Waterloo
- Lab instruction, exam invigilation and marking

2015 **Human Anatomy**
Kinesiology 100, University of Waterloo
- Lab instruction, exam invigilation and marking

2014 **Advanced Biomechanics of Human Motion**
Kinesiology 221, University of Waterloo
- Lab instruction, exam invigilation and marking

2014 **Research Design**
Kinesiology 330, University of Waterloo
- Exam invigilation and marking

2012-2013 **The Brain and Human Movement**
Kinesiology 4P03
- Presentation evaluation and marking

2011-2012 **Introduction to Biomechanics**
Kinesiology 2A03
- Lab instruction, exam invigilation and marking

4. Graduate Level Training GPA: 3.9

- KIN 701: Statistical Methods in Kinesiology (McMaster University)
- KIN 702: Individual Study in Selected Topics (McMaster University)
- KIN 708: Biomechanics (McMaster University)
- KIN 722: Advances in Biomechanics and Electromyography (McMaster University)
- KIN 613: Modern Methods in Biomechanical Modeling (University of Waterloo)
- KIN 612: Signal Processing (University of Waterloo)
- KIN 713: Modeling of Human Musculoskeletal Systems During Movement (University of Waterloo)
- KIN 775: Key Issues and Concerns in Kinesiology (University of Waterloo)
- KIN 782: Selected Topics in Biomechanics: Advanced Biomechanics

5. Scholarly & Professional Activity

5.1 Academic Boards and Committees

2022 – Present **Undergraduate Awards Committee**, The University of British Columbia, School of Kinesiology

2022 – Present **Graduate Awards Committee**, The University of British Columbia, School of Kinesiology

2021 – Present **Graduate Committee**, Neuromechanics Representative
The University of British Columbia, School of Kinesiology

2021 – Present **Graduate Student Adjudication Committee**, Neuromechanics Representative
The University of British Columbia, School of Kinesiology

2019 **Kinesiology Chair Search Committee**, Graduate Student Representative, University of Waterloo, Kinesiology and Health Sciences

• Elected graduate student representative

5.2 Elected Representation

2014-2015 **Communications Coordinator,** Kinesiology Graduate Student Association (KGSA), University of Waterloo

5.3 Conference Leadership

2022 **Conference Judge,** 2023 Neural Control of Movement Satellite Meeting, Victoria, BC, Canada

2023 **Conference Reviewer,** 2023 International Society of Biomechanics Conference, Fukuoka, Japan

2022 **Conference Reviewer,** 2022 North American Congress on Biomechanics, Ottawa, Ontario, Canada

2018 **Session Chair**, 2018 Injury Biomechanics Symposium, Columbus, Ohio, United States of America

2015 **Session Chair**, *Low Back Pain*, 46th Annual Conference of the Association of Canadian Ergonomists, Waterloo, Ontario, Canada

2015 **Session Chair**, *Ergonomics*, 12th Annual Ontario Biomechanics Conference, Barrie, Ontario, Canada.