

Daniel R. Martel

Daniel Richard Martel, PhD

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EDUCATION

Doctor of Philosophy (Kinesiology – Biomechanics) 2017 - 2022
University of Waterloo, Faculty of Applied Health Science, Department of Kinesiology,
Waterloo, ON

Thesis: Contributors to Proximal Femur Fracture Force: Multiscale
Considerations of Rate, Toughness, and Bone Composition

https://uwspace.uwaterloo.ca/bitstream/handle/10012/18362/Martel_Daniel.pdf?sequence=7&isAllowed=y

Advisor: Dr. Andrew C. Laing

Master of Science (Kinesiology – Biomechanics) 2015 - 2017
University of Waterloo, Faculty of Applied Health Science, Department of Kinesiology,
Waterloo, ON

Thesis: Development and Application of a Probabilistic/Mechanistic Model to
Investigate the Influence of Safety Flooring on Population-Level Hip Fracture
Risk

https://uwspace.uwaterloo.ca/bitstream/handle/10012/12239/Martel_Daniel.pdf

Advisor: Dr. Andrew C. Laing

Bachelor of Science (Honours, Kinesiology, Co-operative Program) 2010 - 2015
University of Waterloo, Faculty of Applied Health Science, Department of Kinesiology,
Waterloo, ON

TEACHING EXPERIENCE

Courses

2023 HKIN 284: Growth and Motor Development, 26 students, Okanagan College

2023 HKIN 121L: Biomechanics Laboratory, 23 students, Okanagan College

2021 Kin 470: Tissue Trauma and Injury Prevention, 19 students. University of
Waterloo (Undergraduate),

- End of term Instructor Overall Rating 5/5

- End of term Course Overall Rating 4.8/5

Guest lectures

2021 “Human Tissue Testing Ethics” Guest Lecture for BMCH 1100: Ethics of
Scientific Research” taught by Dr. David Kingston, University of Nebraska at
Omaha

-Guest lecture evaluation: Overall Rating 4.8/5

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- 2020 “Impact Biomechanics” Guest lecture for the Kin 471: Trauma Biomechanics course taught by Dr. Andrew C. Laing. University of Waterloo (Undergraduate)
- Guest lecture evaluation: Overall Rating 4.4/5
- 2020 “Tissue Mechanics” Guest Lecture for Kine 4P10: Clinical Biomechanics course taught by Dr. Alan Cudlip. Brock University (Undergraduate)
-Guest lecture evaluation: Overall Rating 4.9/5

Public outreach

- 2018 Ontario Science Centre Visiting Scientist for the “Biomechanics: The Machine Inside” interactive exhibit, 2 days.

Teaching Assistantship

- 2021 Kin 221L: Advanced Biomechanics of Human Activity Laboratory, 36 students, Spring term, University of Waterloo
- 2017 Kin 121L: Biomechanics of Human Activity Laboratory, 34 students, Fall Term, University of Waterloo
- 2016 Kin 222: Statistical Techniques Applied to Kinesiology Tutorial, 40 students, Winter Term. University of Waterloo
- 2015 Kin 121L: Biomechanics of Human Activity Laboratory, 36 students, Fall Term, University of Waterloo

Teaching Certificates

- 2021 Fundamentals in University Teaching Certificate, University of Waterloo

PUBLICATIONS

a) Refereed Journals:

Published: (7)

1. D.Y. Dapaah, **D.R. Martel**, A.C. Laing, T. Willett (2021). The Impact of Fall-Related Loading Rate on the Formation of Micro-Damage in Human Cortical Bone. Accepted for publication in the *Journal of Biomechanics* on August 8th, 2022.

DRM contributions: data collection, data processing, editing and approval of the final manuscript.

2. **D.R. Martel**, M.R. Tanel, A.C. Laing. Impact attenuation provided by older adult protective headwear products during simulated fall-related head impacts. Published online in *Journal of Rehabilitation and Assistive Technologies Engineering* on October 29th, 2021
<https://journals.sagepub.com/doi/10.1177/20556683211050357>

DRM contributions: data collection (along with MRT), data processing, statistical analysis, results interpretation (along with MRT), manuscript writing, editing and approval of the final manuscript.

3. T.B. Winberg, **D.R. Martel**, T.B. Hoshizaki, A.C. Laing. Removal of Inertial Artifact During Surface Translations to Improve Estimates of Lower Limb Kinetics. Published online in *Gait and Posture* on March 26th, 2021
<https://doi.org/10.1016/j.gaitpost.2021.03.024>

DRM contributions: conceptualization, data processing, manuscript writing, editing and approval of the final manuscript.

4. C.D. McKinnon, **D.R. Martel**, J.P. Callaghan. The Impact of a Progressive Sit-Stand Rotation on Low Back Posture, Muscle Activation, and Pain Development. *Ergonomics*. 64(4): 502-511

DRM contributions: study design, data collection and statistical analysis was performed along with CDM. DRM was involved in manuscript editing and approval for submission.

5. **D.R. Martel**, M. Lysy, A.C. Laing. Predicting Population Level Hip Fracture Risk: A Novel Hierarchical Model Incorporating Probabilistic Approaches and Factor of Risk Principles. Published online in *Computation Methods in Biomechanics and Biomedical Engineering*: July 20, 2020;
<https://doi.org/10.1080/10255842.2020.1793331>

DRM contributions: study design, data collection, data processing, statistical analysis, results interpretation, manuscript writing, editing and approval of the final manuscript. All was conducted in the context of DRM's M.Sc. Thesis.

6. **D.R. Martel**, I.C. Levine, S.P. Pretty, A.C. Laing (2018). The influence of muscle activation on impact dynamics during lateral falls on the hip. *Journal of Biomechanics*. 66: 111-118

DRM contribution: study design, data collection, data processing, statistical analysis, results interpretation, manuscript writing, editing and approval of the final manuscript.

7. S.P. Pretty, **D.R. Martel**, A.C. Laing (2017). The Influence of Body Mass Index, Sex, & Muscle Activation on Pressure Distribution During Lateral Falls on the Hip, *Annals of Biomedical Engineering*. 45(12): 2775-2783

DRM contributions: study design, data collection, data processing (along with SPP), editing and approval of the final manuscript.

b) Refereed Conference Proceedings:

1. **D.R. Martel**, D.Y. Dapaah, T.B. Winberg, T. Willett, A.C. Laing (2022). Collagen-Based Femoral Strength in Fall-Related Hip Fractures. The 5th joint meeting of the North American Congress of Biomechanics, Ottawa, Canada. August 21-25.
 - a. Oral Presentation

2. **D.R. Martel**, D.Y. Dapaah, T. Willett, A.C. Laing (2021). The relationship between cortical bone fracture toughness and femoral neck bone strength. The 21st Biennial Meeting of the Canadian Society for Biomechanics, Montreal, Canada (held virtually). May 26th.
 - a. Oral Presentation

3. **D.R. Martel**, D.Y. Dapaah, T. Willett, A.C. Laing (2021). Femoral Neck Bone Fracture Toughness and Bone Strength Relationships under High-Rate Impact Loading. The 16th Annual Injury Biomechanics Symposium, Columbus, OH, USA (held virtually). May 25th.
 - a. Oral Presentation

4. **D.R. Martel**, Daniel. Y. Dapaah, T. Willett, A.C. Laing (2020). The Role of Cortical Bone Fracture Toughness on Femoral Neck Bone Strength. The 4th Biennial Canadian Bone and Joint Conference, London, Canada (held virtually).
 - a. Podium Presentation; Awarded Top Oral Presenter in Basic Biological and Biomedical Science

5. Daniel. Y. Dapaah, **D.R. Martel**, A.C. Laing, T. Willett (2020). Impact of Loading Rate on Micro-Damage Formation During Bone Fracture. The 4th Biennial Canadian Bone and Joint Conference, London, Canada (held virtually).
 - a. Poster Presentation (non-presenting co-author)

6. **D.R. Martel**, M. Mourtzakis, T. Willett, A.C. Laing (2019). Relationship Between Impact Velocity, Loading Rate, and Femoral Bone Strength During Lateral Impacts with Biofidelic Fall Conditions. The 15th Annual Injury Biomechanics Symposium, Columbus, OH, USA. May 19-21.
 - a. Poster Presentation

7. **D.R. Martel**, M. Mourtzakis, T. Willett, A.C. Laing (2019). Relating Impact Velocity and Loading Rate to Femoral Bone Strength in Biofidelic Simulated Lateral Impacts. The International Society of Biomechanics 2019 Congress XXVII, Calgary, AB, Canada. July 31-August 4.
 - a. Poster Presentation

8. **D.R. Martel**, S.P. Pretty, A.C. Laing (2018). Probabilistic Model Approaches for Comparing the Effectiveness of Interventions Targeting Reduced Risk of Hip

- Fracture. The 20th Biennial Meeting of the Canadian Society for Biomechanics, Halifax, ON, Canada. August 14-17.
- a. Poster Presentation
9. **D.R. Martel**, S.P. Pretty, A.C. Laing (2018). Probabilistic Model Approaches for Comparing the Effectiveness of Interventions Targeting Reduced Risk of Hip Fracture. The 14th Annual Injury Biomechanics Symposium, Columbus, OH, USA. May 20-22.
 - a. Poster Presentation
 10. **D.R. Martel**, S.P. Pretty, A.C. Laing (2018). Probabilistic Model Approaches for Comparing the Effectiveness of Interventions Targeting Reduced Risk of Hip Fracture. The 3rd Biennial Canadian Bone and Joint Conference, London, Canada. May 11-12.
 - a. Podium Presentation
 11. **D.R. Martel**, A.C. Laing (2017). A Novel Probabilistic Modeling Approach using a Factor-of-Risk Framework to Predict Population Level Hip Fracture Risk in Canadian Older Adults. Slips, Trips, and Falls International Conference, Toronto, Canada, June 15-16.
 - a. Podium Presentation
 12. **D.R. Martel**, A.C. Laing (2017). Predicting Population-Level Hip Fracture Risk: A Novel Probabilistic Modeling Approach Incorporating Factor-of-Risk Principles. The 13th Annual Injury Biomechanics Symposium, Columbus, OH, USA. May 21-23.
 - a. Poster Presentation
 13. **D.R. Martel**, M. Tanel, S.P. Pretty, D. Merrick, A.C. Laing (2016). Biomechanical effectiveness of older adult protective headwear products during simulated head impacts. ‘Watch Your Step’ National Falls Prevention Conference, Calgary, AB, Canada, May 16-17.
 - a. Podium Presentation
 14. **D.R. Martel**, A.C. Laing (2016). Are Protective Headwear Products an Effective Method for Preventing Fall Related Head Injuries in Older Adults? A Biomechanics and Survey Based Investigation. Canadian Society for Biomechanics Conference, Hamilton, ON, Canada, July 19-22.
 - a. Poster Presentation
 15. S.P. Pretty, **D.R. Martel**, I.C. Levine, A.C. Laing (2016). Effect of Muscle Activation, Body Mass Index and Gender on Pressure Distribution over the Hip during Simulated Falls. Canadian Society of Biomechanics Conference, Hamilton, ON, Canada, July 19-22.
 - a. Podium Presentation (non-presenting co-author)

16. C.D. McKinnon, **D.R. Martel**, J.P. Callaghan (2015). The Effect of Early and Frequent Seated Breaks on Low Back Pain Development during Prolonged Standing Work. Thirty-Ninth Annual Meeting of the American Society of Biomechanics. Columbus, OH, USA, July 19-22.
 - a. Poster Presentation (non-presenting co-author)
17. C.D. McKinnon, **D.R. Martel**, J.P. Callaghan (2015). The Impact of a Progressive Sit-Stand Rotation on Low Back Posture, Muscle Activation, and Pain Development. 46th Annual Conference of the Association of Canadian Ergonomists. Waterloo, ON, Canada, October 6-8.
 - a. Poster Presentation (non-presenting co-author)

c) Non-Refereed Conference Proceedings:

1. **D.R. Martel**, A.C. Laing (2016). Are Protective Headwear Products an Effective Method for Preventing Fall Related Head Injuries in Older Adults? A Biomechanics and Survey Based Investigation. Four Cities Geriatric Research Day, Waterloo, Canada, June 22.
 - a. Poster Presentation
2. **D.R. Martel**, M. Tanel, S.P. Pretty, D. Merrick, A.C. Laing (2016). Biomechanical effectiveness of older adult protective headwear products during simulated head impacts. 13th Annual Ontario Biomechanics Conference, Alliston, Canada, March 11-13.
 - a. Podium Presentation
3. S.P. Pretty, **D.R. Martel**, I. Levine, A.C. Laing (2016). Effect of muscle activation, gender, and body mass index on pressure distribution over the hip during simulated lateral falls. 13th Annual Ontario Biomechanics Conference, Alliston, Canada, March 11-13.
 - a. Podium Presentation
4. B. Lafleur, **D.R. Martel**, M. Tanel, A.C. Laing (2015). The Frequency Content of a Lateral Hip Impact. Annual Falls & Mobility Network Conference of the Toronto Rehabilitation Institute - University Health Network, Toronto, Canada, June 5.
 - a. Poster Presentation (non-presenting co-author)
5. **D.R. Martel**, I.C. Levine, B. Lafleur, A.C. Laing (2015). The influence of muscle activation on the impact dynamics of a lateral falls. 12th Annual Ontario Biomechanics Conference, Alliston, Canada, March 13-15.
 - a. Podium Presentation

6. C.D. McKinnon, **D.R. Martel**, J.P. Callaghan (2015). The Effect of Frequency and Duration of Seated Breaks on Low Back Pain Development During Prolonged Standing Work. 12th Annual Ontario Biomechanics Conference, Alliston, Canada March 13-15.
 - a. Poster Presentation (non-presenting co-author)
7. B. Lafleur, **D.R. Martel**, M. Tanel, A.C. Laing (2015). The Effect of Gender, Drop Height, and Muscle Activation on the Frequency Content of a Lateral Hip, Impact. 12th Annual Ontario Biomechanics Conference, Alliston, Canada, March 13-15.
 - a. Poster Presentation (non-presenting co-author)
8. **D.R. Martel**, I.C. Levine, B. Lafleur, A.C. Laing (2014). The Influence of Muscle Activation on the Magnitude and Distribution of Peak Force and Pressure During Lateral Falls. 11th Annual Ontario Biomechanics Conference, Barrie, Canada, March 14-16.
 - a. Poster Presentation

EMPLOYMENT HISTORY

<u>Date</u>	<u>Position</u>	<u>Institution</u>
2023	Professor	Okanagan College Department of Kinesiology
2022	Postdoctoral Associate Full-time (2022) Part-time (2023)	University of Calgary Faculty of Kinesiology
2021	Sessional Instructor	University of Waterloo Department of Kinesiology
2015-2017, 2021	Teaching Assistant	University of Waterloo Department of Kinesiology
2014-2015	Research Assistant - Project: <i>The influence of muscle activation on the magnitude and distribution of peak force and pressure during lateral falls</i>	Injury Biomechanics and Aging Laboratory University of Waterloo
2014	Research Assistant - Project: <i>The impact of a progressive sit-stand rotation on low back posture, muscle activation, and pain development</i>	Callaghan Spine Laboratory University of Waterloo

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2013	Research Apprentice	Injury Biomechanics and Aging Laboratory University of Waterloo
2012-2013	UW Well-Fit Program Personal Trainer	University of Waterloo Faculty of Applied Health Science

ACADEMIC AWARDS AND DISTINCTIONS

2020	Canadian Bone and Joint Conference - Top Oral Presenter in Basic Biological and Biomedical Science Award; \$300	
2018-2021	Natural Sciences and Engineering Research Council Alexander Graham Bell Canada Graduate Scholarship - Doctoral; \$35 000 x 3 years	
2018-2021	University of Waterloo President's Graduate Scholarship; \$6667 x 3 years	
2018-2021	University of Waterloo Graduate Scholarship; \$3332 x 3 years	
2017-2018	Schlegel Award for Research in Aging in AHS: \$1000	
2016-2017	Natural Sciences and Engineering Research Council Canadian Graduate Studies - Masters; \$17 500	
2016-2017	University of Waterloo President's Graduate Scholarship; \$5000	
2016-2017	University of Waterloo Graduate Scholarship; \$5000	
2013	RBC Your Future by Design Retirement Undergraduate Fellowship Award; \$9000	
2013	McGraw-Hill Ryerson Student Scholarship Award; \$1000	

SCHOLARLY AND PROFESSIONAL ACTIVITIES

- a) Review Duties – Programs:
 - University of Waterloo, Senate and Graduate Research Council: Final Assessment Report for Quantum Information Collaborative
- b) Professional Society Membership:
 - British Columbia Association of Kinesiologists, Practicing Member, 2022
 - Student Member, Canadian Society for Biomechanics (CSB) 2016-2022
 - Student Member, International Society of Biomechanics (ISB) 2019-2020
- c) Consulting:
 - Kods Engineering Inc, 2019 – details currently under NDA
- d) Professional Development
 - Waterloo Content Management System for content maintainers, University of Waterloo, September 12, 2019
 - Biosafety (SO1069), University of Waterloo, July 7, 2019
 - Systematic Review for Social Sciences workshop, University of Waterloo, January 24, 2019
 - AHS academic integrity workshop, University of Waterloo, September 14, 2018
 - Online course on research ethics, Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2: CORE), May 9, 2013

SUPERVISORY EXPERIENCE:

2023	Torri Heiser	Undergraduate Student, University of Calgary
2019	Saira Thavaneethan	Community Program Instructor, March of Dimes Canada
2018	Kanishk Goomer	Research Assistant, University of Waterloo
2018	Eric Will	Learning Advisor, BrainStation
2015	Darien Merrick	Occupational Therapist, Vancouver Coastal Hospital
2014	Steven Pretty	Doctoral Student, University of Waterloo

CERTIFICATES

2013	Online course on research ethics, Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2: CORE), May 9, 2013
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SERVICE

- a) Academic
 - 1. Session Chair, The 15th Annual Injury Biomechanics Symposium, 2019
 - 2. Session Chair, The 14th Annual Injury Biomechanics Symposium, 2018
 - 3. Session Chair, Ontario Biomechanics Conference, 2018
- b) Professional:
 - 1. Invited Guest, Applied Health Sciences Speed Networking, 2019
- c) University
 - 1. Member (Graduate Student Representative), Human Research Ethics Board, 2020-2022
 - 2. Member (Graduate Student Representative), Senate Graduate Research Council, 2017-2021
 - 3. Councillor, University of Waterloo Graduate Student Association Presidential Nominating Committee, 2018
- d) Faculty
 - 1. Faculty of Applied Health Sciences Graduate Studies Committee, 2018-2019
- e) Community
 - 1. Communications Representative, Kinesiology Graduate Student Association, University of Waterloo, 2019-2020
 - 2. Applied Health Sciences Faculty Council Representative, University of Waterloo, 2018-2019
 - 3. Graduate Student Association Council Representative, University of Waterloo, 2017-2018
 - 4. Visiting Scientist, Ontario Science Centre “The Machine Inside: Biomechanics” Exhibit, 2017