

# Mathew J. Wingerson

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## Education

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### Doctor of Philosophy: Rehabilitation Sciences

Expected: 2026

University of Colorado Anschutz School of Medicine, Aurora, CO.

### Certificate/Focus Area: Data Science and Health Analytics

Completed: October 2025.

Conferred: May 2026.

University of Colorado School of Public Health, Aurora, CO.

## Master of Science: Applied Sport Psychology

Conferred: August 2021.

Adams State University, Department of Kinesiology, Alamosa, CO.

## Bachelor of Arts: Psychology

Conferred: December 2018.

Simpson College, Department of Psychology, Indianola, IA.

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## Professional Experience

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### PhD Student/Candidate Researcher

August 2022 - Present

University of Colorado School of Medicine, Rehabilitation Sciences Program

Supervised by: David Howell, PhD, ATC; Julie Wilson, MD; Jennifer Stevens-Lapsley, PT, PhD.

### Senior Clinical Research Coordinator

November 2021 - July 2022

University of Colorado School of Medicine, Department of Orthopedics

Supervised by: David Howell, PhD, ATC; Julie Wilson, MD; Michael Kirkwood, PhD.

### Clinical Research Assistant

December 2019 - November 2021

Childrens Hospital Colorado, Sports Medicine Center

Supervised by: David Howell, PhD, ATC; Julie Wilson, MD; Michael Kirkwood, PhD.

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## Funding History

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### Predoctoral National Research Service Award (F31)

#### Ruth L. Kirschstein National Research Service Award (NRSA) for Individual Predoctoral Fellows

National Institutes of Health (NIH)

Eunice Kennedy Shriver National Institute of Child Health & Human Development

Award Number: F31HD116524-01

Total Award Amount: \$77,600

Institution: Department of Orthopedics, University of Colorado Anschutz School of Medicine

Project Title: A novel approach to exercise as treatment for injury-induced impairments in cerebrovascular function among adolescents with concussion

Sponsor: David Howell

Co-Sponsor: Brianne Bettcher

Mentorship Team: Patrick Carry & Jonathan Smirl

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## Peer-Reviewed Publications

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Total Collaborating Authors: 37 (last updated 11/04/2025)

### First Authored

1. **Wingerson MJ**, Seehusen CN, Walker GA, Wilson JC, Howell DR. Clinical feasibility and utility of a dual-task tandem gait protocol for pediatric concussion management. *Journal of Athletic Training*. 2020 Nov 5;58(2):106-111. DOI: 10.4085/323-20.
2. **Wingerson MJ**, Wilson JC, Seehusen CN, Walker GA, Howell DR. Patient characteristics predictive of immediate and delayed word recall performance following adolescent concussion. *Int J Sports Med*. 2023;44(1):72-77. doi:10.1055/a-1941-5673.
3. **Wingerson MJ**, Baugh CM, Provance AJ, Armento A, Walker GA, Howell DR. Change in quality of life, sleep, and physical activity during COVID-19: A longitudinal study of adolescent athletes. *J Athl Train*. 2023;10.4085/1062-6050-0529.22. doi:10.4085/1062-6050-0529.22.
4. **Wingerson MJ**, Magliato SN, Smulligan KL, Wilson JC, Little CC, Howell DR. Predicting time to evaluation after pediatric concussion: factors affecting specialty concussion care. *Orthop J Sports Med*. 2023;11(8):23259671231186430. Published 2023 Aug 17. doi:10.1177/23259671231186430.
5. **Wingerson MJ**, Schmitz B, Smulligan KL, Walker GA, Magliato SN, Wilson JC, Howell DR. Concussion symptom presentation and clinical recovery among pediatric athletes: Comparing concussion sustained during school and summer months. *Brain Inj*. 2024 Jun 6;38(7):574-582. doi: 10.1080/02699052.2024.2332770.
6. **Wingerson MJ**, Hunt DL, Wilson JC, Mannix RC, Meehan WP, Howell DR. Factors associated with symptom resolution after aerobic exercise intervention in adolescent and young adults with concussion. *J Sci Med Sports Exerc*. 2024;26(3):183-188. doi: 10.1249/MSS.0000000000003358.
7. **Wingerson MJ**, Carry P, Mannix R, Meier T, Smulligan KL, Wilson JC, Howell DR. Concussion and depressive symptoms in high school students: Impact of physical activity and substance use. *Br J Sports Med*. 2025 Jan 20:bjsports-2024-109029. doi: 10.1136/bjsports-2024-109029.
8. **Wingerson MJ**, Smulligan KL, Svoboda E, Baugh CM, Magliato SN, Wilson JC, Howell DR. Who are the participants in pediatric concussion randomized clinical trials? A meta-epidemiology study. *The Journal of Orthopaedic & Sports Physical Therapy (JOSPT) Open*. In press, accepted April 22, 2025.
9. **Wingerson MJ**, Smulligan KL, Baugh CM, Wilson JC, Howell DR. Are we engaging in consistent and equitable reporting of demographics in clinical research? *The Journal of Orthopaedic & Sports Physical Therapy (JOSPT) Open*. In press, accepted May 5, 2025.

### Co-Authored

1. Howell DR, Seehusen CN, **Wingerson MJ**, Wilson JC, Lynall RC, Lugade V. Reliability and minimal detectable change for a smartphone-based motor-cognitive assessment: Implications for concussion assessment. *Journal of Applied Biomechanics*. Published online July 13, 2021.

2. Krainin BM, Seehusen CN, Smulligan KL, **Wingerson MJ**\* Wilson JC, Howell DR. Symptom and clinical recovery outcomes for pediatric concussion following early physical activity. *Journal of Neurosurgery: Pediatrics*. In press, accepted June 11, 2021.
3. Smulligan KL, **Wingerson MJ**, Corrine SN, Magliato SN, Wilson JC, Howell DR. Patient perception of dizziness and balance impairment does not correlate with gait measures in adolescent athletes' post-concussion. *Gait and Posture*. September 20, 2021.
4. Smulligan KL, Wilson JC, Seehusen CN, **Wingerson MJ**, Magliato SN, Howell DR. Post-concussion dizziness, sleep quality, and postural instability: a cross-sectional investigation. *Journal of Athletic Training*. In press, accepted September 27, 2021.
5. Smulligan KL, **Wingerson MJ**, Seehusen C, Wilson J, Howell DR. Examining Initial Post-Concussion Dizziness and Postural Stability as Potential Recovery Predictors. *Journal of Science and Medicine in Sport*. Jan 31, 2022.
6. Smulligan KL, **Wingerson MJ**, Seehusen CN, Wilson JC, Howell DR. Post-concussion dizziness severity predicts daily step count during recovery among adolescent athletes. *Medicine and Science in Sports and Exercise*. E-pub ahead of print: January 25, 2022.
7. Howell DR, **Wingerson MJ**, Kirkwood MW, Grubenhoff JA, Wilson JC. Early aerobic exercise among adolescents at moderate/high risk for persistent postconcussion symptoms: A pilot randomized clinical trial. *Physical Therapy in Sport*. Accepted April 19, 2022.
8. Smulligan KL, **Wingerson MJ**, Seehusen CN, Smith AC, Walker GA, Wilson JC, Howell DR. Dizziness is associated with neck/shoulder pain in pediatric concussion. *Clinical Journal of Sports Medicine*. Accepted May 31st, 2022.
9. Smulligan KL, **Wingerson MJ**, Seehusen CN, Little CC, Wilson JC, Howell DR. More Physical Activity Is Correlated With Reduction in Kinesiophobia for Adolescents With Persistent Symptoms After Concussion. *J Sport Rehabil*. 2022;32(2):196-202. Published 2022 Oct 11. doi:10.1123/jsr.2022-0193.
10. Schmitz B, Smulligan KL, **Wingerson MJ**, Walker GA, Wilson JC, Howell DR. Double Vision and Light Sensitivity Symptoms are Associated With Return-to-School Timing After Pediatric Concussion. *Clin J Sport Med*. 2023;33(3):264-269. doi:10.1097/JSM.0000000000001106.
11. Neely LM, Smulligan KL, **Wingerson MJ**, et al. The association between sleep and physical activity with persisting postconcussion symptoms among adolescent athletes [published online ahead of print, 2022 Dec 29]. *Physical Medicine and Rehabilitation*. 2022;10.1002/pmrj.12939. doi:10.1002/pmrj.12939.
12. Barnes A, Smulligan K, **Wingerson MJ**, et al. A Multifaceted Approach to Interpreting Reaction Time Deficits After Adolescent Concussion [published online ahead of print, 2023 Jan 27]. *J Athl Train*. 2023;10.4085/1062-6050-0566.22. doi:10.4085/1062-6050-0566.22.
13. Magliato SN, **Wingerson MJ**, Seehusen CN, et al. Sleep Problems After Concussion Are Associated With Poor Balance and Persistent Postconcussion Symptoms. *J Child Neurol*. 2023;38(3-4):198-205. doi:10.1177/08830738231170721.
14. Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC, Howell DR. Early physical activity after concussion is associated with sleep quality but not dizziness among adolescent athletes. *J Sci Med Sport*. 2023;26(3):183-188. doi:10.1016/j.jsams.2023.02.001.

15. Rademacher JG, **Wingerson MJ**, Smulligan KL, Little CC, Wilson JC, Howell DR. Early Moderate to Vigorous Physical Activity After Concussion Is Associated With Faster Symptom Resolution Time. *J Sport Rehabil.* 2023;32(7):790-796. Published 2023 Jun 9. doi:10.1123/jsr.2023-0022.
16. Smulligan KL, Magliato SN, Keeter CL, **Wingerson MJ**, Smith AC, Wilson JC, Howell DR. The Diagnostic Utility of Cervical Spine Proprioception for Adolescent Concussion. *Clinical Journal of Sport Medicine.* In press, accepted June 12, 2024.
17. Howell DR, **Wingerson MJ**, Smulligan KL, Magliato SN, Simon S, Wilson JC. Exercising more than 150 minutes/week after concussion is associated with sleep quality improvements. *J Head Trauma Rehabil.* 2024;39(4).
18. Smulligan KL, **Wingerson MJ**, Magliato SN, Rademacher JG, Wilson JC, Howell DR. Post-concussion moderate to vigorous physical activity predicts anxiety severity after return-to-play in adolescent athletes. *Med Sci Sports Exerc.* 2024; 56(5):790-795.
19. Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Lugade V, Wilson JC, Howell DR. Smartphone-Based Neuromuscular Training Among Physically Active Young Adults: A Feasibility Study. *Journal of Sport Rehabilitation.* In press, accepted July 30, 2024.
20. Smulligan KL, Carry P, **Wingerson MJ**, Donahue C, Wilson JC, Howell DR. Clinical Measures Associated with Subsequent Injury After Adolescent Concussion: A Prospective Cohort Study. *Medicine & Science in Sports & Exercise.* In press, accepted September 22, 2024.
21. Donahue CC, Smulligan KL, **Wingerson MJ**, Kniss JR, Simon SL, Wilson JC, Howell DR. Feasibility of at-home sleep monitoring in adolescents with and without concussion. *Nat Sci Sleep.* 2024 Dec 28;16:2257-2268. doi: 10.2147/NSS.S497858.
22. Donahue CC, Smulligan KL, **Wingerson MJ**, Brna ML, Simon SL, Wilson JC, Howell DR. Clinical Cut Point for the Pittsburgh Sleep Quality Index After Adolescent Concussion. *Orthopaedic Journal of Sports Medicine.* 2025;13(4). doi:10.1177/23259671251330571.
23. Singh M, Smulligan KL, **Wingerson MJ**, Magliato S, Wilson JC, Howell DR. Prognostic Utility of Immediate Memory and Delayed Recall Assessments for Adolescent Concussion. 2025. *Clinical Journal of Sport Medicine.* In press, accepted May 28, 2025.
24. Smulligan KL, Magliato SN, **Wingerson MJ**, Lugade V, Wilson, JC, Howell DR. Virtual Neuromuscular Training: Preliminary Findings Using an Injury Prevention Program for Physically Active Young Adults. *Journal of Sport Rehabilitation.* In press, accepted July 27, 2025.
25. Moseley RR, **Wingerson MJ**, Richardson KL, Hurlburt KD, Warren K, Wilson JC, Meehan WP, Mannix R, Howell DR. Post-concussion physical activity frequency and plasma biomarkers associations among adolescents. *In review at... tbd.*
26. Smulligan KL, **Wingerson MJ**, Armento AM, Meehan WP, Wilson JC, Howell DR. Sex differences in physical activity and energy expenditure after adolescent concussion. *In review at Medicine & Science in Sports & Exercise (MSSE).*
27. Donahue CC, Smulligan KL, **Wingerson MJ**, Brna ML, Simon SL, Wilson JC, Howell DR. Expanding the Discussion on Sleep Assessment After Concussion: Author Response to Letter. *Orthopaedic Journal of Sports Medicine.* Pre-print, accepted Nov. 11, 2025.

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## Peer-Reviewed Conference Presentations

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**Total Collaborating Authors:** 86 (last updated 11/04/2025)

### Presenting Author

1. **Wingerson MJ**, Wilson JC, Lugade V, Seehusen C, Howell DR. Test-retest reliability of an automated smartphone application for gait analysis: Implications for concussion management. *Rocky Mountain American Society of Biomechanics*. March 27-28, 2020. Estes Park, CO. Meeting cancelled due to COVID-19.
2. **Wingerson MJ**, Seehusen CN, Walker GA, Wilson JC, Howell DR. Clinical feasibility and utility of a dual-task tandem gait protocol for pediatric concussion management. *University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship*. November 14, 2020. Anschutz Medical Campus, Aurora, CO. Virtual podium Presentation. **Top Trainee/Post-Doc Presentation Finalist; Mack Clayton Pre-Doctoral Presentation Award.**
3. **Wingerson MJ**, Wilson JC, Seehusen CN, Walker GA, Howell DR. Determinants of immediate and delayed recall performance following pediatric concussion. *Pediatric Research in Sports Medicine Society (PRiSM) 8th Annual Meeting*. January 28-30, 2021. Virtual poster presentation.
4. **Wingerson MJ**, Baugh CM, Provance AJ, Armento A, Walker GA, Howell DR. Differences in quality of life, sleep, and physical activity in adolescent athletes before and during COVID-19. *Pediatric Research in Sports Medicine Society (PRiSM) 8th Annual Meeting*. January 28-30, 2021. Virtual poster presentation.
5. **Wingerson MJ**, Seehusen CN, Wilson JC, Smulligan KL, Reinking SE, Magliato SN, Howell DR. Assessments of post-concussion reaction time predict persistent symptoms and delayed return-to-play. *Rocky Mountain American Society of Biomechanics*. April 2, 2021. Estes Park, CO. Virtual poster presentation.
6. **Wingerson MJ**, Seehusen CN, Wilson JC, Smulligan KL, Reinking SE, Magliato SN, Howell DR. Diagnostic and predictive ability of reaction time assessments for adolescent concussion. *Pediatric Research in Sports Medicine Society (PRiSM) 9th Annual Meeting*. January 27-29, 2022. Houston, TX. Poster presentation.
7. **Wingerson MJ**, Seehusen CN, Wilson JC, Smulligan KL, Lynall RC, Lugade V, Howell DR. Smartphone measured single- and dual-task gait evaluations in adolescent's post-concussion: A longitudinal comparison to healthy controls. *Pediatric Research in Sports Medicine Society (PRiSM) 9th Annual Meeting*. January 27-29, 2022. Houston, TX. Poster presentation w/ 5-minute podium presentation. **Top poster award finalist.**
8. **Wingerson MJ**, Seehusen CN, Wilson JC, Smulligan KL, Lynall RC, Lugade V, Howell DR. Smartphone measured single- and dual-task gait evaluation in adolescent's post-concussion: A longitudinal comparison to healthy controls. *University of Colorado 3rd Annual Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship*. November 10, 2021. Aurora, CO. Poster presentation.



9. **Wingerson MJ**, Smulligan KL, Wilson JC, Walker GA, Howell DR. Sociodemographic and injury characteristics predictive of time to presentation at a specialty clinic after concussion. *American College of Sports Medicine (ACSM) 2022 Annual Meeting & World Congress*. May 31 – June 4, 2022. San Diego, California. Free Communication/Poster Presentation.
10. **Wingerson MJ**, Hunt DL, Wilson JC, Mannix RC, Meehan WP, Howell DR. Differentiating treatment responders from non-responders after aerobic exercise intervention in adolescents with concussion. *Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting*. February 2 – 4, 2023. Denver, CO. Poster Presentation.
11. **Wingerson MJ**, Hunt DL, Wilson JC, Mannix RC, Meehan WP, Howell DR. Aerobic exercise following concussion in adolescents: Differentiating treatment responders and non-responders. *6th International Consensus Conference on Concussion in Sport*. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
12. **Wingerson MJ**, Seehusen CN, Smulligan KL, Wilson JC, Howell DR. Symptom resolution among adolescents reporting both sleep and exercise after concussion. *Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting*. February 2 – 4, 2023. Denver, CO. Poster Presentation.
13. **Wingerson MJ**, Seehusen CN, Smulligan KL, Wilson JC, Howell DR. Combined effect of sleep and exercise soon after concussion on symptom duration among adolescents. *6th International Consensus Conference on Concussion in Sport*. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
14. **Wingerson MJ**, Rademacher JG, Smulligan KL, Little CC, Wilson JC, Howell DR. Higher intensity daily physical activity during concussion recovery is associated with reduced symptom duration. *6th International Consensus Conference on Concussion in Sport*. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
15. **Wingerson MJ**, Magliato SN, Smulligan KL, Little CC, Wilson JC, Howell DR. Predicting time to clinical presentation after adolescent concussion: Propensity and barriers to accessing post-concussion care. *University of Colorado 4th Annual Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship*. October 5, 2022. Aurora, CO. Poster Presentation.
16. **Wingerson MJ**, Schmitz B, Smulligan KL, Walker GA, Little CC, Wilson JC, Howell DR. Exercise, Symptom Severity, And Return-To-Play Time Among Pediatric Athletes: Comparing Concussions Sustained During Academic and Summer Months. *Pediatric Research in Sports Medicine (PRiSM) 10th Annual Meeting*. Denver, CO. February 2-4, 2023. Poster Presentation.
17. **Wingerson MJ**, Lemaire AC, Smulligan KL, Magliato SN, Breedlove KM, Lin AP, Wilson JC, Howell DR. Neurochemistry after pediatric concussion: Correlations with exercise frequency, duration, and intensity. *American College of Sports Medicine (ACSM) 2023 Annual Meeting & World Congress*. May 30 – June 2, 2023. Denver, CO. Thematic poster presentation w/ a 5 minute podium presentation.
18. Rademacher JG, **Wingerson MJ (presenter)**, Smulligan KL, Little CC, Wilson JC, Howell DR. Moderate to vigorous physical activity is associated with symptom resolution in adolescents with concussion. *Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting*. February 2 – 4, 2023. Denver, CO. Poster Presentation.

19. **Wingerson MJ**, Smulligan KL, Magliato SN, Breedlove KM, Lin AP, Lemaire A, Wilson JC, Howell DR. Exercise duration, but not frequency or intensity, correlates with neurochemical markers after adolescent concussion. *Rocky Mountain American Society of Biomechanics (RMASB)*. April 7 – 8, 2023. Estes Park, CO. Poster Presentation.
20. **Wingerson MJ**, Smulligan KL, Carry PM, Magliato SN, Wilson JC, Howell DR. Isotemporal substitution modeling: A novel approach to estimating the effects of time spent in physical activity on concussion recovery. *Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting*. January 25-27, 2024. Anaheim, CA. Poster Presentation.
21. **Wingerson MJ**, Smulligan KL, Magliato SN, Wilson JC, Simon SL, Howell DR. Time-based allocations of physical activity, sleep, and leisure time to facilitate symptom resolution after concussion. *Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting*. January 25-27, 2024. Anaheim, CA. Not accepted.
22. **Wingerson MJ**, Smulligan KL, Magliato SN, Simon SL, Wilson JC, Howell DR. Integrated recovery strategies: How concurrent sleep and exercise early in concussion recovery relate to symptom resolution. *8th Annual Vail Scientific Summit*. August 20-23, 2023. Poster Presentation.
23. **Wingerson MJ**, Keeter C, Smulligan KL, Messenger SA, Magliato SN, Simon SL, Wilson JC, Howell DR. Sleep and exercise: Longitudinal associations throughout recovery from adolescent concussion. *University of Colorado Orthopedics Research Symposium and D'Ambrosia Diversity Lectureship*. October 25, 2023. Aurora, CO. Poster presentation.
24. **Wingerson MJ**, Mannix RC, Carry PM, Meier TB, Smulligan KL, Wilson JC, Howell DR. Preventing mental illness and suicidality as secondary sequelae of sport-related concussion in adolescents. *7th International Olympic Committee World Conference on Prevention of Injury and Illness in Sport*. February 29 – March 2, 2024. Monaco City, Monaco. Full Oral Presentation.
25. **Wingerson MJ**, Keeter C, Smulligan KL, Messenger SA, Magliato SN, Simon SL, Wilson JC, Howell DR. Sleep and exercise: Longitudinal associations throughout recovery from adolescent concussion. *University of Colorado 38th Annual Student Research Forum*. December 5, 2023. Aurora, CO. Poster Presentation.
26. **Wingerson MJ**, Carry PM, Mannix RC, Meier TB, Smulligan KL, Wilson JC, Howell DR. Adolescent sadness/hopelessness is associated with substance/illicit drug use, but not concussion history. *American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress*. May 28 – 31, 2024. Boston, MA. Poster Presentation.
27. **Wingerson MJ**, Keeter C, Carry P, Smulligan KL, Wilson JC, Halstead M, Miller S, Santana J, Valovich McLeod T, Zaslow T, Master C, Grady M, Snedden T, Fazekas M, Coel R, Howell DR. Machine Learning to Identify Patients at Risk of Developing Anxiety/Depression Symptoms After Adolescent Concussion: Findings from the PRiSM Concussion RIG. *Pediatric Research in Sports Medicine (PRiSM) 2025 Annual Meeting*. Podium presentation (declined to attend/present).
28. **Wingerson MJ**, Keeter C, Carry P, Smulligan KL, Wilson JC, Halstead M, Miller S, Santana J, Valovich McLeod T, Zaslow T, Master C, Grady M, Snedden T, Fazekas M, Coel R, Howell DR. Machine Learning to Identify Patients at Risk of Developing Anxiety/Depression Symptoms After Adolescent Concussion: Findings from the PRiSM Concussion RIG. *University of Colorado 6th Annual Orthopedic Research*



*Symposium & D'Ambrosia Diversity*. October 23, 2024. Aurora, CO. Podium Presentation. **Mack Clayton Pre-Doctoral Trainee Award Finalist.**

29. **Wingerson MJ**, Kniss JR, Wilson JC, Howell DR. A decision tree framework for clinically intuitive prediction of persisting symptoms after concussion. *American College of Sports Medicine (ACSM), 2026 Annual Meeting & World Congress*. May 26-29. Salt Lake City, UT. Presentation format pending.
30. **Wingerson MJ**, A patients-like-me approach to aggregating data in clinical management of adolescent concussion. *2026 Culture of Data: Colorado Public Health Association*. April 15, 2026. Denver, CO. Presentation format pending.

## Co-Author

1. Wilson JC, Seehusen CN, Smulligan KL, **Wingerson MJ**, Howell DR. Sleep quality and functional outcomes during pediatric concussion recovery. American Medical Society for Sports Medicine (AMSSM). April 13-18, 2021. Hybrid Conference. Virtual poster presentation.
2. Krainin BM, Seehusen CN, Smulligan KL, **Wingerson MJ**, Wilson JC, Howell DR. Symptom and clinical recovery outcomes for pediatric sport-related concussion following early physical activity. American Medical Society for Sports Medicine (AMSSM). April 13-18, 2021. Hybrid Conference. Virtual poster presentation.
3. Smulligan KL, Wilson JC, Seehusen CN, **Wingerson MJ**, Magliato SN, Howell DR. Post-concussion dizziness, sleep quality, and postural stability in young athletes. American College of Sports Medicine (ACSM). June 1-5, 2021. Virtual poster presentation.
4. Seehusen CN, **Wingerson MJ**, Smulligan KL, Magliato SN, Wilson JC, Howell DR. Effects of an 8-week neuromuscular training program on postural stability following concussion: A randomized clinical trial. 16th International Symposium of 3D-Analysis of Human Movement (3D-AHM 2021). May 24-28, 2021. Virtual podium presentation.
5. Magliato SN, Seehusen CN, **Wingerson MJ**, Smulligan KL, Wilson JC, Howell DR. Self-reported sleep problems after concussion are associated with poor balance and risk of prolonged recovery. 16th International Symposium of 3D-Analysis of Human Movement (3D-AHM 2021). May 24-28, 2021. Virtual podium presentation.
6. Smulligan KL, Wilson JC, Seehusen CN, **Wingerson MJ**, Magliato SN, Howell DR. Patient perception of dizziness and imbalance does not correlate with gait measures in adolescent athletes acutely post-concussion. 16th International Symposium of 3D-Analysis of Human Movement (3D-AHM 2021). May 24-28, 2021. Virtual podium presentation.
7. Petranovich C, Tlustos-Carter S, Wingerson MJ. Does inpatient cognitive assessment predict longer-term functioning? Considerations for pediatric neuropsychological assessment in the inpatient rehabilitation setting. American Conference of Rehabilitation Medicine (ACRM). Sept. 24-26, 2021. Virtual podium presentation.
8. Magliato SN, Seehusen CN, **Wingerson MJ**, Smulligan KL, Wilson JC, Howell DR. Post-concussion sleep problems associated with worse balance among youth athletes. Rocky Mountain American Society of Biomechanics. April 2, 2021. Estes Park, CO. Virtual podium presentation.

9. Smulligan KL, Wilson JC, Seehusen CN, **Wingerson MJ**, Magliato SN, Howell DR. Post-concussion dizziness is associated with impaired postural stability. Rocky Mountain American Society of Biomechanics. April 2, 2021. Estes Park, CO. Virtual podium presentation.
10. Smulligan KL, **Wingerson MJ**, Seehusen CN, Wilson JC, Howell DR. Examining initial post-concussion dizziness and postural stability as predictors of recovery. American Academy of Neurology, Sports Concussion Conference 2021. July 30-31, 2021. Virtual poster presentation.
11. Smulligan KL, Seehusen CN, **Wingerson MJ**, Wilson JC, Howell DR. Post-concussion dizziness severity predicts daily step count during recovery for adolescent athletes. Pediatric Research in Sports Medicine Society (PRiSM) 9th Annual Meeting. January 27-29, 2022. Houston, TX. Podium presentation.
12. Magliato SN, Seehusen CN, **Wingerson MJ**, Smulligan KL, Wilson JC, Howell DR. Sleep problems following concussion are associated with worse balance and more severe symptoms in youth athletes. Pediatric Research in Sports Medicine Society (PRiSM) 9th Annual Meeting. January 27-29, 2022. Houston, TX. Podium presentation.
13. Smulligan KL, **Wingerson MJ**, Seehusen CN, Wilson JC, Howell DR. Physical activity predicts kinesiophobia at return to play for adolescent athletes with persistent post-concussion symptoms. American Physical Therapy Association Combined Sections Meeting (APTA CSM 2022). February 2-5, 2022. Podium presentation.
14. Smulligan KL, **Wingerson MJ**, Seehusen CN, Wilson JC, Howell DR. Identifying predictors of time to concussion symptom resolution: The role of dizziness and postural stability. American Physical Therapy Association (APTA) Rocky Mountain Annual Conference. September 24, 2021. Podium presentation.
15. Smulligan KL, Seehusen CN, **Wingerson MJ**, Smith AC, Walker GA, Wilson JC, Howell DR. Dizziness is associated with neck and shoulder pain in pediatric concussion. University of Colorado 3rd Annual Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. November 10, 2021. Aurora, CO. Poster presentation.
16. Little CC, **Wingerson MJ**, Seehusen CN, Smulligan KL, Wilson JC, Simon S, Howell DR. Evaluation of sex differences in sleep stages following concussion in adolescents. University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. November 10, 2021. Aurora, CO. Poster presentation.
17. Smulligan KL, **Wingerson MJ**, Seehusen CN, Wilson JC, Howell DR. More physical activity reduces fear of movement for adolescent athletes with persistent post-concussion symptoms. American College of Sports Medicine (ACSM) 2022 Annual Meeting & World Congress. May 31 – June 4, 2022. San Diego, CA. Free Communication/Poster Presentation.
18. Neely L, Smulligan KL, **Wingerson MJ**, Seehusen CN, Simon S, Wilson JC, Howell DR. Evaluating the association of sleep and physical activity with prolonged concussion symptoms. American Association for Anatomy (AAA) 2022 Annual Meeting at Experimental Biology. April 2 – April 5, 2022. Philadelphia, PA. Poster presentation.
19. Magliato SN, **Wingerson MJ**, Little CC, Smulligan KL, Wilson JC, Howell DR. Virtual neuromuscular training to reduce injury risk after concussion: A pilot study in healthy adults. University of Colorado School of Medicine Annual Student Research Forum 2021. Poster presentation.

20. Wilson JC, **Wingerson MJ**, Kirkwood M, Grubenhoff J, Howell DR. Early aerobic exercise for adolescents at moderate/high risk for persistent post-concussion symptoms: A pilot randomized clinical trial. American Medical Society for Sports Medicine, 31st Annual Meeting 2022. Poster presentation.
21. Little CC, **Wingerson MJ**, Smulligan KL, Wilson JC, Howell DR. Post-concussion kinesiophobia in adolescent athletes with and without a history of lower extremity musculoskeletal injury or prior concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Poster Presentation.
22. Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Seehusen CN, Lugade V, Wilson JC, Howell DR. Changes in smartphone-obtained dual-task gait and correlation with sleep quality in adolescents recovering from concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Poster Presentation.
23. Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Seehusen CN, Lugade V, Wilson JC, Howell DR. Tracking concussion recovery using a smartphone-based motor-cognitive assessment among youth athletes. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
24. Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Seehusen CN, Lugade V, Wilson JC, Howell DR. Changes in motor/cognitive performance across time are correlated with sleep quality changes among adolescent athletes with concussion. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
25. Rademacher JG, **Wingerson MJ**, Smulligan KL, Little CC, Wilson JC, Howell DR. Moderate to vigorous physical activity is associated with symptom resolution in adolescents with concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Poster Presentation.
26. Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Lugade V, Wilson JC, Howell DR. Virtual neuromuscular training to reduce injury risk after concussion: A randomized feasibility study in healthy adults. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
27. Neely LM, Smulligan KL, **Wingerson MJ**, Seehusen CN, Simon SL, Wilson JC, Howell DR. Objective measurements of sleep and sleep and physical activity behavior following adolescent concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Podium Presentation.
28. Wilson JC, **Wingerson MJ**, Little CC, Smulligan KL, Howell DR. 5P risk score as a predictor of physical activity and exercise in adolescents with concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Electronic Poster Presentation.
29. Wilson JC, **Wingerson MJ**, Little CC, Smulligan KL, Howell DR. 5P clinical risk score predicts exercise intensity in adolescents recovering from concussion. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
30. Howell DR, **Wingerson MJ**, Smulligan KL, Little CC, Simon S, Wilson JC. High exercise volume after adolescent concussion is associated with improved sleep. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. e-Poster Presentation.

31. Howell DR, **Wingerson MJ**, Smulligan KL, Little CC, Simon S, Wilson JC. Adolescents with concussion who exercise more than 150 minutes/week demonstrate sleep quality improvements. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
32. Howell DR, Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC. Slower simple reaction time after concussion return-to-play predicts higher risk of subsequent injury. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Poster Presentation.
33. Howell DR, Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC. Post-concussion subsequent injury prediction: The role of reaction time as a clinically viable prognostic indicator. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
34. Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC, Howell DR. Health-related quality of life, sleep, and kinesiophobia do not predict post-concussion musculoskeletal injury risk. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
35. Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC, Howell DR. Patient-reported outcomes do not predict time to subsequent injury after concussion return to play. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Poster Presentation.
36. Barnes A, Smulligan KL, **Wingerson MJ**, Little CC, Lugade V, Wilson JC, Howell DR. A multifaceted approach to measuring reaction time deficits after adolescent concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Poster Presentation.
37. Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC, Howell DR. Early physical activity after concussion is associated with sleep quality but not dizziness among adolescent athletes. 6th International Consensus Conference on Concussion in Sport. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
38. Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC, Howell DR. Sleep quality, dizziness, and postural stability outcomes following early post-concussion physical activity. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Not accepted for presentation.
39. Heronemus M, **Wingerson MJ**, Magliato SN, Smulligan KL, Wilson JC, Lugade V, Howell DR. Concussion history is associated with post-concussion dual-task cognitive performance among adolescents using a smartphone-based evaluation. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Electronic Poster Presentation.
40. Seehusen CN, **Wingerson MJ**, Magliato SN, Smulligan KL, Wilson JC, Howell DR. Headache sub-types and NSAID use in youth concussion. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Not accepted for presentation.
41. Truong DV, **Wingerson MJ**, Seehusen CN, Smulligan KL, Magliato SN, Provance AJ, Wilson JC, Howell DR. Evaluating concussion management patterns among adventure sports. Pediatric Research in Sports Medicine (PRiSM) 10th annual meeting. February 2 – 4, 2023. Denver, CO. Podium Presentation.

42. Smulligan KL, **Wingerson MJ**, Magliato SN, Little CC, Wilson JC, Howell DR. Assessing vestibular, oculomotor, and cervical spine impairments as predictors of post-concussion gait speed. American Physical Therapy Association (APTA) 2023 Combined Sections Meeting. February 23-25, 2023. San Diego, CA. AASPT Science Meets Practice Podium Presentation.
43. Barnes A, Smulligan KL, **Wingerson MJ**, Little CC, Lugade V, Wilson JC, Howell DR. A multifaceted approach to measuring reaction time deficits after adolescent concussion. American Physical Therapy Association (APTA) 2023 Combined Sections Meeting. February 23-25, 2023. San Diego, CA. AASPT Science Meets Practice Podium presentation. **Top Sports Physical Therapy Abstract Finalist.**
44. Smulligan KL, **Wingerson MJ**, Magliato SN, Little CC, Wilson JC, Howell DR. Impaired Cervical Spine Proprioception Predicts Gait Speed After Adolescent Concussion. University of Colorado Orthopedics Research Symposium and D'Ambrosia Diversity Lectureship. October 5, 2022. Poster Presentation. **Mack Clayton Travel Award Finalist. Mack Clayton Pre-Doctoral Presentation Travel Award Winner.**
45. Magliato SN, Carry PM, Smulligan KL, **Wingerson MJ**, Wilson JC, Howell DR. Latent trajectory analysis to identify post-concussion injury risk among adolescent athletes. University of Colorado Orthopedics Research Symposium and D'Ambrosia Diversity Lectureship. October 5, 2022. Podium presentation. **Mack Clayton Travel Award Finalist. Mack Clayton Pre-Doctoral Presentation Travel Award Winner.**
46. Seehusen CN, **Wingerson MJ**, Magliato SN, Smulligan KL, Wilson JC, Howell DR. Headache Types and Medication/Supplement Use in Youth Concussion. University of New England College of Osteopathic Medicine Fall Research Symposium. September 30, 2022. Portland, ME. Poster presentation.
47. Smulligan KL, Schmitz B, **Wingerson MJ**, Walker GA, Wilson JC, Howell DR. Double Vision and Light Sensitivity Symptoms Are Associated with Return to School Timing After Pediatric Concussion. Pediatric Research in Sports Medicine (PRiSM) 10th Annual Meeting. Denver, CO. February 2-4, 2023. Podium Presentation.
48. Heronemus M, **Wingerson MJ**, Magliato SN, Smulligan KL, Willson JC, Lugade V, Howell DR. Concussion history does not affect smartphone-based dual-task performance in adolescents. 2023 American Medical Society for Sports Medicine (AMSSM) Annual Meeting. Phoenix, AZ. April 28 – May 3, 2023. Podium Presentation.
49. Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Lugade V, Wilson JC, Howell DR. Virtual neuromuscular and dual-task training: A randomized feasibility study in uninjured young adults. American College of Sports Medicine (ACSM) 2023 Annual Meeting & World Congress. May 30 – June 2, 2023. Denver, CO. Free Communications/Poster Presentation.
50. LaGreca R, Magliato SN, **Wingerson MJ**, Smulligan KL, Little CC, Lugade V, Wilson JC, Howell DR. Translating concussion gait evaluations to a mobile approach: Reliability and test environment differences. American College of Sports Medicine (ACSM) 2023 Annual Meeting & World Congress. May 30 – June 2, 2023. Denver, CO. Poster presentation.
51. Brna M, Smulligan KL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Clinical assessments of gait and postural control do not predict kinesiophobia following adolescent concussion. American College of Sports Medicine (ACSM) 2023 Annual Meeting & World Congress. May 30 – June 2, 2023. Denver, CO. Poster presentation.



52. Smulligan KL, Lemaire A, **Wingerson MJ**, Magliato SN, Breedlove KM, Lin AP, Wilson JC, Howell DR. Brain neurochemistry after concussion among adolescents with and without Vestibular/Oculomotor Symptom Provocation. American College of Sports Medicine (ACSM) 2023 Annual Meeting & World Congress. May 30 – June 2, 2023. Denver, CO. Thematic Poster Presentation.
53. Szeto NS, **Wingerson MJ**, Smulligan KL, Magliato SN, Simon S, Wilson JC, Howell DR. Sex differences in self-reported depressive symptoms in adolescents with concussion. American College of Sports Medicine (ACSM) 2023 Annual Meeting & World Congress. May 30 – June 2, 2023. Denver, CO. Free Communications/Poster Presentation.
54. Smulligan KL, **Wingerson MJ**, Little CC, Wilson JC, Howell DR. Sleep Quality, Dizziness, and Postural Stability Following Early Post-Concussion Physical Activity. University of Colorado Anschutz Medical Campus 37th Annual Student Research Forum. December 13, 2022. Aurora, CO. Poster presentation. **Top Poster Award.**
55. Smulligan KL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Moderate to vigorous physical activity predicts post-concussion anxiety among adolescents athletes. Rocky Mountain American Society of Biomechanics. April 7-8, 2023. Estes Park, CO. Poster Presentation.
56. Magliato SN, Smulligan KL, Keeter C, **Wingerson MJ**, Wilson JC, Howell DR. Tandem gait is a more reliable but less stable measure than the modified balance error scoring system. Rocky Mountain American Society of Biomechanics. April 7-8, 2023. Estes Park, CO. Podium Presentation.
57. Magliato SN, **Wingerson MJ**, Smulligan KL, Wilson JC, Howell DR. Dual-task tandem gait is a more reliable measure than the modified balance error scoring system in adolescents. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Poster presentation.
58. Kemp LE, Smulligan KL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Influence of self-reported fatigue on assessments of postural control in adolescents with concussion. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Podium presentation.
59. Howell NM, Seehusen CN, Smulligan KL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Neuromuscular training improves reaction time, but not postural stability, following concussion return-to-play. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Podium Presentation.
60. Smulligan KL, Magliato SN, **Wingerson MJ**, Brna ML, Armento AN, Wilson JC, Howell DR. Sex differences in quality-of-life outcomes among adolescents with and without concussion. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Electronic Poster Presentation.
61. Smulligan KL, Magliato SN, Keeter C, **Wingerson MJ**, Smith AC, Wilson JC, Howell DR. Head repositioning accuracy as a diagnostic tool for adolescent concussion. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Podium Presentation.
62. Smulligan KL, Magliato SN, Keeter C, **Wingerson MJ**, Smith AC, Wilson JC, Howell DR. The diagnostic utility of cervical spine proprioception for adolescent concussion. American Physical Therapy Association (APTA): Combined Sections Meeting. February 15-17, 2024. Boston, MA. Poster presentation.

63. Brna ML, Smulligan KL, **Wingerson MJ**, Magliato SN, Kemp LE, Wilson JC, Howell DR. Anxiety, but not pain or kinesiophobia, predicts postural control performance after concussion. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Podium Presentation.
64. Singh M, Smulligan KL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. The utility of immediate and delayed recall assessment for concussion prognosis. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Podium Presentation.
65. Kniss JR, **Wingerson MJ**, Smulligan KL, Magliato SN, Kemp LE, Wilson JC, Howell DR. Post-concussion dual-task performance among adolescents with and without attention deficit/hyperactivity disorder: A cross-sectional study. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Podium Presentation. **Top Podium Presentation Award Finalist.**
66. Messenger SA, Magliato SN, Kemp LE, Smulligan KL, **Wingerson MJ**, Simon SL, Wilson JC, Howell DR. Predictors of sleep efficiency among adolescents with concussion. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Poster presentation.
67. Donahue C, Messenger SA, **Wingerson MJ**, Smulligan KL, Magliato SN, Simon SL, Wilson JC, Howell DR. Sex-differences in associations between quality of life and sleep disturbances among adolescents post-concussion. Pediatric Research in Sports Medicine (PRiSM) 11th Annual Meeting. January 25-27, 2024. Anaheim, CA. Poster Presentation.
68. Smulligan KL, Keeter CL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Cervical Spine Proprioception and Vestibular/Oculomotor Symptom Provocation Do Not Predict Post-Concussion Injury Risk. American Physical Therapy Association Combined Sections Meeting (APTA CSM 2023). February 15-17, 2024. Boston, MA. Poster Presentation.
69. Smulligan KL, Keeter CL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Predicting subsequent injury risk after concussion: The role of cervical spine proprioception and vestibular/oculomotor symptom provocation. University of Colorado Orthopedics Research Symposium and D'Ambrosia Diversity Lectureship. October 25, 2023. Aurora, CO. Podium Presentation.
70. Smulligan KL, Magliato SN, **Wingerson MJ**, Little CC, Lugade V, Wilson JC, Howell DR. Virtual neuromuscular training: An injury prevention strategy for physically active young adults. 7th International Olympic Committee (IOC) World Conference on Prevention of Injury and Illness in Sport. February 29 – March 2, 2024. Monaco, EU. Podium Presentation.
71. Donahue C, Smulligan KL, **Wingerson MJ**, Kemp LE, Simon SL, Wilson JC, Howell DR. Clinical cutoff scores for the Pittsburgh sleep quality index in adolescents with concussion. American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress. May 28 – 31, 2024. Boston, MA. Poster Presentation.
72. Smulligan KL, **Wingerson MJ**, Brna ML, Armento AM, Wilson JC, Howell DR. The role of energy expenditure in concussion recovery: A longitudinal comparison with healthy controls. American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress. May 28 – 31, 2024. Boston, MA. Poster Presentation.
73. Kniss JR, Donahue CC, **Wingerson MJ**, Smulligan KL, Kemp LE, Wilson JC, Howell DR. Post-concussion sleep quality association with dual-task performance, reaction time, and postural stability

among adolescent athletes: A cross-sectional study. American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress. May 28 – 31, 2024. Boston, MA. Poster Presentation.

74. Kemp LE, Smulligan KL, **Wingerson MJ**, Wilson JC, Howell DR. Influence of pre-diagnosed anxiety of symptoms and resolution time after adolescent concussion. American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress. May 28 – 31, 2024. Boston, MA. Podium presentation.
75. Hemmerle M, **Wingerson MJ**, Kemp LE, Smulligan KL, Wilson JC, Howell DR. Self-percieved mobility and fatigue as predictors of post-concussion moderate-to-vigorous physical activity participation. American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress. May 28 – 31, 2024. Boston, MA. Poster Presentation.
76. Wilson JC, Smulligan KL, **Wingerson MJ**, Kniss JR, Porfido T, Esopenko C, Howell DR. Neck strength does not predict time to concussion symptom resolution among adolescents. American College of Sports Medicine (ACSM) 2024 Annual Meeting & World Congress. May 28 – 31, 2024. Boston, MA. Poster Presentation.
77. Davidson JA, **Wingerson MJ**, Creasy S, Cooper E, Brinton JT, Bowen AE, Hawkins SM, Cree MG, Nadeau KJ, Melanson E, Wright KP, Simon SL. Reallocation of sleep and sedentary behavior with physical activity and impact on mental health symptoms in habitually short-sleeping adolescents: An isotemporal modeling approach. American Academy of Sleep Medicine (AASM): SLEEP 2024, the 38th annual meeting of the Associated Professional Sleep Societies (APSS). Podium Presentation.
78. Smulligan KL, Keeter CL, **Wingerson MJ**, Magliato SN, Wilson JC, Howell DR. Predicting Subsequent Injury Risk After Concussion: The Role of Cervical Spine Proprioception. 2nd Annual EaRLY TBI Conference. February 22-23, 2024. Virtual. Podium Presentation. Top podium presentation award.
79. Donahue C, **Wingerson MJ**, Smulligan KL, Warren K, Mannix RC, Meehan W, Wilson JC, Howell DR. 2024 Lund Glymphatic Symposim. Lund, Sweden, EU. June 17-20, 2024. Poster presentation.
80. Kniss JR, **Wingerson MJ**, Smulligan KL, Wilson JC, Howell DR. Prognostic utility of single- and dual-task tandem gait, mBESS, and reaction time assessments for identifying risk of developing persisting post-concussion symptoms. 2024 Military Health System Research Symposium (MHSRS). Poster presentation.
81. Donahue CC, Messenger S, **Wingerson MJ**, Smulligan KL, Simon S, Wilson JC, Howell DR. The Role of Sleep Latency in Predicting Mental Health Outcomes After Concussion. 7th International Olympic Committee World Conference on Prevention of Injury and Illness in Sport. February 29 – March 2, 2024. Monaco City, Monaco. Moderated Poster.
82. Kniss JR, Hemmerle MR, Magliato SN, Smulligan KL, **Wingerson MJ**, Lugade VA, Wilson JC, Howell DR. Smartphone-Based Assessment of Gait During Normal Walking in Laboratory and Free-Living Environments. Rocky Mountain American Society of Biomechanics (RMASB) 2024 Annual Meeting. April 5, 2024. Estes Park, CO. Poster Presentation.
83. Donahue CC, **Wingerson MJ**, Smulligan KL, Brna M, Simon S, Wilson JC, Howell DR. Sleep quality variability predicts mental health during a sports season among females adolescent athletes. Pediatric Research in Sports Medicine (PRiSM) 11th annual meeting. Columbus, OH. Poster Presentation.
84. Wilson JC, **Wingerson MJ**, Smulligan KL, Kniss J, Donahue C, Howell DR. Exploring the connection between physical activity and depressive symptoms in adolescents after concussion. Pediatric Research

in Sports Medicine (PRiSM) 11th annual meeting. Columbus, OH. Poster presentation. **Top 10 Poster Finalist.**

85. Kniss JR, **Wingerson MJ**, Smulligan KL, Greene N, Wilson JC, Howell DR. Quality of life among adolescents with and without noise sensitivity following concussion: A cross-sectional study. Pediatric Research in Sports Medicine (PRiSM) 11th annual meeting. Columbus, OH. Poster Presentation.
86. Kniss JR, Smulligan KL, **Wingerson MJ**, Magliato SN, Lugade V, Wilson JC, Howell DR. Virtual Neuromuscular Training's Effect on Gait Temporal-Distance Metrics, Balance, and Reaction Time in Uninjured Adults. American Physical Therapy Association (APTA) Combined Sections Meeting. Houston, TX. February 13-15, 2025. Poster presentation.
87. Kniss JR, Smulligan KL, **Wingerson MJ**, Magliato SN, Lugade V, Wilson JC, Howell DR. Smartphone-Based Gait Assessment of Normal Walking in Laboratory and Free-Living Environments. American Physical Therapy Association (APTA) Combined Sections Meeting. Houston, TX. February 13-15, 2025. Poster presentation.
88. Kniss JR, Smulligan KL, **Wingerson MJ**, Garcia A, Savel S, Carry P, Lugade V, Davis W, Wilson JC, Howell DR. Military status and the association between concussion history and self-selected gait temporal-distance metrics. 6th Annual Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. Poster presentation.
89. Donahue C, Smulligan KL, **Wingerson MJ**, Kniss JR, Wilson JC, Howell DR. Clinical cut point for the post-concussion symptom inventory following adolescent concussion. American College of Sports Medicine (ACSM) 2025 Annual Meeting & World Congress. May 27 – 30, 2025. Atlanta, GA. Thematic poster.
90. Richardson K, Hatolkar V, Smulligan KL, **Wingerson MJ**, Wilson JC, Breedlove K, Lin A, Howell DR. Brain creatine concentration associations with tandem gait and reaction time among adolescents with concussion. American College of Sports Medicine (ACSM) 2025 Annual Meeting & World Congress. May 27 – 30, 2025. Atlanta, GA. Poster presentation.
91. Hatolkar V, Breedlove KM, Wilson J, **Wingerson MJ**, Smulligan K, Kawaja MD, Howell DR, Lin AP. Associations between neurochemistry and quality-of-life symptoms following sports-related concussion in adolescent athletes. International Society for Magnetic Resonance in Medicine (ISMRM). Presentation format pending.
92. Kniss J, **Wingerson MJ**, Smulligan KL, Richardson K, Hurlburt K, Lugade V, Wilson J, Howell DR. Associations between tandem gait and self-selected gait in adolescents following concussion: A cross-sectional analysis. American College of Sports Medicine (ACSM) 2025 Annual Meeting & World Congress. May 27 – 30, 2025. Atlanta, GA. Poster presentation.
93. Wilson JC, **Wingerson MJ**, Smulligan KL, Kniss J, Donahue C, Howell, DR. Association of physical activity and mood symptoms in adolescents with concussion. American Medical Society for Sports Medicine (AMSSM) 2025 Annual Meeting. Kansas City, MO. Rising in Research Podium.
94. Donahue C, Smulligan KL, **Wingerson MJ**, Kniss J, Simon S, Breedlove K, Lin A, Wilson JC, Howell DR. Lactate as a biomarker of sleep following adolescent concussion. American Academy of Sleep Medicine (AASM) 2025 Annual Meeting. Seattle, WA. Presentation format pending.

95. Donahue C, Smulligan KL, **Wingerson MJ**, Kniss J, Simon S, Breedlove K, Lin A, Wilson JC, Howell DR. Lactate as a biomarker of sleep following adolescent concussion. Concussion in Sport Group (CISG) 2025 Symposium. Milwaukee, WI. Presentation format pending.
96. Donahue CC, Smulligan KL, **Wingerson MJ**, Kniss JR, Simson SL, Hatolkar V, Breedlove K, Lin AP, Wilson JC, Howell DR. Sleep quality, lactate, and neuronal integrity: Evidence for compounded effects in adolescent brain injury recovery. Concussion in Sport Group (CISG) 2025 Symposium. Milwaukee, WI. Presentation format pending.
97. Moseley R, **Wingerson MJ**, Smulligan KL, Hatolkar V, Breedlove KM, Lin AP, Wilson JC, Howell DR. Neurometabolite measurement through magnetic resonance spectroscopy is associated with physical activity after pediatric concussion. Concussion in Sport Group (CISG) 2025 Symposium. Milwaukee, WI. Presentation format pending.
98. Richardson K, Hurlburt K, **Wingerson MJ**, Warren K, Mannix R, Meehan W, Wilson J, Howell DR. Serum tau levels associated with loss of consciousness at time of injury and elevated anxiety ratings post-concussion. Concussion in Sport Group (CISG) 2025 Symposium. Milwaukee, WI. Presentation format pending.
99. Hurlburt K, Richardson K, **Wingerson MJ**, Kniss J, Wilson J, Howell DR. Concussion history and recency: Associations with current concussion symptom severity and balance. Concussion in Sport Group (CISG) 2025 Symposium. Milwaukee, WI. Poster presentation.
100. Wilson JC, **Wingerson MJ**, Kniss JR, Porfido T, Esopenko C, Howell DR, Smulligan KL. Neck strength, range of motion, or neck disability index do not impact concussion recovery duration in adolescents. Concussion in Sport Group (CISG) 2025 Symposium. Milwaukee, WI. Poster presentation.
101. Kniss J, Smulligan KL, **Wingerson MJ**, Garcia A, Savell S, Carry P, Lugade V, Davis W, Wilson JC, Howell DR. Smartphone-based spatiotemporal gait metrics are associated with military status but not concussion history: A cross-sectional study. 2025 Military Health System Research Symposium (MHSRS). August 5, 2025. Kissimmee, FL. Poster Presentation.
102. Hurlburt KD, Richardson KL, **Wingerson MJ**, Kniss JR, Smulligan KL, Wilson JC, Howell DR. Symptom Severity not NSAID Use is Associated with PPCS in Adolescents with Concussion. American College of Sports Medicine (ACSM) Annual Meeting. Atlanta, GA. May 2025. Thematic Poster.
103. Hurlburt KD, **Wingerson MJ**, Richardson KL, Nagle S, Elie O, Meehan W, Wilson JC, Howell DR. Predictors of Exercise Test Tolerance Among Adolescent Athletes with Concussion. American Academy of Pediatrics (AAP) Annual Meeting, Denver, CO. September 2025. Poster Presentation.
104. Whalen MM, **Wingerson MJ**, Nagle S, Richardson KL, Hurlburt KD, Wilson JC, Meehan WP, Howell DR. Predictors of sport participation after concussion symptom resolution. Pediatric Research in Sports Medicine (PRiSM) 2026 Annual Meeting. Austin, TX. January 29-31. Poster presentation.
105. Richardson KL, Hurlburt KD, **Wingerson MJ**, Donahue CC, Wilson JC, Howell DR. Post-concussion exercise and injury associations with psychological readiness to return to sport. Pediatric Research in Sports Medicine (PRiSM) 2026 Annual Meeting. Austin, TX. January 29-31. Poster presentation.
106. Donahue CC, **Wingerson MJ**, Kniss JR, Richardson KL, Hurlburt KD, Simon SL, Wilson JC, Howell DR. Consistency is key: Irregular sleep timing and delayed recovery following adolescent concussion.



Pediatric Research in Sports Medicine (PRiSM) 2026 Annual Meeting. Austin, TX. January 29-31.  
Podium presentation.

107. Moseley R, **Wingerson MJ**, Hurlburt KD, Richardson KL, Nagle S, Wilson JC, Meehan WP, Howell DR. Concussion symptom resolution expectations and subsequent development of persisting symptoms. Pediatric Research in Sports Medicine (PRiSM) 2026 Annual Meeting. Austin, TX. January 29-31. Poster presentation.
108. Wunderlich L, **Wingerson MJ**, Kniss J, Richardson KL, Hurlburt KD, Wilson JC, Howell DR. The interaction between biological sex and early physical activity on post-concussion outcomes. Pediatric Research in Sports Medicine (PRiSM) 2026 Annual Meeting. Austin, TX. January 29-31. Poster presentation.
109. Kniss J, **Wingerson MJ**, Smulligan KL, Richardson KL, Hurlburt KD, Lugade V, Wilson JC, Howell DR. Smartphone-assessed spatiotemporal gait parameters differentiate adolescents with and without concussion. Pediatric Research in Sports Medicine (PRiSM) 2026 Annual Meeting. Austin, TX. January 29-31. Podium presentation.
110. Kniss J, Biscoe K, Donahue CC, Smulligan KL, **Wingerson MJ**, Savell S, Davis T, Wilson JC, Howell DR. Military Status and Concussion History: Effects on Anxiety, Sleep Quality, and Dizziness in Healthy Adults. APTA Combined Sections Meeting. February 14, 2026. Anaheim, CA. Poster Presentation.
111. Hurlburt K, **Wingerson MJ**, Richardson KL, Kniss J, Moseley R, Wilson JC, Meehan WP, Howell DR. Evaluating strength training during concussion recovery in adolescents. 7th Annual Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. October 22, 2025. Aurora, CO. Poster Presentation.
112. Richardson KL, Hurlburt KD, **Wingerson MJ**, Kniss J, Donahue CC, Wilson JC, Howell DR. Psychological readiness to return to sport is associated with recovery time and subsequent injury, but not exercise dosage. 7th Annual Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. Poster presentation.
113. Kniss J, **Wingerson MJ**, Smulligan K, Richardson K, Hurlburt K, Lugade V, Wilson J, Howell D. Smartphone-Based Gait Analysis Identifies Deficits Among Adolescents With Concussion Compared to Healthy Controls. University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. October 22, 2025. Aurora, CO. Podium Presentation. **Mack Clayton Travel Award Finalist.**
114. Acree J; Donahue C; Smulligan K; Wingerson MJ; Moseley M; Kniss J; Wilson J; Howell DR. Dizziness, Vestibulo-oculomotor Symptoms and their Association with Sleep and Physical Activity After Concussion. Colorado APTA 2025 Conference. Golden, CO. October 3 and 4. Poster Presentation.
115. Giffen SF, **Wingerson MJ**, Kniss JR, Simon SL, Mannix R, Meehan WP, Wilson JC, Howell DR, Donahue CC. Persistent Sleep Problems Among Adolescents Post-Concussion: A Longitudinal Investigation of Sleep Quality Across Recovery Phases. University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship. October 22, 2025. Aurora, CO. Poster Presentation.
116. Howell DR, Hurlburt K, Richardson K, Kniss J, Wunderlich L, **Wingerson MJ**, Wilson JC. The influence of exercise volume and intensity on depressive symptoms following concussion. International Pediatric Brain Injury Society. May 2026. Calgary, CAN. Presentation format pending.
117. Hurlburt KD, **Wingerson MJ**, Moseley RR, Richardson KL, Kniss JR, Wilson JC, Howell DR. Post-concussion exercise duration is longer among adolescents with ADHD. American College of Sports

Medicine (ACSM) Annual Meeting. Salt Lake City, UT. May 2026. Presentation format pending.

118. Richardson KL, Hurlburt KD, **Wingerson MJ**, Warren K, Wilson JC, Mannix R, Meehan W, Howell DR. Plasma biomarkers of inflammation after concussion symptom resolution: Associations with subsequent injury risk. International Pediatric Brain Injury Society. May 2026. Calgary, CAN. Presentation format pending.
119. Wunderlich L, Richardson KL, Hurlburt KD, Donahue CC, **Wingerson MJ**, Wilson JC, Armento A, Howell DR. Post-concussion exercise volume is associated with menstrual dysfunction in female adolescents. American College of Sports Medicine (ACSM) Annual Meeting. Salt Lake City, UT. May 2026. Presentation format pending.
120. Richardson KL, Hurlburt KD, **Wingerson MJ**, Warren K, Wilson JC, Mannix R, Meehan WP, Howell DR. Are inflammatory cytokine plasma biomarkers associated with subsequent injury risk following concussion symptom resolution? American College of Sports Medicine (ACSM) Annual Meeting. Salt Lake City, UT. May 2026. Presentation format pending.
121. Wunderlich L, **Wingerson MJ**, Kniss JR, Richardson KL, Hurlburt KD, Wilson JC, Howell DR. Sex-specific effects of early physical activity on concussion outcomes. 40th Annual Virtual Student Research Forum at the University of Colorado Anschutz Medical Campus. Aurora, CO. December 9, 2025. Presentation format pending.

## Other Presentations

1. **Wingerson MJ**, Smulligan KL, Magliato SN, Wilson JC, Baugh CM, Howell DR. Underrepresentation of diverse populations in pediatric concussion randomized clinical trials. *University of Colorado Anschutz Rehabilitation Sciences PhD Program: Work in Progress Presentations*. November 28, 2022. Podium presentation.
2. **Wingerson MJ**, Smulligan KL, Magliato SN, Kemp LE, Wilson JC, Breedlove KM, Lin AP, Howell DR. Exercise and neurochemistry in adolescents with concussion: Implications for future research. *University of Colorado Anschutz Department of Orthopedics T32 Program: Work in Progress Presentations*. April 13, 2023. Podium presentation.
3. **Wingerson MJ**, Lemaire AC, Smulligan KL, Magliato SN, Breedlove KM, Lin AP, Wilson JC, Howell DR. Neurochemistry after pediatric concussion: Correlations with exercise frequency, duration, and intensity. *University of Colorado Anschutz - Rehabilitation Sciences Symposium*. May 5th, 2023. Aurora, CO. Poster Presentation.
4. **Wingerson MJ**, McKinley A. Linguistic threat activates the amygdala: Implications for neurobiological responses to hate speech. *University of Colorado Anschutz, Master's of Modern Human Anatomy Program: Neuroscience in the News Presentations*. December 7th, 2023. Aurora, CO. Podium Presentation.
5. **Wingerson MJ**, Smulligan KL, Magliato SN, Wilson JC, Howell DR. Aerobic exercise as treatment for concussion: Updates from the 2022 Amsterdam consensus statement. *University of Colorado Anschutz, Doctor of Physical Therapy Program: Lunch and Learn Presentations*. December 7th, 2023. Aurora, CO. Podium Presentation.

6. **Wingerson MJ**, Smulligan KL, Svoboda E, Magliato SN, Wilson JC, Baugh CM, Howell DR. Inequitable participation of diverse populations in pediatric concussion randomized clinical trials: A systematic review. *University of Colorado Anschutz Rehabilitation Sciences PhD Program: Work in Progress Presentations*. December 7, 2023. Podium Presentation.
7. **Wingerson MJ**. Density-Based Spatial Clustering of Applications with Noise (DBSCAN): An unsupervised learning technique for data with noise. *University of Colorado Anschutz Machine Learning: Student Presentations*. December 8, 2024. Podium Presentation.
8. **Wingerson MJ**, Hurlburt K, Richardson K, Wilson JC, Howell DR. Exercise test performance in adolescents with concussion. *University of Colorado Anschutz Rehabilitation Sciences Symposium*. May 6, 2025. Podium Presentation.
9. **Wingerson MJ**, Hurlburt K, Richardson K, Wilson JC, Howell DR. Prescribing exercise in the absence of exercise testing: Does 50% HRm measure up? *1st International Concussion Research Summit*. May 7, 2025. Podium Presentation.

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## Provided Peer-Reviews

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Assisting reviewer (primary reviewer: David R Howell). *Clinical Journal of Sports Medicine*. Completed August 1, 2023.

Primary reviewer. *Archives of Clinical Neuropsychology*. Completed August 1, 2023.

Primary reviewer. *Sports Medicine*. Completed January 15, 2024.

Primary reviewer. *Frontiers in Public Health*. Completed May 21, 2025.

Primary reviewer. *Archives of Clinical Neuropsychology*. Completed July 29, 2025.

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## Other Works

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### Contributing to Consensus Clinical Guidelines:

1. Echemendia RJ, et al. *Br J Sports Med*. 2023; 57:1-3. doi: 10.1136/bjsports-2023-107036. Sport Concussion Assessment Tool 6th Edition. Supplement: Guidelines to using the Sport Concussion Assessment Tool 6t (SCAT6).
  - Work Cited: **Wingerson MJ**, et al. Clinical feasibility and utility of a dual-task tandem gait protocol for pediatric concussion management. *J Athl Train*. 2020; 58(2), 106-111.
2. Patricios JS, et al. *Br J Sports Med*. 2023; 57:737-748. doi: 10.1136/bjsports-2023-106897. Beyond acute concussion assessment to office management: A systematic review informing the development of a Sport Concussion Office Assessment Tool (SCOAT6) for adults and children.
  - Work Cited: **Wingerson MJ**, et al. Clinical feasibility and utility of a dual-task tandem gait protocol for pediatric concussion management. *J Athl Train*. 2020; 58(2), 106-111.

## International Conference Presentations:

1. *6th International Consensus Conference on Concussion in Sport*. October 27 – 28, 2022. Amsterdam, Netherlands. **Significance:** This meeting of international experts summarized evidence-informed principles of concussion prevention, assessment and management, and emphasized areas requiring more research. Held every 4 years.
  - Presentation: **Wingerson MJ**, Seehusen CN, Smulligan KL, Wilson JC, Howell DR. Combined effect of sleep and exercise soon after concussion on symptom duration among adolescents. *6th International Consensus Conference on Concussion in Sport*. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
  - Presentation: **Wingerson MJ**, Rademacher JG, Smulligan KL, Little CC, Wilson JC, Howell DR. Higher intensity daily physical activity during concussion recovery is associated with reduced symptom duration. *6th International Consensus Conference on Concussion in Sport*. October 27 – 28, 2022. Amsterdam, Netherlands. Poster presentation.
2. *7th International Olympic Committee (IOC) World Conference on Prevention of Injury and Illness in Sport*. February 29 – March 2, 2024. **Significance:** This meeting is a premier conference for those researching clinical aspects of sports and exercise medicine. Diverse faculty represent the pre-eminent international authorities in injury and illness prevention. Held every 3 years.
  - Work Cited: **Wingerson MJ**, Mannix RC, Carry PM, Meier TB, Smulligan KL, Wilson JC, Howell DR. Preventing mental illness and suicidality as secondary sequelae of sport-related concussion in adolescents. *7th International Olympic Committee World Conference on Prevention of Injury and Illness in Sport*. February 29 – March 2, 2024. Monaco City, Monaco. Full Oral Presentation.

## Podcast Episodes:

1. Journal of Athletic Training: JATChat. Emerging Concussion Assessments. April 5, 2023.  
<https://jatcast.podbean.com/e/jatchat-emerging-concussion-assessments/>

## In the News:

1. <https://www.msn.com/en-us/health/other/study-investigates-flag-football-s-affect-on-girl-s-physical-mental-health/ar-AA1JYIZA>

## Python Packaging:

1. PropensityBatchRandomization: A tool for randomizing participant biological samples across plates or batches while numerically evaluating the balance of key participant covariates post-randomization.
  - [GitHub Repo](#)
  - [PyPI Project Page](#)

## Neural Network Examples:

1. Neural Network From Scratch: Building a neural network, with forward passes and backpropagation for weight/bias updates, from scratch using just numpy.
  - [GitHub Repo](#)
2. Predicting Cancerous Cells using Gene Expression Data: A fully connected neural network using gene expression to differentiate cancerous from non-cancerous cells.

- [GitHub Repo](#)
- 3. Convolutional Neural Network: Predicting skin lesion types from images of skin lesions. A multi-class classification problem implemented in PyTorch.
  - [GitHub Repo](#)
- 4. See NeurIPS 2025 Submission below.

### Web Apps:

1. Predicting Exercise Test Heart Rate After Concussion (sandbox/non-production version)
  - [Project GitHub](#)
  - [Application Link](#)
2. Visualizing the Colorado Concussion Research Laboratory presentations at an upcoming conference: Connections with the various post-concussion health domains we study.
  - [Project GitHub](#)
  - [Application Link](#)
3. Random Forest Prediction of Non-Resolving Anxiety/Depression Symptoms After Concussion: Multi-site predictions using clinical data.
  - [Project GitHub](#)
  - [Application Link](#)

### NeurIPS Submission:

1. Submitted work to NeurIPS 2025.
  - **Project Summary:** This study introduces a neural network approach using ordinal embeddings of health-related behaviors to predict substance use risk. We propose that adjacent health-related behaviors can predict substance use, and that a model with ordinal embeddings can successfully distinguish between adolescents using substances and non-users with enough success to be clinically feasible. We also demonstrate improved generalizability to unseen data when including ordinal embedding in the model compared to traditional one-hot encoding of data, at least within the context of predicting adolescent substance use.
  - [GitHub Repo](#)

### Side-Projects in Machine Learning:

1. A Patients-Like-Me Approach to Aggregating Data in Clinical Management of Adolescent Concussion.
  - **Project Summary:** Recovery after adolescent concussion is difficult to predict, and communicating realistic recovery timelines is equally challenging. A simple “patients-like-me” framework that aggregates recovery outcomes from past patients seen in the clinic can support clinical prognosis by setting individualized, data-driven recovery expectations based on prior patients who are most similar to a current patient. We used a reference cohort of 558 adolescents treated in a concussion clinic. Nine routinely collected demographic and injury-related variables defined a “Like-Me Cohort”: a subset of patients most similar to a given index patient based on Euclidean distance. This patients-like-me aggregation approach generates sub-cohorts that better reflect individual clinical presentations and recovery trajectories, offering an interpretable, data-driven complement to clinical management and supporting patient-centered discussions of expected recovery.
  - [GitHub Repo](#)



2. Clustering Algorithms (K-Means, DBSCAN, OPTICS): Unsupervised clustering to identify cell types based on gene expression characteristics.
  - [GitHub Repo](#)
3. Quick Gradient Descent Example: Exploring gradient descent in a single-layer neural network (from scratch, but without activation function (i.e., just linear representations)).
  - [GitHub Repo](#)
4. Support Vector Machines and Random Forests: Predicting brain stroke using clinical and self-report data on known risk factors.
  - [GitHub Repo](#)
5. Exploring grid search, sampling techniques, and sample weights for datasets with imbalanced target variables.
  - [GitHub Repo](#)

### Random Forests and Decision Trees:

1. A decision tree framework for clinically intuitive prediction of persisting symptoms after concussion.
  - [GitHub Repo](#)
2. Random Forest Prediction of Non-Resolving Anxiety/Depression Symptoms After Concussion: Multi-site predictions using clinical data.
  - [Project GitHub](#)

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## Honors and Awards

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### Top Trainee/Pre-Doctoral Presentation Finalist

*University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship.* November 14, 2020. Anschutz Medical Campus, Aurora, CO.

### Mack Clayton Pre-Doctoral Presentation Award

*University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship.* November 14, 2020. Anschutz Medical Campus, Aurora, CO.

### Mack Clayton Travel Award

*University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship.* November 14, 2020. Anschutz Medical Campus, Aurora, CO. \$1000

### Top Poster Award Finalist

*Pediatric Research in Sports Medicine Society (PRiSM).* January 27-29, 2022. Houston, TX.

### Top Trainee/Pre-Doctoral Presentation Finalist

*University of Colorado Orthopedic Research Symposium & D'Ambrosia Diversity Lectureship.* October 23, 2024. Anschutz Medical Campus, Aurora, CO.

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## Supervised Research Trainees

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### Undergraduate Students:

- Jake Rademacher. *University of Denver, College of Natural Sciences and Mathematics*. Fall 2021 - Spring 2023.
- Zachary Salfi. *University of North Carolina*. Summer 2025 - Present.

#### **Graduate Students:**

- Nicole Szeto. *University of Colorado Anschutz, Graduate School*. Fall 2022 - Fall 2023.
- Bailey Schmitz. *Northern Arizona University, Doctor of Occupational Therapy Program*. Fall 2021 - Spring 2022.
- Sammuel Messenger. *University of Colorado Anschutz, Master of Epidemiology Program*. Fall 2022 - Fall 2023.
- Ross Moseley, *University of Colorado Anschutz, School of Medicine*. Fall 2024 - Present.

#### **Research Trainees:**

- Katelyn Hurlburt. *University of Colorado Anschutz, Colorado Concussion Research Laboratory*. Spring 2025 - Present.
- Meghan Whalen. *Boston Children's Hospital, Micheli Center for Sports Injury Prevention*. Spring 2025 - Present.

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## **References**

### **David Howell, PhD, ATC.**

Associate Professor, Department of Orthopedics, University of Colorado School of Medicine.

Lead Researcher, Sports Medicine Center, Children's Hospital Colorado.

Lead Researcher, Colorado Concussion Research Laboratory, University of Colorado School of Medicine.

*Contact information available upon request*

### **Julie Wilson, MD.**

Attending Physician, Sports Medicine Center, Children's Hospital Colorado.

Associate Professor, Department of Orthopedics, University of Colorado School of Medicine.

*Contact information available upon request*

### **Patrick Carry, PhD.**

Assistant Professor, Department of Orthopedics, University of Colorado School of Medicine.

Lead Statistician, Colorado Concussion Research Laboratory, University of Colorado School of Medicine.

*Contact information available upon request*

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