Nikki Aitcheson-Huehn, MKin

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Education

University of North Carolina at Chapel Hill | Chapel Hill, NC, USA
Doctor of Philosophy in Human Movement Science
August 2020 – present, expected graduation May 2024

> Specialization: Evaluating sport performance from a dynamical systems perspective for enhancing performance and preventing injury with the goal of precisely profiling and modelling all the complex interactions among the components of performance (personal factors, environmental factors, oculomotor efficiency, and movement pattern, indexed by neuromechanics and GPS tracking).
> Mentor: Adam Kiefer, PhD
> Committee: Jason Mihalik, PhD, CAT(C), ATC, Johna Register-Mihalik, PhD, LAT, ATC, Shelby Baez, PhD, ATC, & Steve Marshall, PhD

Wilfrid Laurier University | Waterloo, ON, Canada
Master of Kinesiology
September 2017 – October 2019

> Specialization: Neuromechanics of balance and gait
> Thesis: "Spinal Motor Neuron Excitability and Balance Control Changes Following Downslope Walking"
> Committee: Michael Cinelli, PhD, Jayne Kalmar, PhD, CATA, Stephen Perry, PhD

Bachelor of Science Honours Kinesiology and Physical Education
Minor: Chemistry
September 2013 – June 2017

> Undergraduate Thesis: "Stone-Stepping Task: Measuring Accuracy and Dynamic Stability in Young Adults and Individuals with Multiple Sclerosis"

Research Experience

Toronto Blue Jays, Baseball Operations (Major League Baseball)
Biomechanics Intern
May 2023 - Present

- Developed objective hitting metrics that represent each subjective measure that amateur scouts identify from 2-D video during player evaluations. Built the processing pipeline in R for each hitting metric.
- Created video documentation (using Premiere Pro) of discrete hitting metrics for coaching staff to visualize and understand each variable and its value listed in the hitting lab reports.
- Analyzed linear and non-linear relationships between discrete hitting metrics to provide coaching staff with supporting documentation on the relative importance of each variable to outcomes such as exit velocity, launch angle, spray angle, and distance.

University of North Carolina at Chapel Hill, Department of Allied Health Sciences
Doctoral Research Assistant
STAR (Simulation Training Analytics Rehabilitation) Heel Performance Laboratory
August 2021 – Present

- Oversee the day-to-day operations and perform the data collections and analyses of a federally funded study using virtual reality, surface EMG, and marker-less motion capture (Intel 3D Athlete with 4 Intel

RealSense cameras) to assess the on-field movement responses in club-sport athletes following return to play from a lower-limb musculoskeletal injury and non-injured controls (goal of project is to use technology and behaviour modelling for re-injury prevention)
- Collect and analyze mobile eye gaze tracking data to assess visual-motor control (quiet eye) during uncontested basketball shooting and apply machine learning models to predict shot performance
- Assist with collection of mobile eye gaze tracking data and marker-less motion capture (using 2 Logitech Brio cameras) during contested and uncontested football routes performed by UNC's division I football team, using collected data to inform coaches of the wide receiver's visual-motor control
- Educated and trained 4 undergraduate research assistants on proper data collection techniques for EMG, motion capture, and eye gaze tracking through hands-on collection and data processing experience. Assisted research assistants with summarizing methodology and findings to present at local conference.

Motion Science Institute
January 2022 – Present
- Cleaned and processed previously collected marker-based motion capture data (Qualisys) in Visual3D to extract lower limb joint angles during treadmill walking for a comparison with marker-less motion capture data (Intel 3D Athlete with 1 Intel RealSense camera), which was collected synonymously
- Used R-studio to calculate maximum knee extension from swing to stance phase, maximum knee flexion during loading, and maximum knee extension during terminal stance for each participant on 3 loading conditions (under-loading, control, over-loading)

Independent Study in STAR Heel Performance Laboratory
August 2019 – December 2019
- Performed a literature review on behavioural dynamics and ecological dynamics in sport, and the persisting perceptual-motor deficits in athletes cleared to return-to-play following concussion to understand if their behaviour could be modelled
- Learned how to develop in Unity3D and ran a variety of simulations to test a research hypothesis regarding the Steering Dynamics Model
- Synthesized information from the literature review with the simulation data for multiple presentations

Wilfrid Laurier University, Department of Kinesiology & Physical Education
Master's Student Research Assistant
LPMB (Lifespan Psychomotor Behaviour) Laboratory
September 2017 – October 2019
- Completed a master's thesis project investigating the effects of an acute bout of downslope walking on static and dynamic balance control and spinal motor neuron excitability in neurotypical young adults
- Collected kinematic data (using Optotrak motion analysis system) and kinetic data (using an AMTI strain-gauge force plate), and provided nerve stimulation to measure the Hoffman reflex

Undergraduate Research Assistant
LPMB (Lifespan Psychomotor Behaviour) Laboratory
September 2016 – August 2017
- Completed an undergraduate thesis project exploring the dynamic stability and foot placement accuracy of people with Multiple Sclerosis during a visual-motor stone-stepping task compared to controls
- Extended undergraduate thesis by including an additional participant group and condition, whereby young adults completed the stone-stepping task while walking on a compliant foam surface

Publications

Published Abstracts
Aitcheson-Huehn NC, Cinelli ME (2017). Research Poster Abstract, Stone-Stepping Task: Measuring target accuracy and dynamic stability in Multiple Sclerosis. International Journal of MS Care, 19(6):329-330.

Manuscripts In Preparation
Aitcheson-Huehn NC, Kiefer AW (2023). The utility of eye gaze tracking in sport: A SWOT analysis.

Aitcheson-Huehn NC, MacPherson R, Panchuk D, Kiefer AW (2023). Predicting basketball shooting outcome from visual-motor control data using machine learning.

Aitcheson-Huehn NC, MacPherson R, Kiefer AW (2023). Altering task complexity in sport-like virtual reality to promote true-to-life changes in athlete behavior.

Conference Presentations

Aitcheson-Huehn NC, MacPherson, R., Panchuk, D., Kiefer, AW (2023). Predicting basketball shooting outcome from visual-motor control data using machine learning. *North American Society for Psychology of Sport and Physical Activity.* Oral Presentation. Toronto, ON.

Aitcheson-Huehn NC, Silva P, MacPherson R, Sathyan A, Cohen K, Kiefer AW (2022). Altering task complexity in sport-like virtual reality to promote true-to-life changes in athlete behavior. *Human Movement Science Curriculum Day*. Poster Presentation. Chapel Hill, NC.

Aitcheson-Huehn NC, Kalmar J, Cinelli ME (2019). Neural mechanisms of balance and gait adaptations following downslope walking. *International Society of Posture and Gait Research.* Poster Presentation. Edinburgh, UK.

Aitcheson-Huehn NC, Kalmar J, Cinelli ME (2019). Neural mechanisms of balance and gait adaptations following downslope walking. *Southern Ontario Motor Behaviour Symposium.* Oral Presentation. Toronto, ON.

Aitcheson-Huehn NC, Cinelli ME (2018). Stone-stepping task: Measuring target accuracy and dynamic stability in young adults. *North American Society for Psychology of Sport and Physical Activity.* Poster Presentation. Denver, CO.

Aitcheson-Huehn NC, Cinelli ME (2017). Stone-stepping task: Measuring accuracy and dynamic stability in Multiple Sclerosis. *International Symposium of Gait and Balance in Multiple Sclerosis.* Poster Presentation. Portland, OR.

Teaching Experience

University of North Carolina at Chapel Hill, Department of Allied Health Sciences
Graduate Teaching Assistant
EXSS273 Research in Exercise and Sport Science, *Winter 2022, Fall 2022, and Winter 2023, Fall 2023*
> Lectured how to perform proper and efficient literature searches and how to conduct a literature review, supervised class work periods, and marked assignments for a 2nd year exercise science course.

EXSS380 Neuromuscular Control and Learning, *Fall 2021*
> Lectured about spinal reflexes and inhibition, held weekly office hours, and marked examinations for a

3rd year exercise science course.

Wilfrid Laurier University, Department of Kinesiology & Physical Education
Graduate Teaching Assistant
KP 222 Human Physiology, *Winter 2019*
 Instructed tutorials, asked students thought-provoking questions, answered student's questions, marked
 reports, and assisted with laboratory experiments of a 2nd year kinesiology course.

KP221 Functional Anatomy, *Fall 2018 and Fall 2017*
 Instructed tutorials, educated students in small groups during work periods, answered student questions,
 proctored laboratory bell ringers, and assisted with dissections of a 2nd year kinesiology course.

KP465 Balance, Posture, and Gait, *Fall 2018*
 Provided feedback on student's final presentations, marked midterm examinations, and marked final
 papers of a 4th year kinesiology course.

KP161 Fundamentals of Motor Learning and Control, *Winter 2018*
 Independently taught a weekly tutorial, assisting students when needed, and marked weekly lab reports,
 midterm examinations, and final examinations of a 1st year kinesiology course.

Professional Service

Mentorship
Master's Thesis Committee Member and Mentor
Department of Exercise and Sports Science | University of North Carolina at Chapel Hill
August 2021 – May 2023
The effect of pressure on quiet eye performance of a football receiver during a reception.

Department of Exercise and Sports Science | University of North Carolina at Chapel Hill
August 2022 – Present
Does ability of commonly utilized physical performance tests associate with functional performance during an
overground virtual reality task.

Undergraduate Honours Thesis Committee Member and Mentor
Department of Exercise and Sports Science | University of North Carolina at Chapel Hill
August 2021 – May 2022
Neuromuscular activation during high injury-risk movements performed in a simulated sport environment by
athletes cleared to return to play following anterior cruciate ligament reconstruction.

Honours & Awards

May 2023 – Present	NASPSPA Graduate Student Research Grant
August 2021	ARPA (American Rescue Plan Act) Graduate Degree Completion Grant
September 2018 – August 2019	CGS-M: Canadian Institute of Health Research Scholarship Dean of Graduate Studies Scholarship
September 2017 – August 2018	OGS: Ontario Graduate Scholarship Dean of Graduate Studies Scholarship

Graduate Masters Studentship

Committee Memberships

January 2023 – Present	North American Society for Psychology of Sport and Physical Activity (NASPSPA), Member
September 2021 – Present	Sports Tech Research Network (STRN), Member
April 2019 – September 2020	International Society of Posture & Gait Research (ISPGR), Member
January 2018 – December 2018	North American Society for Psychology of Sport and Physical Activity (NASPSPA), Member

Community & Volunteer Activities

American Society of Biomechanics Student Chapter Member | University of North Carolina at Chapel Hill
August 2021 – May 2023
Attend monthly meetings with the student chapter to stay involved with events.

Kinesiology Graduate Student Association President | Wilfrid Laurier University
September 2018 – August 2019
Facilitated meetings with the Kinesiology Graduate Student Association to fundraise for the department and organize events for the Kinesiology graduate students, while also acting as a liaison between faculty and students through attendance at monthly department meetings.

Director of Team Up Against Concussions | Wilfrid Laurier University
September 2016 – August 2019
Led a concussion education team comprised of undergraduate students in providing free, tailored 45-minute concussion presentations to groups of students throughout the community in grades 3 through 12 and student-athletes at Wilfrid Laurier University. Facilitated meetings with school board representatives, coaches, and teachers with an end goal of enrolling approximately 2500 students over 3 years. Activities were overseen by Concussion Legacy Foundation Canada.