



UNIVERSITY OF CALGARY
FACULTY OF KINESIOLOGY



Human Performance Lab 2022 Annual Report

DIRECTOR'S MESSAGE



2022 was a year of revitalization, marked by the removal of nearly all COVID-19 pandemic restrictions and the reopening of most international borders. From a professional standpoint, this meant the resurgence of in-person scientific conferences and a reconnection with close colleagues and collaborators that were so dearly missed. For our many international students and trainees, this meant the ability to visit family and friends for the first time in years. The influx of new students and staff, and revival of in-person seminars and lab meetings, brought a sense of normalcy to the HPL culture and dynamics that makes this place so special.

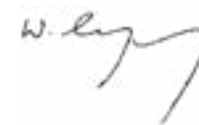


2022 also marked the unfortunate passing of Joan Snyder, a visionary philanthropist and dear friend to the Faculty of Kinesiology. Joan was one of the University of Calgary's longest-standing donors, providing decades of support for women's hockey, sport science, and research into chronic and infectious diseases. Joan's unmatched generosity is underscored by a transformative \$67.5 million gift to the University of Calgary. \$30 million of this donation will go towards the establishment of the Joan Snyder Fund for Excellence in Kinesiology. The Joan Snyder Fund will provide strategic funding to advanced research into physical activity and health in women and girls and support our international reputation in sports science.

The success of the Human Performance Laboratory would not be possible without your support. We would like to thank the University of Calgary, the Faculty of Kinesiology, and our many donors, supporters, granting agencies, family, and friends for your trust in us and our research, and your belief that the pursuit of human mobility, longevity, and quality of life are worthwhile endeavors.

Walter Herzog

W. Brent Edwards

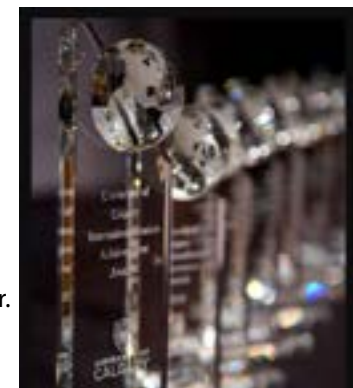


HIGHLIGHTS

- Honour Carolyn Emery — Canadian Academy of Sport and Exercise Medicine (CASEM) Presidential Coin (2022)
- Honour Walter Herzog — Killam Annual Professor, University of Calgary, Killam Trust
- Honour Kathryn Schneider — Canadian Physiotherapy Association Centenary Medal of Distinction (2021). The award recognizes leaders, role models, and innovators, honouring those who have made an impact on the Physiotherapy profession between 1920 to 2020.
- Honour Sport Injury Prevention Research Centre (SIPRC) (Chair, Carolyn Emery) — [officially named an IOC Research Centre 2022—2026](#)
- Honour Salvatore Federico - Inducted Scholar, Canadian Society for Biomechanics
- Award Amanda Black — Canadian Collaborating Centers for Injury Prevention (CCCIP) Award for contribution to CATT (Concussion Awareness Training Tool)
- Award Walter Herzog — [University of Calgary Internationalization Career Achievement Award](#) (UCIA)
- Award Dana Lowry – Donald N. Byers Memorial Killam Scholar Prize. Supervised by Raylene Reimer
- Award Dana Lowry – Izaak Walton Killam Doctoral Scholarship. Supervised by Raylene Reimer
- Award Baaba Otoo — Canadian Society for Biomechanics Graduate New Investigator Award – Doctoral Level, North American Congress on Biomechanics 2022 (NACOB) Ottawa, August. Supervised by Walter Herzog.
- Award Ryan Peters — Faculty Award, Human Performance Laboratory. December 2022.
- Award Ryan Peters — Student Union Teaching Excellence Award, Kinesiology. 2021/22 Fall/Winter Semesters

HIGHLIGHTS

- Award Isla Shill — Vanier Scholarship 2022 — PhD Faculty of Kinesiology. Supervised by Carolyn Emery and Brent Hagel.
- Award Bryan Yu — Young Investigator Award, Sport Innovation (SPIN) Summit 2022 Vancouver, December. Supervised by Walter Herzog.
- Award Kenzie Vaandering – President’s Award recipient. Supervised by Kathryn Schneider
- Appointed W. Brent Edwards — Co-Director, Human Performance Lab, Faculty of Kinesiology
- Appointed Carolyn Emery — [Global Chair, UK, University of Bath \(2022-2023\)](#)
- Appointed Walter Herzog — Reviewer, National Killam Selection Committee, Killam Prize and Dorothy Killam Fellowship (2022—2024)
- Appointed Ryan Peters — Chief Science Officer, [Neursantys Inc.](#)
- Appointed Raylene Reimer — Interim Dean, Faculty of Kinesiology
- Appointed Kathryn Schneider — Co-Chair of the Scientific Committee, 6th International Consensus Conference on Concussion in Sport



HIGHLIGHTS

- M.Sc. Taffin Evans — Supervised by Dr. Amanda Black
Thesis: Barriers and Facilitators to implementing a national injury surveillance program.
- M.Sc. Eric Gibson — Supervised by Drs. Kati Pasanen and Carolyn Emery
Thesis: [Shoulder and Upper Extremity Injuries in Canadian Youth Ice Hockey: Investigating Injury Rates, Types, Severity, Mechanisms, and Risk Factors.](#)
- M.Sc. Emily Heming — Supervised by Dr. Carolyn Emery
Thesis: [Zooming in on female ice sports: Video-analyses examining head contacts and suspected injuries in ringette and ice hockey.](#)
- M.Sc. Dana Hunter — Supervised by Drs. Nicholas Mohtadi and Amanda Black
Thesis: Non-Surgical Management of the Medial Collateral Ligament of the Knee: Understanding Adherence to Bracing Treatment.
- M.Sc. Yun Yun Lee — Supervised by Drs. Dana Olstad and Jane Shearer
Thesis: [Experiences and perceived outcomes of a grocery gift card program for households at risk of food insecurity.](#)
- M.Sc. Owen Lindsay — Supervised by Dr. Ryan Peters
Thesis: [A Novel Vibration—Emitting Smartphone Application to Clinically Assess Cutaneous Sensitivity”.](#)
- M.Sc. Mary Mackie — Supervised by Dr. Juan Murias
Thesis: [The “Step—Ramp—Step” Protocol: Evaluating the Effects of a Smaller First Step Amplitude and Different Ramp Slopes to Determine the V̇O₂ Mean Response Time and the Expression of the V̇O₂ Slow Component During Ramp—Incremental Tests.](#)

HIGHLIGHTS

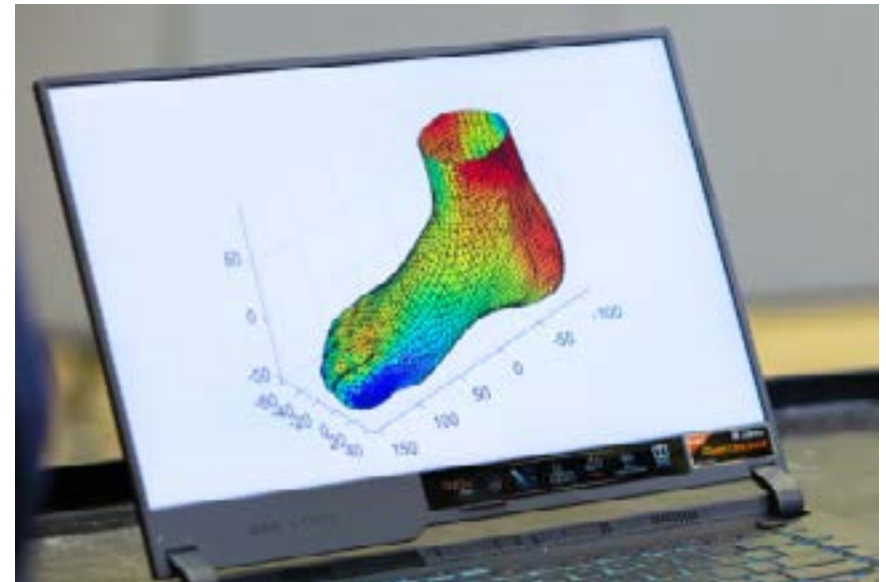
- M.Sc. Ishan Malagalage Don — Supervised by Dr. Darren Stefanyshyn
Thesis: [Using a Single inertial measurement unit to measure the knee flexion angle at touchdown in side-cutting movements.](#)
- M.Sc. Rachel McDougall — Supervised by Dr. Martin MacInnis
Thesis: The influences of skeletal muscle mitochondria and sex on critical torque and fatigue in humans.
- M.Sc. Lindsay Morrison — Supervised by Drs. Meghan McDonough and Sarah Kenny
Thesis: Social Support for Physical Activity and Physical Literacy in Older Adults.
- M.Sc. Suvojit Mukherjee — Supervised by Drs. Usman Alim and Sarah Kenny
Thesis: [DanceShala - A Visual Feedback Interface for Dance Learning.](#)
- M.Sc. Vanessa Paglione — Supervised by Drs. Sarah Kenny and Meghan McDonough
Thesis: [Community Dance Supports Older Adults’ Successful Aging, Physical Literacy, and Embodiment: A Case Study.](#)
- M.Sc. Linden Penner — Supervised by Drs. Jonathan Smirl and Carolyn Emery
Thesis: [Effects of Interval Exercise on Commonly Studied Fluid Biomarkers for Sport—related Concussion in Serum and Plasma.](#)
- M.Sc. Monica Russell — Supervised by Drs. W. Brent Edwards and Carolyn Emery
Thesis: [Biomechanical Differences Between Young Adults With and Without a History of Youth Sport—Related Ankle Injury.](#)
- M.Sc. Reid Srydiuk — Supervised by Dr. Carolyn Emery
Thesis: [Perfecting the scramble: Examining the influence of the COVID-19 pandemic on youth Canadian tackle football.](#)

HIGHLIGHTS

- M.Sc. Catherine Tremblay — Supervised by Drs. Carolyn Emery and Elizabeth Condliffe
Thesis: [Adapted Sport and Recreation Camps: Examining Physical Activity, Self—Perceptions, and Motivations for Participation in Youth with Physical Disabilities.](#)
- M.Sc. Mackenzie Vaandering — Supervised by Dr. Kathryn Schneider
Thesis: [Setting the Standard: Injury, Concussion and Performance in Youth Volleyball.](#)
- M.Sc. Bryan Yu — Supervised by Dr. Walter Herzog
Thesis: [In Vivo Vastus Lateralis Fascicle Excursion During Speed Skating Imitation.](#)
- Ph.D. Rafael Azevedo — Supervised by Drs. Juan Murias and Guillaume Millet
Thesis: [The development of neuromuscular fatigue throughout constant power output cycling below, at, and above the maximal lactate steady state in young and healthy females and males.](#)
- Ph.D. Michael Baggaley — Supervised by Drs. W. Brent Edwards and Guillaume Millet
Thesis: [Musculoskeletal loading during graded running.](#)
- Ph.D. Meghan Critchley — Supervised by Drs. Sarah Kenny and Kati Pasanen
Thesis: [Pre-season Screening and Injury Surveillance of Pre-Professional Dancers: A Longitudinal Study.](#)
- Ph.D. Robyn Madden — Supervised by Drs. Jane Shearer and Jill Parnell
Thesis: [Evaluation of Dietary Supplement Usage, Dietary Intakes, and Nutrition Knowledge in Clinical and Athletic Populations.](#)
- Ph.D. Kyle McCallum — Supervised by Drs. William Bridel and Carolyn Emery
Thesis: Exploring children's constructions of risk, risky play, injury, and pain: A qualitative case study.

HIGHLIGHTS

- Ph.D. Lauren Miutz — Supervised by Drs. Carolyn Emery and Jonathan Smirl
Thesis: [Evaluating different methodological approaches to inform physiologically based exercise strategies to improve recovery following sport-related concussion.](#)
- Ph.D. Najratun Pinky — Supervised by Drs. Brad Goodyear and Carolyn Emery
Thesis: [Multimodal Magnetic Resonance Imaging of Sport-Related Concussion in Youth.](#)
- Ph.D. Heather Shepherd — Supervised by Dr. Carolyn Emery
Thesis: Optimizing Return to School for Adolescents Following a Concussion: Informing the Development of a Multifaceted Return to School Framework.
- Ph.D. Scott Sibole — Supervised by Drs. Walter Herzog and Salvatore Federico
Thesis: [Towards understanding multiscale articular cartilage mechanics.](#)



ABOODARDA



Exercise Neurophysiology Laboratory

Dr. Jalal Aboodarda's research in 2022 focused on the integration of physiological and perceptual factors determining exercise tolerance in healthy individuals. Dr. Aboodarda's research group managed to coordinate a study investigating the kinetics of neuromuscular and perceptual responses to high-intensity interval training (HIIT). Despite being matched for work-to-rest ratio, HIIT protocols with shorter work intervals elicited a four-fold increase in exercise tolerance and mitigated performance fatigability and

perceptual responses when matched for work completed, but not at task failure. In another project, they measured acute corticospinal excitability and inhibition responses to experimental pain during cycling exercise. They demonstrated that the experimental pain curtailed exercise time to task failure and modulated corticomotor responses recorded during cycling exercise. In the third project, they examined the effect of accumulative fatiguing exercise sessions on neuromuscular fatigue and perceptual responses; and assessed whether these outcomes were intensity-dependent (i.e., HIIT vs. work- and duration-matched continuous cycling). In this study, HIIT resulted in greater impairments in force-generating capacity and muscle contractile properties compared to constant load exercise. Neurophysiological responses were quantified using non-invasive techniques such as transcranial magnetic stimulation of the brain and peripheral nerve electrical stimulation of the skeletal muscles.

BARHA



Dr. Cindy Barha is a new Assistant Professor of Neuroscience in the Faculty of Kinesiology. She is a translational researcher with training in behavioural neuroscience, epidemiology, neuroendocrinology and exercise neuroscience. The overarching theme of her research program is utilizing mixed-methods, including (randomized controlled trials and rodent models), to better understand moderators and mediators of exercise efficacy. Going beyond the "one-size-fits-all" approach allows for efficacious precise exercise recommendations to promote healthy cognitive aging. Specifically, she is interested in determining who benefits from exercise by focusing on biological sex and genetics and when, in the lifespan, to most effectively intervene with exercise. Using rodent models, she also explores how exercise exerts its influence on the brain. Dr. Barha also studies how hormone-related life events (e.g., pregnancy, menopause) impact brain aging to determine why females are at increased risk for certain forms of dementia and to determine how these events interact to influence the brain's responsiveness to different exercise interventions later in life.

Research Functions

Conference Organization

- Organization for the Study of Sex Differences

Conference Reviewer

- International Behavioral Neuroscience Society (IBNS) 31st Annual Meeting

Grant Reviewer

- CIHR 2022 Summer Program in Aging

BLACK



The Injury Prevention, Clinical Intervention and Implementation Science Research Group

The Injury Prevention, Clinical Intervention and Implementation Science Research Group, led by Dr. Amanda Black, is a new group in the Sport Injury Prevention Research Centre. Core projects focus on: (1) injury surveillance and epidemiology; (2) evidence-based practice and knowledge translation; (3) theory-driven implementation, behaviour change and evaluation. Ongoing projects include examining the implementation of concussion guidelines;

education and management protocols for sporting organizations and high schools; examining the context for the implementation of injury prevention initiatives and injury surveillance in high school and university athletic populations.

Research Functions

Board Membership

- Sport Information Research Centre

Committee Member

- Canadian Athletic Therapy Association Education Committee

Conference Reviewer

- Canadian Athletic Therapy Association (CATA) Conference
- Pediatric Research in Sports Medicine Society (PRISM) 2022 Annual Meeting

CLUFF

Integrative Sensorimotor Neuroscience Laboratory

The Integrative Sensorimotor Neuroscience Laboratory is a growing group in the Human Performance Laboratory led by Dr. Tyler Cluff. Their work is focused on the mechanistic, multidisciplinary study of human sensorimotor control and learning. They combine behavioural experiments with robotics, medical imaging and computational models to examine the function of human sensory and motor systems. The research group's work is



focused on understanding how basic aspects of sensory processing contribute to human motor control and learning. Ongoing projects in the lab focus on four topics: (1) the role of sensory feedback in the selection, planning and control of voluntary movements; (2) basic principles of sensory processing and how they impact individual patterns of human motor behaviour; (3) probing the function of neural circuits that support motor behaviour; and (4) identifying how impairments in sensory and motor function caused by stroke and concussion influence sensorimotor control and learning. Through the research group's basic science program and ongoing collaborations, they hope to generate tools that allow for better assessment and monitor deficits in sensory and motor function.

Research Functions

Conference Reviewer

- Motor Learning and Motor Control (MLMC) Conference, Society for Neuroscience Satellite Meeting

Grant Reviewer

- NSERC Discovery Grant Program, External Reviewer
- Swiss National Science Foundation, External Reviewer
- CIHR CGS-D competition, University of Calgary Reviewer

DOYLE-BAKER

Associate Dean Graduate



Doyle-Baker Lab

The study of female physiology and reproductive health is a focus of the Doyle-Baker Lab. This area of research can be challenging and costly because of individual variability related to the menstrual cycle. This past year was focused on recruiting and collecting data across female athlete populations, as well as young women aged 18-35 years old. In the first study, participants were required to engage with a specific app designed to track their menstrual cycle. Participants were supplied with ovulation

test kits (urinary) and salivary kits so their estrogen to progesterone hormone ratios could be analyzed. This study is ongoing as recruitment and menstrual cycle verification requires a minimum duration of four months for each participant.

Menstrual health and literacy are emerging areas of study, and factors affecting retention in menstrual cycle apps have limited research. In early November the Doyle-Baker Lab partnered with the Faculty of Kinesiology's communications team and employed a social media firm to develop a campaign targeted at identifying app users' experience. The objective was to find out what features associated with a female health tracking app contributed to health literacy and subsequently to user engagement and retention.

The Doyle-Baker Lab has learned that tapping into a participant's lived experience helps with study design success. Using semi-structured interviews, athletes informed the research group about their menstrual cycle and what they experience all the way from symptomology to their coach's knowledge, awareness, and understanding of the menstrual cycle. The interviews were a rich source of information and will assist with providing support to athletes and their coaches through publications, webinars, and workshops.

Research Functions

Board Membership

- International Journal of Environmental Research in Public Health Editorial Board
- International Journal of Kinesiology and Sport Science (IJKSS) Editorial Board
- Alpine Canada True Grit Award Advisory Board

- Annals of Applied Sport Science Advisory Board
- International Congress on Sport Science in Skiing (ICSS) Scientific Board Conference Organization
- Canadian Society for Exercise Physiologists 2023 (CSEP) Conference Chair Conference Reviewer
- International Congress on Sport Science in Skiing (ICSS) Young Investigator Award reviewer
- Grant Reviewer
 - College of Medicine Research Awards (CoMRAD), University of Saskatchewan
 - Mitacs
- Program Reviewer
 - Fitness & Health Promotion/Exercise Science Program, Niagara College, ON



EDWARDS



Mechanical fatigue of load-bearing biological tissue is an inevitable consequence of physical activity. Over time, habitual loading of the musculoskeletal system causes microdamage accumulation that reduces the overall quality of the tissue and leads to a reduction in stiffness and an increase in mechanical strain with continued loading. Without adequate tissue repair and adaptation, the evolution and accumulation of microdamage may eventually lead to musculoskeletal injury. Mechanical fatigue is thought to play a predominant role in the pathophysiology of musculoskeletal

injuries, such as bone stress fracture and Achilles and patellar tendinopathy. Dr. Brent Edwards' research combines biomechanical experimentation with advanced medical imaging and computational modeling to investigate tissue damage and fatigue in response to mechanical loading. This unique approach allows for the estimation of in vivo tissue mechanics in a non-invasive and subject-specific manner. The work in his research group spans multiple dimensional scales, from basic experiments at the tissue level that enhance the understanding of the mechanical fatigue process, to applied experiments at the whole-body level for the development of treatments and interventions to improve tissue quality and decrease injury risk.

Research Functions

Board Membership

- Secretary General, International Society of Biomechanics Executive Board
- JBMR Plus Editorial Board
- BONE Editorial Board
- Bone Reports Editorial Board
- Journal of Biomechanics Editorial Board
- Current Osteoporosis Reports Editorial Board

Conference Reviewer

- Annual Meeting of the Orthopedic Research Society
- World Congress of Biomechanics
- North American Congress of Biomechanics
- Alberta BME Conference

EMERY



Dr. Carolyn Emery is the Chair of the Sport Injury Prevention Research Centre and Co-Lead of the Integrated Concussion Research Program at UCalgary. Her research group aims to reduce the burden of youth sport-related injuries and their consequences through evidence-informed prevention and treatment strategies. A multifaceted approach to prevention targets sport policy and rules, equipment, training and injury management strategies. Highlights include research supporting policy disallowing bodychecking in adolescent (ages 15-17) hockey players, leading to 62% lower rates of injury (51% for concussion), with no evidence of unintended consequences of such policy across youth age groups. Other policy relevant research includes evaluation of referee knowledge and behaviours and the high burden of injury in female youth rugby union. Surveillance in High Schools and Community Sports to Reduce Injuries and their Consequences in Sport (SHRed Injuries) has been scaled up nationally and internationally through an international multisite girls' rugby cohort study and international collaborations in dance to evaluate prevention strategies. Evaluation and scale-up of sport-specific neuromuscular training warm-ups (e.g., SHRed Injuries rugby, football) in youth sport is a focus provincially, nationally and internationally to reduce injuries and concussions. The CFI funded SHRed mobile has been actively engaged in supporting multidisciplinary collaboration and knowledge translation provincially and nationally, supporting rural and Indigenous community partnerships. The SHRed Consequences of Concussion cohort study and a clinical trial evaluating a multifaceted approach to treatment following concussion in youth will inform better outcomes following concussion in youth. Dr. Emery continues to lead a program of research focused on safe participation and health outcomes associated with adapted physical activity programs for neurodiverse youth (Calgary Adapted Hub Power by Jumpstart).

Research Functions

Board Membership

- Canadian Concussion Network Executive Board
- Canadian Traumatic Brain Injury Research Consortium Executive Board
- British Journal of Sport Medicine Editorial Board
- FACETS Journal of the Royal Society of Canada's Academy of Science Editorial Board

GENERAL COMMENTS

- Canadian Institute of Human Development, Institute of Human Development, Child, and Youth Health Institute, Advisory Board
- Centre for Health and Injury and Illness Prevention in Sport (CHI2PS) University of Bath Advisory Board
- HitIQ Advisory Board
- Canadian Concussion Network (CCN) Scientific Board, Scientific Chair
- Promotion University of British Columbia Scientific Board
- Hospital for Sick Kids, Scientific Board
- Promotion University of the Fraser Valley Scientific Board
- University of Toronto, Scientific Board Scientific Chair
- Promotion Tufts University Scientific Board
- Promotion University of Bath Scientific Board

Committee Member

- Canadian Academy of Health Sciences Fellowship
- UK Concussion Prevention Network
- Concussion in Para Sport (CIPS)
- Canadian Physiotherapy Association
- World Conference on Prevention of Injury and Illness in Sport
- 6th International Consensus on Concussion in Sport
- Sport, Exercise, Physical Activity and Osteoarthritis Prevention Discussion Group Meeting
- Medical and Scientific Network, International Olympic Committee (IOC)
- Canadian Concussion Network, Co-Lead Training and Career Development Committee
- Canadian Traumatic Brain Injury Research Consortium, Chair Training and Education Committee
- Promotion University of Edinburg

Conference Organization

- Sport Injury Prevention Research Centre Research and Community Engagement (RACE) Symposium
- Canadian Traumatic Brain Injury Research Consortium (CTRC) Training Committee and Conference Chair
- Injury Prevention Research Symposium CASEM, Co-Chair
- Canadian Concussion Network Annual Meeting, Program Chair
- World Conference on Prevention of Injury and Illness in Sport, Scientific Program Committee

Conference Reviewer

- World Conference on Prevention of Injury and Illness in Sport
- Canadian Concussion Network Annual Meeting
- Canadian Academy of Sport and Exercise Medicine

Grant Reviewer

- Canadian Institutes of Health Research (CIHR) College of Reviewers

GENERAL COMMENTS

FEDERICO

Continuum Biomechanics Group

Continuum Mechanics is the study of matter at a length-scale at which the existence of the atomic structure can be neglected, and matter can be treated as continuous rather than discrete. Research in our group is devoted to the mathematical foundations of Continuum Mechanics and its applications to the Biomechanics of Soft Tissue. In particular, we are interested in modelling soft tissue accounting for its structural elements, i.e., collagen fibres, cells, non-fibrous extracellular matrix and fluid. Most phenomena of structural rearrangement in a biological tissue can be described under the umbrella of growth and remodelling. Structural damage is what can initiate injury and disease.

A main theme is the modelling of articular cartilage. Articular cartilage is the thin layer of connective tissue covering the end of bones in our joints: for the span of a lifetime, it provides stress redistribution and an extremely low-friction contact. When the tissue degenerates because of diseases such as osteoarthritis, it cannot perform its function properly and this results in pain, limitation of mobility, and ultimately a decrease in quality of life. Understanding the relationship between the tissue structure and its function, remodelling and damage processes may shed light on the causes of the initiation of degeneration, and suggest possible treatments to prevent disease.

Research Functions

Executive Board Member

- Member of the Canadian National Committee of the International Union of Theoretical and Applied Mechanics (CNC-IUTAM)

Editorial Board Member

- Journal: Mathematics and Mechanics of Solids

Editorial Advisory Board Member

- Journal: Atti dell'Accademia Peloritana dei Pericolanti, Classe di Scienze Matematiche, Fisiche e Naturali

Conference Organization

- Symposium "Geometry and Continuum Mechanics Symposium" within ICoNSoM 2022 ([Int. Conference of Nonlinear Solid Mechanics](#))

Grant Reviewer

- Evaluation Group Member, Mechanical Engineering, Natural Sciences and Engineering Research Council of Canada (2019-2023 term)

FERBER**Associate Dean Research**

Dr. Reed Ferber is a clinical biomechanist whose research is aimed at optimizing rehabilitation and predicting injuries. He leads the NSERC Wearable Technology Research and Collaboration (We-TRAC) CREATE Training program and has established a campus-wide graduate specialization in Wearable Technology – Canada's first and only specialization in this fast-growing field. Overall, his research group is engaged in two streams of research: clinical gait analysis and wearable sensors.



Dr. Ferber's research group has successfully established an international and growing gait analysis research network currently consisting of 15 researchers and over 125 clinical partners. Each centre is linked to the world's largest research database of biomechanical gait and clinical data. The research group is transforming the biomechanics research community by openly sharing data between laboratories, employing unique data science analysis methods and growing their research network. Dr. Ferber's wearable research is based on three challenges: (1) wearable sensors generate a profound amount of data that is largely ignored; (2) the information derived from these sensors is not placed within a contextual narrative; and (3) most sensors are designed for activity monitoring and not for healthcare.

Research Functions**Board Membership**

- Prosthetics and Orthotics International Editorial Board
- Journal of Sport Rehabilitation Editorial Board
- Journal of Athletic Training Editorial Board

GABEL**Movement and Musculoskeletal Health Laboratory (MyMSK)**

In 2022, Dr. Gabel focused on establishing her laboratory, bringing on her first MSc student and a host of undergraduate thesis and summer students. Dr. Gabel's research focuses on the role of movement (physical activity and exercise) for musculoskeletal health across the lifespan. At the pediatric end of MyMSK's research spectrum, Dr. Gabel's trainees investigated how to best measure free-living physical activity in children



and youth for understanding how bone adapts to physical activity. Other trainees began projects investigating the role of physical activity for bone development in children with chronic disease (i.e., cerebral palsy and juvenile idiopathic arthritis). Along the adult continuum, Dr. Gabel secured seed funding for a resistance training intervention to prevent bone loss in early menopausal women that will begin in 2023. Finally, Dr. Gabel's spaceflight research also gained traction across multiple media and news outlets, highlighting the importance of resistance training on earth and in space for preventing bone loss during long-duration spaceflight.

Research Functions**Board Membership**

- British Journal of Sports Medicine Editorial Board, Associate Editor

Grant Reviewer

- CIHR Doctoral Award Review Committee
- NSERC Undergraduate Research Studentship Award Reviewer
- GAC Award Review Committee



HERZOG

This past year, Dr. Walter Herzog's research group solved a long-standing controversy in striated muscle physiology: what causes titin-actin interactions in muscle contraction? They determined that strong binding of cross-bridges to actin and associated configurational changes in the regulatory protein tropomyosin free up binding sites for titin on actin, thus providing a mechanistic answer to the problem of titin's force contribution in muscle. Furthermore, they dispelled the erroneous idea in the scientific

literature that cardiac muscle, in contrast to skeletal muscle, does not possess history-dependent properties. In their research on joint biomechanics and osteoarthritis, they developed an imaging procedure involving two-photon microscopy that relates cartilage cell shape and collagen fibrillar orientation to the mechanical properties of cartilage samples that are used for transplantation services. This procedure is efficient and allows for quick identification of tissue samples that can be safely used for transplantation. They also developed in vitro methods that allow for reducing fibrosis in muscles from children with spastic cerebral palsy, which might hopefully be transferable to patients soon. In their applied research on back biomechanics, Dr. Herzog's research group published a seminal article on the safety of back and neck manipulation in pediatric patients.

Research Functions

Board Memberships

- Journal of Sport and Health Science Editorial Board, Co-Editor in Chief
- Exercise and Sports Science Reviews Editorial Board, Associate Editor
- IEEE Transactions in Neural Systems and Rehabilitation Engineering Editorial Board Associate Editor
- Brazilian Journal of Motor Behavior Editorial Board
- BMC Biomedical Engineering Editorial Board
- Chiropractic & Manual Therapies Editorial Board
- The Current Issues of Sport Science (CISS) Editorial Board
- Journal of Functional Morphology and Kinesiology Editorial Board
- Biomechanics and Modeling in Mechanobiology Editorial Board
- International Journal of Mechanical and Materials Engineering Editorial Board
- Muscles, Ligaments and Tendons Journal Editorial Board
- Sports Orthopaedics and Sports Traumatology Editorial Board
- Molecular and Cellular Biomechanics Editorial Board
- Journal of Biomechanics Editorial Board

- Journal of Electromyography and Kinesiology Editorial Board
- Journal of Manipulative and Physiological Therapeutics Editorial Board
- Journal of the Canadian Chiropractic Association Editorial Board
- Sportverletzung Sportschaden Editorial Board
- German Journal of Exercise and Sport Research Advisory Board
- Nike Sport Research Advisory Board
- German Journal of Sport Sciences Advisory Board
- Sportwissenschaft Journal Advisory Board
- Sportorthopädie Sporttraumatologie Advisory Board

Committee Member

- Jim Hay Memorial Award, American Society of Biomechanics (Career Award for Biomechanics in the Exercise and Sports Sciences Field)

Conference Organization

- 5th Rocky Mountain Muscle Symposium
- Scientific Committee Member, Congress of International Society of Biomechanics/Japanese Society of Biomechanics
- Career Award Committee, Canadian Society for Biomechanics
- Scientific Chair, Active Muscle Mechanics: Bone and Soft Tissue, World Congress of Biomechanics

Grant Reviewer

- National Killam Selection Committee, Killam Prize and Dorothy Killam
- CIHR Biomedical Engineering Grant Review Committee
- Natural Sciences and Engineering Research Council of Canada
- CIHR College of Reviewers





HOLASH

Exercise Physiology Laboratory

The focus of John's work at the University of Calgary is teaching Exercise Physiology content, and John teaches 6 courses per year. John has demonstrated his dedication to education by completing an open access textbook chapter on muscle physiology and supervising multiple students, including two masters of kinesiology students, three honours students, and two summer students.

John's major roll within the faculty is to develop and integrate new advanced teaching and learning techniques and resources for exercise physiology. One of John's focuses is to develop, a team that hopes to integrate state-of-the-art computer-based methods for measuring, recording, and analyzing large data sets of physiological variables. The goal of this team is to enhance the student experience by providing opportunities for: software product development, rapid prototyping, machine learning, data processing, and potentially some entrepreneurship opportunities that revolve around leveraging digital technologies.

John serves the faculty by sitting on three professional committees: The Learning Technologies Advisory Committee, the Teaching and Learning Committee and sits on the human ethics research board for the faculty of Kinesiology. John has also shared his expertise with the public by delivering two general lectures on maintaining fitness for masters' athletes to the Foothills Nordic ski club and the Active living program. Overall, John's combination of teaching and research experience, as well as his service to the academic and public communities, showcases his commitment to the advancement of exercise physiology and the promotion of healthy living at the University of Calgary, and in the greater Calgary community.

JORDAN

Integrative Neuromuscular Sport Performance Laboratory (INPSL)

In 2022, Drs. Matt Jordan and Kati Pasanen founded the Integrative Neuromuscular Sport Performance Laboratory (INPSL). Dr. Jordan's lab focuses on muscle strength and power adaptations across the lifespan, the effects of traumatic knee injury on muscle function and describing the neuromuscular response to resistance training in adolescent, early adult and elite athletes. Dr. Jordan's research group has been working hard to operationalize the INPSL and received a VPR Catalyst Research Grant to accelerate this process. Dr. Jordan and his research team were funded by the Dinos Excellence PhD Scholarship to address secondary and tertiary knee injury prevention research in collegiate athletes. Working closely with the Athletic Therapy department, the Head Strength & Conditioning Coach and the Sport Medicine Centre, the INPSL conducted neuromuscular testing on injured athletes to track rehabilitation progress.

Highlighting their integration with other Faculty of Kinesiology departments, the INPSL conducted an examination of off-ice predictors of on-ice acceleration performance in elite long track speed skaters training at the Olympic Oval. Dr. Jordan continues to collaborate internationally with colleagues at Edith Cowan University and the University of Pretoria. Throughout 2022, Dr. Jordan participated in the International Ski Federation's working group on Guidelines for Return to Sport and Competition in winter slope sport athletes.

Research Functions

Board Membership

- Elite Sports and Performance Enhancement, Frontiers in Sports and Active Living Editorial Board
- Biomechanics and Control of Human Movement, Frontiers in Sports and Active Living Editorial Board

Committee Member

- International Ski Federation, ISPASS Consensus on Return to Sport Working Group





KENNY

Dr. Sarah Kenny's research is unique in Canada, bringing together the disciplines of kinesiology and dance. Specifically, Dr. Kenny applies her experience as a contemporary dancer to the science of injury epidemiology. As lead of a longitudinal project with a professional dance organization, Alberta Ballet, Dr. Kenny's research is impacting the international dance medicine and science community, contributing to refined international standards of how dance-related injury is defined and measured, and advocating

for the recognition of dancers across all styles and levels of practice, as both artists and athletes. An additional focus of Dr. Kenny's research aims to understand the psychosocial experience of community dance as a form of physical activity and social connection for populations across the age spectrum. Her research team is leading funded projects examining the lived experiences of participating in community dance and how these experiences contribute to physical literacy and successful aging among older adults and those living with Parkinson's Disease.

Research Functions

Board Membership

- Healthy Dancer Canada Editorial Board
- Journal of Dance Medicine and Science Editorial Board

Committee Member

- International Association for Dance Medicine and Science, Standard Measures Consensus Initiative Taskforce
- Healthy Dancer Canada, Co-chair Dancer Screening Committee

Conference Reviewer

- International Association for Dance Medicine & Science

MACINNIS

Molecular, Exercise, and Environmental Physiology Laboratory (MEEP)

The Molecular, Exercise, and Environmental Physiology (MEEP) Laboratory is an integrative physiology laboratory primarily interested in understanding how humans respond to individual exercise sessions and long-term exercise training. Led by Dr. Martin MacInnis, this research group investigates: (1) the effects of different exercise training programs on the skeletal muscle, cardiovascular and hematological systems; (2) the molecular and physiological mechanisms underpinning the plasticity of physiological systems; (3) the influence of oxygen availability on aerobic metabolism, neuromuscular fatigue and exercise performance; (4) the use of wearable technologies and novel methods to improve exercise testing/prescription and to assess human physiology; and (5) the extent to which responses to exercise are influenced by nutrition, sex and the environment. The MEEP Laboratory employs a wide breadth of techniques, ranging from the biochemical and molecular analysis of human tissues to whole-body measures of exercise metabolism, tolerance and performance. The overall aim of their research program is to understand how humans respond to exercise and translate this knowledge to develop optimal strategies for improving the health and fitness of Canadians.



Research Functions

Conference Organization

- Canadian Society for Exercise Physiology Annual General Meeting 2023, Co-chair

Grant Reviewer

- NSERC Discovery Grant



NIGG

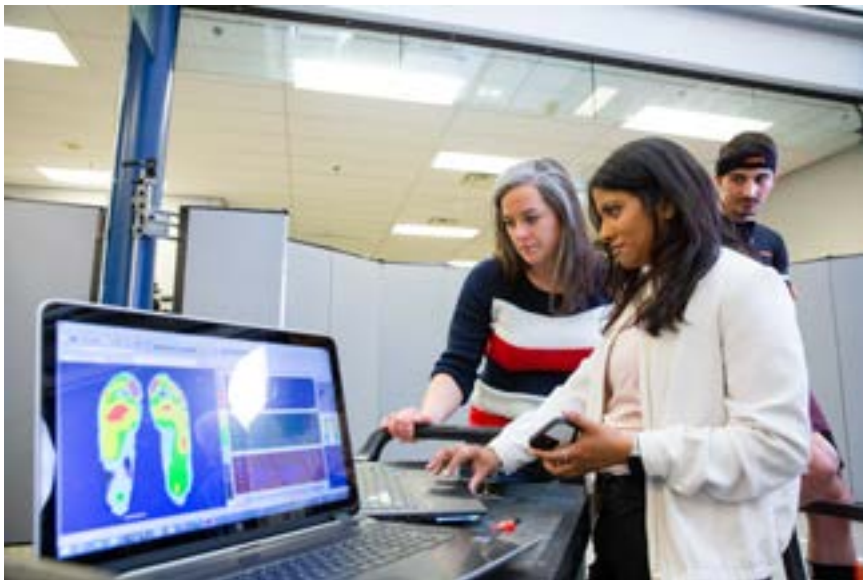
Biomechanig Sport & Health Research

The Nigg research group concentrates on locomotion topics that are health

and performance related with special considerations for footwear, apparel,

and equipment. In the next five years, the research group plans to focus on the following

key topics: 1) The influence of footwear design on lower limb work distribution; 2) applying machine learning tools to develop and validate algorithms; 3) using shape modelling techniques to help design better fitting sport shoes; 4) investigating the “teeter-totter” mechanism, to better understand enhanced running performance in specific long distance footwear; 5) the development of a soft tissue vibration quantification technique.



PASANEN



Dr. Kati Pasanen is the Director of the Clinical Biomechanics Lab, and Co-Lead of the Integrative Neuromuscular Sport Performance Laboratory (INSPL). With a primary focus on team sports, the lab develops, evaluates and implements sport specific training strategies for injury prevention in athletes of all performance levels. Dr. Pasanen’s research group has a special interest in prevention of anterior cruciate ligament (ACL) injuries in female athletes and works in close collaboration with the Oslo Sports Trauma Research Center, Norwegian School of Sport Sciences (Norway). Dr. Pasanen is also leading five collaboration studies in Finland – three of them in team sports, one in professional ballet and one among recreational runners. Ongoing projects include epidemiological, clinical, biomechanical and experimental studies investigating: (1) athletes’ running, cutting, and landing biomechanics; (2) mechanisms and risk factors of lower extremity injuries; (3) effects of different exercise training programs on running, cutting and landing biomechanics and on the risk of lower extremity injuries.

Research Functions

Board Membership

- Healthy Dancer Program, Finnish National Ballet Advisory Board
- Finnish Strength and Conditioning Coaches Association
- Finnish Coaches Association Advisory Board
- Finnish Sports Physiotherapists Association Scientific Board

Committee Member

- FIS Injury Surveillance and Prevention Program (ISPP), Preventative Training and Testing in Skiers

Conference Organization

- SUFT Sport Physiotherapy Congress
- Sport Injury Congress, Finnish Coaches Association

PETERS

In 2022, Dr. Ryan Peters continued to build out two different industry related research projects. On the industry applied front, Dr. Peters has partnered with Neursantys to develop a novel wearable device for diagnosing impairments in gait and balance and providing therapeutic stimulation of the vestibular system to help correct such impairments. This technology is currently under review by the Canadian Space Agency for Phase 3 of their 'Deep Space Healthcare Challenge' and a video describing the product can be found at: <https://www.youtube.com/watch?v=nJ2T46BYo9M>.



Dr. Peters' lab has also completed the validation testing for a novel vibration-emitting smartphone application that enables users to perform standard assessments of skin sensitivity remotely at home. This work is supported by a New Frontiers Grant ('Innovative Approaches to Research in the Pandemic Context') that was awarded in the spring of 2022. He is currently working with local neurologists to incorporate this app into their workflow, empowering patients with neurological conditions, such as peripheral neuropathies and carpal tunnel syndrome, to monitor disease progression on their own at home, with unprecedented accuracy and frequency.

PFAU

Animal Locomotor Biomechanics

In 2022, Dr. Thilo Pfau's research has concentrated on: (1) quantifying how directional exercise (running around a bend in a specific direction) influences movement asymmetry and may be associated with structural changes in the distal limbs (hooves); (2) establishing small scale research projects within the horseracing industry of Alberta (Calgary Stampede, Century Mile/Downs); (3) seeking further funding for farrier related research empowering footcare providers to conduct quantitative research into the effects of trimming and shoeing; (4) quantifying the effect of horse-she-surface interaction at high-speed gaits; (5) initiate research into the interaction between gait asymmetry and back movement; and (6) establishing protocols for collecting fundamental gait parameters in quadrupedal animals by high-update-rate global positioning systems.

Research Functions

Committee Member

- International Conference on Canine and Equine Locomotion, ICEL, Utrecht, The Netherlands

Conference Organization

- International Conference on Canine and Equine Locomotion, ICEL, Utrecht, The Netherlands
- UCVM International Equine Symposium, Calgary

Conference Reviewer

- International Conference on Canine and Equine Locomotion, ICEL, Utrecht, The Netherlands
- International Conference on Equine Exercise Physiology, Sweden

Grant Reviewer

- Horserace Betting Levy Board, UK

REIMER (DE BRUYN)

Interim Dean

Dr. Raylene Reimer's research focuses on understanding how nutrition and the bacteria that live in our intestine (called gut microbiota) interact to affect our risk of developing chronic diseases such as obesity, type 2 diabetes and fatty liver disease. Changes to the gut microbiota in early life play a particularly strong role in increasing or decreasing the risk of many diseases later in life including obesity and asthma. The Reimer research group has focused their recent animal work on several aspects of early life microbiota development. In the first instance, they examined how critical components of maternal milk called milk oligosaccharides affect the development of infant gut microbiota and alter obesity risk. A second focus is an examination of how a father's diet affects the metabolism of their offspring. This year, the Reimer research group examined how a father's consumption of animal protein versus plant protein affects the obesity risk of their offspring. The Reimer research group is also actively engaged in human clinical trial research and is studying how prebiotic fiber supplementation can improve health outcomes in children with newly diagnosed type 1 diabetes and in adults with knee osteoarthritis and obesity. Ultimately, the goal of Dr. Reimer's research is to design and evaluate diets aimed at body weight management and optimal gut microbiota profiles.



Research Functions

Board Member

- Applied Physiology, Nutrition and Metabolism Editorial Board, Associate Editor
- Frontiers in Endocrinology Editorial Board
- InovoBiologic Inc. Scientific Board

Committee Member

- Canadian Nutrition Society Awards Committee
- Data Monitoring Committee: FMT in Major Depression
- Canadian Nutrition Society, University of Calgary Faculty Advisor

Grant Reviewer

- Fonds de la Recherche Scientifique

SCHNEIDER

Concussion Prevention, Detection and Rehabilitation Lab

In 2022, Dr. Kathryn Schneider co-chaired the 6th International Consensus Conference on Concussion in Sport, where she was also a member of the expert panel, scientific committee and lead for the systematic review on rehabilitation following concussion. Since 2018 she has been leading the methodology to inform the conference and has led the writing of 10 systematic reviews that have informed the consensus statement (historically the highest cited paper in the field). This conference is supported by the International Olympic Committee (IOC), Fédération Internationale de Football Association (FIFA), International Ice Hockey Federation (IIHF), World Rugby, International Federation for Equestrian Sports (FEI) and Fédération Aéronautique Internationale (FAI).



Dr. Schneider's research focuses on the prevention, detection and rehabilitation of concussion with a special interest in the role of the cervical spine and balance systems across ages and level of sport, i.e., youth and adults, grass roots to national team/professional. They use clinical and technological tests that evaluate multiple areas of sensory and motor function, gaining insight into changes that may occur after a concussion and with recovery. The program of clinical research involves collaboration with multiple clinicians and researchers across the University of Calgary and other national and international groups, enabling clinically meaningful questions to be evaluated and translated back to the clinic.

This year Dr. Schneider's research group began a new collaboration with World Rugby to evaluate changes in management of concussion in professional male and female rugby players with the addition of a detailed multifaceted assessment and rehabilitation (the RREP – "Rugby Rehabilitation Enhanced and Personalized" study).

Research Functions

Board Member

- Frontiers in Neurology-Neuro-Otology Editorial Board, Associate Editor
- British Journal of Sport Medicine (BJSM) Editorial Board, Associate Editor
- Australian Football League Scientific Board
- Brain Canada Scientific Board

Committee Member

- Canadian Committee of Combative Sports Associations
- Canadian Concussion Network, Co-Chair of the Integrated Knowledge Translation Committee and Executive Committee
- Federal Working Group on Concussion in Sport, Surveillance Initiative
- Parachute Concussion Expert Advisory Committee (CEAC)
- Pediatric Living Guideline on Concussion, Expert Panelist
- Sport Physiotherapy Canada Concussion

Conference Organization

- International Consensus Conference on Concussion in Sport, Co-chair
- Conference Reviewer
- International Consensus Conference on Concussion in Sport
- Canadian Concussion Network Annual Meeting

Grant Reviewer

- HBI
- CFI, JELF
- CFI Innovation Fund
- ACHRI, Catalyst Awards



SMIRL



Dr. Jonathan Smirl’s research team works with the Sport Injury Prevention Research Centre in the Human Performance Laboratory. His team is focused on understanding the basis of the physiological and autonomic disruptions which occur following concussion. The aim is to use this knowledge base to develop informed interventions (exercise, physiological and pharmacological) which can aid in the recovery process during both acute and chronic symptom periods.

Dr. Smirl’s research group is currently leading the exercise-based measures in the Pan-Canadian Surveillance in High Schools to REDuce (SHRed) Concussions project. They are actively collaborating with other Canadian institutions on objectively quantifying the extent concussed athletes rest and exercise following concussions. Dr. Smirl’s research group has been busy collecting data on numerous fronts including: field based measures of physical activity; effects of exercise modalities on blood based biomarkers of concussion; developing new testing protocols for establishing exercise prescriptions following concussion; assessing cerebral blood flow changes while cycling with progressive lower body negative pressure; assessing the long-term effects of concussion on autonomic function; as well as developing a multimodal assessment of cerebrovascular function by merging transcranial Doppler ultrasound with functional near infrared spectroscopy and electroencephalography. Through this multifaceted and integrative approach to concussion research and collaboration network, Dr. Smirl aims to create novel approaches and interventions which will enable us to objectively assess physiological disruptions following concussion and improve outcomes for individuals following this traumatic injury.

Research Functions

Conference Organization

- Cerebrovascular Research Network Annual Meeting

Conference Reviewer

- Cerebrovascular Research Network Annual Meeting

STEFANYSHYN

Darren Stefanyshyn and Bill Wannop

Drs. Darren Stefanyshyn and Bill Wannop's research focuses on questions related to human locomotion, sport performance and sport injury biomechanics. Research interests extend to functional sport equipment with a goal of tuning the properties of the equipment to specific athlete characteristics to maximize the athlete's performance and minimize the risk of injury. Performance research involves developing a basic understanding of the mechanics of human movement during various locomotor and athletic movements. The goal is to determine the mechanical factors dictating an athlete's performance and how performance can be improved by manipulating these factors. In 2022 industry work explored identifying methods of matching sport equipment and footwear to individual athletes. Investigations studied various sporting equipment ranging from ice hockey sticks to pickleball surfaces.



Injury research involves identifying potential injury factors such as global loading characteristics associated with ankle and knee sport related injuries as well as developing an understanding of the role played by equipment. This past year valuable insight was gained on the role of sport surface characteristics studying different compositions of infilled artificial turf as well as next generation non-infilled surfaces.

Research Functions

Board Membership

- NFL Engineering Committee Editorial Board
- Footwear Science Editorial Board
- European Journal of Sport Science Editorial Board

PRESENTATIONS

Aging stress and training adaptations, importance of zone 2 training for aging athletes. – John Holash
Active Living Lecture Series, Calgary, AB (virtual); May 28.

Discussion about the effects of gravity on our bones and joints.
– Leigh Gabel, Steven Boyd, David Hart
Science in the Cinema, Calgary, AB; June 1.

Forecasting a healthy menstrual cycle: not unlike predicting your golf score. – Patricia Doyle-Baker
Calgary Women's Health Research Symposium, Calgary, AB (virtual); April 21.

Golf and menstrual cycle analytics: same, same, but different.
– Patricia Doyle-Baker
Spin Summit, Vancouver, BC; December 7-9.

Individual training in a team setting. – Kati Pasanen
Finnish Coaches Association's Conference, Helsinki, Finland; November 5.

Knee injuries in team sports – insights for injury prevention.
– Kati Pasanen
McCaig Seminar, University of Calgary, Calgary, AB; February 9.

Love of the Game and Concussion Prevention in Sport.
– Carolyn Emery
Developing a Concussion Prevention Network in the UK, LoveDay, London, England; August.

Maintaining fitness in summer months. – John Holash
Seminar series, Masters x-country skiing, Winsport, Calgary, AB; April 8 & 15.

The fate of the weekend warrior: death wish or decreased risk? – Patricia Doyle-Baker
Perspectives in Exercise, Health and Fitness Conference, Kananaskis, AB; October 21-22.

PUBLIC ENGAGEMENT

The menstrual cycle: A.S.K. from an athlete's perspective.

– Patricia Doyle-Baker

Grouse Mountain Ski Club, Vancouver, BC (virtual);
November 23.

Understanding momnesia: Why and how is memory affected
across pregnancy? – Cindy Barha

[Through Pregnancy and Beyond](#); Women's Health
Research Institute, Vancouver, BC (Virtual Event);
March 10.

Understanding training benefits, exercise intensities, fatigue and
over training. – John Holash

Foothills Nordic ski club, Lake Louise, AB; November 13.

Update on Dance Injury Research. – Sarah Kenny, Meghan
Critchley (postdoc)

Alberta Ballet School, Calgary, AB; December 19.



PUBLIC ENGAGEMENT

MEDIA and INTERVIEWS

[51-year-old Calgary woman talks about training, endurance after setting
marathon record.](#) – Patricia Doyle-Baker

Global News, Carolyn Kury de Castillo; May 30.

[Academic Research with Nacsport at the University of Calgary.](#)

– Carolyn Emery

Nacsport, Duncan Ritchie; September 13.

Astronauts suffer bone loss in space. – Leigh Gabel

CHED 630 Calgary: Mid-morning with Shaye Ganam;
July 8.

Bone loss after spaceflight. – Leigh Gabel

AccuWeather; July 18.

[Canada's first space health research symposium launches at
UCalgary.](#) – Leigh Gabel

UToday, Michael Platt; November 17.

[Class of 2022: Kinesiology student takes one shot at her dream
school and makes it.](#) – Patricia Doyle-Baker

UToday, Stacy McGuire; June 14.

[Concussion study rolls into Winnipeg.](#) – Shane Esau

CTV News Winnipeg, Winnipeg; May 5.

[Consuming sweeteners during pregnancy may affect baby's
microbiome and obesity risk.](#) – Raylene Reimer

UK Today News, January 17.

Course revamp is a hit with kinesiology students when they
create their own fitness tests. – John Holash

• [UToday](#)

• [CUR Council on Undergraduate Research](#)

Stacy McGuire, Kara Loy; May 13

[Exoskeleton robot helps researchers shed new light on learning and stroke recovery.](#) – Tyler Cluff
 UToday, Jaelyn Molyneux; June 8.



Tyler Cluff (PI) and Delowar Hossain (PD)

[Floating in space might be fun, but Tbone study shows it's hard on earthly bodies.](#) – Leigh Gabel
 UToday, Gillian Edwards.

[Fostering athletes, world-class research, and career-relevant skills.](#) – Eliza Dawson, undergraduate honours student (Tyler Cluff supervisor)
 UToday, Christine O'Brien; March 23.

[From the Human Performance Lab to Lululemon: Changing the game for athletic shoes.](#) – Colin Firminger, PhD student (Brent Edwards supervisor)
 UToday, Sumaya Bernier; June 9.

[Helping to better understand concussion in teens: The SHRed Concussions Study.](#) – Carolyn Emery
 BC Injury Research and Prevention Unit; September 21.

[Hockey Alberta won't withhold fees to Hockey Canada, but demands answers.](#)
 – Cari Din
 Calgary Herald, Olivia Condon; October 7.

Press Release for:

[Incomplete recovery of bone strength and trabecular microarchitecture at the distal tibia 1 year after return from long duration spaceflight.](#) - Leigh Gabel et. al. Scientific Reports, Article number: 9446.

[The Canadian Press](#), Bill Graveland; June 30
 Picked up by 200+ Media outlets.

- [Astronauts Can Suffer a Decade of Bone Loss During Months in Space, New Research Suggests.](#)
 Gizmodo, George Dvorsky; June 30
- Bone loss after spaceflight.
 AccuWeather; July 18.
- [CHED 630 Calgary:](#) Mid-morning with Shaye Ganam; July 8.
- [U of C confirms bone loss in astronauts.](#)
 Global TV News Calgary, Jodi Hughes; July 3
- [Live Science](#), Ben Turner ; July 5

[Keep Moving FWD: How Adidas and Carbon 3D Updated the 4DFWD.](#) – Bill Wannop
 Believe in the Run, adidas 4dFWD Shoe Launch.

[Meeting of the Scientific Committee for the 6th International Conference on Concussion in Sport.](#) - Kathryn Schneider
 University of Calgary Newsroom; October 27.

PUBLIC ENGAGEMENT

[Midway-ride nausea all part of aging for older Stampede-goers, says UCalgary researcher.](#) – Ryan Peters

- UToday, Michael Platt; July 11.
- The Calgary Eyeopener, CBC Radio, Rob Brown; July 11.



[Nike designed a running shoe to smash records, not quash injuries.](#) – Darren Stefanyshyn, Bill Wannop
Proto.Life, Chris Gorski; December 8.

[Neursantys and University of Calgary pilot wearable device to treat age-related balance decline.](#) – Ryan Peters
EIN Presswire, WKBN27 First News; November 24.

[Neursantys wins \\$10K business plan competition at 2022 'What's Next Longevity Venture Summit'.](#) – Ryan Peters
EIN Newswires, John Ralston; June 30.

[Non-local fatigue and muscle pain modulate exercise.](#)
– Saied Jalal Aboodarda
University of Calgary, Faculty of Kinesiology Seminar, Calgary, AB; September 22.

Radio Interview. – Ryan Peters
The Calgary Eyeopener, CBC Radio, Rob Brown; July 11.

[SHRed Concussions.](#) – Carolyn Emery
CBC Radio Canada Morning Show, Quebec; May 26.

[SHRed Concussions and Sledge Hockey Tips.](#) – Carolyn Emery
CTV Morning Live, Jackie Perez; March 16.

PUBLIC ENGAGEMENT

[Some Canadian doctors are prescribing nature as a remedy; local experts think Alberta should do the same.](#)
– Patricia Doyle-Baker
Calgary Citizen, Mario Toneguzzi; February 17.

[Sport Injury Prevention.](#) – Kati Pasanen
Movement Physio/Fysioterapiaa liikkeella, Marko Gronholm;
November.

[Study: Consuming Artificial Sweeteners During Pregnancy May Affect Baby's Microbiome, Obesity Risk.](#)
– Raylene Reimer
Pharmacy Times; January 24.

[Study eyes chuckwagon horse safety.](#)
– Brent Edwards, Thilo Pfau
The Western Producer, Doug Ferguson; July 28.

[Sweeteners consumed during pregnancy may affect baby's microbiome.](#) –
Raylene Reimer
NUTRA Ingredients, Danielle Masterson; February 3.

[Sweeteners during pregnancy may increase obesity risk in offspring.](#) –
Raylene Reimer
Nutrition Insight, Missy Green; January 17.

The Effects of Walking. – Patricia Doyle-Baker
770 Radio, CHQR, The Drive, T. Henley; September 23.

The science of "mom brain". – Cindy Barha
Newbies Podcast, New Mommy Media; August 5.

[UCalgary receives significant World Rugby grant to better understand female rugby injuries.](#) – Carolyn Emery
UToday, Faculty of Kinesiology; August 3.

Understanding training benefits, exercise intensities, fatigue and over training. – John Holash
Lake Louise, AB; November 13.

[What Fitness Metrics Are Actually Worth Tracking?](#)
– Martin MacInnis
Chatelaine, Mariyam Khaja; July 19.

PUBLIC ENGAGEMENT

[Will Stampede Midway Food Spoil My Dinner — and My Health? \(Asking for a Friend\)](#). – Raylene Reimer
Arch Magazine; June 27

[World Rugby funding kicks off international collaboration to reduce injuries in girls' rugby](#). – Carolyn Emery
University of Bath Press Release; August 4.

[World Rugby gives UofC \\$500K for concussion, injury research](#).
– Carolyn Emery
CBC News, The Canadian Press; August 3.

TOURS and EVENTS HOSTED

[2022 Research and Community Engagement \(RACE\) Symposium](#).
Hosted by SIPRC (Sport Injury Prevention Research Centre), University of Calgary, Calgary, AB; September 28

The HPL hosted students from both the HYRS and SHAD Valley programs in 2022.



PUBLIC ENGAGEMENT

WORKSHOPS, FORUMS, PANELS and WEBINARS

Assessing and Monitoring Interlimb Force-Time Asymmetries.
– Matt Jordan

- Seminar for Minnesota Vikings; January 26.
- Seminar for Memphis Grizzlies; August 20-22.

Comprehensive Assessment and Rehabilitation following concussion in rugby.
– Kathryn Schneider

- course for physicians and physiotherapists working in professional rugby in the Premiership and AP 15s, London, England; July.
- two day course for health care professionals working in Professional Rugby in South Africa, Stellenbosch, South Africa; December 5 & 6.

Equine Gait Analysis: Using sensor-based gait assessment applied to quantifying gait changes observable before and after trimming and shoeing of horses. – Thilo Pfau

- NAEP Convention 2022, Saratoga Springs, Florida, USA; May 16-19.
- Rood and Riddle Podiatry Conference 2022, Lexington, Kentucky, USA; April 14-16.

Food as Fuel - Dance Nutrition. – Sarah Kenny
Alberta Ballet School, Calgary, AB; November 15.

[“Hide it in the Spaghetti Sauce” - How to Implement Neuromuscular Training in Your School to Prevent Injuries, Develop Movement Skills, & Improve Performance in Student-Athletes](#) - Carla van den Berg (Carolyn Emery, supervisor)
Sport Injury Prevention Research Centre Workshop for Canadian Interscholastic Athletic Administrators Association; April 22.

Improving concussion education, evaluation of programs and policy implementation. – Amanda Black, J Halushak, K Isaak, M Morris
Canadian Concussion in Sport Virtual Symposium, Virtual Event; January.

PUBLIC ENGAGEMENT

Neuromuscular training warm-up program for injury prevention. SHRed Injuries Rugby, Sport Injury Prevention Centre Rugby Coach Workshop.

- Carla Van den Berg, PhD student, Isla Shill, MSc student, Anu Raisanen, Postdoctoral Fellow (Carolyn Emery, supervisor); 8 workshops in Calgary, Grande Prairie and online.
- Carla Van den Berg, PhD student, Mike McKinnon (Carolyn Emery, supervisor); 4 workshops in Edmonton and online.
- Carla Van den Berg, PhD student, Stephen West, Postdoctoral Fellow, Isla Shill, MSc student, (Carolyn Emery, supervisor); 8 workshops.

Pre-Season dancer screen: Dance educator version.

- Sarah Kenny, et.al.
- Healthy Dancer Canada webinar series; April 24.

Rehabilitation and modifiers of recovery following concussion.

- Kathryn Schneider
- IOC Advanced Team Physician Course, Concussion Section, Lausanne, Switzerland; September 7.

SHRED injuries: Neuromuscular training program.

- Carla Van den Berg, PhD student, (Carolyn Emery, supervisor). Sherwood Park Minor Hockey Association Coach Workshop
- Carla Van den Berg, PhD student, Mike McKinnon (Carolyn Emery, supervisor). Sport Injury Prevention Centre Neuromuscular Training sessions; 10 online sessions.

Sport-related concussion, a workshop – assessment and management. –

- Kathryn Schneider
- ReFORM Injury Prevention Symposium, Luxemburg; October.

Tackling health and menopause across the lifespan.

- Patricia Doyle-Baker
- Perspectives in Exercise, Health and Fitness Conference, Kananaskis, AB; October 21-22.

PUBLIC ENGAGEMENT

Take my breath away: asthma in female athletes and strategies for screening and management. – Patricia Doyle-Baker
Workshop Symposium, CSEP Annual Conference, Fredericton, NB; November 22-28.

The Lab Reform Workshop: Enriching Teaching and Learning in Your Labs. – Cari Din, Martin MacInnis.
Taylor Institute, University of Calgary, Calgary, AB; June 21.

[Tips for supporting athletes to return to sport after concussion, with Dr. Kathryn Schneider.](#) – Kathryn Schneider
JOSPT Insights; July 26.

OTHER KNOWLEDGE TRANSLATION ACTIVITIES, PUBLICATIONS AND DOCUMENTS

PATENTS AND LICENSES

[Systems and methods for detecting and treating neurophysiological impairment \(Publication No. US 2022-0257149 A1\). United States Patent and Trademark Office \(USPTO\).](#)

- J. Ralston, Ryan Peters, Chris Banman, & Neursantys Inc.

PUBLICATIONS

[How can we predict bone loss in astronauts?](#)

- Leigh Gabel, Steven K Boyd
Science Journal for Kids and Teens; June.



WEBSITE RESOURCES

[SHRed Concussions](#). - Sport Injury Prevention Research Centre

The SHRed Concussions Research Program is supported by the NFL "Play Smart. Play Safe." Program

[SHRED injuries Neuromuscular Training Warm-Up Programs](#).

- Sport Injury Prevention Research Centre
a public-facing resource aimed at supporting coaches and teachers in their delivery of neuromuscular training warm-up programs.

OTHER KNOWLEDGE TRANSLATION ACTIVITIES

[SHRed Mobile Trek to Quebec](#).

- Sport Injury Prevention Research Centre.
In April, the SHRed Mobile travelled from Calgary, Alberta to Quebec City, Quebec for the Annual Canadian Academy of Sport and Exercise Medicine (CASEM) Symposium visiting communities and teams across the country on its way. April.



Abbariki F, Roy MA, Labrecque L, Drapeau A, Imhoff S, Smirl JD, Brassard P. Influence of high-intensity interval training to exhaustion on the directional sensitivity of the cerebral pressure-flow relationship in young endurance-trained men. *Physiological Reports*. 2022
DOI: [10.14814/phy2.15384](https://doi.org/10.14814/phy2.15384)

Alcantara RS, Edwards WB, Millet GY, Grabowski AM. Predicting continuous ground reaction forces from accelerometers during uphill and downhill running: A recurrent neural network solution. *PeerJ*. 2022 DOI: [10.7717/peerj.12752](https://doi.org/10.7717/peerj.12752)

Alhasadi MF, Sun Q, Federico S. Theory of Uniformity Applied to Dielectric Elastic Materials and Piezoelectricity, *European Journal of Mechanics*. 2022. DOI: [10.1016/j.euromechsol.2021.104391](https://doi.org/10.1016/j.euromechsol.2021.104391)

Alhasadi MF, Ghansela P, Sun Q, Federico S. Thermodynamical Analysis of Hysteresis in Rigid Ferroelectric Bodies, *ZAMP - Zeitschrift für Angewandte Mathematik und Physik*. 2022. DOI: [10.1007/s00033-022-01802-z](https://doi.org/10.1007/s00033-022-01802-z)

Alvares TS, Oliveira GVD, Volino-Souza M, Conte-Junior CA, Murias JM. Effect of dietary nitrate ingestion on muscular performance: A systematic review and meta-analysis of randomized controlled trials. *Critical Reviews in Food Science and Nutrition*. 2022
DOI: [10.1080/10408398.2021.1884040](https://doi.org/10.1080/10408398.2021.1884040)

Ames SR, Joumaa V, Herzog W. Effect of active shortening and stretching on the rate of force re-development in rabbit psoas muscle fibres. *Journal of Experimental Biology*. 2022 DOI: [10.1242/jeb.244703](https://doi.org/10.1242/jeb.244703)

de Almeida Azevedo R, Keir DA, Forot J, Iannetta D, Millet GY, Murias JM. The effects of exercise intensity and duration on the relationship between the slow component of $\dot{V}O_2$ and peripheral fatigue. *Acta Physiologica*. 2022
DOI: [10.1111/apha.13776](https://doi.org/10.1111/apha.13776)

Azevedo RA, Jazayeri D, Yeung ST, Khoshreza R, Millet GY, Murias J, Aboodarda SJ. The effects of pain induced by blood flow occlusion in one leg on exercise tolerance and corticospinal excitability and inhibition of the contralateral leg in males. *Applied Physiology, Nutrition and Metabolism*. 2022 DOI: [10.1139/apnm-2021-0597](https://doi.org/10.1139/apnm-2021-0597)

PEER REVIEWED JOURNAL ARTICLES

Azevedo RDEA, Forot J, Iannetta D, Aboodarda SJ, Millet GY, Murias JM. Time course of performance fatigability during exercise below, at, and above the critical intensity in females and males. *Medicine & Science in Sports & Exercise*. 2022 DOI: [10.1249/MSS.0000000000002957](https://doi.org/10.1249/MSS.0000000000002957)

Baggaley M, Derrick TR, Brent Edwards W. Sensitivity of internal tibial forces and moments to static optimization moment constraints at the subtalar and ankle joints. *Journal of Biomechanical Engineering*. 2023 DOI: [10.1115/1.4055036](https://doi.org/10.1115/1.4055036)

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- Barrons Z, Esposito M, Wannop JW, Stefanyshyn DJ. 2022 Influence of Stack Height on Running Performance and Biomechanics. Technical Report for adidas Innovation.
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- Liu T, Vienneau J, Nigg SR, Nigg BM. 2022. Chelsea Boot: A Subjective and Biomechanical Evaluation. Technical Report for FitFlop.
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- Trama R, Denis Y, Vogel A, Wannop JW, Stefanyshyn DJ. 2022 Using Wearable Sensors to Differentiate Artificial Turf Surfaces. Technical Report for FieldTurf.
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- Wannop JW, Esposito M, Stefanyshyn DJ. 2022 Kinematic and Kinetic Comparison of American Football Cleats. Technical Report for Under Armour.
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- Wannop JW, Esposito M, Stefanyshyn DJ. 2022 Mechanical Traction of New Infill Blend System. Technical Report for FieldTurf.
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- Wannop JW, Trama R, Esposito M, Stefanyshyn DJ. 2022 American Football Traction Maps. Technical Report for Under Armour.
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- Wannop JW, Trama R, Stefanyshyn DJ. 2022. The Influence of Shift Footwear on Running Performance and Biomechanics. Technical Report for adidas Future Team.

KEYNOTE AND INVITED LECTURES

- Aboodarda SJ. Non-local muscle fatigue. 8th International Conference on Movement, Health and Exercise 2022 (MoHE2022). Sep 27, 2022. (Invited)
- Black A. Concussion Awareness Training Tool and the Canadian Integrated Injury and Health Surveillance System. 2022 U Sports Conference & Annual Meeting. Halifax, NS; May 30, 2022. (Invited)
- Black A. Race and Concussion. See the Line Concussion Research and Awareness. Western University, London, ON; Aug 10, 2022. (Invited)
- Edwards WB. In silico modeling of fatigue failure in whole-bone and bone tissue: implications for the prediction of stress fracture. 9th World Congress of Biomechanics. Taipei, Taiwan; Jul 14, 2022. (Invited, Virtual Presentation)
- Edwards WB. Spinal cord injury as a ground-based analog of bone loss in microgravity. 1st Canadian Space Health Research Symposium: Skeletal Effects of Microgravity. Calgary, AB; Nov 17, 2022. (Invited)
- Edwards WB. The “ins and outs” of bone loading and stress fracture prediction. 40th Conference of the International Society of Biomechanics in Sports 2022. Liverpool, UK; Jul 19, 2022. (Keynote)
- Emery CA. Bridging the gaps across concussion surveillance, video-analysis, and biomechanics: A multidisciplinary approach informing concussion prevention in youth rugby. Leeds Bucket Beckett University/ England Rugby Conference. Leeds, England; Jul 01, 2022. (Keynote)
- Emery CA. Impact of Policy and Rule changes on Injury Incidence. ReFORM: 2nd Sports Injury Prevention Symposium. Luxembourg; Oct 15, 2022. (Invited)
- Emery CA. Surveillance informing Best Practice and Policy in Youth Sport. ReFORM: 1st Sports Injury Prevention Symposium. Quebec City, QC; Apr 27, 2022. (Invited)

KEYNOTE AND INVITED LECTURES

- Federico S. Biomechanics and Mechanobiology in the Present Day. Firenze, Italy; Feb 25, 2022. (Invited)
- Federico S. Okinawa Institute of Science and Technology. Okinawa, Japan; Nov 21, 2022. (Invited)
- Federico S. Graduate School of Energy Science. Kyoto, Japan; Dec 15, 2022. (Invited)
- Gabel L. Adaptation of bone microarchitecture in long-duration space flight and recovery upon return to Earth. 1st Canadian Space Health Research Network Symposium. Calgary, AB; Nov 17, 2022. (Invited)
- Herzog W. Evolution of knowledge in muscle mechanics: molecular mechanisms of contraction. 9th World Congress of Biomechanics. Taipei, Taiwan; Jul 13, 2022. (Invited)
- Herzog W. Musculoskeletal injuries and diseases: mechanics and/or biology. 3rd Bio-Ergonomics Conference. Manaus, Brazil; Jun 17, 2022. (Keynote)
- Herzog W. Skeletal muscle scaling: from sarcomeres to muscles and back. North American Conference of Biomechanics. Ottawa, ON; Aug 22, 2022. (Invited)
- Herzog W. The importance of undergraduate research: a gateway to a career in science and international research. 12th Congress of Applied Neuromechanics. Porto Alegre, Brazil; Jul 22, 2022. (Keynote)
- Herzog W. Undergraduate involvement in biomechanics. International Women in Biomechanics Group. Virtual Event; Nov 02, 2022. (Keynote)
- Jordan MJ. Building Resilience against ACL Injury & Reinjury with Strength Training. University of Notre Dame and ACU Human Performance Summit 2022. Notre Dame, IN; Jun 17, 2022. (Keynote)
- Jordan MJ. Monitoring Neuromuscular Readiness after ACL Injury: Measuring What Matters. Royal College of Chiropractic Sports Sciences: Actionable Analytics. Toronto, ON; Apr 01, 2022. (Invited)

KEYNOTE AND INVITED LECTURES

- Jordan MJ. Secondary Prevention of ACL Injury in Winter Slope Sports: It's Not All Downhill. ReFORM: 1st Sports Injury Prevention Symposium. Quebec City, QC; Apr 27, 2022. (Keynote)
- Jordan MJ. Vertical Jump Force Time Testing for Return to Play and Athlete Monitoring. Major League Baseball Strength & Conditioning Meetings. San Diego, CA; Dec 10, 2022. (Invited)
- Joumaa V. What does small-angle X-ray diffraction tell us about the structure of the contractile filaments after active shortening and stretching? 9th World Congress of Biomechanics. Taipei, Taiwan; Jul 11, 2022. (Invited)
- MacInnis MJ. Increased oxidative capacity after training: mechanistic basis and functional consequences. Canadian Society for Exercise Physiology Annual General Meeting. Fredericton, NB; Nov 02, 2022. (Invited)
- Pasanen K. How to reduce the risk of injury in sports? Finnish Coaches Association's Conference. Helsinki, Finland; Nov 04, 2022. (Keynote)
- Pasanen K. Individual training in a team setting. Finnish Coaches Association's Conference. Helsinki, Finland; Nov 05, 2022. (Invited)
- Pfau T. Back to Basics Part 1: Fundamental Biomechanics or Physics meets Biology, learning to understand technical and biological constraints relevant for reliable measurements of gait parameters. Saratoga 2022 - Vet & Farrier Conference (NAEP). Saratoga Springs, NY; Sep 22, 2022. (Invited)
- Pfau T. Back to Basics Part 2: Applied Biomechanics or Physics meets Biology or Practical Methods for Analyzing Gait. Saratoga 2022 - Vet & Farrier Conference (NAEP). Saratoga Springs, NY; Sep 23, 2022. (Invited)



Pfau T. Back to Basics: Fundamental Biomechanics or Physics meets Biology. Rood and Riddle International Podiatry Seminar. Lexington, KY; Apr 01, 2022. (Invited)

Pfau T. Back to Basics: Fundamental Biomechanics: Practical Methods, Acknowledgements. Rood and Riddle International Podiatry Seminar. Lexington, KY; Apr 01, 2022. (Invited)

Pfau T. Differences between Objective Gait Analysis Systems. BEAV Congress 2022. Liverpool, UK; Sep 01, 2022. (Invited)

Pfau T. Quo vadis Ganganalyse': Ausblick in die Zukunft. BPT Kongress. Hannover, Germany; Nov 19, 2022. (Invited)

Pfau T. Unterschiede zwischen objektiven Ganganalyse-Systemen. BPT Kongress. Hannover, Germany; Nov 19, 2022. (Invited)

Reimer RA. The intergenerational effects of paternal nutrition: father's diet matters too. Canadian Nutrition Society Annual Conference. Gatineau, QC; May 07, 2022. (Invited)

Schneider K. Concussion rehabilitation – Cervicovestibular rehabilitation in the management of concussion. 2022 Canadian Concussion Network Annual Meeting. Montreal, QC; Jun 06, 2022. (Invited)

Schneider K. Dizziness and Concussion – What Can We Do? 2nd International Conference for Vestibular Rehabilitation (ICVR). Minneapolis, MN; Oct 15, 2022. (Invited)

Schneider K. Forging a new path: Novel strategies to optimize detection and management of concussion – Addressing barriers and facilitating optimization of care. (Co-Presenter Pierre Frémont) 2022 Canadian Concussion Network Annual Meeting. Montreal, QC; Jun 06, 2022. (Invited)

Schneider K. Future directions and priorities for research. 6th International Consensus Conference on Concussion in Sport. Amsterdam, Netherlands; Oct 27, 2022. (Invited)

Schneider K. Methodology for the 6th International Consensus Conference on Concussion in sport. 6th International Consensus Conference on Concussion in Sport. Amsterdam, Netherlands; Oct 27, 2022. (Invited)

Schneider K. Moving up the chain: C-training strategies to prevent concussion. ReFORM: 1st Sports Injury Prevention Symposium. Quebec City, QC; Apr 27, 2022. (Keynote)

Schneider K. Rehabilitation following concussion. 6th International Consensus Conference on Concussion in Sport. Amsterdam, Netherlands; Oct 27, 2022. (Invited)

Schneider K. SiMPLY Rehab: Seeing Moving Playing: Evaluation and Rehabilitation across the spectrum of TBI. 2022 IPBIS and NABIS Joint Conference on Brain Injury. New York, NY; Sep 24, 2022. (Invited)

Wannop B. Influence of Longitudinal Bending Stiffness of Footwear on Athletic Injury and Performance. 2022 Pedorthic Runners Forum. Sep 16, 2022. (Keynote)

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This gift will boost research, student learning and athletics while taking sport-science research to unprecedented new heights – building on UCalgary's reputation for being a top-five research university, the No. 1 sport-science school in North America and No. 10 globally, for three years in a row.

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