

Dear colleagues,

We have some great news in our faculty.

First, we are ranked No. 11 globally in the Shanghai Rankings for schools of sport science. This is truly remarkable – and I congratulate each of you for your significant contributions to research that have contributed to this success.

While talking of metrics, I want to also let you know that in the 15 metrics used by the university to rank our faculties internally within the University of Calgary, we ranked #1 alongside the Cumming School of Medicine. That is quite outstanding. So, a second congratulations is in order, to every faculty member and our terrific staff.

The research and teaching metrics used by the university were as follows: Teaching: (numerous National Survey of Student Engagement (NSSE) rankings and Canadian Graduate and Professional Student Survey (CGPSS)); Research (sponsored academic research, Tri-Council funding per academic, awards per academic, QS by subject ranking, Times and Shanghai rankings); Awards (Killam and other prestigious awards, University teaching awards); and Fundraising (funds raised per academic staff).

Congratulations to all.

Penny Werthner
Dean



Annual Report 2020 - Highlights

Human Performance Lab



Human Performance
Laboratory

The Year 2020

It has been a long year. Restrictions, social distancing, wearing masks, research interrupted, courses cancelled, working from home. Like the rest of the world, life stopped for the Human Performance Lab from April to August 2020, and then recovered slowly, and as I am writing this note in the spring of 2021, we are almost back to normal. It took a special effort from all to keep trainees going and offer rich research experiences to the many undergraduate and foreign visiting students who had to work remotely for big parts of the year.

The research associates of the lab were particularly resourceful, and I want to thank them all for their effort, inspiration, and flexibility. Above all, I want to thank Tim Leonard, who has looked after the HPL for more than 30 years. He was in the lab virtually every day during the pandemic, making sure we had dry ice and liquid nitrogen, the freezers were working, animals were fed and trained, collecting data for innumerable student projects, fixing the things that broke, and so much more. He provided the HPL with some much-needed normality, making sure everything worked at all times.

I worked mostly remotely from my weekend home in the Rocky Mountains, right next to the forest and wilderness, with bears and deer and elk and squirrels and cougars visiting daily. It is a quiet place, ideal for isolation in times of a pandemic. I must admit, I enjoyed the solitude, the quiet, the calm, the long days without interruptions. It provided for more time for the things I love: thinking, writing, skiing, reading, hiking, and relaxing with my favourite person. The days were flexible, and a routine evolved that was natural, peaceful, and highly productive. I will miss some aspects of this life when we “return to normal”.

However, I missed the traveling to far away, unknown places, attending scientific conferences, meeting friends and colleagues, and talking to the always young and energetic and eager students and trainees. Talking to the leaders in the world of science, learning first-hand of new techniques, surprising developments, facts destroyed, and knowledge emerge. There is nothing more invigorating than having a coffee, a beer, a dinner, after an exciting scientific session, and discuss the pros and cons, the good and the bad, agree, disagree, fight, come to conclusions, and plan the next set of experiments that will settle it once and forever. What a privilege it is to be an academic scientist. A life that is made possible thanks to the generosity of our families, friends, and supporters of the HPL, the Faculty of Kinesiology and the University of Calgary. I would like to thank you all for your continued support and dedication in these uncertain times, and your undeterred belief that we can be global leaders in human health, wellness, and performance research.

Sincerely,

Walter Herzog
Director

The full version of the
annual report can
be found at
www.ucalgary.ca/hpl



UNIVERSITY OF
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Awards and Honours

Members of the Human Performance Laboratory that were honoured for their scientific contributions:

Internal Awards

Fabian Hoitz	Biomedical Engineering Academic Award
Sasa Cigoja	Dr. Benno Nigg Distinguished Faculty Achievement Award
Raylene Reimer	Human Performance Laboratory Faculty Award

External Honors

Walter Herzog	Outstanding Reviewer, CIHR College of Reviewers
Carolyn Emery	Canada Research Chair (Tier 1) Concussion

Special Appointments

Kathryn Schneider	Co-Chair 6th International Consensus Conference on Concussion in Sport
Kathryn Schneider	Executive committee, Canadian Concussion Network
Franziska Onasch	Student Representative, Canadian Society for Biomechanics
Carolyn Emery	Co-lead Integrated Concussion Research Program, University of Calgary
Carolyn Emery	Strategic Research Committee of the Canadian Physiotherapy Association
Carolyn Emery	Chair Scientific Committee Sport Physiotherapy Canada Congress
Salvatore Federico	Canadian National Committee of the International Union of Theoretical and Applied Mechanics (CNC-IUTAM)

External Awards

Raylene Reimer	Killam Annual Professor
Walter Herzog	Journal of Orthopaedic Research for Best Manuscript of 2020
Fabian Hoitz	Alberta Innovates Graduate Student Scholarship for Data-Enabled Innovation
Dana Hunter	2020 Alberta SPOR Graduate Studentship

Support

Our work was financially supported by many different sources, the University of Calgary, government grants, industry and non-government sources and external student support. The corresponding amounts in Canadian dollars were:

University	\$3.9M	28%
Gov. Grants	\$4.3M	31%
Industry	\$4.8M	35%
Students - External	\$760,557	5%
Total	\$13.9M	

For 2020, the average research dollars available per faculty member, was about \$924,687. We would like to thank all supporters of our work, the Faculty of Kinesiology, the University of Calgary, all granting agencies, industry and our major sponsor, Engineered Air.

Menstrual Cycle and Performance



Does the menstrual cycle impact sport performance? This is something Anmol Mattu (MSc, Murias) wondered.

“Most researchers are unsure about how hormonal changes influence study outcomes, but it is important that we understand how women differ in their physiology from men by studying these changes,” says Mattu.

Women remain under-represented in sport and exercise research. They tend to be excluded from exercise studies because of the unknown effects of fluctuations in natural reproductive hormones across the menstrual cycle on sport performance, injury risk, etc.

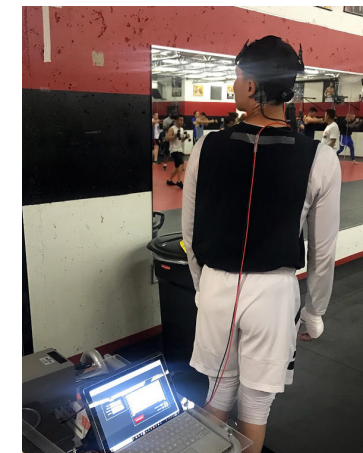
“We demonstrated that the menstrual cycle and the oral contraceptive cycle phases have little impact on exercise performance,” says Mattu. “Based on these findings, exercise researchers should at least question the idea of not testing women solely because their cycle might act as a confounding factor for the outcome of performance measures. In many cases, women can and should be included in exercise studies.”

The study included 15 women who were not taking hormonal contraceptives and 15 women who were taking an oral contraceptive. Each participant performed several submaximal and maximal exercise tests before and after ovulation.

There were no detectable effects of the hormonal cycle on exercise performance in either group of athletes. However, the measures of subjective exertion during the submaximal exercise tests were greater prior to than right after ovulation in the athletes not taking contraceptives.

“It is important to apply an evidence-based approach to optimize an athlete’s health and performance”, says Dr. Patricia Doyle-Baker, a co-author of the study. “Although the menstrual cycle may cause discomfort in some, their exercise performance is not impacted.”

Head Trauma in Athletes



Dr. Ryan Peters discovered that middle-aged athletes who suffered repeated blows to the head have brain patterns similar to those of people twice their age. His team found evidence that high intensity head-motion damages the vestibular part of the inner ear in much the same way as exposure to high intensity sound damages the hearing part of the inner ear. Peters refers to the findings of their recent study as both “startling” and “alarming.”

Using Electrical Vestibular Stimulation (EVS) on study participants, they observed lower-strength and, slower balance-correcting muscle reflexes in the athletes competing in martial arts compared to controls, and also found a strong relationship between reduced strength and reflexes with their total number of sparring and competitive bouts. With greater fight exposure, these vestibular balance-correcting reflexes become weaker and delayed, suggesting that EVS-based balance assessments might provide a powerful new biomarker of head trauma.

Peters’ Lab is collaborating with PROTX Medical Ltd. to develop a next generation wearable balance assessment device that includes EVS, for which they have recently filed a U.S. provisional patent. In the future, this device could enable more precise in-clinic diagnoses and treatment for conditions such as stroke, spinal injuries, and invasive neurosurgeries and neuro-degenerative conditions, such as multiple sclerosis and Parkinson’s disease. Peters says that the ability to diagnose deteriorations in strength and reflexes could guide decisions to ensure athlete safety, and would prove beneficial for contact sports outside of the combative area, including hockey, football and rugby.