

ISB/ASB in Calgary

The Biomechanics Group of the Human Performance Laboratory (HPL) at the University of Calgary hosted the 27th Congress of the International Society of Biomechanics (ISB) and the 43rd Congress of the American Society of Biomechanics (ASB) at the Calgary TELUS Convention Centre from July 31st to Aug 4th, 2019. The ISB is the world governing body of biomechanics and its biennial meeting is the centre point for biomechanics researchers and trainees from all over the world.

With six excellent keynote presentations, 17 invited speakers, over 900 oral and over 1100 poster presentations, 52 exhibitors and more than 2,200 attendees, the ISB 2019 conference exceeded even the greatest expectations of the ISB/ASB and the local organizers.

Through the generous support of all faculties of the Biomedical Engineering Program, the University of Calgary, and our gold sponsor, Delsys and the de Luca Foundation, we were able to offer vastly reduced registration for all full member participants from economically developing Countries (EDCs), and were able to pay for registration and full accommodation (5 nights) for student members from EDCs attending the conference.

Aside from faculties, departments, and laboratories of the University of Calgary, Delsys and the de Luca Foundation, we also received a generous grant of \$ 94,000 from the city of Calgary for the ISB/ASB congress. Our thanks go to them. We would also like to acknowledge the core Biomechanics Group of the Human Performance Laboratory (Drs. B. Nigg, D. Stefanyshyn, B. Edwards, A. Kuo, and M. Vaz (visiting professor from Brazil)), who took on major responsibilities in the organization of the conference. Over 100 volunteers, students and trainees from the HPL, faculty members, friends, colleagues and family members also made sure that the day to day logistics worked like Swiss clockwork. Barbara Holash, Glenda McNeil, Juliana Cyr, and Azim Jinha made sure that all administrative work, the conference schedule, social events, and challenges before, during and after the conference were attended to efficiently and competently.



Jacqueline Lourdes Rio, Baaba Otoo, and Jade He at the Closing Ceremony,



Dr. Hugh Herr gives the Keynote Address at the Opening Ceremony of the congress.

In addition to the scientific success, we received hundreds of emails congratulating us on the social aspects of the conference, the friendliness of our staff, the beautiful setting and surroundings of the conference, and how much attendees enjoyed the congress.

For many scientists and trainees, the ISB/ASB conference represents the highlight of their scientific schedule. We were happy to provide the forum for this most important celebration of biomechanics research. A big thank you to the International and the American Societies for Biomechanics for entrusting us with hosting and organizing this most important event. It was our privilege and pleasure to welcome the world community of biomechanics at our door.

Walter Herzog (Conference Chair)

Sandro Nigg (Event Director)

Annual Report 2019 - Highlights

Human Performance Lab



Human Performance Laboratory



UNIVERSITY OF CALGARY

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

The Year 2019

2019 might go into the records as the year before everything changed, the year before the pandemic. I send my sincere wish to all of you that you, your families, friends, and colleagues are healthy and safe.

2019 was altogether different than the times we live in now, and I want to remark on two extraordinary things directly related to the Human Performance Lab (HPL) and its global reach: (i) the ranking of the Faculty of Kinesiology globally, and (ii) the Congress of the International and the American Societies of Biomechanics.

Faculty of Kinesiology Ranking: Shanghai Ranking Consultancy is an independent organization dedicated to research on higher education. It ranks special focus institutions, and among them the hundreds of schools, faculties, and departments of sport science. For 2019, the Faculty of Kinesiology at the University of Calgary was ranked 7th globally and 1st in North America in the Sport Science category. Much of this success can be traced to the excellence and dedication of faculty members, students, trainees, technicians, and research assistants of the Human Performance Lab, which in turn is a direct reflection of the investment of our faculty and the university into the HPL. Our gratitude and thanks go to them. We are proud to contribute to the success and reputation of our faculty and University.

Congress of the International and American Societies of Biomechanics: In 2016 we made the successful bid to host the 2019 congress of the International Society of Biomechanics (ISB), and exactly three years later, the opening ceremony of ISB2019 took place in Calgary's Convention Centre. ISB2019 was joined by the annual conference of the American Society of Biomechanics, which made the event the biggest and most important for biomechanics research in 2019. Members of the biomechanics group of the HPL hosted the event, and members from other disciplines organized special symposia, helped with fundraising, and served among the contingent of over 100 volunteers that were required every day. It was a true team effort. The ISB/ASB 2019 congress was not only the biggest ever, it was also a resounding scientific and social success, and most of all, a lot of fun. Having been in self-isolation for three months now due to the coronavirus, I am reminiscent of those five days in August of last year, with crowded poster sessions and rooms filled to capacity, never ending discussions late into the night, dinners with friends, the banquet and the dancing, without fear, without restriction. That is what scientific conferences are all about. Let us hope we will meet again soon, in person and personally.

Two global events, two global successes. It was another eventful and exciting year for the HPL. My thanks go to the International and American Societies of Biomechanics for allowing us to host ISB/ASB 2019, and to the University of Calgary, the Faculty of Kinesiology, and all departments and sponsors of ISB/ASB 2019. It was a pleasure and privilege to be your host. My final thanks go to our families, friends, and supporters of the HPL. Your continued engagement and dedication, and your undeterred belief that we can be global leaders in human health wellness and performance research is needed more today than ever before.

Walter Herzog
Director

Awards and Honours

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

Internal Awards

Sadhig Nazeer	Faculty of Kinesiology Award University of Calgary Undergradu- ate Research Symposium
Reed Ferber	Great Supervisor Award University of Calgary
Jeff Ilg	Podium Presentation Award McCaig Summer Student Series
Salvatore Federico	Teaching Achievement Award Schulich School of Engineering

External Honors

Preston Wiley	Honoured Athletic Leader Award Calgary Booster Club
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Special Appointments

Zachary Barrons	Informatics Officer, Footwear Biomechanics Group
Salvatore Federico	Editorial Advisory Board, Atti dell’Accademia Peloritana dei Pericolanti
Salvatore Federico	NSERC Discovery, Evaluation Group in Mechanical Engineering
Bill Wannop	Associate Editor and Awards Officer, Footwear Biomechanics Group

External Awards

Joshua Cashaback	Alberta Innovated Health Solutions (AIHS) Postdoctoral Fellowship
Mathieu Chin	3M National Student Fellowship
Ifaz Haider	TimMurray Short Term Training Award, Osteoporosis Canada
Lindsay Loundagin	Young Investigator Award, 22nd International Workshop on Quantitative Musculoskeletal Imaging
Shyamchand Mayengbam	Metabolics Association of North America Early Career Award
Ryan Miller	Best Poster Award, Campus Alberta Student Conference in Health
Eng Kuan Moo	Promising Young Scientist Award, International Society of Biomechanics Conference 2019
Rob Moore	Best Presentation Award, Alberta Biomedical Engineering Conference (Alberta BME)
Jacqueline Rios	J.B. Hyne Research Innovation Award
Baaba Otoo	David Winter Young Investigator Award (Poster), International Society of Biomechanics Conference 2019
Tessa VanDerVeecken	Tim Murray Short Term Training Award, Osteoporosis Canada
Valeriya Volkova	2019 Best Presentation Award, USB Wearable Summer School

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	\$5.2M	38%
Gov. Grants	\$2.7M	20%
Industry	\$5.3M	38%
Students - External	\$763,000	4%
Total	\$13.8M	

For 2019, the average research dollars available per faculty member, was about \$727,186. 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.

NFL Awards Funding to SHRed



Youth account for more than half of the annual burden of more than three million concussions annually in North America. The University of Calgary has received \$12 million CDN from the National Football League’s scientific advisory board for a pan-Canadian research program, led by Dr. Carolyn Emery, to reduce concussions and their consequences in youth sport on a national level.

Through the NFL’s Play Smart. Play Safe initiative, \$35 million US in funding was allotted to five institutions in North America in this round for medical research. The University of Calgary is the only institution in Canada to receive funding.

Led by Dr. Emery, the program - SHRed Concussions (Surveillance in High Schools to Reduce Concussions and Consequences of Concussions in Youth) - will provide a national platform for concussion surveillance in high schools to evaluate solutions for concussion prevention that will have significant impact in reducing the risk of sport-related concussions and their consequences in youth.

“This is an exciting and truly a pan-Canadian research initiative aimed to reduce the burden of concussions in youth sport nationally,” says Emery. “This funding is the key to reducing concussions and their public health impact in youth sport. It will support the development, implementation and evaluation of novel and sustainable approaches to concussion prevention through rule changes, equipment recommendations and training strategies.”

Dr. Keith Yeates, PhD, Ward Chair in Pediatric Brain Injury and leader of the University of Calgary Integrated Concussion Research Program, says the NFL support is a recognition of the university as a world leader in concussion.

“The University of Calgary is among the top five worldwide in terms of scientific advances in concussion, and this award to Dr. Emery confirms our stature as a world leader in concussion research and knowledge translation,” says Yeates.

Matching Athletes with Equipment



When developing sporting equipment, it is important to understand the interaction that occurs between the athlete and their equipment. The purely mechanical equipment becomes part of a biomechanical system once it is interacting with the athlete. Whether it is a hockey stick that is placed in an athlete’s hands, or shoes that are placed on an athlete’s foot, the athlete will influence the underlying mechanics of that biomechanical system.

As a result, in order to optimize an individual athlete’s performance, it is necessary to:

- 1) understand how that specific athlete interacts with their equipment
- 2) how to match the athlete to the right piece of equipment

We have conducted several studies in various different sports and were able to identify subtle differences in the way individual athletes apply forces to sports equipment that predict how effective a specific piece of equipment will be for them. Based on these findings we have just been granted a patent entitled *Method and System for Matching Athletes with Equipment*.