

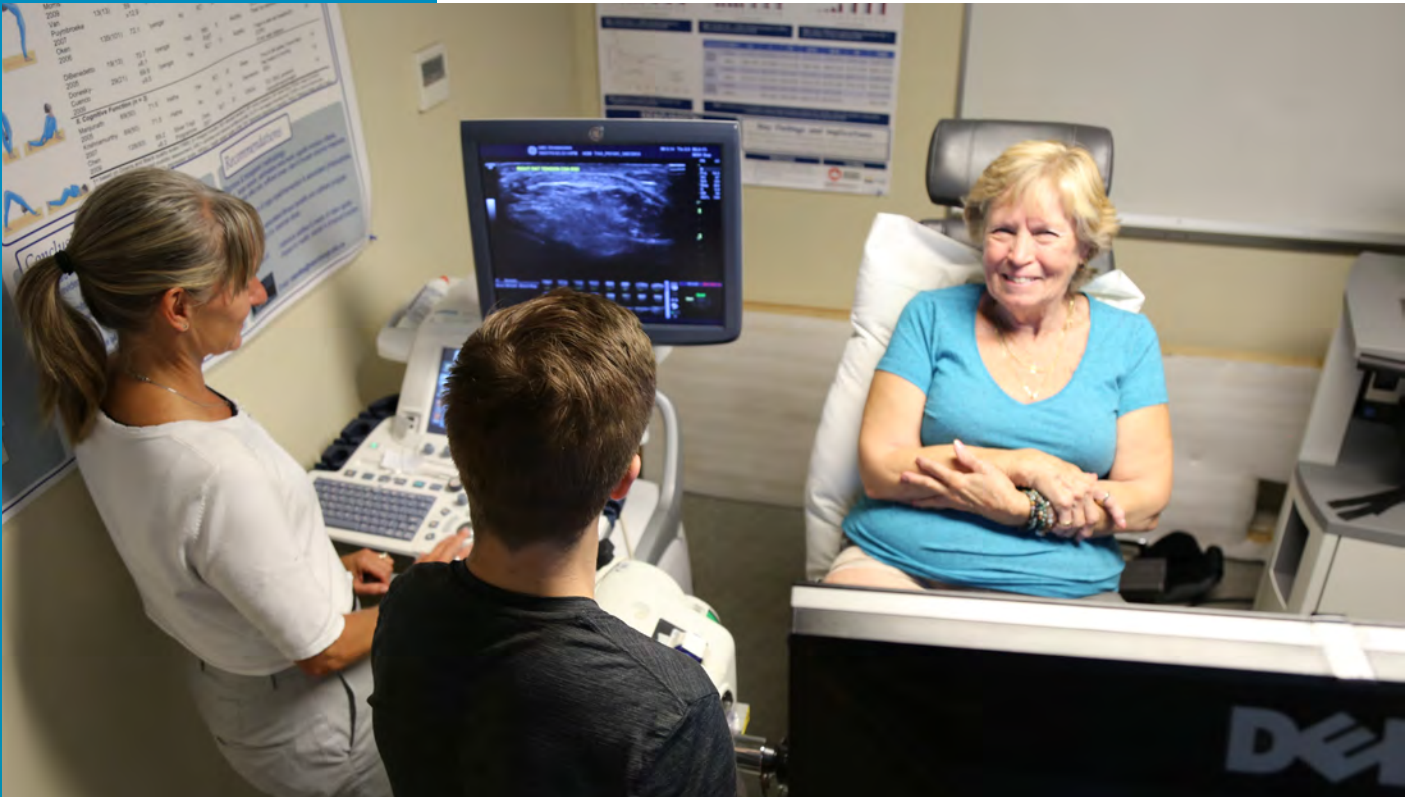


SCHOOL OF HEALTH AND EXERCISE SCIENCES

# ANNUAL RESEARCH REPORT 2019



THE UNIVERSITY OF BRITISH COLUMBIA



## CURRENT RESEARCH

**102**

FUNDED PROJECTS

**\$15.8M\***

FUNDING

**\$2.7M\***

RESEARCH  
INFRASTRUCTURE

\* 5 year (2014-2019)

## ABOUT US

**Our faculty members and graduate students are working on a variety of research projects that explore health and human movement in today's society with the goal to create positive changes in health.**

The School of Health and Exercise Sciences encompasses a diverse research portfolio, ranging from systems physiology through to health behaviour change and population health services. Since inception, the School has enjoyed significant research productivity, as assessed through grant capture and publication of peer-reviewed outputs.

Currently, the School has 19 full-time academic staff members, of which there are 15 active researchers. In 2019, in combination with the School of Kinesiology at UBC Vancouver the School was globally ranked #2 and #16 respectively in the QS University Rankings and the Shanghai University Rankings for sports-related subjects.

# School Strategic Focus

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*The School's vision is to advance the discovery and application of health and exercise knowledge for a better world. To achieve this vision, the School strategically focuses on generating knowledge that improves our understanding of the environmental challenges and mechanisms that impact health, with the goal of informing and translating interventions that prevent, manage, and treat chronic disease across the lifespan.*

The span of research activities within the School is broadly encapsulated across three thematic groupings, with a small number of faculty conducting research between, or across these areas. Each group has identified key aims to help the School achieve its overall research mission.



## **Behaviour change for people with chronic conditions**

The behaviour change group aims to improve people's lives through research that applies the science of behaviour change. It has a specific focus on working with people at risk for, or living with diabetes, and people with physical disabilities, particularly individuals with a spinal cord injury (SCI). The group's three primary objectives are: 1) To design, implement, and evaluate exercise, diet, and smoking behaviour change interventions; 2) To develop evidence-based methods for community engaged, integrated knowledge translation research across populations; and, 3) To work with stakeholders to translate interventions, knowledge products and tools and evaluate their uptake and implementation into the real world.



## **Cardiovascular and respiratory physiology**

The Centre for Heart Lung and Vascular Health has identified two overarching aims: 1) To investigate mechanisms and interventions that generate novel approaches to improve respiratory and cardiovascular health across the lifespan; and, 2) To understand the isolated, and combined impact of environmental stress on physiological function.



## **Sensorimotor neuroscience and neuromuscular physiology**

This grouping of researchers is developing a strong collaborative program in the field of adult aging, focusing on the origins of neurological insults (e.g. Parkinson's disease, mild traumatic brain injury, and environmental stressors). This work specifically examines balance and falls, fatigue and overall motor behaviour/function across the adult lifespan.

# Who we are

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## **Philip Ainslie | Professor and Canada Research Chair**

**Research interests:** Dr. Ainslie's research is directed to the integrated mechanisms, which regulate human cerebral (brain) blood flow in health and disease, including three interrelated areas: 1) Mechanisms of cerebral blood flow regulation in health and disease states; 2) Influence of environmental stress on integrative physiology and cerebrovascular function (with focus on hypoxia and temperature regulation); and, 3) Influence of acute and chronic exercise training on cerebrovascular function.

## **Gord Binsted | Professor**

**Research interests:** Dr. Binsted's research program focuses on understanding how the human brain detects and uses sensory information to control movement. Even the simple act of picking up a cup of coffee requires the brain to rapidly perform a complex series of sensory to motor transformations. Binsted's research focuses on how these functions change with age, disease or environmental disruption.

## **Brian Dalton | Assistant Professor**

**Research interests:** Dr. Dalton's research interests focus on understanding the sensorimotor control of human movement using various models of study (e.g., neuromuscular fatigue, healthy adult aging, hypoxia). His current research includes experiments related to understanding: 1) the vestibular contributions to reaching and arm-supported standing balance; 2) the vestibular control of balance during hypoxia; and 3) the neuromechanical control of the intrinsic foot muscles and their role in standing balance.

## **Neil Eves | Professor**

**Research interests:** Dr. Eves' research interests are in the integrative aspects of pulmonary and cardiovascular physiology in health and disease. His current research focuses on how the pulmonary and cardiovascular systems interact and how these interactions mediate adverse symptoms, exercise intolerance and the accelerated progression of cardiovascular disease that occurs in patients with chronic respiratory conditions. Dr. Eves' program also explores the role of novel exercise therapies specifically tailored to alter and reverse the primary and secondary pathophysiology of respiratory diseases such as COPD and lung cancer.

## **Glen Foster | Associate Professor**

**Research interests:** As an integrative physiologist, Dr. Foster's research program approaches complex physiological problems using integrative and applied experimental approaches that focus on the cardiopulmonary systems in vivo. Dr. Foster is interested in human adaptation to hypoxia and the pathological consequences of intermittent hypoxia similar to that experienced by sleep apnea patients. His research focuses on the reflexive control of breathing and blood flow. Laboratory infrastructure supports human investigation of pulmonary, peripheral, coronary and cerebral blood flow regulation, work of breathing, cardiac function, direct measurement of sympathetic nerve activity, and novel technology development to measure tissue perfusion using contrast enhanced ultrasound.

## **Heather Gainforth | Assistant Professor**

**Research interests:** Dr. Gainforth and her lab aim to close the gap between health promotion research and practice by examining knowledge translation – the act of moving research evidence into the hands of research users. The research program aims to identify, develop and implement novel strategies for disseminating evidence-based health information and interventions to populations. The systems-based research is grounded in behaviour change theory and techniques and is guided by strong collaborations between researchers and communities.

## **Jennifer Jakobi | Professor**

**Research interests:** Dr. Jakobi's research program focuses on maintaining functional independence in older adults. The lab applies a number of neuromuscular techniques to explore sex-specific physiological adaptations with aging. Dr. Jakobi is particularly interested in applying acute and chronic exercise interventions to understand neuromuscular plasticity for functional gain.

### **Mary Jung | Associate Professor**

**Research interests:** Dr. Jung's research program examines dietary and physical activity behaviour change and maintenance, with a particular interest in diabetes prevention through the use of evidence-based interventions. Dr. Jung works with an interdisciplinary team of scientists and community-based organizations to test the implementation and sustainability of such interventions in the real world. She also evaluates programs that seek to assist individuals make dietary and exercise changes (e.g., national physical activity programs, mHealth apps, prediabetes and type 2 diabetes online platforms).

### **Jonathan Little | Associate Professor**

**Research interests:** Dr. Little's Exercise Metabolism and Inflammation Laboratory (EMIL) employs a broad spectrum of techniques, from whole-body metabolic measurement in humans to advanced molecular analyses in isolated cells. Studies range from applied exercise interventions in clinical populations (e.g., patients with type 2 diabetes) to basic studies examining intracellular signaling pathways and gene expression in cultured cells. Human exercise intervention studies are focused on the health benefits of high-intensity interval training and nutrition research is centered around carbohydrate restriction for the treatment and prevention of type 2 diabetes.

### **Kathleen Martin Ginis | Professor**

**Research interests:** Dr. Martin Ginis' research program focuses on the psychosocial mechanisms and consequences of physical activity behaviour change. She has a particular interest in physical activity among people with spinal cord injury and frequently works with multi-disciplinary teams to study various health-outcomes (e.g., cardiovascular disease risk, pain). Dr. Martin Ginis also works closely with numerous community-based organizations on research and knowledge translation projects to advance physical activity and other types of social participation among Canadians with disabilities.

### **Alison McManus | Professor**

**Research interests:** Dr. McManus' research focuses on the physiological consequences of sedentary behavior in children. She uses experimental models of sitting in the laboratory, alongside community-based observational studies to: 1) examine the impact of too much sitting on the vascular system; 2) whether breaking-up prolonged sitting with exercise preserves vascular function and; 3) discovering the dose-response relationship between exercise and vascular benefit in children.

### **Chris McNeil | Associate Professor**

**Research interests:** Dr. McNeil's program of research uses an integrative approach to investigate the performance and plasticity (adaptability) of the human neuromuscular system. Specifically, Dr. McNeil studies how the brain, spinal cord and muscles respond to acute interventions (e.g., muscle fatigue, hypoxia or conditioning stimuli) or chronic perturbations (e.g., aging, training or disease).

### **Colin Reid | Assistant Professor**

**Research interests:** Dr. Reid is a health services researcher who focuses on care for persons living in residential long-term care. Working with many local and national collaborators, Dr. Reid uses an interdisciplinary approach, typically employing mixed methods, in his community-based research program.

### **Rob Shave | Professor**

**Research interests:** Dr. Shave's research interests focus on understanding the acute and chronic effects of exercise and/or environmental stress upon cardiac structure and function. Using echocardiography and biomarkers, Dr. Shave combines comparative and experimental physiology approaches to further understand how the mammalian heart has evolved, and how the cardiovascular system remodels in response to exercise, or physical activity in a range of populations.

### **Paul van Donkelaar | Professor**

**Research interests:** Dr. van Donkelaar's research focuses on gaining a better understanding of traumatic brain injury (TBI) due to sports concussion or intimate partner violence. van Donkelaar and his team are using an integrated knowledge translation approach with the goal of co-designing and creating TBI-informed tools and resources for front-line staff working at community organizations supporting survivors; and aims to improve safety of repetitive impacts on players' heads during contact and non-contact sports.

# Research in the Community



## PARTNERSHIP

The Diabetes Prevention Research Group, led by Dr. Mary Jung, celebrated two years of collaboration with the YMCA with the signing of a Memorandum of Understanding (MOU). The MOU includes the expansion of Small Steps for Big Changes, Jung's personalized, one-on-one, training and counselling program. The event celebrated the success participants have had in making lasting changes in their dietary and exercise behaviours. The program will now be available at 3 community YMCA locations across the Okanagan.

## COMMUNITY FOCUS

A new community-focused research space was opened in the Upper Campus Health Building in April, 2019. The new facilities, which were made possible with funding in part from the Government of Canada, were officially opened with the Honourable Carla Qualtrough, Minister of Public Services and Procurement and Accessibility, on hand to preside over the ceremony.



## COLLABORATION

The Pediatric Inactivity & Exercise Physiology Research Lab, led by Dr. Ali McManus, partnered with colleagues from the United Kingdom and United States to explore physiological adaptation to high altitude in children. The Kids with Altitude expedition consisted of 3 assessments performed at 3 different altitudes. Children, aged 7-14, along with their parents, completed a staged ascent to a research facility at 3800m in California and underwent in-depth physiological assessment at each stage to monitor their responses and potential adaptations.





## PARTNERSHIP

In collaboration with the School of Kinesiology, the School sponsored the Canadian Society for Exercise Physiology (CSEP) 2019 conference, which welcomed health professionals from across the world to Kelowna. Dr. Jennifer Jakobi led the organization of the annual conference as co-Chair with Bill Sheel UBC Vancouver.

## MENTORSHIP

Dr. Kathleen Martin Ginis was recognized by the Canadian Society for Psychomotor Learning and Sport Psychology (SCAPPS) for exceptional mentorship. She received the inaugural Scapps Brawley & Elliott Award for Excellence in Supervision & Mentorship.



## OUTREACH

The Government of Canada provided \$1 million to fund a unique research collaboration to study traumatic brain injury (TBI) in women who have experienced violence and abuse at the hands of an intimate partner. Supporting Survivors of Abuse and Brain Injury through Research (SOAR) is led by Dr. Paul van Donkelaar and former Director of the Kelowna Women's Shelter, Karen Mason, who partner with organizations in BC and across Canada.

## TEAMWORK

Dr. Gordon Binsted joined colleagues from across Canada for a visit to the Hawaii Space Exploration Analog and Simulation lab (HI-SEAS) to complete experiments on astronaut fatigue. The research team spent 8 days in a simulation to design and execute experiments to measure the brain function of astronauts as they become fatigued. The seven-member crew lived in a 1,200-square-foot habitat and wore spacesuits to go outside to replicate life on Mars.



# Remarkable Students & Fellows

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## 2019 Post-Doctoral Fellows in Training

**Corliss Bean**, with Mary Jung  
**Joan Ûbeda Colomer**, with Kathleen Martin Ginis  
**Femke Hoekstra**, with Heather Gainforth and Kathleen Martin Ginis  
**Ryan Hoiland**, with Phil Ainslie  
**Elena Ivanova**, with Mary Jung  
**Sean Locke**, with Mary Jung and Jonathan Little  
**Mike Kennefick**, with Brian Dalton and Heather Gainforth  
**Barbara Oliveira**, with Jonathan Little  
**Hossein Rafiei**, with Jonathan Little  
**Matthew Stork**, with Mary Jung and Jonathan Little  
**Josh Tremblay**, with Phil Ainslie and Rob Shave  
**Anis Toumi**, with Jennifer Jakobi  
**Mike Tymko**, with Phil Ainslie  
**Colin Wallace**, with Paul van Donkelaar  
**Jeremy Walsh**, with Jonathan Little  
**Steve Wright**, with Neil Eves

28

MASTER'S OF  
SCIENCE  
STUDENTS

### NEW STUDENTS ADMITTED

6 Master of Science  
9 Doctor of Philosophy

13

POSTDOCTORAL  
FELLOWS

### DEGREE CONFERRALS

9 Master of Science  
3 Doctor of Philosophy

28

DOCTOR OF  
PHILOSOPHY  
STUDENTS

## 2019 Student Awards and Recognition

**Taylor Atwater**, NSERC USRA and Undergraduate Aboriginal Research Mentorship Award.

**Courtney Brown**, Best Poster 2019 International Hypoxia Symposium

**Nique Bruce**, British Columbia Graduate Scholarship, Graduate Dean's Aboriginal Entrance Scholarship, and NSERC Post-Graduate Doctoral Scholarship

**Hannah Caldwell**, NSERC Canada Graduate Scholarship-Masters; Graduate Dean's Entrance Scholarship; British Columbia Graduate Scholarship, and NSERC Postgraduate Scholarship-Doctoral

**Paige Copeland**, Deputy Vice-Chancellor's Scholarship, NSERC USRA, NSERC CGS-M, BCGS, Graduate Dean's Entrance Scholarship

**Paul Cotton**, NSERC CGS-M

**Gabriel Dix**, CIHR CGS Master's scholarship and Lieutenant-Governor's Medal for Inclusion, Democracy and Reconciliation.

**Justine Magnuson**, Graduate Dean's Entrance Scholarship



**Brooke Shafer**, Tier 1 Young Investigator Award, World Sleep Society

**Robert Shaw**, Gragopean Scholarship

**Rowan Smart**, Mitacs Globalink research award, CGS D, NSERC

**Matthew Stork**, Michael Smith Foundation for Health Research Fellowship

**Kendra Todd**, SSHRC CGS scholarship, Killam Fellowship and a Worksafe BC scholarship

**Josh Tremblay** Killam post-doctoral Research Fellowship and a NSERC Postdoctoral Fellowship award

**Tyler Vemeulen**, Tier 2 Young Investigator Award, World Sleep Society

**Steve Wright**, Institute of Medical Science Siminovitch-Salter Award, Canadian Respiratory Research Network Breathing as One Fellowship & Michael Smith Foundation for Health Research Trainee Award



UBC OKANAGAN 2019 MASTER'S  
STUDENT RESEARCHER OF THE YEAR

## Emily Giroux

Emily Giroux who conferred her Masters in Health and Exercise Sciences in 2018 was the 2019 recipient of the UBC Okanagan Student Researcher of the Year Award, Master's level.



UBC OKANAGAN 2019  
GOVERNOR GENERAL'S GOLD MEDAL

## Ryan Hoiland

Ryan Hoiland, who received his PhD in Interdisciplinary Graduate studies from the School of Health and Exercise Sciences, was awarded the Governor General Gold Medal for UBC's Okanagan campus. It's an award presented annually to the graduate student with the highest academic achievement.

GRADUATE HEALTH AND EXERCISE SCIENCES STUDENTS

# Graduate Research Day



The annual Graduate Student Research Day hosted 29 presenters, including 11 talks and 18 posters and was attended by a delegation from the University of Exeter, UK who were visiting the School to explore international collaboration opportunities. With over 60 people in attendance, the group welcomed Dr. Stephen Cheung and Dr. Eve Valera as keynote speakers.

## Undergraduate Honour's Research Projects

**Austin Basso**, with Tanya Forneris

Enhancing wellbeing of Indigenous University Students: Perceptions of co-constructed two-eyed seeing intervention

**Jenna Benbaruj**, with Glen Foster

The effect of intermittent hypoxia on the sympathetic vasomotor and blood pressure response to handgrip exercise and muscle metaboreflex activation

**Kara Crampton**, with Jonathan Little

Investigating the impact of bulletproof coffee on cognitive performance and satiation in healthy individuals

**Joelle Deschenes-Bilodeau**, with Heather Gainforth

Understanding infant feeding behaviours among mothers experiencing food insecurity: An application of the theoretical domains framework

**Miranda Dinwoodie**, with Kathleen Martin Ginis

Examining the relationship between implementation characteristics, physical activity and barriers in a pragmatic physical activity behavioural counselling intervention for adults with spinal cord injury

**Ryoma Murata**, with Ali McManus

Transcranial doppler ultrasound to assess between-day reproducibility of cerebrovascular reactivity in children

**Afton Servatius**, with Tanya Forneris

Barriers and facilitators for undergraduate utilization of university resources using a theoretical approach.

**Clara Val**, with Paul van Donkelaar

The effects of intimate partner violence-related brain injury on complex sensorimotor function in females

# Research Centre & Laboratories

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**As the foundation to our research efforts, our labs and the Centre for Heart, Lung and Vascular Health serve as a training ground for our students and postdoctoral fellows studying health and exercise sciences.**

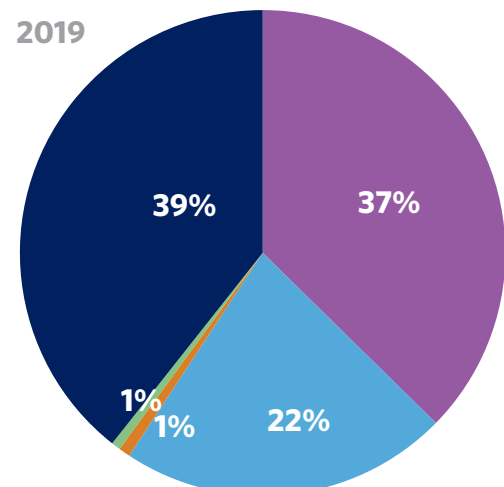
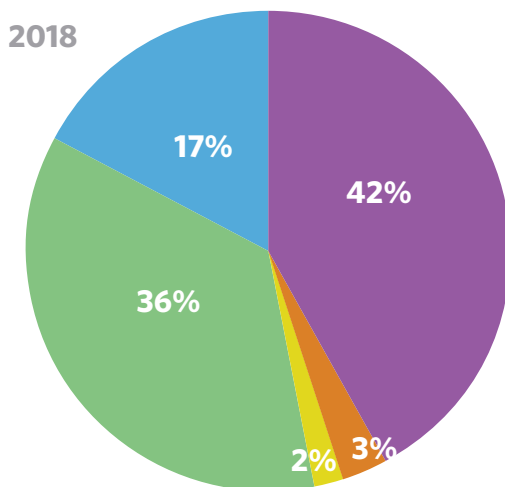
1. Cerebrovascular Physiology Lab (PI: Phil Ainslie)
2. Sensorimotor Neuroscience Lab (Co-PI's: Gordon Binsted & Paul van Donkelaar)
3. Sensorimotor Physiology and Integrative Neuromechanics Laboratory (PI: Brian Dalton)
4. Integrative Clinical Cardiopulmonary Physiology Lab (PI: Neil Eves)
5. Cardiopulmonary Laboratory for Experimental and Applied Physiology (PI: Glen Foster)
6. Applied Behaviour Change Lab (PI: Heather Gainforth)
7. Healthy Exercise and Aging Lab (PI: Jennifer Jakobi)
8. Diabetes Prevention Research Group (PI: Mary Jung)
9. Exercise, Metabolism and Inflammation Lab (PI: Jonathan Little)
10. SCI Action Canada Lab (PI: Kathleen Martin Ginis)
11. Pediatric Exercise & Inactivity Research Laboratory (PI: Alison McManus)
12. Integrative Neuromuscular Physiology Lab (PI: Chris McNeil)
13. Comparative and Functional Cardiac Imaging Lab (PI: Rob Shave)
14. Concussion Research Lab (PI: Paul van Donkelaar)

# New Funding Success

Beginning in 2018, the School established metrics by which we will measure our performance.

## Research funding received by the School of Health and Exercise Sciences

Source	2018		2019	
	Amount	Percent of total	Amount	Percent of total
Tri-council grants	\$999,354	42%	\$1,250,359	37%
Other external	\$866,544	36%	\$20,000	1%
Internal funding	\$61,995	3%	\$26,000	1%
Contracts	\$415,000	17%	\$733,400	22%
Federal/Provincial government	\$53,020	2%	\$1,317,404	39%
<b>Total</b>	<b>\$ 2,395,913</b>		<b>\$3,347,163</b>	
Co-I funding (PI outside of School)	+\$5,059,993		+\$4,586,607	



# New Publications

School of Health and Exercise Publications	2018	2019
Total number peer-reviewed papers	143	102
Average per active research faculty member	9.5	6.9
Median per active research faculty member	9	5
Total peer review (co-authorship removed)	125	97
Publications in journals with an impact factor <2.5 *	37% (n=47)	38% (n=37)
Publications in journals with an impact factor 2.5-5.0	55% (n=70)	43% (n=42)
Publications in journals with an impact factor 5+	8% (n=11)	19% (n=18)
Publications in Q1 journals **	66% (n=85)	67% (n=60)
Publications in Q2 journals	20% (n=25)	20% (n=19)
Total 2019 citations ***	8,410	8,974

\* Data obtained from journal citation reports  
 \*\* Data obtained from Scimago  
 \*\*\* Data obtained from Google Scholar



FEATURED ALUMNUS

## Jonathan Smirl

Jonathan Smirl joined the Faculty of Kinesiology as an Assistant Professor at the University of Calgary in September, 2019. Dr. Jonathan Smirl completed his BSc in Biology at the University of Victoria in 2004 and spent several years working as a swim and triathlon coach throughout Victoria, BC. He re-entered academia in 2008 at the Okanagan campus of the University of British Columbia where he completed both his MSc (2011) and PhD (2015) focusing on cerebral blood flow regulation under the guidance of Prof. Philip Ainslie. After completing his PhD, he was a Post-Doctoral Fellow in the Concussion Research Lab at UBC working alongside Prof. Paul van Donkelaar. He is a cerebrovascular and exercise physiologist, and in 2017 was the first Canadian ever elected to the International Cerebral Autoregulation Research Network (CARNet) steering committee and was re-elected to this position in 2019. Currently, Dr. Smirl's research focuses on understanding the cerebrovascular and autonomic dysregulation which occurs following a concussion. His research aims to use this knowledge to develop physiologically-informed interventions which can be used to help aid in the recovery process during both acute and prolonged symptom periods. As a School we are incredibly proud of everything John has achieved and look forward to continued collaboration as his academic career progresses.

## Centre Report

The Centre for Heart, Lung and Vascular Health (CHLVH) has a mission to produce and disseminate internationally-leading research into the causes, consequences and treatment of cardiovascular, pulmonary and cerebrovascular diseases. In 2019, the CHLVH had 117 members (11 Faculty, 13 PDFs, 25 PhD, 19 MSc, 55 undergraduate students and 5 research Associates) performing research focused on two specific long-term research aims: 1) to investigate novel mechanisms and interventions which generate new approaches to improve respiratory and cardiovascular health across the lifespan and 2) to understand the isolated and combined effects of environmental stress on physiological function. Researchers within the CHLVH published 78 manuscripts in a number of prestigious physiological, clinical and general science journals (e.g. American Journal of Respiratory and Critical Care Medicine (*IF*=17.5), Circulation Research (*IF*=14.5), PNAS (n=2, *IF*=9.4), Hypertension (*IF*=7.7), American Journal of Clinical Nutrition (n=2, *IF*=6.8), Journal of Physiology (n=7, *IF*=4.6)) and received \$976K in new operating and \$625k in new infrastructure funding. We also had a number of trainees (n=7) and Faculty (n=8) from across Canada and around the world (i.e. Brazil, China, Poland, UK) visit the CHLVH for extended research collaborations.

In 2019, the CHLVH gained two new affiliate members from the Southern Medical Program: Dr. Chris West (Assistant Professor in the Department of Cellular and Physiological Sciences) and Dr. Christine Voss (Assistant Professor in the Department of Pediatrics). Dr. West's research investigates the mechanisms that underpin the reduction in cardiovascular and pulmonary function that occurs following high-level spinal cord injury (SCI) and novel interventions aimed at restoring function of these important systems. Dr. Voss's research focuses on state-of-the-art technologies to understand complex physical activity behaviours, particularly in at-risk pediatric populations (i.e. children and teens with congenital heart disease). Dr. West also successfully established his small



Dr. Christine Voss



Dr. Chris West

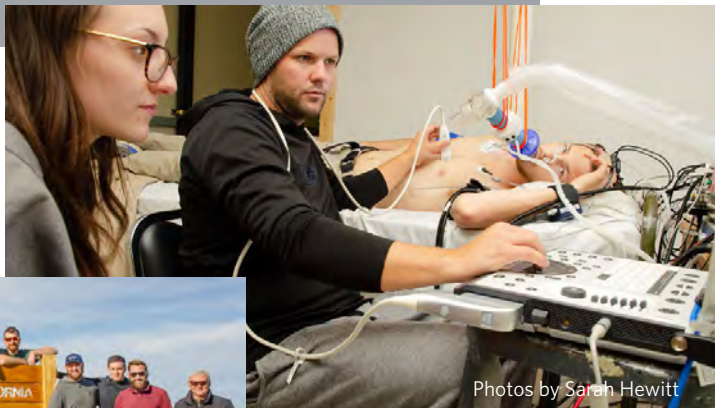
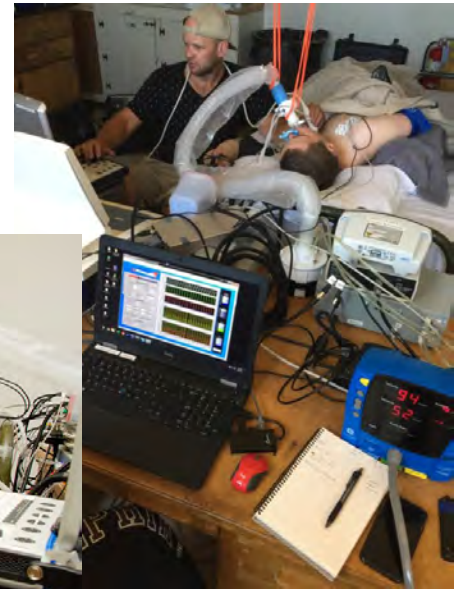
animal research laboratory at UBC-O which provides considerable measurement capacity to understand fundamental aspects of cardiovascular and autonomic function in healthy animals and a rodent model of SCI.

### RESEARCH INITIATIVES

Investigators from the CHLVH participated in a wide variety of large research initiatives in 2019 including high altitude field studies (Ainslie, Foster and McManus), breath-hold diving (Ainslie) and research with non-human primates and subsistence farmers (Shave).

## Integrative Human Physiological Responses and Acclimatization to High Altitude.

Glen Foster was one of six organizing members of a high-altitude research expedition to the Barcroft Research Station on White Mountain, in California in August 2019. This research expedition included members from six different research teams including Mount Royal University, the University of Calgary, the University of Alberta, University College Cork (Ireland), and the University of North Texas Health Science Centre (USA). In total, 11 different research projects were completed which ranged in scope from coronary blood flow regulation at high altitude to scanning the retina for insights into acute mountain sickness. Nineteen trainees participated and included undergraduate and graduate students, as well as post-doctoral fellows.



Photos by Sarah Hewitt



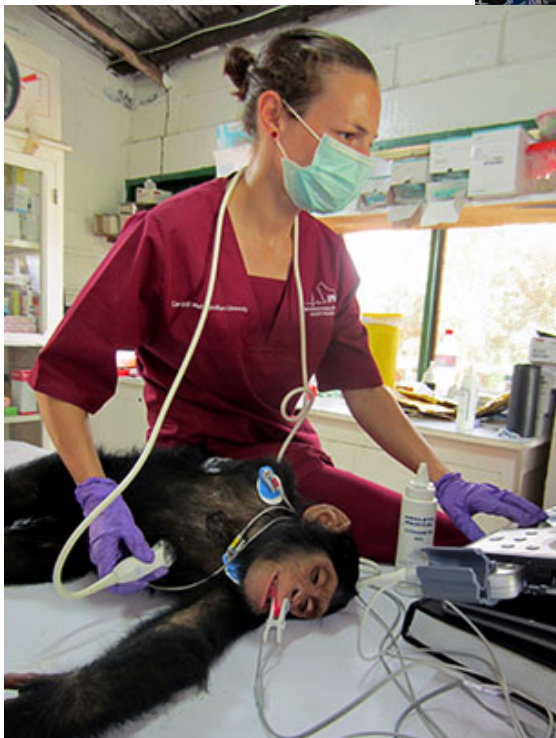
## Physiological Responses in Elite Free-Divers

The over-arching objectives of this internationally collaborative project led locally by Phil Ainslie and involving researchers and trainees from Croatia, UK, USA and Canada is to investigate: 1) the physiological responses that occur during deep and repetitive breath-hold diving, and 2) the time-course of these responses and to pinpoint the mechanisms underlying the consequences to different physiological systems (e.g. lungs, brain and heart), to aid in the development of safe return-to-dive guidelines. The two most recent field-based studies (2018 and 2019; conducted in Cavtat, Croatia), focused on evaluating the susceptibility of the lungs and pulmonary vasculature to hydrostatic-induced compression – which included the assessment of dives deeper than 100 meters.



## Expedition 5300

Expedition 5300 is an international research collaboration with multi-disciplinary researchers from France, Italy, Denmark, and Canada with the aim of investigating human physiology and adaptation to hypoxia in residents of the highest city in the world, La Rinconada Peru (5100m elevation). In 2019, multiple studies were completed by this collaborative group including Phil Ainslie and his trainees who were investigating cardiovascular, cerebrovascular, pulmonary and hematological physiology in Andean individuals with and without Chronic Mountain Sickness; a disease characterized by excessive red blood cell production. Work is currently underway utilizing findings from this initial expedition to test a number of pharmacological treatments to reduce symptom severity and improve quality of life in individuals suffering from Chronic Mountain Sickness.



## International Primate Heart Project

This long-term international collaboration with researchers and veterinary professionals in the UK, US and Canada led by Rob Shave has adopted a comparative approach to 1) examine the influence of endurance exercise in shaping the evolution of the human heart, and 2) the causes and consequences of cardiac disease in great apes. Data from chimpanzees living in Africa, subsistence farmers from Mexico and athletes and sedentary individuals from north America were combined to explore the defining characteristics of the evolved human heart and how physical activity patterns may have initially shaped, and continue to remodel, the derived human heart. Initial data from this large initiative were published in the Proceedings of the National Academy of Science in 2019 and received considerable attention in the news including the New York Times.

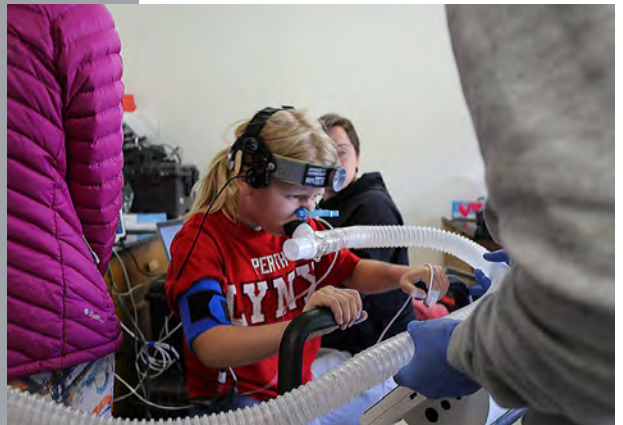


## Kids with Altitude

High-altitude travel that was once exclusive to mountaineers, explorers and scientists is becoming more and more popular with travelers each year. Families are skiing the resorts of Colorado, trekking through the Himalayas, and visiting high mountain villages in the Andes on an ever-increasing scale. In each of these scenarios, children are more frequently accompanying their parents to altitudes over 4000 meters, yet decades of high-altitude research have focused on the physiological responses to low-oxygen almost exclusively in adults.

The overall purpose of this work was to examine the physiological effect of a prolonged stay at high altitude in lowland children. We aimed to characterize ventilatory, cardiac, pulmonary, and cerebrovascular adjustments made during acclimatization, and to compare those changes with physiological responses observed in adults.

This study consisted of 3 components performed at 3 different altitudes. Baseline testing was performed at UBC in Kelowna (344m). In August, child and adult participants were transported to California and driven to the Crooked Creek Station (3050m) on White Mountain California, where they spent two nights. Physiological measurements were taken immediately upon arrival at the Crooked Creek research station. After 2 nights at Crooked Creek, participants were driven to the Barcroft Station (3811m), where they stayed for 4 nights/5 days. This stepwise ascent resembles an ascent profile (i.e. 2 rest days at ~3000m) commonly used on trekking expeditions to high-altitude destinations.



# Appendix

## PUBLICATIONS

1. Ayas NT, Foster GE, Shah N, Floras J, Laher I. (2019) Could Adjunctive Pharmacology Mitigate Cardiovascular Consequences of OSA? *American Journal of Respiratory and Critical Care Medicine*. 200(5): 551-555
2. Bassett-Gunter, R., Angevaere, K., Tomasone, J., Leo, J., Varughese, B., Langvee, J., & Martin Ginis, K. A. (2019). A systematic scoping review: Resources targeting the training and education of health and recreation practitioners to support physical activity among people with physical disabilities. *Disability and Health Journal*, 12, 542-550. doi: 10.1016/j.dhjo.2019.06.007.
3. Bean C. & Forneris T. (2019) Examining the role of needs support in mediating the relationship between programme quality and developmental outcomes in youth sport, *International Journal of Sport and Exercise Psychology*, 17:4, 350-366, DOI: 10.1080/1612197X.2017.1350825
4. Bean C., McFadden T., Fortier M & Forneris T. (2019) Understanding the relationships between programme quality, psychological needs satisfaction, and mental well-being in competitive youth sport, *International Journal of Sport and Exercise Psychology*, DOI: 10.1080/1612197X.2019.1655774
5. Bean C., Rocchi M. & Forneris T. (2019) Using the Learning Climate Questionnaire to Assess Basic Psychological Needs Support in Youth Sport, *Journal of Applied Sport Psychology*, DOI: 10.1080/10413200.2019.1571537
6. Bourne, J. E., Ivanova, E., Gainforth, H. L., & Jung, M. E. (accepted Jan 7, 2019). Mapping behavior change techniques to characterize a social cognitive theory informed physical activity intervention for adults at risk of type 2 diabetes mellitus. *Translational Behavioral Medicine*. Online ahead of print. DOI: 10.1093/tbm/ibz008
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## 2019 SUCCESSFUL PRINCIPAL INVESTIGATOR GRANTS

Researcher	Amount	Funding Agency	Project
Ainslie (PI)	\$21,000	ICORD	Nitrate inhalation to augment nitric oxide bioactivity and reduce secondary hypoxic injury: Initial proof of concept
Ainslie (PI)	\$224,000	NSERC (CRD)	The effects of far-infrared emitting textiles on sleep quality, blood vessel function, and exercise performance
Dalton (PI)	\$55,000	Mitacs	Analyzing cognitive-motor function through the development of portable tools
Foster (PI)	\$5,000	UBCO-ORS Collaborative Research Mobility Award	Multicenter clinical trial to minimize cardiovascular disease in obstructive sleep apnea
Gainforth (PI)	\$199,735	SSHRC Partnership Development Grant	Co-Developing and Co-Implementing the First Integrated Knowledge Translation Guiding Principles for the Spinal Cord Injury Research System
Jakobi (PI)	\$20,000	Westcoast Women in Engineering Science and Technology (WWEST)	Associate Chair
Jakobi (PI)	\$5,000	Natural Science and Engineering Research Council (NSERC); Promoscience	iSTAND; Science Odyssey Outreach
Jung (PI)	\$97,000	Private	Scaling Up and Sustaining the Small Steps for Big Changes Health-Improvement Initiative in the Okanagan
Little (PI)	\$100,000	CIHR	The effect of exogenous beta-hydroxybutyrate supplementation on glucose control in type 2 diabetes
Little (PI)	\$81,400	MITACS	A randomized control trial comparing weight loss effects between the Keyto virtual "ketogenic diet" program compared to a standard-care weight loss app
Little (PI)	\$120,000	NSERC	UBC Okanagan peptide detection facility
Little (PI)	\$47,000	NSERC	Impact of exercise and nutritional manipulations on inflammatory function in humans
Martin-Ginis (PI)	\$554,624	CIHR	Can Exercise Prescribed According to the International Scientific Spinal Cord Injury Exercise Guidelines Alleviate Chronic Pain in Adults Living with Spinal Cord Injury? A Pragmatic Randomized Controlled Trial.
Shave (PI)	\$317,404	CFI & BCKDF	Development of the Comparative and Functional Cardiac Imaging (CFCI) Laboratory
van Donkelaar (PI)	\$500,000	Private	Changing the conversation: Integrating traumatic brain injury knowledge into community-based supports
van Donkelaar (PI)	\$1,000,000	Department of Women and Gender Equality Gender-Based Violence Grants Program	Supporting Survivors of Abuse and Brain Injury through Research (SOAR)



THE UNIVERSITY OF BRITISH COLUMBIA

**School of Health and Exercise Sciences**

Faculty of Health and Social Development  
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