

FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION



ANNUAL RESEARCH REPORT 2018-2019



UNIVERSITY OF
TORONTO

ANNUAL RESEARCH REPORT 2018-2019

MEET THE RESEARCH FACULTY	3
JENNA GILLEN ON THE FUTURE OF FITNESS	4
CLOSING THE GAP	5
HEALTHY MOVES.....	6
JOYCE CHEN, SPECIALIST IN MOTOR LEARNING AND STROKE RESEARCH.....	7
THE ZEN OF GOLF	8
NATIONAL GRANT FUNDS KIDNEY CANCER RESEARCH.....	9
PROTEIN FOR BREAKFAST.....	10
BUSY KIDS	13
PEER POWER, BOYS LEARN BEST FROM EACH OTHER.....	16
LET'S PLAY!.....	17
GIRL POWER, KPE STUDENT IS ONE OF THE G(IRLS)20.....	18

PROFESSOR SCOTT THOMAS RECOGNIZED	19
THE BALL'S IN YOUR COURT.....	20
KPE RESEARCH FUNDING AWARDED – 2018-2019	26
RESEARCH FUNDING BY YEAR.....	28
PUBLICATIONS.....	29

2018-19 SUMMARY	Count
Awards and Grants	39
Books	7
Book Chapters	15
Peer-Review Articles	167

WELCOME

Welcome to the 2018-19 Research Report of the Faculty of Kinesiology and Physical Education.

The following pages offer an overview of the innovative and impactful research led by our faculty members and their students across a wide variety of fields that comprise the academic discipline of kinesiology.

Our researchers' work affected communities near and far – from helping a national charity build better, more inclusive playgrounds throughout Canada to teaming up with Varsity Blue athletes and Princess Margaret Cancer Centre (PMCC) to deliver a program that leverages sport as a conduit to engage testicular cancer survivors in supportive care.

They looked into how children and youth engage in “self-other matching” and examined the effects of meditating before a golf game. They got top honours for their work in exercise physiology and won national grants to examine how physical activity levels can improve cognition function in kidney cancer patients.

And, earlier this year, our researchers shared their expertise with the public through another successful annual symposium, discussing how exercise can optimize nutrition.

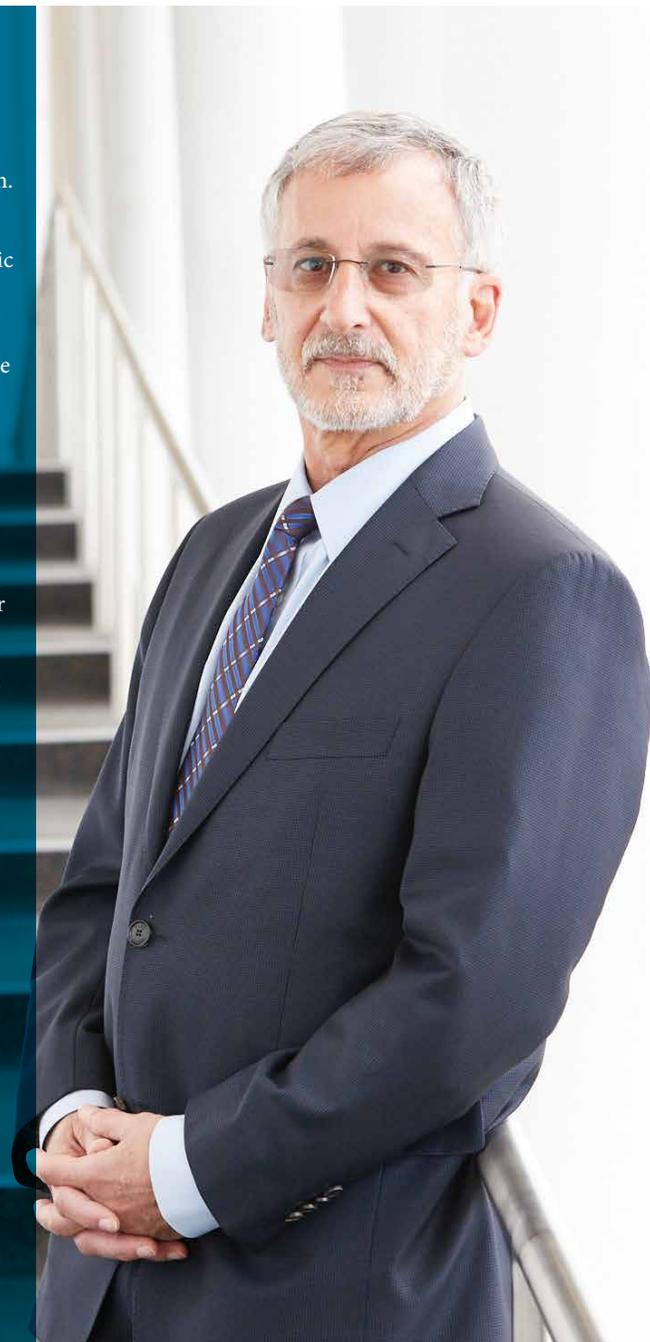
Collectively, our faculty published 167 peer-reviewed articles, 7 books and 15 book chapters this year. They secured 39 research grants and contracts, garnering more than 2 million dollars. These are exceptional funding totals for a Faculty of our size.

Our record was reflected in this year's QS World University Rankings, which placed the University of Toronto programs in kinesiology physical education and sport and exercise sciences fifth in the world, one place higher than last year. This important recognition is indicative of the growing global relevance of the discipline of kinesiology and serves as further incentive for our Faculty to continue the steady progress we are making against the research capacity and research excellence priorities set out in our Strategic Academic Plan.

We are proud of our research progress, and I hope that you enjoy perusing this annual summary.



Ira Jacobs, Dean
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MEET THE RESEARCH FACULTY



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Jenna Gillen on The Future of Fitness

KPE's new assistant professor is helping to change the way we think about exercise. **Jenna Gillen** has been interested in exercise and nutrition for as long as she can remember. This passion led to a BSc in Kinesiology and a PhD in Exercise Physiology, both from McMaster. She went on to complete a post-doctoral fellowship at the University of Michigan, and for the past two years has been completing a second post-doc at U of T. In her new role as assistant professor, Jenna is excited to share her knowledge. "I enjoy bringing my research into the classroom and teaching students the physiology behind how exercise improves health and performance," she says.

Pursuit sat down with Jenna to learn more about her work and her passion for teaching.

Tell us about your research. I am interested in understanding how exercise and nutrition impact carbohydrate and fat metabolism, and identifying lifestyle strategies to improve metabolic health. This ranges from conducting studies in healthy adults to those at risk for, or afflicted with, metabolic disease. I'm interested in practical questions relating to the importance of exercise dose (intensity vs. duration), mode (aerobic vs. resistance) and timing (before vs. after a meal) on key measures of health and performance.

What do you hope to achieve? I hope to contribute to our understanding of how different exercise and nutritional strategies impact metabolism, health and performance. We know regular exercise reduces your risk for many chronic diseases, but there are still many unanswered questions regarding the best strategy. I am particularly interested in optimizing guidelines for women, and also hope to test some of our lab's strategies in a community setting to determine their effectiveness in the "real-world."

Your research is challenging some norms in the world of exercise. My research has questioned some ideas regarding the amount of exercise required to improve health. We have shown that brief but intense exercise – known as high-intensity interval training – can lead to many health benefits that we normally associate with longer durations of moderate-intensity exercise. Many individuals cite a lack of time as a barrier to regular exercise, so it's important to identify time-efficient options that are still effective. Our work shows that if you're willing to work hard, you can get away with a surprisingly small amount of total exercise.

Why did you want to be part of the Faculty? We have such a multidisciplinary faculty with a wide range of expertise. I see many opportunities to build on existing collaborations with exercise physiologists, and also to develop new connections with researchers interested in the psychosocial aspects of physical activity. I think we are well equipped to better address important research questions with the collective expertise we have in this Faculty.

What will you be teaching? I will be teaching a new course called Lifestyle and Metabolic Disease. A major focus is for students to learn how lifestyle strategies incorporating exercise and nutrition can help to prevent and/or treat metabolic disease. By learning the underlying physiology, students will be able to critically evaluate health claims for scientific accuracy. 📌 — Elaine Evans

Published in *Pursuit* Spring 2019 By Elaine Evans

Joyce Chen, specialist in motor learning and stroke research



A LOVE OF MUSIC and a fascination with the human brain inspired KPE's new faculty member to pursue a career in neurological research. Assistant Professor Joyce Chen was trained as a physical therapist in the area of neurorehabilitation. She went on to complete her PhD at McGill and post-doctoral training at Oxford University and Harvard Medical School in the cognitive neuroscience of music. Curious about the brain's incredible potential, Chen decided to focus her research on motor learning in patients recovering from a stroke and is looking forward to collaborating with the Faculty's multidisciplinary team of researchers.

What drew you to this field of research?

I'm an amateur musician and trained as a physical therapist. I also love the brain – what other organ allows us to feel, experience and think? This led to a curiosity for how we can enhance the learning or re-learning of skills.

Can you tell us a bit about your research?

I want to know how to enhance human performance in terms of our ability to learn and execute motor skills. Are there ways to help a musician master a piano concerto, an athlete consistently execute a slam-dunk, or a stroke survivor lift a grandchild into her arms?

Why is it important to focus on this area?

One of the most remarkable discoveries in the 20th century has been the brain's neuroplasticity; its ability to change in response to experience, injury and training. This has been especially important given the many neurological disorders that impair a person's ability to move. In these cases, therapy often entails the re-training or re-learning of skills like walking, bathing and dressing. We need to find ways to enhance the brain's receptiveness to motor learning, whether it is through practice and feedback, or novel technologies such as non-invasive brain stimulation. Improving a person's capacity to move will enhance their ability to engage in physical activity and foster a healthy lifestyle.

What are some findings you've come across that have surprised you?

Practice may not make perfect in the context of a stroke survivor re-learning basic motor skills. Recent findings suggest that the amount of practice does not correlate with the amount of improvement in some stroke survivors. This is counterintuitive to our understanding that the more you practice, the better you get. It suggests that there may be some limits, at least in the injured brain, as to how far we can push the brain's plasticity and thus recovery.

Tell us more about your background.

I trained and worked as a physical therapist in the area of neurorehabilitation. I completed my graduate and first post-doctoral fellowship in the area of the cognitive neuroscience of music, focusing on how we integrate auditory cues with movements. I wanted to know how we sway our hips in synch with a samba tune, and which regions of the brain help us do this.

Why did you want to join KPE?

I love the fact that KPE is so multidisciplinary. While it's important to specialize in research, nothing exists in a vacuum. I get to focus on my interests in motor learning and be part of the Centre for Motor Control with Tim Welsh and Luc Tremblay. But, I'm also equally excited to build new collaborations with people working in areas such as psychosocial aspects of health and physical activity, and cardiovascular exercise. We need to also understand brain-mind, brain-muscle and brain-heart links that will enable us to intervene in a holistic way.

What do you enjoy most about teaching?

I really enjoy interacting with students. I enjoy hearing about their interests and perspectives and feeling their excitement and curiosity.

What do you like to do when you're not teaching?

I love to hack away at my violin, pretending that I'm a celebrity fiddler...though in reality, it's not too fun for my family. If I weren't in research, I'd see if 10,000 hours of deliberate practice leads me to Carnegie Hall.

Published in *Pursuit* Fall 2018 By Elaine Evans



Healthy Moves

Increasing physical activity can boost immunity in breast cancer patients

A new study from the Faculty has found that moderate to vigorous physical activity may help to regulate a body's level of C-reactive protein – an important biomarker whose levels rise in response to inflammation or infection in the body.

High concentrations of C-reactive protein (CRP) are associated with a higher incidence of disease and mortality in women diagnosed with breast cancer, so strategies to decrease CRP levels are important to improve prognosis and health outcomes, says Professor Catherine Sabiston, a Canada Research Chair in Physical Activity and Mental Health and lead author of the study.

Increasing physical activity levels may be a cost-effective, non-pharmaceutical treatment that can mitigate CRP concentrations after a cancer diagnosis, she says.

“In this study, we found that physical

activity is consistently related to better immunity in the early survivorship period post-treatment, when inflammation could relate to other illness or disease and when the women are focused on getting past treatments and overcoming the lingering side-effects of breast cancer diagnosis,” says Sabiston.

Although previous studies have found

“In this study, we found that physical activity is consistently related to better immunity in the early survivorship period post-treatment.”

— Professor Catherine Sabiston

that moderate to vigorous physical activity decreases the levels of CRP, most of the evidence regarding the benefits of exercise for breast cancer patients was based on controlled and supervised laboratory-based interventions that fall short of describing naturally occurring developmental trends in physical activity and CRP over time, says Sabiston.

The study followed 138 women over the first year after being treated for breast cancer, comparing each woman's physical activity trends over time to her levels of CRP, as well as comparing each woman against the larger group of survivors. The researchers made five data collections over the year, during which the women filled out questionnaires, wore accelerometers for seven consecutive

days to measure their physical activity and provided blood samples to measure their CRP concentrations.

“We found that when women exercise more than their own personal average, they have

better immune function,” says Sabiston. “We also found that women in our sample who were generally more physically active have better CRP outcomes compared to women in the sample who were less physically active.”

It is never too late to start exercising, says Sabiston, and when you exercise any more than usual, it is beneficial.

Published in *Pursuit* Fall 2018 By Jelena Damjanovic



Closing the Gap

Research reshapes exercise education for cancer patients

Sabiston hopes the results of the study will lead to health professionals encouraging women to engage in moderate to vigorous physical activity early after a breast cancer diagnosis and treatment to improve immune function and general health and well-being.

“A specific understanding of the association between moderate to vigorous physical activity and inflammation during the first year [of] post-treatment for breast cancer helps to inform behaviour modification strategies and improve health and disease outcomes,” she says.

The study, published in the *Annals of Behavioral Medicine* journal, was co-authored by Carsten Wrosch and Andrée L. Castonguay from the department of psychology at Concordia University, and Benjamin Sylvester, a post-doctoral researcher in the Faculty of Kinesiology and Physical Education.

The research was supported by the Canadian Institutes of Health Research.

There are two reasons why Angela Fong should feel proud – she recently completed her PhD in Exercise Science with the Faculty and won two awards from the International Society of Behavioral Nutrition and Physical Activity (ISBNPA) at a conference in Hong Kong. Her research on how cancer survivors are educated about the benefits of exercise earned her “best early career abstract” from the Cancer Prevention and Management special interest group and another for “best early career researcher.”

John Cairney, the Faculty’s Director of Graduate Studies, says Fong is a great example of a graduate student who is “excelling at a very high level and getting recognition nationally and internationally for her research.”

Fong was inspired early when she volunteered at a lab that focused on cancer survivors during her undergraduate degree at Western University. “In my doctoral research at U of T, I wanted to drill down to investigate how knowledge is transferred to survivors to see what can be improved from both the patient and doctor perspective.”

Her study included three components: an online survey to breast cancer survivors across Canada about the information they receive about exercise; an environmental scan of Ontario’s 14 main cancer centres to observe the kinds of information they offer; and focus groups with oncology care providers at four cancer centres in southern Ontario to gather perspectives on exercise education.

Fong is building on her award-winning PhD research as a post-doctoral scholar at McMaster University. “Medical professionals are eager to have specialized resources and presenters to talk about exercise,” says Fong. “My plan now is to create and pilot these tools at cancer centres in Kingston and Hamilton. If the pilots go well, I hope to roll the project out across Ontario.”

Fong says the ISBNPA recognition is a real honour. “It shows the work I’m doing is important and impactful.”

Published in *Pursuit* Fall 2018 By Suzanne Bowness

The Zen of Golf

Meditation can improve your golf game



Research from the University of Toronto's Faculty of Kinesiology and Physical Education and Aix-Marseille University in Marseille, France, has found that just seven minutes of meditation can improve your golf game. The study, supervised by KPE Associate Professor Luc Tremblay, in collaboration with Assistant Professor Katherine Tamminen and Laurence Mouchnino, a researcher at Aix-Marseille University, looked at how meditation can improve performance on an indoor (synthetic) putting green.

Before going out on the green, the study participants had their brain wave activity measured with a portable electroencephalogram (EEG) device called MUSE™. After a first set of 30 putts, participants were given a seven-minute break. One group was told to meditate using the MUSE™ headbands, which can provide real-time auditory feedback about brain activity. The second group was told to meditate without the auditory neuro-feedback and the third group was told to just relax. The researchers recorded the study participants' brain activity after the break and then sent them back out on the green for another 30 putts.

"I didn't think a seven-minute meditation was going to do anything," says Sadiya Abdulrabba, a fourth-year kinesiology student, who conducted the study. "A lot of the research I reviewed looked at about eight weeks of intense meditation, so I thought what's seven minutes of meditation going to do for someone who is not an experienced meditator or golfer?"

However, the data analysis showed that the two groups that meditated with and without the neuro-feedback significantly reduced the type of brain activity associated with voluntary movement control, as compared to the group that didn't meditate. These reductions in movement-related brain waves were associated with putting performance improvements for the meditation groups.

"We found that meditation with and without neuro-feedback resulted in better performance," says Abdulrabba. "The group that did not meditate didn't significantly reduce the activity of their movement-related brain waves and showed no improvement in their putting precision.

"Before getting on the green, for best results, consider sitting down for a few minutes and meditating," says Abdulrabba, who benefited from the Undergraduate Student Research Award (USRA) from the Natural Sciences and Engineering Research Council of Canada (NSERC) to conduct this study.

TIPS FOR NOVICE GOLFERS LOOKING TO IMPROVE THEIR GAME

- 1. Don't just jump on the green and start putting. Spend a few minutes sitting close to where you plan to putt and meditate/relax mindfully for a few minutes. Make sure you are in a comfortable position.**
- 2. Try to relax your muscles, including your face, shoulders, arms, trunk and legs.**
- 3. Accept that your mind may wander and try to return the focus to your breathing.**

Published in *Pursuit* Spring 2019 By Jelena Damjanovic



National Grant Funds Kidney Cancer Research

Linda Trinh, an assistant professor in the Exercise Oncology Laboratory at the Faculty, is the winner of the B. Lois Smith Research Award 2018. The award, established by Kidney Cancer Canada and the Kidney Cancer Research Network of Canada (KCRNC), supports peer-reviewed research that promotes excellence in kidney cancer research with a \$50,000 grant.

Trinh was awarded the grant for her proposal to investigate the associations between physical activity and cardiorespiratory fitness levels that contribute to cognitive function in metastatic renal cell carcinoma (mRCC) patients on antiangiogenic therapies. These are treatments that stop tumours from growing their own blood vessels, which might slow the growth of the cancer or potentially shrink it. mRCC patients are likely to be on medications long-term and some data suggests the medications contribute not only to fatigue, but induce cognitive decline as an additional side effect. Trinh's study will examine how physical activity levels can improve cognition function in mRCC patients.

"I am very grateful for this award and want to thank KCRNC for their support on this project. As a junior investigator, it is very exciting to be able to collaborate with a team of internationally renowned experts in exercise, cognition and aging, genitourinary oncology and cancer survivorship," says Trinh.

"This award will allow me to build new collaborations beyond the Toronto Academic Health Science Network to include cancer centres outside of the GTA, such as the Juravinski Cancer Centre in Hamilton."

Luc Tremblay, associate professor and dean of research at KPE, applauds the diverse lenses applied to how we implement physical activity programs and how we assess their impact on the well-being of individuals.

"Our faculty members are demonstrating their ability to develop new research programs that have a strong potential to improve standards of care in various clinical populations," he says. "We are extremely proud that Linda was able to convince organizations providing funding for cancer research to recognize the potential of her research for kidney cancer patients. This early research award is clear evidence of the promising career ahead of Linda."

📍 — JD

Published in *Pursuit* Spring 2019 By Jelena Damjanovic

Protein for breakfast: A recipe for success

By now we all know the importance of eating breakfast each morning, but a new study out of KPE has found that where children are concerned, the type of breakfast matters too. Daniel Moore, an Assistant Professor with the Faculty, recently published a study in the *Journal of Nutrition* that uncovered the benefits of protein intake during a child's first meal of the day to help support their growth and development.



"The more protein a child ate for breakfast, the better their body was able to build new body proteins over the next 9-10 hours." — Professor Daniel Moore

What were you looking to uncover with this study?

We know that dietary protein is important for helping us to maintain muscle mass, and with children, it helps them to grow. Understanding how much protein a child needs is important for us to understand how it might support their overall growth and development. In Western society, we eat protein in an unbalanced manner, which means a little bit for breakfast and most at dinner. If you're a child who's growing and active, we want to make sure you have proper nutrition at the proper time.

Tell us more about the study.

With this study, we asked the question: What kind of an impact does unbalanced protein distribution have on children's growth? Using novel methods, we tracked how much protein their bodies were building and breaking down over the course of several hours, up to an entire day, which allowed us to estimate how much they "grew" over the day. We understood the importance of protein for building lean mass (e.g. muscle and bone), and we wanted to identify what happened if we gave different amounts of protein in breakfast meals. If a child is deficient at breakfast, we wanted to see if there's a dose of protein that would help them grow.

Did any findings surprise you?

We confirmed that similar to adults, when kids sleep and they aren't eating, they are in a negative protein balance, which is normal but would not support their growth over time. During the day when they were eating, they gained back their protein balance. We confirmed our suspicions that the more protein a child ate for breakfast, the better their body was able to build new body proteins over the next 9-10 hours. We structured the study to create an environment similar to a normal school day. The children ate breakfast, stayed in the lab, then ate a small lunch, had recesses etc. During that day, the kids who ate more protein for breakfast were in a better protein balance by the end of the day. In effect, they had grown more in the 9-10 hours than those who had a smaller protein breakfast.

Does it matter which source of protein you choose?

That is something that we are exploring now. In this study we provided milk-based proteins. We were looking at protein amounts and timing and not necessarily protein type. In adults it seems that animal proteins are used more efficiently by the body than plant proteins. Right now we don't know if that's the case in kids, so we are looking at additional studies.

Fit Tips from Professor Moore

Make sure kids consume breakfasts with protein. Aim for about 7-14 grams, depending on the child's size. A cup of milk would give 7 or 8 grams. An egg might be 6-8 grams. If your child really enjoys a big scrambled egg breakfast with a big glass of milk and gets 21 grams of protein, it's not a big deal. Within reason, they can't overconsume protein at breakfast.

Ensure that your kids continue to consume protein throughout the day. We recommend anything with protein in it, consumed about every 4-5 hours. This will help them meet their daily protein requirements and will help support their growth.

Liquid and whole foods are both important. Whether the protein comes from milk or a peanut butter sandwich, both sources are going to help support a child's requirements.

Whole foods are much more nutrient dense than supplements for children. A child who is 30 kg only needs about 40 grams of protein to meet their daily requirements. Most kids in the Western world are meeting the protein requirements, so there is no need to supplement protein.

Make sure kids meet the minimum daily requirements of moderate to vigorous physical activity, which is 60 minutes a day. In addition to other health benefits, children who meet this requirement have stronger muscles and bones than those who don't.

BUSY KIDS

Are organized sports robbing kids of free play?

By Jelena Damjanovic

Photography by Seed9

Mason Gelman is seven years old. He goes to a hockey practice or game 4 to 5 times a week, sometimes more, interrupting the cycle only to go for a swimming class once a week. In the summer and fall, he takes up flag football and baseball. Too much time in training, too little time left for playing? Not really, says Mason's father Bryan.

"I find the opposite," he says. "Mason is in a high level of hockey and takes it very seriously, but when he gets home he has no issue throwing the basketball around for hours on end, playing soccer in the backyard, or even just playing Lego in the basement."

Gelman is among the group of parents who see value in their children's busy schedules, despite growing public sentiment that too much structured activity may be interfering with a child's ability to play freely.

A new study by researchers from KPE and McMaster University now validates their viewpoint. The study followed 2,278 children from Grades 4 to 8. Not only did it find that children who are involved in organized sport embrace free play, it found they generally engage in more physical activity on their own than those who are not in organized sport.

Lead author of the study, KPE Professor **John Cairney**, says part of the explanation might be that children who are naturally inclined to enjoy organized sport are simply active kids. But, the other reason may be that organized sport teaches the fundamental motor, psychological and social skills that children need for unsupervised activities.

"There is more to organized sport than just moderate to vigorous physical activity participation. There is learning to follow rules, playing as a team member, friendships that form through team sport and, of course, learning new skills. While time spent being physically active is important, we can't ignore or minimize the importance of these other benefits for the child's development," says Cairney.

Still, the researchers were surprised by the results.

"You would expect that children who are participating in a lot of organized sport each week would have less time or less desire to participate in free play," says Rheanna Bulten, who contributed to the study as a research assistant while finishing her undergraduate degree at KPE.

"I've been a varsity athlete at U of T for the last five years, and when I get home from practice I don't much feel like going out for a bike ride with my friends. But our study indicated the opposite: children who participate in more organized sport are more likely to engage in free play pursuits."

The study found this effect to be independent of gender or socio-economic status, meaning the positive correlation isn't limited to one specific group of kids.

"That was a surprise too, because we expected that even if we didn't see organized sport participation affecting free play participation in boys, we would likely see it in girls given the gender gap in physical activity participation that starts to emerge around adolescence. But there was no gender effect. In other words, organized sport is good for free play participation no matter the child's gender, and no matter their socio-economic status," says Bulten, who started her first year in the Faculty's Master of Science program in Exercise Sciences this September.

Although the results weren't what the researchers expected, they are what they had hoped.

"Given how many children today participate in organized sport, it is very encouraging that kids are still finding time for free active play, especially given the importance of it for child development," says Cairney.



Stella does gymnastics year round, soccer in the spring and skiing in the winter.

“Given how many children today participate in organized sport, it is very encouraging that kids are still finding time for free active play.”

– Professor John Cairney

Children and youth participating in free, active play have the opportunity to be creative, learn to organize games in the absence of adults or specific rules, and develop or alter physical activity experiences in a variety of ways and settings, the researchers say.

But, contrary to what some may think, children do not naturally acquire many of these skills on their own. And if they are not confident in their physical ability, they will be less likely to explore and try a wide range of activities.

“Organized sport and physical activity often involve a skill development component, where fundamental motor skills are practiced and reinforced. The acquisition and reinforcement of a range of these skills through structured experiences may provide the foundational skills necessary to facilitate participation in a broader range of discretionary activities in children,” says Cairney.

So, it’s possible that children are getting those skills from their experiences in sport and organized play and they’re practicing and using them in free play.

This resonates with Lianne Assal, mother of three boys, who play soccer, hockey, karate and baseball. Assal says she’s been confronted on numerous occasions by family members or friends who tell her that her children are overscheduled and don’t have a chance to play freely.

“It makes you think, but then I see the benefits of organized sport every day in my children. I see them developing, making friends and having fun. If anything, I’d say organized sport enhances their ability to play,” Lianne says, describing her younger child playing with hockey cards for hours, strategizing, keeping scores and inventing his own game.

“And, the older one will go out in the backyard and kick around a soccer ball with the younger ones,” she says.

Mason’s father says he, too, hears from other parents that they don’t want their kids spending their young lives in a hockey rink.

“I get it, but from my perspective, I see the value in what Mason gets out of being on a great hockey team with his amazing buddies. He’s having fun, learning about discipline, time management skills and commitment to the team. He is learning how to be a good winner and a good loser, on and off the ice,” he says.

“I think these are great life lessons.”

So, are there any downsides to being involved in organized sport?

Researchers found indirect evidence against early specialization in a single sport or physical activity.

“Too often we hear about children being pushed into activities because mom or dad think it is what they should be doing or what they played when they were a kid. I would love to see a system where children, especially in the first 10 to 12 years of

life, could experiment and try all kinds of activities before they decide to narrow their options,” says KPE Assistant Professor **Kelly Arbour-Nicitopoulos**, who co-authored the study with Cairney.

“It is not a problem if a child decides to quit or stop playing a sport or activity, if they move to a different activity. It is only a concern if they stop active pursuits altogether. Physical activity participation is a journey, not a destination.”

She encourages parents considering an organized sport for their child to ask themselves whether the focus is more on competition, or having fun and making friends.

“Kids who enjoy sports tend to identify two reasons – that it’s fun and they can make friends,” she says. “When youth drop out, it is because these things are comprised.”

Cairney says the children have it right. “It should be about fun and friendship. It can also be about learning new skills and trying different activities that challenge us. The overwhelming majority of children and youth who play sport will not go on to professional or even high-level amateur careers.”

He says the goal should be participation for life, to encourage kids to experience the joys of playing that will lead to lifelong participation in physical activity.

“We need to stop viewing youth sport as a gateway or feeder system to elite sport participation. Our goal should be to let all children (and adults) play.”

While the researchers found the positive effect of sport participation on free play to benefit both sexes, they also found that sex and socio-economic status were among the most important barriers to children’s participation in organized sport.

“Removing structural and social/cultural barriers to organized physical activity participation should be a priority for policy makers, communities and parents,” says Arbour-Nicitopoulos.

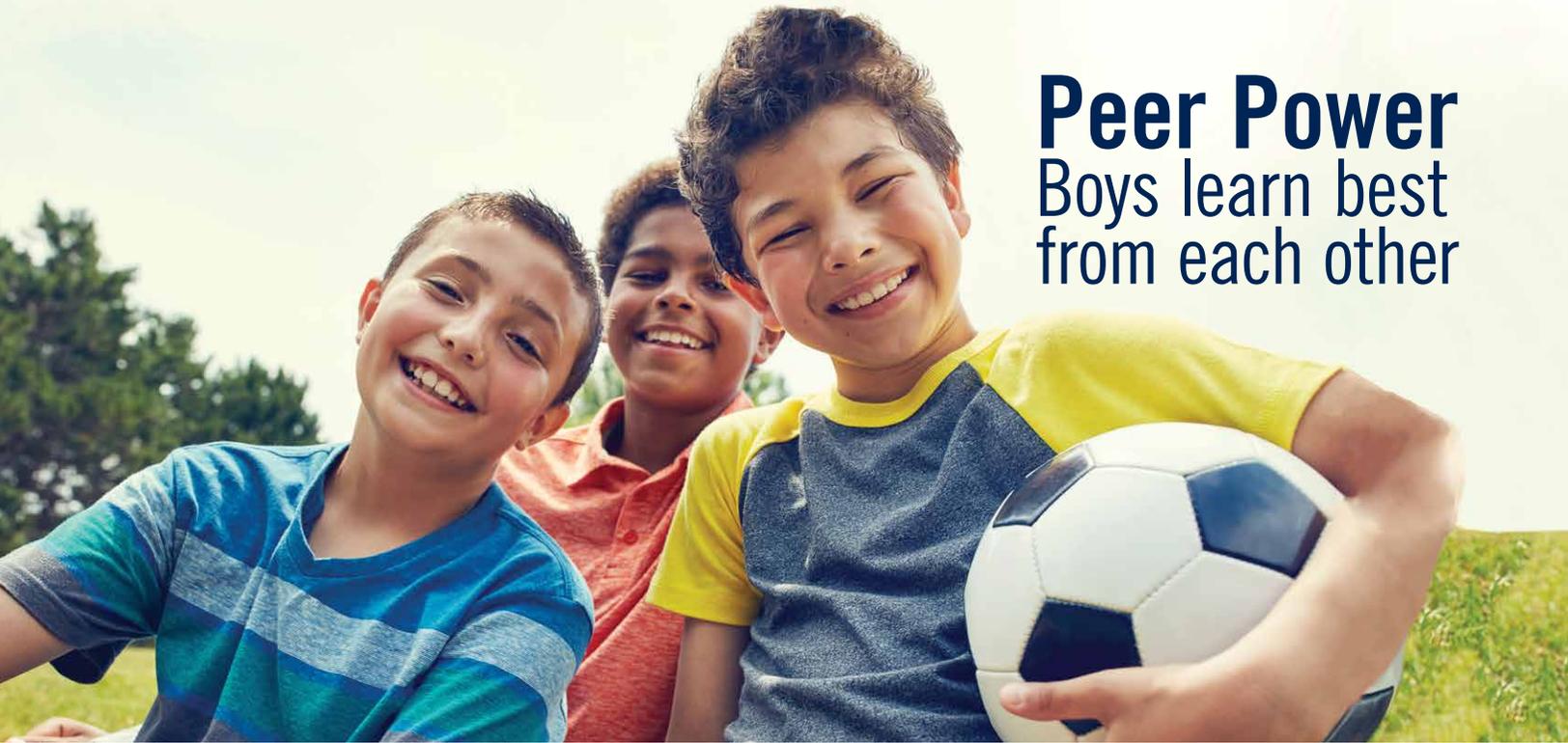
“Having instructors and coaches who are well-trained in inclusive practices, activity spaces that are welcoming to individuals of varied abilities and experiences and funding to support the sustainability of programs are three critical issues to consider when promoting physical activity for all,” she says.

“Making a commitment to ensuring all children are getting enough physical activity means a societal investment into high-quality physical activity programs that start when children are young. It not only encourages participation in sport, but as our study results indicate, it may also help to support active free play.” 

This study was supported by the Canadian Institutes of Health Research and is available online in the *Medicine & Science in Sports & Exercise journal*.

Peer Power

Boys learn best from each other



Trying to get your teenage boys to behave at the dinner table? Chances are they will respond better if you get one of their peers to model the behaviour for them, according to a study from researchers at the Faculty.

The study, published in the *Cognitive Development* journal, looks into how children and youth engage in “self-other matching” – the ability to look at another person’s body and relate it to an understanding of their own body.

“When we attempt to imitate someone else’s action, such as how they are standing or walking, we need to first identify the other person’s body parts – the arms, legs, head, etc. Then, we need to conceptually map those body parts to our own body parts and match the positions and motions of the other person’s body parts to those of our own body,” explains Timothy Welsh, a professor in the Faculty who co-authored the study with Associate Professor Luc Tremblay, and graduate students Sandra M. Pacione, Shikha Patel and Aarohi Pathak of the Faculty’s Centre for Motor Control.

The researchers hope the study will lead them to a greater awareness of how people with and without neurological or social disorders interact socially.

“Because this ‘self-other matching’ process is thought to be one core step in social interactions like empathy and observational learning, more effective self-other matching with peers might help us understand more about how we interact with and learn from people we consider to be peers and non-peers,” says Welsh.

The researchers found that the matching process was strongest when the children and youth looked at the bodies of their peers. For example, boys aged 10 to 12 engaged in “self-other matching” when they saw an image of an 11-year-old boy, but not so much when they were shown pictures of a seven-year-old boy and a 15-year-old boy.

This age component surprised the researchers, who had assumed that because people interact with those in all stages of life, age wouldn’t be an issue. “It’s not that children and youth are incapable of self-other matching with non-peers, but it does seem that this self-other matching process is most effective with peers,” says Welsh.

There was no evidence of self-other matching among girls who participated in the study. The researchers attribute this finding to the fact that youth participating in the study were only

given images of boys to view. Boys were the focus of the study because the research was designed as the start of a series of future studies of people with neurological disorders, such as autism, which tend to be more common in boys than girls. This result may indicate some cross-gender considerations that require additional research, according to Welsh.

Teachers, coaches and parents may want to take note of the results of the study. “If you are trying to teach someone a new behaviour or movement by having the person model and imitate those movements of another person, it could be that this modelling and learning might be more effective if a peer is the model,” says Welsh.

“This is not to suggest that people cannot learn by watching anyone, whether they are a peer or not, only that the learning might be more effective when we can easily match the body we observe onto our own body.”

The research was supported by the Natural Sciences and Engineering Research Council of Canada (NSERC), Social Sciences and Humanities Research Council of Canada (SSHRC) and Ontario Ministry of Research and Innovation. 📍 — Jelena Damjanovic

Published in *Pursuit* Spring 2019 By Jelena Damjanovic



Let's Play!

Creating inclusive playgrounds

In October 2018, Prince Edward Island's Charlottetown became the first Canadian city to get an accessible playground built through Canadian Tire Jumpstart Charities, a national charity invested in giving all children a sporting chance. The playground features traditional play components modified for children of all abilities, including double-wide ramps for wheelchair access and roller slides to eliminate possible static electricity build-up for those who wear hearing devices.

Jumpstart has pledged to build at least one Jumpstart Playground in every Canadian province and territory over the next five years through its Inclusive Playground Project – welcome news for families of children with disabilities, who often experience exclusion in typical playground spaces, where design has been based on normative assumptions about how children develop, move and play.

“We push our children to play outdoors, tell them about the importance of being in nature for their physical and mental health, but these opportunities

are not available for all children,” says KPE Assistant Professor Kelly Arbour-Nicitopoulos, who specializes in disability and physical activity.

She and Ron Buliung, a professor of geography at UTM and chair of the tri-campus graduate programs in Geography and Planning at U of T, are co-leading a team of experts to evaluate the experiences of accessible playground users, primarily the families of children with disabilities. Their findings will help the stakeholders understand how well these spaces work for the families and if there are elements of the design that can be improved.

“The goal is to be able to do this research on an ongoing basis, so that we can inform the design of playgrounds as they are developed for other provinces and territories,” says Arbour-Nicitopoulos. The study will kick off its evaluation in spring 2019 by which time five of the playgrounds are scheduled to be up and running. The remaining eight playgrounds will be evaluated between summer 2019 and spring 2021.

For Buliung, the connection is personal. His daughter was born with spinal muscular atrophy type 2, a genetic neuromuscular disease that causes progressive muscle weakness and requires her to use a wheelchair.

“We can't just get in the car and go to a playground and play like other families. We have to make the space work for us and that's not always easy,” he says.

Arbour-Nicitopoulos and Buliung hope their findings can provide guidelines on how to create inclusive playground spaces for children of all abilities. But the end goal, both of them agree, is to eventually modify and adapt all municipal playgrounds to make them inclusive for a range of abilities.

“If we can determine that these accessible playgrounds make sense and work for families, then we can begin to look at how to apply this knowledge and design to other playgrounds across the city. Instead of building islands of and for disability, let's create inclusive opportunities for play for all children across our cities,” says Buliung. 📍 — JD

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GIRL POWER

KPE student is one of the G(irls)20

When the annual G(irls)20 Global Summit met in October in Argentina, fourth-year KPE student Ambareen-Rose Velji (pictured left) was among the 24 international delegates representing Canada. Launched in 2009 at the Clinton Global Initiative, G(irls)20 aims to empower girls and women to be agents of economic and social change.

Velji's application was helped by the research she had been doing with KPE Professor Catherine Sabiston, focusing on girls' participation in sport and body image.

"I think that definitely gave me a leg up, as it demonstrated my knowledge of prominent issues surrounding girl's health and what I could uniquely contribute if given the opportunity," says Velji.

Part of the role of the delegates was to create policy recommendations for increased participation of girls in digital, rural or financial spaces. Velji chose to contribute recommendations towards digital inclusion, specifically girls' health, safety and representation in that space. Her recommendations were based on her research on body image disturbances, eating disorders and mental illnesses

resulting from unrealistic societal expectations of the body, and the role sport can play to combat unhealthy ideals in girls.

"My background as an athlete, kinesiology student, researcher and future author (Velji is writing a book on her personal journey with weight and body image) all came together full circle," she says.

Velji played competitive sport for 14 years, coming close to playing for team Canada's floorball team. She went into kinesiology driven by the idea of studying movement, sport and physical activity. But, she was equally excited to learn about sport psychology and nutrition.

"Going through rehabilitation from sport injuries piqued my interest in anatomy, high performance and recovery," says Velji.

"During my competitive sport years, as I grew older and began to move up in skill level, my dad became my mental coach. That's when I began to be more interested in the mental side of being an athlete."

Working in Professor Sabiston's lab, Velji worked on a study focused on girls' body image and the reasons for

dropout among girls in sport. She collected videos and resources that exist on helping to foster positive body image, and analyzed them for valuable information to inform future intervention work.

"She has a passion for girls' health and well-being, and a personal interest in body image, so it was a natural fit for her," says Sabiston.

Velji describes her experience at the G(irls)20 Summit as life changing.

"There was something so powerful, empowering and inspiring about being in a room with 23 other female delegates from across the globe, working together on levelling the playing field for girls, empowering them to be confident and independent, and providing them with equal opportunity to contribute to whatever field they feel passionate about, from politics and economics to medicine."

Over the week in Buenos Aires, the delegates attended workshops, participated in panel discussions with international experts, and voted on the topics that will be included in the final



G(irls)20 Communiqué, creating a set of policy recommendations on increasing the participation of girls through digital, financial and rural inclusion.

“Developing a communiqué was such a unique experience, because I learned about how decisions are actually made on a global level between countries,” says Velji.

The communiqué was presented to Argentina’s G20 Sherpa, Pedro Villagra Delgado, who will bring it before the G20, an international forum for governments and central bank governors that served as a model for the G(irls)20 Summit.

The delegates also learned how to develop a strategy and how to pitch their post-summit impact initiatives when they return to their home countries. Velji’s initiative is centred on building a camp called Shatter, which would offer leadership workshops to girls from low-income families in Canada, using sport as the driving vehicle. Through her initiative she also wants to increase participation of girls in science, technology, engineering and mathematics (STEM), working with companies to provide volunteer/intern opportunities for participants of her camp.

“It was an absolute honour to represent Canada at the G(irls)20 Summit. I have never felt more proud to be a Canadian nor have I ever felt more confident in what I have to do to shatter the ceiling for other young girls,” says Velji. “This has been the best experience of my 20-year life and I can’t wait to be a change maker who helps close the gender gap.” 📍 — JD

Published in *Pursuit* Spring 2019 By Jelena Damjanovic



TOP HONOURS

Professor Scott Thomas recognized by the Canadian Society for Exercise Physiology

Professor Scott Thomas was recognized with a prestigious award at the annual meeting of the Canadian Society for Exercise Physiology (CSEP). Thomas received the 2018 CSEP Professional Standards Program Recognition Award for his contributions spanning over 30 years.

“This award means a lot to me. It highlights the importance of our efforts to make exercise for health safe, effective and accessible to Canadians,” says Thomas.

His research into the role of physical activity in cardiovascular health, control of blood pressure during exercise, effective behaviour change strategies in cardiac rehabilitation and best practices for assessing readiness to return to activity was described as integral to CSEP’s mission to promote evidence-based practice in the health and fitness industry.

“CSEP is known as the premier exercise physiology research organization in Canada and also as Canada’s gold standard for exercise and fitness certification programs,” says Professor Ira Jacobs, dean of KPE. “I applaud those on the award selection committee for their insightful recognition of this most deserving awardee and offer my heartfelt congratulations to Professor Thomas.” 📍 — JD

Published in *Pursuit* Spring 2019 By Jelena Damjanovic

THE BALL'S IN YOUR COURT

By Jelena Damjanovic

Photography by Denise Miltzer



“These young men get told that they have cancer and it totally derails them.”

Although testicular cancer accounts for a little over one per cent of all male cancers, it is the most common cancer diagnosed in male adolescents and young adults in Canada. According to the Canadian Cancer Society’s Advisory Committee on Cancer Statistics, incidence rates of testicular cancer have nearly doubled over the last 20 years, with approximately 1,100 new cases discovered each year.

The good news is that the majority of these cases are discovered early, with many survivors expected to have a long life expectancy following curative treatment. But, this also means that there is a growing community of young men in need of long-term follow-up care because testicular cancer survivors are at an increased risk of cardiovascular disease, secondary cancers and infertility. They also report higher levels of psychological distress compared to their peers.

“This is a very unique group of cancer patients,” says Doctor Robert Hamilton, a surgeon at the Princess Margaret Cancer Centre (PMCC), who oversees the testicular cancer program. “They are usually young men between the ages of 15 and 39. They may have just started a new job or they’re in the early part of a relationship. Then they get told that they have cancer and it totally derails them. It’s very easy to fall off the societal map if you don’t have something to ground you,” he says.

Anika Petrella, a PhD candidate in the Health Behaviour and Emotion Lab at KPE, worked with Hamilton at the Princess Margaret Hospital as a clinical counsellor for testicular cancer survivors and noticed many of them were struggling.

“They don’t fit in the children’s hospital where the average age is six and they don’t fit in at an adult hospital where the average cancer patient age is 60-65, especially in genitourinary cancers,” says Petrella. “So, they kept asking me if there were any programs they could join with other testicular cancer survivors and there was nothing.”

Petrella went back to her PhD supervisor at KPE, Professor Catherine Sabiston, to put together a program that would improve social support for testicular cancer survivors while giving them an opportunity to address their concerns about physical health and well-being. With Sabiston’s backing and assistance from Hamilton, Patrella conducted a survey of 140 testicular cancer survivors treated at PMCC and discovered the men preferred interventions outside the hospital setting that are group based and geared towards their age and gender. The survey also revealed that testicular cancer survivors tend to be very active, but few were engaged in sport.

And so, *The Ball’s in Your Court* was conceived, bringing together KPE researchers, Varsity Blues athletes and coaches and PMCC in the delivery of a program that leverages sport as a conduit to engage testicular cancer survivors in supportive care. Hosted in the Faculty’s Athletic Centre, the program was spread over five weeks, with participants meeting each week for an hour of strength and conditioning, followed by an hour of basketball with the coach and volunteer athletes from the Varsity Blues men’s basketball team.



“We put out a call to our varsity coaches to see who would like to be involved and the response was overwhelming.”

“In designing the program, we thought about all the physical activity spaces that we have available on campus,” says Sabiston, “and then we put out a call to our varsity coaches to see who would like to be involved.”

The response was overwhelming, but eventually they settled on basketball because it was easier to modify and widely accessible.

“The players really enjoyed interacting with the participants of the program,” says John Campbell, head coach of the Varsity Blues men’s basketball team. “They were of similar age. This was an opportunity for the players and coaches to gain some awareness about other people’s struggles while also contributing to their recovery. The best part has been seeing the smiles on everybody’s faces.”

Alex Malone, strength and conditioning coach for the Varsity Blues, says he was surprised by the participants’ levels of self-determination.

“Their attitude was amazing. A couple of them came by the gym outside the regular program hours and some got memberships in other gyms. It’s cool to see how some of the stuff we did here influenced their lives outside,” says Malone.

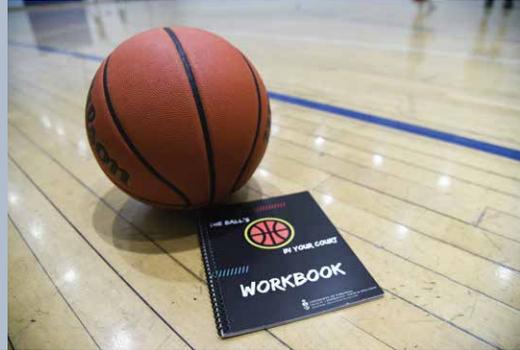
That’s an important part of the program, says Petrella, adding that the participants were also supplied with a workbook to help them manage the side-effects of the disease and to guide them on the path to healthy living.

“We’re trying to integrate new healthy behaviours into their lives that can have a long-term impact on their physical health. Men diagnosed with testicular cancer are living 50 plus years after curative treatment, so we need to reach them now so they make behavioural changes early,” she says.

The pilot program had 11 participants, including Paul Silvestri, an elementary school teacher and musician. He was diagnosed with stage 4 testicular cancer in 2017 at age 36. Following chemotherapy and multiple surgeries, he was glad to come across *The Ball’s in Your Court* program.

“Fitness and nutrition are a high priority of mine, so I jumped on the chance to work out and do something sport specific,” he says.

But, it wasn’t easy. When Silvestri started the program, he was only four weeks out of a surgery and had to get medical clearance from his team of doctors. On day one, he felt he could barely participate, but he took it slowly.



“The very first time we played basketball, the energy was great and everybody was talking to each other, yelling and high fiving. You could see it working.”

“The second session I found I could do 40 per cent and, by going to the gym on other days throughout the week, I found that by the third session I could participate 50 per cent. By the fourth session I could do about 70 per cent,” he says.

Silvestri says his confidence grew when he saw that he was able to do more with every single session, even though he was still recovering from his surgeries. And since participating more in every session was proof that he was recovering very well, he was able to contend with the cancer process better.

“I felt more energized and I felt my strength, endurance and flexibility all improving dramatically,” he says.

This is in line with Petrella’s findings, which point to the significant impact the program had on the participants’ perception of fatigue, strength, sense of control and social connectedness.

“After having two surgeries, I was very eager to get back to exercise for my own well-being and to gear up for my third and final surgery,” says Silvestri. “It was really important for me to be able to work out with other people and build camaraderie. Being on medical leave takes you out of your routines and can put a lot of other important things on hold, like dating. Exercise is something I love to do and I took full advantage of those moments to participate in order to feel like I had a little more of my life back.”

Hamilton, who treated the majority of the participants of the program, says men, especially young men, don’t do a good job talking about cancer and the range of effects on their lives.

“So it’s not just the physical body that we’re tuning up here. It’s about the mental side of the recovery process. The general principle of cancer recovery is that you have to stay active, you have to keep going and try to get back to your normal life as quickly as possible, because there are physical and mental health benefits to doing that.”

“This was an opportunity to gain some awareness about their struggles while also contributing to their recovery.”



Sabiston hopes the program can become a part of standard care to which Hamilton’s patients would have access. The other major goal would be to have a “program in a box,” something that can be disseminated to universities across Canada and globally.

“It’s my understanding that there is no program that links hospitals with varsity athletics programs anywhere in North America or the world. But, there is usually a hospital of some sort in most of the cities where there are big universities, so it makes for a natural fit,” she says, adding the program could also be used as an experiential learning opportunity for kinesiology students, who could lead some of the modules.

Recent KPE graduate David Kuzmochka-Wilks volunteered for the program, advising participants about different movement patterns, but primarily cheering them along.

“The very first time we played basketball, the energy was great and everybody was talking to each other, yelling and high fiving,” says Kuzmochka-Wilks. “I missed two sessions, but coming back and seeing the progression was amazing. You could see it working.”

Seeing the participants enjoy the program also brought happiness to the varsity basketball players volunteering for the program.

“It was a great experience,” says Eli Mouyal, a student of psychology. “I really enjoyed the opportunity to be a mentor.”

“We all go through a lot of stuff in our lives and I was happy to be a part of a program like this,” adds his teammate Hassan Adenola, a third-year kinesiology student.

Sabiston calls it a major collaborative event that came together naturally because so many people really believed in the idea.

On February 10, Silvestri, was doing what he loves, performing at the Free Times Café on College Street. Asked to describe his set, he called it “Smashing Pumpkins and Radiohead meet classical music.” An unexpected combination, but it works, much like the program that supported his recovery.

Published in *Pursuit* Spring 2019 By Jelena Damjanovic

KPE RESEARCH FUNDING – 2018-2019

Primary Investigator	Sponsor	Research Project Title	Funding Type	Amount
ARBOUR-NICITOPOULOS, KELLY	Canadian Tire Jumpstart Charities	Play Finds a Way Through Inclusive Playgrounds	Operating	\$66,250
ARBOUR-NICITOPOULOS, KELLY	MITACS	An Evaluation of the Adoption and Implementation of the Instructor Manual for the Canadian Congenital Heart Alliance's Fearless Physical Activity Event using the RE-AIM Framework	Studentship (Grad)	\$15,000
ARBOUR-NICITOPOULOS, KELLY	Social Sciences & Humanities Research Council (SSHRC)	A Workshop to Advance the Inclusion of Persons with Disabilities in Recreation	Operating	\$24,861
ARBOUR-NICITOPOULOS, KELLY	Special Olympics Canada	A Study on Quality Participation Experiences in Special Olympics Programs	Operating	\$20,000
ARBOUR-NICITOPOULOS, KELLY	University of British Columbia - Subgrant	The National Physical Activity Measurement Project for Children and Youth with Disabilities	Operating	\$66,750
CAIRNEY, JOHN	Ministry of Children and Youth Services (ON)	Developmental Surveillance during the Early Years - Year 2	Operating	\$761,582
CAIRNEY, JOHN	MITACS	Using Dance to Promote Physical Literacy in Children and Youth: An Examination of the Sharing Dance Program	Studentship (Grad)	\$80,000
CAIRNEY, JOHN	Social Sciences & Humanities Research Council (SSHRC)	Youth Sport Participation: A Survey Measure of Youth Sport Experience	Operating	\$66,031
CAIRNEY, JOHN	Social Sciences & Humanities Research Council (SSHRC)	Improving Physical Literacy and Brain Health Through Dance: An Evaluation of the Sharing Dance Program	Operating	\$24,695
CAIRNEY, JOHN	Social Sciences & Humanities Research Council (SSHRC)	Building Capacity and Strengthening Community Research Alliances in Youth Sport for Development	Operating	\$6,283
DARNELL, SIMON	Ministry of Research and Innovation (ON)	Using Participatory Action Research to Understand Sport and Social Development in Toronto Ontario	Operating	\$22,441
DARNELL, SIMON	Social Sciences & Humanities Research Council (SSHRC)	Sport and Sustainable Development: History, Policy and Practice	Operating	\$42,271
FUSCO, CAROLINE	MITACS	Auto-ethnography of a Martial Art Training Camp	Operating	\$3,000
HUTCHISON, MICHAEL	Canadian Institutes of Health Research (CIHR)	Post-acute Structured Exercise following Sport Concussion: A Randomized Controlled Study	Operating	\$504,284
HUTCHISON, MICHAEL	Natural Sciences & Engineering Research Council (NSERC)	An Interactive, Personalized Approach to Concussion Rehabilitation	Operating	\$14,775
HUTCHISON, MICHAEL	Queen's University - Subgrant	Understanding Concussion: From Injury to Return-to-Action	Operating	\$147,194
KERR, GRETCHEN	Respect Group Inc.	An Evaluation of the Respect in Sport Activity Leader Module	Operating	\$9,492
MOORE, DANIEL	Canadian Institutes of Health Research (CIHR)	CIHR Fellowship - High-intensity Exercise as a Countermeasure to Inactivity-Induced Anabolic Resistance and Metabolic Dysregulation in Healthy Adults	Fellowship	\$30,000
MOORE, DANIEL	Natural Sciences & Engineering Research Council (NSERC)	Mechanisms of Human Skeletal Muscle Remodeling with Exercise	Operating	\$29,000

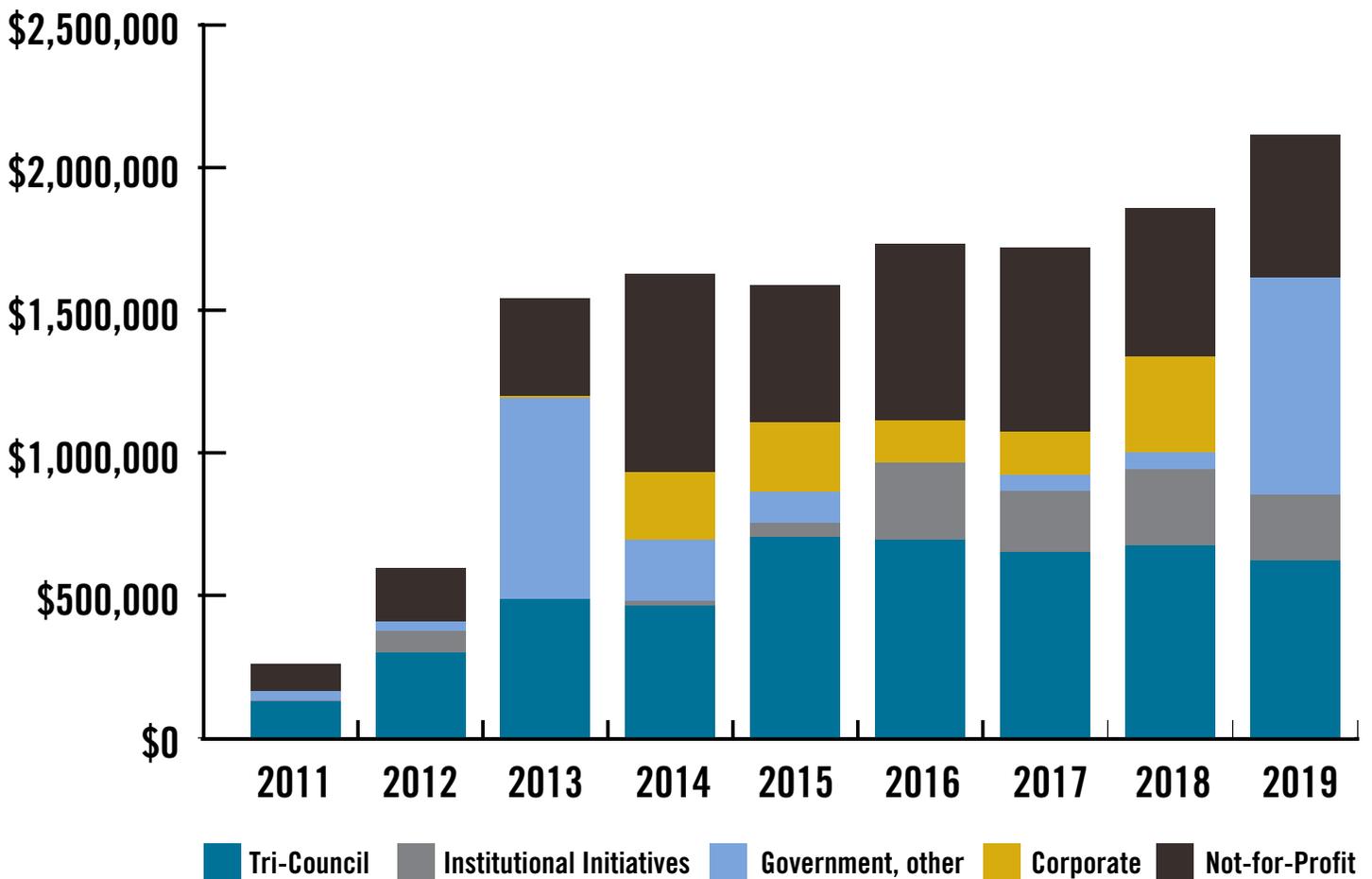
Primary Investigator	Sponsor	Research Project Title	Funding Type	Amount
SABISTON, CATHERINE	Canadian Institutes of Health Research (CIHR)	Development, Implementation, and Evaluation of a Novel Physical Activity Maintenance Program for Women with Cancer	Fellowship	\$34,167
SABISTON, CATHERINE	Canada Research Chairs - CRC (CIHR)	Canada Research Chair in Physical Activity and Mental Health	CRC-Tier 2	\$120,000
SABISTON, CATHERINE	Canadian Breast Cancer Foundation	Improving Physical Activity and Reducing Sedentary Behaviour among Breast Cancer Survivors: MOVING Research to Practice	Operating	\$66,640
SABISTON, CATHERINE	MITACS	An Examination of Physical Activity Discussions in Mental Health Care	Studentship (Grad)	\$6,000
SABISTON, CATHERINE	MITACS	Targeting Lifestyle Behaviours among Teenage and Young Adult (AYA) Cancer Survivors in the United Kingdom and Canada	Studentship (Grad)	\$6,000
SABISTON, CATHERINE	Social Sciences & Humanities Research Council (SSHRC)	Body-related Self-conscious Emotions and Sport Participation among Adolescent Females	Operating	\$45,584
TAMMINEN, KATHERINE	Ministry of Research and Innovation (ON)	Improving Emotion Regulation and Coping among Youth Sport and Competitive Athletes	Operating	\$87,621
TAMMINEN, KATHERINE	Social Sciences & Humanities Research Council (SSHRC)	Interpersonal Emotion Regulation in Sport	Operating	\$46,511
TAMMINEN, KATHERINE	Social Sciences & Humanities Research Council (SSHRC)	Parent-Athlete Communication in Sport	Studentship (Undergrad)	\$6,000
THOMAS, SCOTT	Canadian Institutes of Health Research (CIHR)	DRA Studentship - Cardiac-oncology Rehabilitation Exercise for Breast Cancer Survivors with Reduced Cardiac Function (CORE Study)	Studentship (Grad)	\$35,000
TREMBLAY, LUC	Natural Sciences & Engineering Research Council (NSERC)	Real-time Multisensory Utilization during the Different Online Control Phases of Voluntary Actions	Operating	\$24,000
TRINH, LINDA	Kidney Cancer Research Network	Associations between Physical Fitness, Physical Activity and Cognitive Function in Patients with Metastatic Renal Cell Carcinoma: A Prospective, Pilot Cohort Study	Operating	\$25,000
WELSH, TIMOTHY	Natural Sciences & Engineering Research Council (NSERC)	The Processing of Nonhuman Animal Bodies and Point of Gaze	Operating	\$28,000
WELSH, TIMOTHY	Social Sciences & Humanities Research Council (SSHRC)	Beauty is in the Eye (and Body and Brain) of the Beholder: Identifying and testing predisposing body	Operating	\$37,132
WELSH, TIMOTHY	Social Sciences & Humanities Research Council (SSHRC)	Do Kiki and Boubo become Kirk and Bob, or erhaps Carrie or Bella?	Operating	\$1,570

Source: RIS Award Report by Sponsor, April 1, 2018 to March 31, 2019. Faculty of Kinesiology and Physical Education

Research Funding by Year

2018-2019 FUNDING BY SPONSOR

Tri-Council	\$621,582
Institutional Initiatives	\$230,063
Government, other	\$761,582
Not-for-Profit	\$502,908
TOTAL	\$2,116,135



SOURCE: RESEARCH DATA CUBE FUNDING BY SPONSOR (EXCLUDES ALL INFRASTRUCTURE FUNDING), APRIL 1, 2018 TO MARCH 31, 2019. FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

PUBLICATIONS (2018-2019)

Sorted alphabetically by first listed KPE faculty member. Does not include accepted publications.

Books (7)

Atkinson, M. (2018). *Sport, Mental Illness and Sociology*. London: Elsevier. (Editor)

Darnell, S. C., Field, R., & Kidd, B. (2019). *The History and Politics of Sport-for-Development: Activists, Ideologues and Reformers*. Global Culture and Sport Series, Basingstoke: Palgrave MacMillan.

Collison, H., **Darnell, S. C.**, Giulianotti, R., & Howe, D. (Editors). (2019). *Routledge Handbook of Sport for Development and Peace*. London: Routledge.

Alexander, S. A., Frohlich, K. L., & **Fusco, C.** (2018). *Play, Physical Activity and Public Health: The Reframing of Children's Leisure Lives*. Routledge Studies in Physical Education and Youth Sport, David Kirk, Series Ed..

Kowalski, K., McHugh, T., **Sabiston, C. M.**, & Ferguson, L. (2018). *Research Methods in Kinesiology*. Oxford University Press.

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Shephard, R. J. (2018). *Obesity: A Kinesiologist's perspective*. Abingdon, OX, Routledge.

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Atkinson, M. (2019). Risk Culture. In K. Young (Editor), *The Suffering Body in Sport*. London: Elsevier.

Atkinson, M. (2019). Parkour. In M. Baker (Editor), *Routledge Encyclopaedia of Citizen Media*. London: Routledge.

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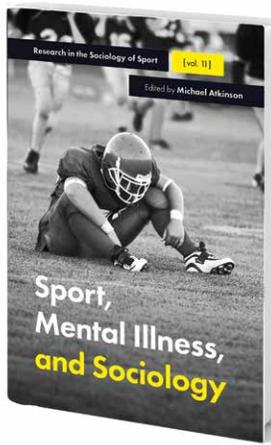
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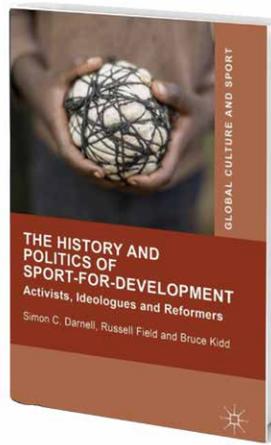
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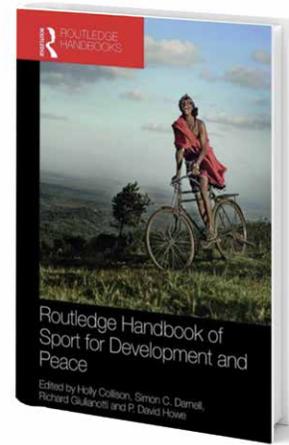
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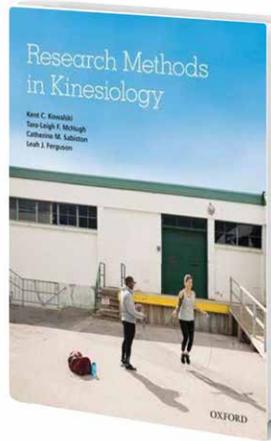
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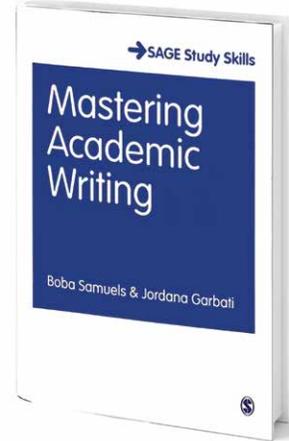
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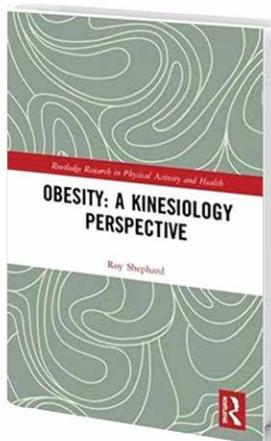
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