



FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

ANNUAL RESEARCH REPORT 2021–2022



UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

WELCOME

Welcome to the 2021–22 Research Report of the Faculty of Kinesiology and Physical Education Education (KPE). The following pages offer an overview of the innovative and impactful research led by our faculty members across a wide variety of fields that comprise the academic discipline of kinesiology. Here are just a few of the highlights from this spectacular year.



Gretchen Kerr, dean



Tim Welsh, associate dean of research

The Tanenbaum Institute for Science in Sport (TISS), a global centre of excellence for high performance sport science and sport medicine, was kickstarted in May 2022 with a \$20-million gift from the Larry and Judy Tanenbaum Family Foundation – the largest philanthropic gift in support of high performance sport research that has ever been given to an academic institution in Canada – and a \$21.5-million contribution from U of T and Sinai Health. With Professor Ira Jacobs appointed interim director, TISS brings together the sport science research of KPE with the sport medicine research of U of T’s Temerty Faculty of Medicine, and the clinical and research expertise of the Dovigi Orthopaedic Sports Medicine Clinic and the Lunenfeld-Tanenbaum Research Institute at Sinai Health.

U of T startup Rhea Health Inc., founded by Associate Professor Michael Hutchison, director of the MacIntosh Clinic concussion program, announced the launch of its digital rehabilitation platform, Active Recovery™, which uses personalized, evidence-based movements to treat brain health conditions.

An anti-racism project, led by Assistant Professor Janelle Joseph, director of the Indigeneity, Diaspora, Equity and Anti-Racism in Sport (IDEAS) Research Lab, in collaboration with Ontario University Athletics (OUA), shed light on OUA racial demographics and members’ experiences and understandings of racism, proposing strategies for change. And that’s just scratching the surface.

Collectively, our faculty published 162 peer-reviewed articles, two books and 18 book chapters this year. They held over \$1.7 million in research funding across 36 research grants and contracts. And, for the third year in a row, the QS World University Rankings placed the U of T programs in kinesiology, physical education and sport and exercise sciences fifth in the world. This important recognition is indicative of the growing global relevance of the discipline of kinesiology, and it serves as further incentive for our faculty to continue the steady progress we are making towards the research capacity and research excellence priorities outlined in the new Strategic Academic Plan.

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

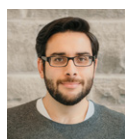
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Awards and Grants	37
Books	2
Book Chapters	18
Peer-Reviewed Articles	162

MEET THE RESEARCH FACULTY



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KPE's Ira Jacobs appointed interim director of newly launched **Tanenbaum Institute for Science in Sport (TISS)**



Professor **Ira Jacobs**, then dean of the Faculty of Kinesiology and Physical Education, got a phone call from Larry Tanenbaum's executive assistant, who told him that the chairman of Maple Leaf Sport and Entertainment (MLSE) would like to meet with him in his office.

Jacobs had spoken to Tanenbaum on many occasions over the years about his philanthropic contributions to the university and the Faculty specifically, including scholarships for U of T student-athletes made available through the Larry and Judy Tanenbaum Family Foundation. Nevertheless, he wasn't sure what to expect.

"Whenever someone asked to meet in my office, I never knew if it was going to be a laudatory, happy meeting to say, 'well done, the Faculty is doing great things,' or if it was to raise a concern about something serious that they thought merited a conversation with me in person," says Jacobs.

As it turned out, he had no reason to be worried. On the contrary. Tanenbaum shared that the time was right to plan a gift that would be supportive of high performance sport, which had been such an important part of his own professional career.

"He wanted to do something significant, something that would have high impact in the field of high performance sport, and he asked if we could develop a plan that would bring together the fields of sport medicine and sport science," says Jacobs. "It was a thrill to understand both the nature and the size of the gift he anticipated."

And so, the vision was born for the Tanenbaum Institute for Science in Sport (TISS), a global centre of excellence for high performance sport science and sport medicine. With a \$20-million gift from the Larry and Judy Tanenbaum Family Foundation – the largest philanthropic gift in support of high performance sport research that has ever been given to an academic institution in Canada – and a \$21.5-million contribution from U of T and Sinai Health, TISS was officially unveiled in late May 2022.

TISS brings together the sport science research of KPE with the sport medicine research of U of T's Temerty Faculty of Medicine, and the clinical and research expertise of the Dovigi Orthopaedic Sports Medicine Clinic and the Lunenfeld-Tanenbaum Research Institute at Sinai Health. Its mission? To support research that advances high performance in sport for professional and non-professional athletes and para-athletes, as well as for members of the wider community, both able-bodied and with disabilities, who want to optimize their recreational participation in sport.

"TISS will help us understand human limitations and human capacities as they relate to sport," says Jacobs, who was appointed interim director of the institute. "Specifically, it will support research that will prevent injury, enhance recovery and utilize technologies to develop nutritional, training and rehabilitation interventions to allow all sport participants to optimize their abilities to achieve high performance."

About half of the funding from the gift will go to each of the TISS partners to endow new positions, such as a new chair in sport science and data modelling, a chair in musculoskeletal regenerative medicine and a professorship in orthopaedic sport medicine, and to attract top researchers from Canada and around the world. The rest of the funding will provide a pot of funds to which scientists associated with the three partners can apply to accelerate their research, innovations and clinical programs.

Professor Gretchen Kerr, dean of KPE, says she is delighted for the Faculty to be a part of this exciting research enterprise. "The Tanenbaum Institute's cutting-edge research will play a leading role in advancing high performance sport in a manner that is healthy, safe, welcoming and inclusive," she says, adding that Jacobs was a natural choice for interim director.

"Professor Jacobs has been instrumental in developing the Tanenbaum Institute from the very beginning, working alongside colleagues in the Temerty Faculty of Medicine, Sinai Health and experts from the high performance world to match the aspirations of the three partners with those of the Larry and Judy Tanenbaum Family Foundation. It's wonderful to see their vision come to fruition."

As interim director, Jacobs will oversee two advisory committees, one focused on research and the other on external relations and partnerships. One of the things he is most looking forward to is having at least one conference annually that would "give scientists an opportunity to communicate with each other and give those who are

in the high performance world – athletes, coaches, etc. – an opportunity to receive cutting-edge and applicable new knowledge."

Jacobs is also excited about the open science framework (OSF) that will be cultivated

at TISS – something that was important to the donor. OSF has scientists sharing their research with each other from the planning stages.

"This will enable researchers to know who else is doing research in their area of interest and, rather than see it as a competition, see it as something that advances science more rapidly," says Jacobs. "They may be able to add something to it or create collaborations and networks that would otherwise either not happen at all or would take a lot longer to occur. The end goal is to make knowledge available to everyone more effectively and efficiently."

Jacobs says he is grateful to the Larry and Judy Tanenbaum Family Foundation for recognizing the power of research to amplify the immense potential of sport.

"Their generous gift will empower TISS to generate, advance and disseminate transformational knowledge in the world of high performance sport that will be of benefit to all – not only in the GTA and Canada, but the world."

"This will enable researchers to know who else is doing research in their area of interest and, rather than see it as a competition, see it as something that advances science more rapidly." – Ira Jacobs

**By Jelena Damjanovic
Published online 12/07/2022**

Study reveals gaps when it comes to recognizing racism in Ontario university sports



An anti-racism project led by a University of Toronto researcher in collaboration with Ontario University Athletics (OUA) found many “completely unaware of the depths of the problem.”

The project, led by **Janelle Joseph**, an assistant professor in the Faculty of Kinesiology and Physical Education and director of the Indigeneity, Diaspora, Equity and Anti-Racism in Sport (IDEAS) Research Lab, aimed to shed light on OUA racial demographics and members’ experiences and understandings of racism – and propose strategies for change.

“The OUA anti-racism project was unique in that it examined a single athletic organization from the perspectives of a wide range of stakeholders, including administrators, coaches and student-athletes,” says Joseph.

“This allowed us to get a good understanding of the relationship between individual experiences and systemic barriers, especially across a large and diverse province such as Ontario.”

The OUA established the Black, Biracial and Indigenous (BBI) Task Force in August 2020, with the KPE-led project stemming from the group’s work. Nearly 45 per cent of an estimated 11,200 members of OUA – including 4,058 student-athletes, 716 coaches and 227 sport administrators – completed questionnaires designed by Joseph and her team. Additionally, 107 members participated in interviews and focus groups, including all 20 OUA athletic directors.

Among the report’s key findings is that universities across Ontario share similar experiences with racism in sport, meaning racism

can’t be dismissed by universities as a problem that only happens elsewhere – on a different team or at a different school.

“The assumptions that racism exists only in the United States or only at those universities about which public reports have been shared is what allows racism to perpetuate,” said Joseph. “But in the same way that culture has shifted on how sexism or concussions are viewed in the OUA today, there needs to be a public acknowledgement of ‘hidden’ racism in order to prevent racial injustice.”

While demographic findings echo previous research on the subject showing disproportionate recruitment, hiring and leadership opportunities for white student-athletes, coaches and administrators, the report provides further insights into members’ experiences and understandings of racism.

For example, while only one per cent of OUA members see racism as “extremely common,” there is a large percentage of student-athletes (52 per cent) who see racism as “not at all common.” That’s a concerning result since 72 per cent of student-athletes identify as white and, according to the researchers, “seem to be unaware of how ‘everyday racism’ operates.”

“Racism can take many forms,” says Sabrina Razack, a PhD student in Joseph’s IDEAS Research Lab. “Overwhelmingly, the examples shared by OUA members fall into the category of microaggressions, which, whether intentional or not, are still deeply felt by racialized members of the community and perpetuate exclusion.”



Razack points out that while 41 per cent of student-athletes, coaches and staff said they “never” witnessed or experienced racism, those who said they experienced it “a lot” (8.9 per cent), “most of the time” (1.7 per cent) or “all of the time” (2.5 per cent) should concern us. Of those who said they experience it “all of the time,” 31.5 per cent identify as Black.

“The biggest surprise for me was the disparity between how racism was a common, daily experience for some and yet completely unknown by others,” says Joseph. “Those who are racialized described racist jokes and barriers to recruitment and promotion that, sadly, had become expected. Meanwhile, those who had not witnessed, heard or seen racism first hand were completely unaware of the depths of the problem.”

To make significant change, Joseph says there is a need to first increase awareness of racism and how racial inequities are embedded in the fabric of university sport.

“We know the range of ways racism occurs and have tools for change recommended directly by OUA members,” she says. These include:

- **Education:** create campaigns, using social media and other channels, to shift culture and build awareness of what racism looks like, providing ongoing educational tools.
- **Recruitment:** remove experience and education barriers from job descriptions while intentionally mentoring and recruiting qualified Black, Indigenous and people of colour (BIPOC) candidates.
- **Supports:** create and hire for a position devoted to anti-racism for case management and programming, hire racialized students, and implement mental health supports.
- **Accountability:** collect data on racial demographics and anti-racism initiatives within the OUA, specify a zero-tolerance racism policy, share publicly, and commit to specific changes.

“The biggest surprise for me was the disparity between how racism was a common, daily experience for some and yet completely unknown by others.”

– Janelle Joseph

Gord Grace, the president and CEO of the OUA, wrote in the introduction to the report that the takeaways from this study will serve as a foundation to support future strategic action and help make the organization a more inclusive and safe community for all. To that end, the OUA has already begun implementing some of the recommendations from the report, including the launch of the Black or Indigenous Heritage Student-Athlete (BIHS) Bursary, which was announced in September 2021.

“The entire OUA community is thankful for the opportunity to work with the IDEAS Research Lab, not only because of the exemplary work done within the anti-racism project, but because of what it will mean moving forward for the entire university sport landscape in Ontario and beyond,” says Grace. “With this invaluable research in hand, we are truly motivated and better informed to help address real change in the OUA.”

By Jelena Damjanovic
Published online 25/10/2021



KPE researchers develop policy tool to help improve sport decisions during COVID-19

In 2021, the Commonwealth Secretariat, the intergovernmental organization that supports member countries to achieve the Commonwealth's aims of development, democracy and peace, announced the launch of a policy tool to help member countries make informed sport decisions during the COVID-19 pandemic.

Developed in collaboration with the Faculty of Kinesiology and Physical Education, the online policy analysis tool offers best practices from across the Commonwealth to support policy makers in tackling emerging sport challenges in a continuously evolving health crisis. The tool is a partner piece to the discussion paper about the implications of COVID-19 for community sport and sport for development prepared by KPE researchers at the Centre for Sport Policy Studies in the summer of 2020.

“There is overwhelming evidence that the organized sport sector has been affected negatively,” says Professor **Peter Donnelly**, one of the co-authors of the policy tool from KPE. “While the main emphases in the media were on the challenges faced by capitalist sport, organized sports for children and youth in schools and communities, adult recreational leagues and all other levels of organized sport participation suffered much more from closed facilities, staff layoffs and social distancing requirements.”

According to Donnelly, restricted access to sport and recreational physical activity had detrimental effects on the physical, mental and community health of citizens. While many innovative ways emerged for people to stay physically active, these

were far more available to higher income people than those whose exposure to poverty and unhealthy environments had already compromised their health.

“While the pandemic exposed and exacerbated what we already understood as inequalities in health and health care, it also exposed many other inequalities in employment, high-speed broadband access, travel, transportation and so on,” Donnelly says.

However, returning to what we had before won't be enough, according to Professor **Bruce Kidd**, who worked with Donnelly and Associate Professor **Simon Darnell**, also of KPE, on developing the policy tool.

“When we talk about returning to ‘normal,’ we need to remember that ‘normal’ was not a very satisfactory or healthy way to live for significant proportions of the populations of Commonwealth countries,” says Kidd. “Instead, we need to build back a better system.”

Kidd suspects that once herd immunity is achieved, there will not be many challenges to resuming ‘normal’ sporting activities – those that have been inaccessible to large proportions of the populations of Commonwealth countries. The real challenges, according to him, will be to find ways to support and fund access to sport and physical activity for far larger proportions of the population.

“There is good evidence to indicate that active healthy populations represent a real asset to public health,” he says. “People developing physical, mental and community resilience are in a far better

position to manage future pandemics and future natural disasters.”

The tool suggests ways in which communities can help to support the continuation of sport and physical activity during various stages of a pandemic and outlines some strategies that would help to achieve a more active, healthy population with more resilience in the face of future pandemics.

These strategies include:

- establishing a cap on funding for high performance sport and channelling all new funding to grassroots participation;
- encouraging school boards to revitalize curricular physical education and after-school sports and encouraging cities to continue to develop bike paths, walking/running trails and recreational spaces; and
- working to overcome inadequacies in the current sport system in order to build a much more open and inclusive system.

“With the arrival of the vaccines, we are able to see the light at the end of the tunnel,” says Darnell. “We hope that our policy tool will serve as a helpful guidebook for governments not only to rebuild, but to build a better, sustainable and more inclusive sport sector that can contribute to the physical well-being and mental health of all its citizens.”

By Jelena Damjanovic
Published online 02/03/2021

There's an app for that

KPE researcher develops mobile rehab tool to help concussion patients manage their recovery

U of T startup Rhea Health Inc. announced the launch of its digital rehabilitation platform, Active Recovery™, which uses personalized, evidence-based movements to treat brain health conditions.

The company also announced it has raised seed funding led by Thought, a Toronto-based family office of investors focused on funding companies with great business models that are designed to enact social change, alongside participation from other investors in the sport and health care fields.

Rhea will initially target concussion rehabilitation, with other brain health areas to follow. Rhea, spun out of the University of Toronto in June 2020, was founded by **Michael Hutchison**, associate professor at the Faculty of Kinesiology and Physical Education and director of the concussion program at the David L. MacIntosh Sport Medicine Clinic.

Working in collaboration with a number of leaders in brain health, including David Lawrence, interim medical director at the MacIntosh Clinic and lead team physician of the Toronto Blue Jays, Hutchison has published pioneering studies showing that an active approach to concussion rehabilitation optimizes recovery.

“We’re pleased with the support we’ve had from Thought and our other investors. These funds will enhance our ability to bring Rhea’s active approach into the hands of patients and clinicians to address a significant void in concussion rehabilitation. The funding also allows us to develop and expand into the mental health area,” says Hutchison.

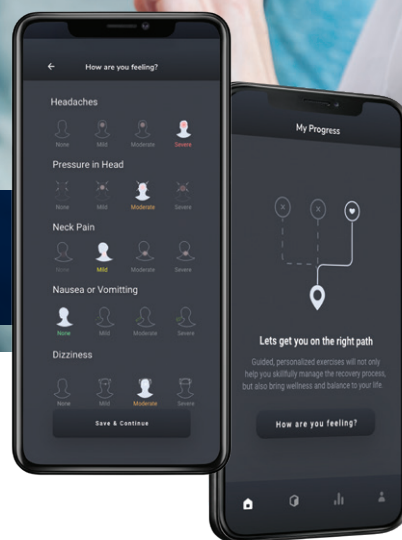
Rhea is based on close to a decade of research and clinic experience in active rehabilitation and movement science, combined with the principles of education and support. Because the platform is fully digital, Rhea offers a new,

enhanced level of access for concussion sufferers on a mobile device or computer.

Lawrence adds, “Currently, there is a gap in concussion recover, and Rhea’s digital platform helps to address it. Individuals and health care professionals now have easy access to evidence-based active recovery strategies and insights from a range of health care professionals.”

“We recognized the unique approach to brain health and concussion recovery that Rhea developed and the opportunity to help those who need it get affordable, leading-edge care where it wasn’t available before. We’re excited to work with the team as they move the platform forward,” says Srin Sridharan of Thought.

Rhea is being commercialized through professional and amateur sports teams, schools and community organizations, and insurance and health care channels. It provides expert support for individuals suffering from concussions and other brain health conditions. Rhea is the only fully digital platform to offer an evidence-based movement program that is tailored to a patient’s symptoms and needs, tracks progress and optimizes the program throughout recovery. Rhea’s Active Recovery approach was developed by leading concussion experts from the Faculty of Kinesiology and Physical Education and the David L. MacIntosh Sport Medicine Clinic. Rhea has been supported by Thought, University of Toronto Innovations and Partnerships Office and UTEST, a U of T accelerator.



By Alyson Bruce
Published online 13/10/2021

“FLEXIBILITY AND CHOICE” NEEDED FOR ATHLETIC UNIFORMS



THE NORWEGIAN WOMEN'S BEACH HANDBALL TEAM was fined €1,500 by the European Handball Federation for not adhering to the athlete uniform regulations and wearing shorts instead of bikini bottoms at the European Beach Handball Championships.

Professor **Catherine Sabiston**, a Canada Research Chair in Physical Activity and Mental Health, has done research on body image and published a paper with Professor Timothy Welsh, interim associate dean of research at KPE, that suggests women wearing loose and concealing clothing had better motor performance than those wearing tight and revealing clothing. We spoke to her about the controversy.

What's your take on this particular uniform regulation?

CS: Regulations for uniforms without any flexibility and choice demonstrate a lack of regard for the athlete's integrity and sense of self, a lack of innovation, a lack of respect for cultures and different climates, a lack of a progressive approach on inclusivity and equity and a maintenance of the objectifying focus on women's sport – where the focus is on how girls and women look versus how they perform.

Can such regulations act as deterrents for women who might otherwise be interested in taking up a sport?

CS: Absolutely. Uniforms can be a deterrent for starting or trying out a sport, a reason for having poor experiences and a factor of disengagement and drop out. We completed a study demonstrating that uniform style, fit and rigid regulations affect girls' body image and provide an overarching feel of inequity for girls' and women's sport – from the athletes, parents, coaches, referees and sport administrators. Uniforms were discussed in the interviews a lot, and there was an overall perception that uniform regulations impacted the quality of sport experiences for girls. Since we have also found that body image and negative emotions tied to the body are related to less sport engagement and greater drop out, it means that some girls are not even thinking about some sports with specific uniform regulations.

Should sport uniforms be a matter of choice?

CS: There are many ways to innovate in regulations for uniforms. From the closeness of fit, to amount and type of material used, to sizing. Uniforms have to be free choice to demonstrate any respect for the athletes. Also, it is important to highlight that many youth may need multiple uniforms in one single season to feel comfortable. The natural developmental changes that take place during adolescence means a season could start out in a perceived comfortable uniform that soon becomes uncomfortable, and in some cases can lead to a lack of intent to return. Without flexibility and choice, uniform regulations are impacting the inequities we see in sport across the lifespan, and from grassroots and community opportunities through to the Olympics.

Can the cut and make of a uniform influence an athlete's performance?

CS: Professor Welsh and I worked together on research showing that close-fitting clothing impacts motor performance. Based on this research and many other similar studies and theories, we found that if uniforms are not comfortable, it provides athletes with another sport stressor to think about and focus on, which draws attention away from the needed skill, strategy and performance. Women should be focusing on what they need to do to perform their best – not how they feel in their uniforms. Uniforms have a purpose to help with performance, but not at the expense of the integrity and self-perceptions of the athletes.

By Jelena Damjanovic (published online 27/07/2021)

KPE EXPERTS CONTRIBUTE TO DIGITAL BOOK ON SAFE SPORT MOVEMENT IN CANADA



Tackling abuse in Canadian sport is high on the list of faculty members at the Faculty of Kinesiology and Physical Education. From conducting groundbreaking research into the prevalence of abuse among elite athletes to affecting policy changes and advocating for a culture shift in sport, KPE scholars have been at the forefront of the movement for safe sport in Canada.

Professor **Gretchen Kerr**, dean of KPE, Professor Emeritus **Bruce Kidd**, U of T's ombudsman, Professor Emeritus **Peter Donnelly**, sessional instructor **Marcus Mazzucco**, senior research associate **Ellen MacPherson** and doctoral student **Erin Willson**, president of AthletesCAN, each contributed a chapter to a book on safe sport, edited by Brock University sport management professor Julie Stevens.

The open-access, digital book is called *Safe Sport: Critical Issues and Practices*. It provides critical insight from researchers, sport leaders and policy makers on the possibilities and limitations of the safe sport movement in Canada.

"Understanding safe sport from the athlete's perspective is vital as we continue working through safe sport issues in Canada," says Willson, who worked with Georgina Truman from AthletesCAN, the independent association of Canada's national team athletes, on a chapter identifying the many ways in which athlete advocacy has led to change in sport, especially in recent years.

Kidd and Donnelly contributed chapters on the history of safe and inclusive sport and the changes that have taken place in sport governance.

"People have always struggled to make sports safer and more inclusive, despite resistance," says Kidd. "The current Canadian campaign for safe sport must be understood in its historical context."

"It's important to be able to determine the organizational chart under which athlete abuse may occur or be prevented," says Donnelly. "Raising questions about sport governance in a sport organization helps us determine whether it is responsible, accountable and transparent."

Mazzucco collaborated with Hilary Findlay, retired associate professor of sport management at Brock, to contribute chapters on legal considerations and safe sport, including the concept of jurisdiction and how it relates to sport bodies adopting and implementing the Universal Code of Conduct to Prevent and Address Maltreatment in Sport (UCCMS).

MacPherson and Ian Moss, CEO of Gymnastics Canada, wrote a chapter about the progressive steps Gymnastics Canada is taking to advance safe sport, including adoption of the UCCMS and educational initiatives to promote culture change.

Finally, Kerr wrote about the key factors that led to the development of the UCCMS, including research evidence and athletes' voices, and identified next steps in realizing UCCMS.

"While the UCCMS identifies prohibited conduct, it represents only a first step in the safe sport journey," says Kerr. "The next steps include the need for independent complaint and adjudication mechanisms, and extending the notion of safe sport beyond the prevention of harms to include optimization of the sport experience."

In addition to researchers from the University of Toronto and Brock University, contributors to the free digital book also include researchers from Ontario Tech University, as well as sport leaders from a number of organizations including AthletesCAN, the Coaching Association of Canada, the Canadian Centre for Ethics in Sport and Gymnastics Canada. The wide-ranging content is complemented by practical case studies and textbook-style learning features.

"This ensures the content can be applied by sport leaders, policy makers and researchers to enhance sport in Canada," says Stevens in a press release issued by Brock University. "The book is also great for students. These future leaders must understand the multiple dimensions of creating and maintaining a safe sport system for lasting change."

Safe Sport: Critical Issues and Practices was made possible with funding by the Government of Ontario and through eCampusOntario's support of the Virtual Learning Strategy.

By Jelena Damjanovic
Published online 19/04/2022



Debating intermittent fasting and exercise

Fans of intermittent fasting say consuming fewer calories by skipping meals helps you lose weight and leads to other health benefits. But what happens to your body when you add exercise to the mix?

Matthew Lees and **Eric Williamson**, both at the Faculty, have studied the effects of intermittent fasting on muscle health in the general population and older adults. Lees, a post-doctoral researcher, and Williamson, a PhD student and registered dietician, conducted the research with Associate Professor Daniel Moore.

Lees and Williamson spoke to us about the benefits of complementing intermittent fasting with exercise.

What is intermittent fasting?

Eric Williamson: Intermittent fasting means going without food for an intentional period of time. There's no real strict definition of how long that time has to be, but for the most part, it's at least 12 hours. Most people will practice intermittent fasting with the intention of losing weight. The thinking behind this is that intermittent fasting will keep your insulin levels lower, and by lowering insulin, which is known as the fat-storing hormone, you will lose body fat.

What does the science say about it?

EW: Research in this area provides ample evidence that the majority of people who practice intermittent fasting will typically lose weight, but not for the purported reason of lowering insulin levels. Rather, evidence shows that skipping meals does not typically lead to compensatory eating. So, if you skip breakfast, you will typically eat a little bit more at lunch, but you won't eat as much as if you had eaten breakfast. That ends up putting you into a caloric deficit and, by the laws of physics, is what leads to the loss of mass over time.

What's the appeal of intermittent fasting?

EW: Finding ways to lose weight that are as simple as skipping a meal is very difficult because many people find it hard to manage their hunger while being in a caloric deficit. But, if they find that their hunger is well managed with intermittent fasting and they plan to exercise at the same time, then it can be an effective tool for losing fat.

What's the benefit of combining intermittent fasting and exercise?

EW: Research indicates that if you are going to practice intermittent fasting, you should combine it with exercise – in particular, resistance training. The reason for that has to do primarily with protein metabolism. We know that having our protein intake in multiple feedings throughout the day is better for our lean mass and for lean mass retention over time. Muscle is a significant component of lean mass, so if you are fasting, you are skipping these opportunities for the effects of a protein intake on your muscle metabolism and risking muscle atrophy.

Put simply, when people practice intermittent fasting without exercising, they are losing weight, but much of it often comes from the muscle in the lean mass. If they are exercising, then that shifts from a loss of muscle mass to a loss of fat mass, so that's a large benefit.

Are certain types of exercises better paired with intermittent fasting than others?

EW: Yes, the effects of resistance exercise in particular are so potent that you would likely still be able to preserve muscle, or at least not lose it as quickly, if you're practicing intermittent fasting at the same time. On the other hand, if somebody was looking to gain as much muscle and strength as possible, like a powerlifter or bodybuilder, they may want to avoid intermittent fasting, because they'll need both the stimulus of resistance training and protein feedings throughout the day. Some may find they still gain muscle while practicing intermittent fasting, but it likely won't be as quickly as with regular meals and snacks.

Athletes who are trying to maximize performance should also be cautioned as they have very high energy needs; meaning, they'll need a lot of food. If they're practicing intermittent fasting, they're limiting their opportunities to gain that energy. By missing protein feedings, they may not be at as high of a risk of atrophy, but they are risking maximizing their potential. Athletes who are eating more regularly throughout the day are going to be more likely to meet their energy needs, recover better and adapt to their training better.

Does it matter what time of day you choose to fast?

EW: There are potential benefits to practicing intermittent fasting later in the day. Most people skip breakfast because it's easy – you're in a rush, you're not that hungry because our appetites decrease as we sleep. But, from a metabolic perspective, you're better off skipping your evening snack or dinner rather than breakfast.

There are a couple of reasons for that. One is that we're more metabolically primed in the morning, not necessarily for protein intake, but for other nutrients. We tend to metabolize nutrients

“Finding ways to lose weight that are as simple as skipping a meal is very difficult because many people find it hard to manage their hunger while being in a caloric deficit.”

– Eric Williamson

better in the morning. Secondly, nighttime is usually when the junk foods come out. So, if somebody says they're not going to eat after 8 p.m., for example, they're probably eliminating some of these calorically dense, low-nutrient foods.

How does age factor in?

Matthew Lees: As we get older, we're at an even higher risk of muscle atrophy. The body becomes less efficient at using the protein that we consume in the diet, and that process, known as anabolic resistance, is made worse by being sedentary.

You see it happen with people after a hip fracture, for example. Even short periods of bed rest tend to lead to anabolic resistance. If you're also truncating all of your meals within, say, an eight-hour timeframe within the day, you have long periods when you're not feeding. There's no anabolism occurring during that period because there's no feeding, and without exercise that's made even worse.

So, would you advise against intermittent fasting in older adults?

ML: From the perspective of muscle health, it's just not ideal for an older person to engage in the practice of intermittent fasting, because it's counterintuitive towards what's best for muscle in an aging population. They need regular stimulation of the processes that build muscle, and that's what feeding and exercise do. Having a long period where you don't consume any dietary protein is just not conducive to skeletal muscle health in an older population.

If your main goal is weight loss, then it can be a useful tool in younger populations if it fits into their lifestyle. But, for older people, weight loss is not always the principal goal, and oftentimes it can be counterproductive. There are studies showing that a little bit of extra weight in older people is actually beneficial.

Is there anything else people should know about intermittent fasting?

EW: I always recommend speaking with a professional before attempting to lose weight. There are some minor physical risks to weight loss, but the mental health concerns can be great. There's mounting evidence to suggest that food relationship issues can present for some individuals who intentionally skip meals. For the reason of maintaining a positive relationship with food and body as well as to preserve or enhance physical health, I suggest that nobody attempt weight loss without speaking to a professional.

**By Jelena Damjanovic
Published online 01/02/2022**



Elite athletes more likely to experience mental health disorders

American gymnast and four-time Olympic gold medallist Simone Biles is the latest high-profile athlete to withdraw from a major tournament citing mental health reasons.

Biles's decision was heralded as brave and empowering for other athletes who may be hesitant to put their well-being first, but she nevertheless faced attacks from some who suggested she was using mental health as an excuse for poor performance.

A study by the Faculty of Kinesiology and Physical Education suggests that elite athletes experience mental health challenges such as depression, anxiety and eating disorders far more frequently than most people realize.

“Athletes face a huge amount of stress and pressure and have to manage lots of different expectations – especially at the Olympics,” says KPE graduate student **Zoe Poucher**.

“This can have a very negative impact on their well-being.”

Poucher published a paper in the journal *Psychology of Sport and Exercise* that explores the prevalence of symptoms of common mental disorders among elite Canadian athletes.

She found that as many as 41.4 per cent of Canadian national team athletes – those training for Tokyo 2020 – met the cut-off criteria as proposed by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) for depression, anxiety and/or an eating disorder. That's compared to an estimated 10 per cent of Canadians in general who report a mental disorder in a given 12 month period, according to the study.

Specifically, 31.7 per cent of athletes reported symptoms of depression, 18.8 per cent reported symptoms of moderate (12.9 per cent) to severe (5.9 per cent) general anxiety and 8.6 per cent reported scores indicating a high risk of an eating disorder.

“We found a significant positive correlation between stress and the three different mental disorders we measured, so I think that is one important piece of the puzzle,” says Poucher, who collaborated on the study with KPE Associate Professor

Katherine Tamminen, Professors **Catherine Sabiston** and **Gretchen Kerr**, as well as Professor John Cairney from the University of Queensland.

The study also revealed that having competed in a previous Olympic/Paralympic Games was negatively correlated with symptoms of an eating disorder, and that having been selected to attend the 2020 Games at the time of the survey in late 2019 was positively correlated with symptoms of depression.

“I was really surprised by the high percentage of Canadian elite athletes experiencing mental disorders, but in hindsight I probably shouldn't have been since this number is very similar to what we have seen in research that has been done with athletes from other countries,” says Poucher.

Another unexpected finding, according to Poucher, was that athletes who had made the Olympic team had more symptoms of depression prior to the Games.

“We hear a lot about post-Olympic depression, but I have not seen any research on mental health prior to the Olympics,” she says. “I think the assumption is that people are happy they made the team.”

Stress, social support, coping skills and self-esteem were all found to have an impact on the athletes' mental health.

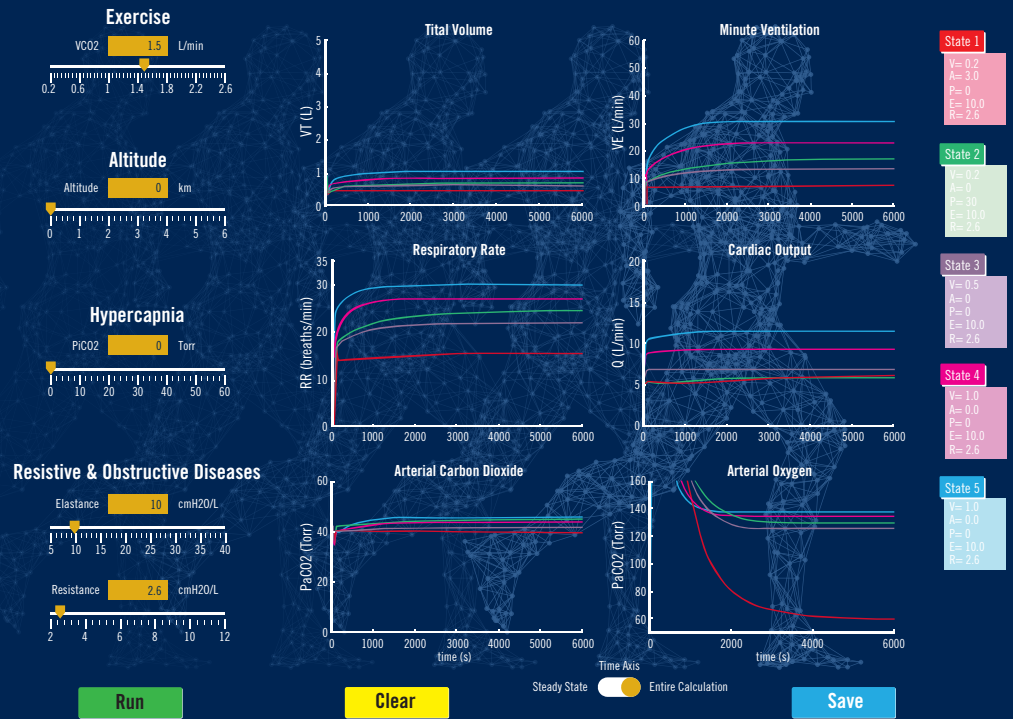
“Mental health is obviously impacting a large portion of elite athletes, but it is still not getting the attention it deserves, and athletes are made to feel bad about it,” says Poucher. “If we can demonstrate that this is a large problem, I am hopeful that it will help to shift the conversation around mental health, increase awareness of the issue and help inform policy-level change.

“Having world renowned athletes like Simone Biles and Naomi Osaka [who pulled out of the French Open, citing her mental health] speak openly about their mental health is helping change the stigma many athletes still face.”

By Jelena Damjanovic (published online 30/07/2021)

BODY MACHINE

KPE students test body responses to exercise using computer simulation



On the left side are the controls that the students can manipulate to simulate exercise or altitude or change lung function. On the right side are the responses that the model predicts. The plots show what happens to breathing, cardiac output, and the levels of O₂ and CO₂ in the blood.

KPE Professor **Scott Thomas** (since retired) came across a study about an application tool called RespiLab. Developed in Spain by Alher Mauricio Hernandez, Miguel Angel Mananas and Ramon Costa-Castelló, RespiLab is a computer model that uses stimuli and responses to help students understand how the body responds to challenges such as exercise, altitude and changes in lung structure.

Intrigued, Thomas emailed the authors to find out more about how the app works and how it could be applied in KPE to teach respiratory physiology. He then teamed up with **Cathie Kessler**, a laboratory coordinator and technician at the Faculty, for help in adapting the app for web use. Several months later, the app was ready to be used in KPE 264, a second-year introductory course to exercise physiology taught by Assistant Professor **Jenna Gillen**.

“I was really excited for the students to use the app in their respiratory and cardiovascular physiology labs,” says Gillen.

“Laboratory activities are designed to complement and help reinforce key concepts discussed in lectures, as well as provide students with a more hands-on learning experience. This usually involves in-person exercise testing in the lab, but in light of current restrictions, this app allowed us to still meet those pedagogical goals while also providing an exciting new tool for our students.”

Students in KPE 264 get a broad understanding of the human body’s physiological response to exercise, specifically the

response of the skeletal muscle metabolic and cardiorespiratory systems.

“This is knowledge that can be applied to both sport performance and human health,” says Gillen.

The students in her course were able to use RespiLab in asynchronous labs to test out different challenges to the respiratory system and to look at how breathing, blood gases and the heart respond.

“The great thing about using a computer simulation is that you can try out challenges that would not be possible in an in-person laboratory,” says Thomas. “For example, you can see what happens if you set the model for moderate intensity exercise at four kilometers altitude for a person with asthma. It also puts some control in the students’ hands because they can try out experiments that they themselves create.”

What makes RespiLab unique, according to Thomas, is that it not only helps students learn about a complex topic such as respiratory physiology, but it also introduces them to widespread computer models.

“My hope is that once these simulations are established in Jenna’s course, we can continue to develop them and use them in other courses across the Faculty,” says Thomas.

“This is knowledge that can be applied to both sport performance and human health.” – Jenna Gillen

By Jelena Damjanovic
Published online 09/03/2021



THE PLAY'S THE THING Creating more inclusive playgrounds

As parasport athletes from around the world converged on Tokyo for the Paralympic Games in August 2021, there was another background conversation going on – one about opportunity. The truth is, not everyone gets an equal shot at that brass ring.

Associate Professor **Kelly Arbour-Nicitopoulos** and her colleagues are working to support the dreams of every child. It all starts on the playground.

For most children, whether they grow up to be Olympians or simply healthy members of society, the journey begins on the local playground. Moving and playing and testing the body outdoors – these are simply part of the story of human development.

And yet, not everyone gets to live that story fully. The urban playground experience is a rite of passage that not all children enjoy.

“The thing is, many playgrounds aren’t actually fully accessible,” says Arbour-Nicitopoulos, who specializes in disability and physical activity. “For example, the wood chips. Those not only keep out a young child who uses a mobility device, it also sends the message that they are not welcome. Spaces like that can end up dividing families. And that can have a ripple effect on the whole community.”

In a peer-reviewed paper, Arbour-Nicitopoulos and colleagues analyzed

35 international studies on the design of existing playgrounds – not just the play structures themselves but their physical and social surroundings – to get a benchmark of what best practices look like right now. The results were fairly discouraging. The verdict: we can do better.

“Play is integral to the health and well-being of all children, and a fundamental child right,” Arbour-Nicitopoulos says.

“Playground play, in particular, is a unique type of play. It offers children with diverse needs and interests the chance to advance their imagination, their self-awareness, their social and motor skills and their identity. So the design of playgrounds is really important.”

Arbour-Nicitopoulos and her colleagues produced a set of evidence-based recommendations to help shape the thinking of playground designers, municipalities and families. All told, they amount to a potential snapshot of the future of urban play.

The next-gen playgrounds may be as different from current playgrounds as the seesaw-and-swingset playgrounds of old are from the playgrounds you see now. They’ll be much more sensitive to the spectrum of children’s needs. They’ll accommodate kids with not just physical disabilities but cognitive and socio-emotional ones as well.

We’ll see changes on multiple fronts – from entry points, to access to elevated components, to the gestalt of the whole space. (There will be a much bigger multi-sensory dimension, for example – but also little oases of calm for solitary play, where sensitive children can get a reprieve from overstimulation.) And members of the disability community will be involved in the design process from the get-go. Fun, safe and completely inclusive: that is the trifecta.

It’s already happening. KPE researchers have been collaborating with Canadian Tire Jumpstart Charities as they pioneer new, more inclusive playgrounds – the first of which was unveiled in 2018 in Charlottetown. (The plan is to build them in every province.)

“Our interdisciplinary team of researchers – with expertise in childhood disability, physical activity, children-and-youth geographies, and planning – is the ideal group to be conducting the research on inclusive playground design,” says Arbour-Nicitopoulos. “Our intent is to use the evidence gathered and lessons learned from the Jumpstart playgrounds to push the thinking on accessible playgrounds ever further.”

Think of it as a transformation of the modern playground into a space where every kid can grow – wherever their dreams take them.

By Bruce Grierson
Published online 20/08/2021



In wake of COVID-19, KPE researcher finds “steep decline” in youth participation in sport

COVID-19 shutdowns gave millions a glimpse of a world without sport. But interruptions to athletic programs due to the coronavirus were also an opportunity to think of better ways for youth to develop through sport after the pandemic. **Simon Darnell**, an associate professor at the Faculty of Kinesiology and Physical Education and director of the Centre for Sport Policy Studies, helped conduct a research project that evaluated youth access and engagement in sport in the wake of the pandemic.

Despite a slight uptick in youth engagement in individual activities such as running, strength training and conditioning, the report found large declines in team and facility-based sports such as soccer, basketball, hockey, swimming and baseball.

“The impact of COVID-19 on sport access and engagement has been drastic,” Darnell says. “There has been a steep decline in the frequency of sport participation overall, as well as changes to both how and where youth have been able to access opportunities to engage in sport.”

Darnell worked on the report – titled “Change the Game” – with Daniel Sailofsky, a PhD student in sociology at McGill University, and Bryan Heal, manager of research and evaluation at the Maple Leaf Sports and Entertainment (MLSE) Foundation. The study, the largest of its kind in Canada, received funding from Mitacs, a non-profit national research organization.

Between March and May of 2021, the researchers surveyed close to 7,000 youth of different backgrounds, including race, geography, age, gender, ability and income, to get a better understanding of barriers to sport participation after the pandemic and explore opportunities to build back better, with a focus on more equitable access to sports for youth.

They found that while different virtual initiatives have been introduced across the sport sector, the increase in virtual engagement paled in comparison to the proportion of youth who

previously enrolled in sport or recreation offerings in-person and who are no longer able to participate.

“To make things worse, youth who have relied on Ontario’s school system for accessible opportunities and competition have now experienced two consecutive years of disruption due to the pandemic,” Darnell says. “Almost unanimously, they expressed feelings of frustration and sadness about the loss of sport.”

The full report includes an interactive visual dashboard that shows how youth responded to key topics, from how many participated in sports multiple times per week before COVID-19 to how those patterns have changed.

The report includes suggestions on how to rebuild the sector in positive ways, including:

- Expanding access to free, low-cost or subsidized youth sport and sport for development opportunities
- Developing a culture of representation and inclusion that is supported by policies and processes
- Designing post-pandemic plans around why youth play – making it fun, social and safe
- Investing in sport to build community belonging

“We set out to better understand how youth from across this land engage in sport and how to build a more equitable sport system for them,” Darnell says. “Along the way, it became the largest youth sports study of its kind in Canada – one which will provide sport and recreation providers, policy makers, funders and future researchers with valuable data and recommendations to change the game for the better.”

By Jelena Damjanovic
Published online 26/08/2021



Elite female athletes subjected to degrading comments, body shaming: KPE study

Female athletes in aesthetic sports are the target of degrading comments and other forms of body shaming that are equal to emotional abuse and can cause long-lasting harm.

That's among the principal findings of a new study by researchers in the Faculty of Kinesiology and Physical Education based on interviews with eight retired female Canadian national team athletes, including five Olympians.

“During the course of our interviews, the athletes all reported experiencing body-related emotional abuse, such as being publicly chastised for their weight or shape and being threatened with removal from the team because of their weight,” says lead author **Erin Willson**, a PhD candidate in KPE and former Olympic synchronized swimmer. “Various international studies of athlete maltreatment in sport cite emotional abuse as the most frequently experienced form of abuse, and yet the long-term implications of these experiences are not well understood.

“In fact, the effects of emotional abuse described by the athletes we interviewed resembled symptoms associated with post-traumatic stress disorder, requiring all eight of them to seek psychological assistance at one time or another to help them recover from their experiences.”

Willson collaborated on the study with Professor **Gretchen Kerr**, dean of KPE. The findings were published in the *International Journal of Sport and Exercise Psychology*.

The study builds on the researchers' previous work with Ashley Stirling, an associate professor, teaching stream, in KPE and vice-dean, academics. That work explored the long-term effects of emotionally abusive coaching on female elite athletes in aesthetic sports, including artistic swimming and rhythmic gymnastics, which emphasize appearance and leanness. The researchers note the athletes experienced body shaming in a variety of ways, including negative comments, body monitoring and extreme food and water restrictions.

One athlete in the study, identified by the pseudonym “Hilary,” said: “The coach put so much pressure on my weight ... she wasn't even coaching me [in training], she was just saying how big my legs were.”

Another, identified as “Carly,” commented: “[My coach] would put me on ridiculous diets, like on weekends if we had Sundays off, I would only be allowed to eat watermelon for the Saturday and Sunday.”

In response to body shaming, the athletes developed an obsession with food and weight, leading to eating disorders, poorer performance and decreased enjoyment in their sport, the researchers say.

“Since many of the actions happened in public and were frequently discussed among teammates, athletes came to accept these behaviours as a normal part of their sport, despite the negative impacts,” Willson says.

“There is a culture of acceptance of these behaviours in many sports when instead they should be recognized as problematic and harmful to the health and well-being of athletes.”

Willson hopes that research drawing a link between body shaming and emotional abuse highlights its negative impact and makes it clear that it is unacceptable.

“There will always be a visual aspect of aesthetic sports that is inherent, but there needs to be an understanding that what a body looks like does not equal the skill or talent of that same body,” she says.

By Jelena Damjanovic
Published online 08/10/2021

CANADIAN SPORT GETS A LOW GRADE ON GENDER EQUITY

Q & A WITH DEAN GRETCHEN KERR



What does gender equity look like in Canadian sport? That's what E-Alliance, Canada's research hub for gender equity in sport, set out to answer. In February 2022, they released their inaugural scorecard on gender equity, which revealed significant gaps in representation, particularly in leadership ranks of Canadian sport.

The researchers looked at data on leadership positions and athlete participation in Canadian National Sport Organizations (NSOs), with a spotlight on Hockey Canada, and on Team Canada at the 2022 Winter Olympic Games.

Among other things, they found that women accounted for only 11.8 per cent of Team Canada's coaches at the 2022 Olympic Games in Beijing and zero coaches in Canadian minor league hockey in 2019-20.

Canadian university- and college-level hockey was the exception to this trend, with close to equal participation rates by athletes across genders and women representing 24 per cent of the coaches.

We spoke to Professor **Gretchen Kerr**, dean of the Faculty of Kinesiology and Physical Education, about the report's findings and how Canadian sport can improve its gender equity grade. Kerr is co-director of E-Alliance, a research and knowledge sharing hub founded in 2020 and comprised of scholars and partner organizations from across Canada who are dedicated to gender+ equity in sport.

How would you describe the current climate for Canadian women and girls in sport across all levels?

GK: Although participation rates of Canadian girls and women in sport have increased recently, gender inequities persist. Fewer girls participate than boys, and participation rates are even lower for girls from equity-deserving groups. For those who participate in sport, approximately one-third of girls quit sport by the time they reach adolescence compared with one in ten. In pre-pandemic times, 80 per cent of Canadian women did not participate regularly in sports. When considering intersectional and gender+ identities, less is known about sport participation.

Within coaching, similar inequities are observed. Only 16 per cent of national-level head coaches and 25 per cent of coaches at all levels of sport in Canada are women. At the Beijing Olympic Games, only 11.8 per cent of Team Canada coaches were women. Again, data are lacking regarding intersectional and gender+ identities in sport leadership.

What are the biggest obstacles to gender equity in leadership positions in sport?

GK: Barriers to gender equity in leadership positions include experiences of systemic biases and discrimination and other forms of gender-based violence. Although a significant body of research has addressed education and mentoring programs for women in coaching, these will result in limited success if positions do not exist for women. Unfortunately, we know more about the barriers to achieving gender equity than we do about what works to get women into leadership and to support them once there.

How is E-Alliance contributing to advancing the case for gender equity in sport?

GK: The research agenda for E-Alliance includes evaluating existing programs; to date, numerous initiatives exist to advance girls and women in sport, but very few have been evaluated empirically. As a result, we have limited knowledge of what works, what does not work and why. We are also conducting longitudinal studies exploring participation in sport. In particular, we are interested in exploring the long-term impacts of the COVID-related shutdown of sports. Will we get those girls and women back to sports or have we lost a generation of participants? Finally, we are looking at ways to transform the design and delivery of sports to be safer, more accessible and inclusive, including extending beyond the binaries of gender and ability.

By Jelena Damjanovic (published online 07/03/2022)

How exercise and the simple act of moving your body can improve mental health



KPE's Catherine Sabiston shared insights on the links between physical activity and mental health. Whether running around a track or simply stretching in your living room, physical activity can go a long way towards making you happier.

Catherine Sabiston, a professor in the Faculty of Kinesiology and Physical Education, says the positive impact of exercise on mental health is well documented.

“There is uncontested evidence that physical activity is conducive to mental health,” she says.

For example, Sabiston co-authored a study in the *Journal of Sport and Exercise Psychology* that adolescents who consistently participated in team sports during high school reported lower depression levels in early adulthood.

A Canada Research Chair in Physical Activity and Mental Health, Sabiston directs a lab that studies the connections between physical activity and mental health, developing and evaluating interventions to promote physical activity and mental wellness among people who are at risk of inactivity and mental health problems.

The lab also runs a six-week program called MoveU.HappyU that provides customized coaching and training aimed at reducing the stress and anxiety of students in the lab through physical movement.

She recently spoke with U of T News about why it's important to stay active during the pandemic – and how to feel good doing it.

How closely connected are physical activity and mental health?

CS: Symptoms of mental illness such as anxiety and depression can impede physical activity and vice versa. When you are experiencing symptoms, you may also encounter feelings of low self-worth and an inability to be motivated. It's very hard to find a type of physical activity that you can engage in when you lack interest in most things. Many of the symptoms tied to mental illness are also barriers to physical activity.

On the flip side, there is uncontested evidence that physical activity is conducive to mental health. Physical activity prevents some forms of mental illness, and, for individuals who have been diagnosed with mental illness, physical activity can help reduce those symptoms and improve their quality of life. It holds its own weight in comparison to all other forms of treatment for mental illness, including psychotherapy and even medication.

Physical activity is a potential adjunct to any other form of preventative or treatment-focused therapy.

How exactly does exercise lift our mood?

CS: There are a number of mechanisms at play, including physical activity effects that are tied to our brain activity and brain chemistry. Physical activity increases our body temperature. When we are warmer, we are given the sense that we are comfortable and cared for. Also, from a historical perspective, we know that humans were naturally much more active in the past than we are now. So, physical activity brings us closer to that core level of movement that human bodies are meant for.

Moreover, physical activity can mimic mental health symptoms such as anxiety. When you exercise, you may sweat or feel your heart racing. That mimics the feeling of panic, so by engaging in exercise, you are producing a similar physical effect that can make you more accustomed to those symptoms. Exercise also provides you with an opportunity, whether for two minutes or 20, to break away from your usual routines or worries. This escape can help people better cope with their symptoms while experiencing a sense of purpose or accomplishment. In fact, feelings of mastery and accomplishment are also specific ways that physical activity impacts mental health. Small goals and activities inherent to physical activity offer plenty of opportunities for positive feedback, feeling successful and achieving, which helps stave off symptoms of mental illness.



Finally, physical activity is something you can partake in outdoors, which has a potentiating effect on mental health. That allows you to see other people, even if you are not interacting with them, and feel a sense of connectedness.

What are some ways people can stay active and motivated during the pandemic?

CS: We want to dispel the myth that physical activity is just running, biking and lifting weights.

Physical activity can be any movement where your heart is increasing its work capacity and your body is moving. In MoveU.HappyU, we coach students on day-to-day strategies for how to maintain a level of physical activity. Because the program is virtual now, we have trained students who are currently all over the world. Some students who had never spoken to their families about their mental health struggles are now actually having their whole families join in on the physical activities.

The physical activity you are doing should be something that you enjoy. If you don't enjoy it, you're not going to continue to do it.

We also want people to engage in physical activity to improve function rather than appearance. It's important to uncouple the relationship between physical activity for weight and body-size reasons and move towards physical activity for enjoyment and fun reasons. If it's fun, you are more likely to do it, and being more likely to do it leads to more benefits.

Do you have any tips for people looking to boost physical activity at home?

CS: There are many ways you can innovate physical activity to make it more varied, even when you are stuck in the same place. The best part of physical activity is thinking about the endless possibilities of the ways your body can move. If you are purposeful about it, physical activity can be integrated into your everyday routines:

- Set aside time as you would if you were going to the gym or commuting. Mark it in your calendar or set an alarm to give you an actual reminder.
- Use your phone or a pedometer to measure your step count. Having something that measures how many steps you're taking gives you a baseline: if you know you walked a certain number of steps on day one, you can add five additional steps on day two. That way you'll have a tangible goal for increasing movement.
- Consciously link items or places in your home to short bouts of movement. For example, if you use the toaster oven every morning, make a habit of doing squats while you're waiting for your bread. Or when you are wheeling from one room to another, add some extra distance.
- When you're outside, use aspects of your environment to change up your physical activity. You can change the intensity of your walking or wheeling, for instance, each time that you pass a lamppost or see a blue car. Make it fun to change up the intensity, type and timing of your activities.
- Create movement challenges for yourself and your friends, family, colleagues or students. Set goals for taking a certain number of steps or finishing a certain number of arm raises each day. Making physical activity more like a game is a proven strategy for increasing movement – and enjoying it.

By Yanan Wang (published online 23/04/2021)

KPE RESEARCH FUNDING – 2021–2022

Primary Investigator	Sponsor	Research Project Title	Funding Type	Amount
Kelly Arbour-Nicitopoulos	Canadian Tire Jumpstart Charities	The National Physical Activity Measurement Project for Children and Youth with Disabilities	Not-for-Profit Sector	\$43,000
Kelly Arbour-Nicitopoulos	Canadian Tire Corporation	Play Finds a Way through Inclusive Playgrounds	Not-for-Profit Sector	\$66,350
Kelly Arbour-Nicitopoulos	SSHRC	A[head] of the Game: An Exploration of Athletes' Experiences and Coach-Athlete Conversations of Mental Health/Illness	Tri-Agency	\$1,525
Robert Francis Bentley	NSERC	Mechanisms of Phenotypic Variance in Cardiovascular Responses to Exercise	Tri-Agency	\$33,000
Robert Francis Bentley	NSERC	Mechanisms of Phenotypic Variance in Cardiovascular Responses to Exercise	Tri-Agency	\$12,500
Timothy Burkhart	Connaught Fund	The Role of Lower Extremity Muscular Fatigue on Muscle Force Development and Lower Extremity Kinematics: A Model for ACL Injury Risk and Return to Activity	Not-for-Profit Sector	\$20,000
Timothy Burkhart	NSERC	Contributions of Lower Extremity Musculature to Hip and Knee Joint Coordination, Stability, and Regional Tissue Mechanics	Tri-Agency	\$32,000
Jenna Gillen	NSERC	Regulation of Human Skeletal Muscle Glucose Metabolism in Response to Exercise	Tri-Agency	\$33,000
Michael Hutchison	Subaward from Public Health Agency of Canada	Understanding Concussion: From Injury to Return-to-Action	Not-for-Profit Sector	\$37,163
Janelle Joseph	SSHRC	Anti-Black Racism and Equity Efforts in Canadian University Sports	Tri-Agency	\$28,333
Janelle Joseph	Ontario Colleges Athletic Association	Ontario Colleges Athletic Association Racial Equity Project	Not-for-Profit Sector	\$25,000
Gretchen Kerr	Coaching Association of Canada	Addressing and Preventing Gender-Based Violence through Sport	Not-for-Profit Sector	\$74,640
Gretchen Kerr	Silver Gummy Foundation	Gender-Based Violence in Sport	Not-for-Profit Sector	\$79,783
Gretchen Kerr	Coaches Association of Ontario	Development of Safe Sport Playbooks	Not-for-Profit Sector	\$70,000
Gretchen Kerr	Baseball Canada	Landscape of Baseball for Girls and Women in Canada	Not-for-Profit Sector	\$15,000
Gretchen Kerr	Guelph Soccer	She's Got Game - She Can Coach	Not-for-Profit Sector	\$20,000
Gretchen Kerr	AthletesCAN	AthletesCAN Diversity, Equity, and Inclusion Survey	Not-for-Profit Sector	\$15,000
Gretchen Kerr	Alpine Canada	Safe Sport and EDI Audits for Alpine Canada	Not-for-Profit Sector	\$19,944

Source: RIS Award Report by Sponsor, April 1, 2021 to March 31, 2022. Faculty of Kinesiology and Physical Education.

KPE RESEARCH FUNDING – 2021–2022

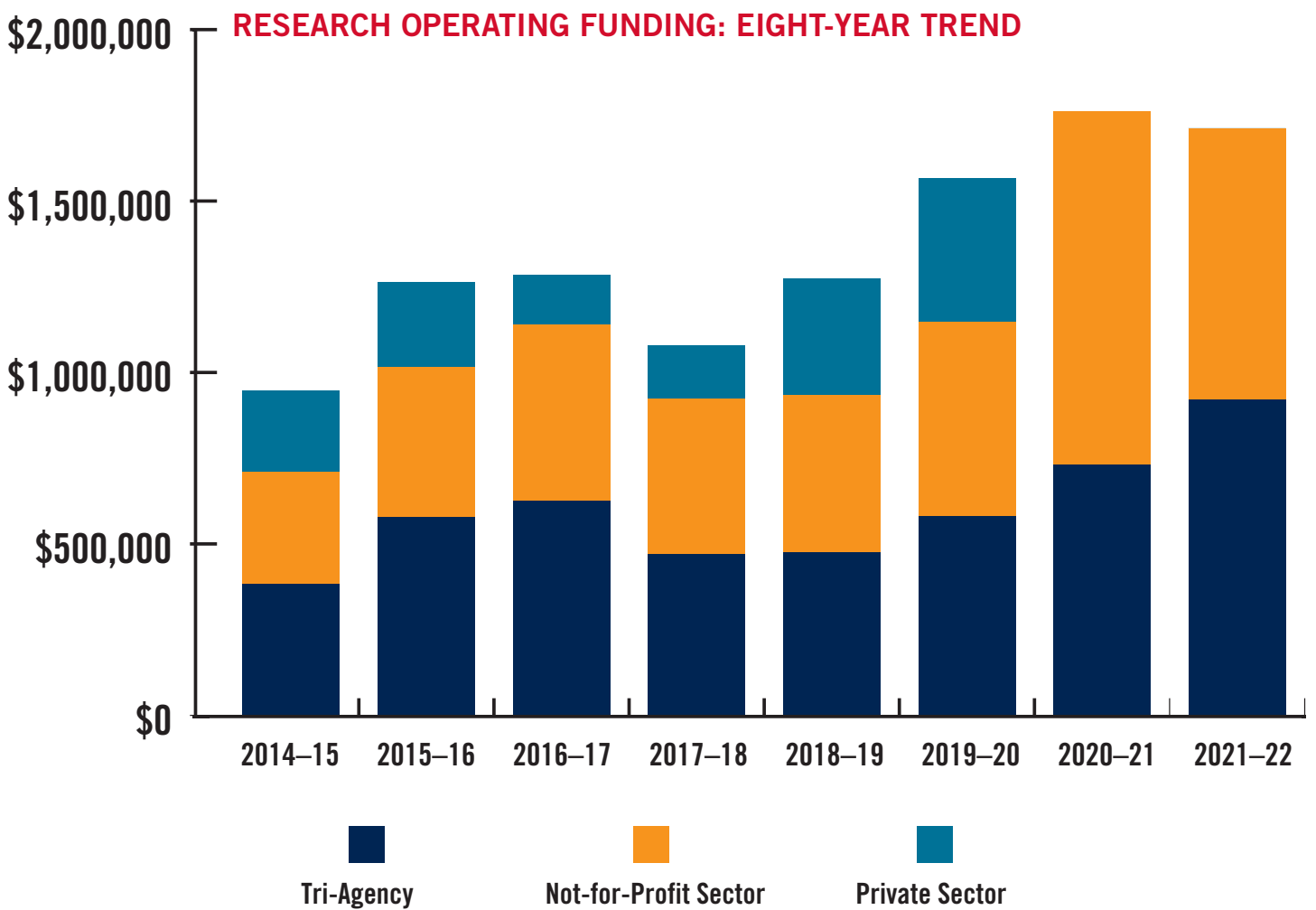
Primary Investigator	Sponsor	Research Project Title	Funding Type	Amount
Amy Kirkham	CIHR	Proof-of-Concept of Time-Restricted Eating as a Novel Lifestyle Intervention for Breast Cancer Prevention	Tri-Agency	\$150,000
Dinesh Kumbhare	NSERC	Mechanisms of Neuroplasticity	Tri-Agency	\$32,000
Daniel Moore	New Frontiers Research Fund	Home-Based Breath Test to Determine Anabolic Sensitivity	Tri-Agency	\$133,925
Catherine Sabiston	Canadian Cancer Society	Connecting Breast Cancer Survivors for Exercise: Extending the Impact of ActiveMatch	Not-for-Profit Sector	\$148,149
Catherine Sabiston	CRC - CIHR	Canada Research Chair (Tier II) in Physical Activity and Mental Health	Tri-Agency	\$100,000
Catherine Sabiston	SSHRC	Body Surveillance and Body-Related Self-Conscious Emotions and Deficits in Cognitive and Motor Performance	Tri-Agency	\$57,740
Catherine Sabiston	SSHRC	Body Surveillance and Body-Related Self-Conscious Emotions and Deficits in Cognitive and Motor Performance	Tri-Agency	\$15,000
Catherine Sabiston	MITACS	Team Unbreakable	Not-for-Profit Sector	\$60,000
Daniel Santa Mina	University of Calgary	EXCEL: Exercise for Cancer to Enhance Living Well	Not-for-Profit Sector	\$35,000
Katherine Tamminen	University of Regina	Youth Homelessness and the Importance of Accessible Recreation Programming	Not-for-Profit Sector	\$3,500
Katherine Tamminen	MITACS	Examining the ParticipACTION App to Promote Sport and Physical Activity among People Who Identify as Women	Not-for-Profit Sector	\$15,000
Katherine Tamminen	SSHRC	Interpersonal Emotion Regulation in Sport	Tri-Agency	\$27,670
Luc Tremblay	NSERC	Modulation in the Use of Multisensory Information during Voluntary Action	Tri-Agency	\$56,000
Linda Trinh	CIHR	RiseTx: A mHealth Intervention for Reducing Sedentary Behaviour among Prostate Cancer Survivors	Tri-Agency	\$126,225
Timothy Welsh	SSHRC	The “Cheerleader Effect” in Body Size Judgements	Tri-Agency	\$3,800
Timothy Welsh	NSERC	The Planning and Control of Movements in Social Contexts	Tri-Agency	\$39,000
Timothy Welsh	SSHRC	Planning and Control of Actions in Unmediated, Augmented, and Virtual Environments	Not-for-Profit Sector	\$45,000
Timothy Welsh	SSHRC	Are Two Better Than One? Assessing the Learning and Motivational Benefits of Practicing in Pairs	Tri-Agency	\$40,307

Source: RIS Award Report by Sponsor, April 1, 2021 to March 31, 2022. Faculty of Kinesiology and Physical Education.

Research Funding by Year



2021–2022 FUNDING BY SPONSOR	
Tri-Agency	\$920,083
Not-for-Profit	\$792,530
TOTAL	\$1,712,613



SOURCE: RESEARCH DATA CUBE FUNDING BY SPONSOR, APRIL 1, 2021 TO MARCH 31, 2022. FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION. (EXCLUDES ALL INFRASTRUCTURE FUNDING.)

IN A TYPICAL YEAR, THE FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION ALSO RECEIVES GOVERNMENT FUNDING FOR RESEARCH-RELATED INFRASTRUCTURE SUCH AS EQUIPMENT AND CONSTRUCTION. THIS INFRASTRUCTURE FUNDING WAS NOT INCLUDED IN THE DATA FIGURE PRESENTED ABOVE BECAUSE THE AMOUNT OF THIS FUNDING VARIES GREATLY FROM YEAR TO YEAR.

PUBLICATIONS (2021–2022)

This list is presented in alphabetical order by first-listed KPE faculty member. It does not include accepted or in-press publications.

Books (2)

Kowalski, K., McHugh, T., **Sabiston, C. M.**, & Ferguson, L. (2022). *Research Methods in Kinesiology*. Oxford University Press. Second Edition.

Stirling, A. & Pretti, J. (Eds.). (2021). *The Practice of Co-op and Work-integrated Learning in the Canadian Context*. CEWIL/WACE.

Book Chapters (18)

Atkinson, M. (2021). Parkour. In M. Baker (Editor), *Routledge Encyclopaedia of Citizen Media*. London: Routledge.

Atkinson, M. and Smith, K. (2021). Sport and Deviance. In D. Hackfort, R. Schinke, and B. Strauss (Editors), *Dictionary of Sport Psychology*. London: Elsevier

Atkinson, M. and K. Smith. (2021). Sideline, boys, sport and depression. In S. Wagg and A. Pollock (Editors), *The Palgrave Handbook of Sport, Politics and Harm*. London: Palgrave.

Atkinson, M. (2021). Mental illness in sport. In E. Pike (Editor), *Research Handbook on Sports and Society*. Routledge.

Millington, R., Ali, A., Smith, T., and **Darnell, S.C.** (2022). SDG 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. In McCullough, B., Kellison, T. and Melton, N. (Editors), *Routledge Handbook of Sport and the Sustainable Development Goals*. Routledge, 215-226.

Darnell, S.C., Razack, S. and Joseph, J. (2021). Sport, social movements and digital media. In Pike, E. (Editor), *Elgar Research Handbook on Sport and Society*. Elgar. 53-68.

Darnell, S.C., Smith, T. and Houston, C. (2021). Re-visiting sport-for-development through rights, capabilities, and global citizenship. In Maguire, J., Liston, K., and Falcous, M. (Editors), *Palgrave Handbook of Sport and Globalisation*. Palgrave. 603-626.

Colberg, S.R., **Gillen, J.B.**, Francois, M.E. (2022). Type 2 diabetes, prediabetes and gestational diabetes mellitus. In J. Feehan, N. Tripodi & V. Apostolopoulos (Editors), *Exercise to Prevent and Manage Chronic Disease Across the Lifespan* (pp. 141-155) Elsevier.

Hutchison, M.G. (2022). Sport-related concussion guideline development: acute management to return-to-activity. In T.A. Schweizer & A. Baker (Editors), *Tackling the Concussion Epidemic*. Springer Nature: Switzerland.

Joseph, J. & Glean, J. (2022). Navigating Black women's leadership, imposter phenomenon, and intergenerational mentorship in post-secondary education. In Wane, N., Odozor, E. & Brady, J. (Editors), *Black Women's Worldview*. Inanna Publications

Joseph, J. (2021) Diasporas in sport: networks, nostalgia and the nuances of dwelling. In J. Maguire, K. Liston & M. Falcous (Editors), *Palgrave Handbook of Globalisation and Sport*. Palgrave.

Mainwaring, L., & Mor, S. (2019). Managing psychological disturbances in performing artists. In L. Elson (Editor), *Performing Arts Medicine*. Elsevier.

Sabiston, C. M., Vani, M., & Murray, R. (2021). Body-related self-conscious emotions in sport and exercise: a self-regulation perspective. In C. Englert and I. Taylor, *Motivation and Self-regulation in Sport and Exercise* (pp. 62-77). New York, NY: Taylor & Francis.

Vani, M., Murray, R., & **Sabiston, C. M.** (2021). Body image in physical activity. In Z. Zenko and L. Jones (Editors), *Essentials of Exercise and Sport Psychology: An Open Access Textbook*. Chapter 6.

Stirling, A. & Pretti, J. (2021). Preface – Advancing WIL research in Canada. In A. Stirling & J. Pretti (Editors), *The Practice of Co-op and Work-integrated Learning in the Canadian Context*. CEWIL/WACE.

Nery, M., Ventura, C., & **Stirling, A.** (2021). Bullying in sport. In P. K. Smith & J. O'Higgins Norman (Editors), *The Wiley-Blackwell Handbook of Bullying: A Comprehensive and International Review of Research and Intervention*. Volume 2. Oxford: John Wiley & Sons, Ltd.

Gurgis, J., **Kerr, G.**, & **Stirling, A.** (2021). Advancing autonomy-supportive coaching through the application of the transtheoretical model. In M. Lang (Editor), *International Handbook of Athlete Welfare*. London: Routledge.

Mulvagh, S. L., Mullen, K. A., Nerenberg, K. A., **Kirkham, A. A.**, Green, C. R., Dhukai, A. R., Grewal, J., Hardy, M., Harvey, P. J., Ahmed, S. B., Hart, D., Levinsson, A. L. E., Parry, M., Foulds, H. J. A., Pacheco, C., Dumanski, S. M., Smith, G., & Norris, C. M. (2021). The Canadian Women's Heart Health Alliance Atlas on the Epidemiology, Diagnosis, and Management of Cardiovascular Disease in Women - Chapter 4: Sex- and Gender-Unique Disparities: CVD Across the Lifespan of a Woman. *CJC open*, 4, 115–132

Peer-Reviewed Articles (162)

Ali, A. E., & King, S. (2020). “He could be dangerous”: orientalism, deradicalization, and the representation of refugee Muslim boxers in TSN's radical play. *Sociology of Sport Journal*, 1–10. <https://doi.org/10.1123/ssj.2020-0104>

Ali, A. E. (2022). Economies of mourning, Canadian nationalism, and the Broncos: an affective reading of TSN's 29 Forever. *Sociology of Sport Journal*, 1–9. <https://doi.org/10.1123/ssj.2021-0043>

Arbour-Nicitopoulos, K. P., Bruno, N., Orr, K., O'Rourke, R., Wright, V., Renwick, R., Bobbie, K., & Noronha, J. (2022). Quality of participation experiences in Special Olympics sports programs. *Adapted Physical Activity Quarterly*, 39, 17–36. <https://doi.org/10.1123/apaq.2021-0033>

Ashdown-Franks, G., DeJonge, M., **Arbour-Nicitopoulos, K. P.**, & **Sabiston, C. M.** (2022). Exploring the feasibility and acceptability of a physical activity programme for individuals with serious mental illness: A case study. *Qualitative Research in Sport, Exercise and Health*, 1–23. <https://doi.org/10.1080/2159676x.2021.2019098>

Arbour-Nicitopoulos, K. P., James, M. E., Moore, S. A., Sharma, R., & Martin Ginis, K. A. (2022). Movement behaviours and health of children and youth with disabilities: Impact of the 2020 COVID-19 pandemic. *Paediatrics & Child Health*, 27(Suppl 1), S66–S71. <https://doi.org/10.1093/pch/pxac007>

Bremer, E., Liska, T. M., **Arbour-Nicitopoulos, K. P.**, Best, K. L., & Sweet, S. N. (2022). Examining long-term motivational and behavioral outcomes of two physical activity interventions. *The Journal of Spinal Cord Medicine*, 1, 1–11. <https://doi.org/10.1080/10790268.2022.2033935>

Brown, D. M. Y., Ross, T., Leo, J., Buliung, R. N., Shirazipour, C. H., Latimer-Cheung, A. E., & **Arbour-Nicitopoulos, K. P.** (2021). A scoping review of evidence-informed recommendations for designing inclusive playgrounds. *Frontiers in Rehabilitation Sciences*, 2. <https://doi.org/10.3389/frsc.2021.664595>

Bruno, N., Richardson, A., Kauffeldt, K. D., Tomason, J. R., **Arbour-Nicitopoulos, K. P.**, & Latimer Cheung, A. E. (2022). Exploring experiential elements, strategies and outcomes of quality participation for children with intellectual and developmental disabilities: A systematic scoping review. *Journal of Applied Research in Intellectual Disabilities*, 35, 691–718. <https://doi.org/10.1111/jar.12982>

PUBLICATIONS (2021–2022) CONT'D

- Koch, L. C., Sweet, S. N., Man, K. E., **Arbour-Nicitopoulos, K. P.**, Orr, K., Bundon, A., Latimer-Cheung, A. E., & Tomasone, J. R. (2022). Exploring the relationship between quality and quantity of physical activity participation in community-based exercise programs for persons with physical disabilities. *Adapted Physical Activity Quarterly*, 39, 1–19. <https://doi.org/10.1123/apaq.2021-0168>
- Moore, S. A., Sharma, R., Martin Ginis, K. A., & **Arbour-Nicitopoulos, K. P.** (2021). Adverse effects of the COVID-19 pandemic on movement and play behaviours of children and youth living with disabilities: findings from the national physical activity measurement (NPAM) study. *International Journal of Environmental Research and Public Health*, 18, 12950. <https://doi.org/10.3390/ijerph182412950>
- Orr, K., **Tamminen, K. A.**, Evans, M., & **Arbour-Nicitopoulos, K. P.** (2021). Social influences in recreational sport programs for emerging adults with a disability: A preliminary examination using a mixed methods approach. *European Journal of Adapted Physical Activity*, 14, 6–6. <https://doi.org/10.5507/euj.2020.014>
- Trinh, L.**, **Sabiston, C. M.**, Alibhai, S. M. H., Jones, J. M., **Arbour-Nicitopoulos, K. P.**, **Mina, D. S.**, **Campbell, K.**, & **Faulkner, G. E.** (2022). A distance-based, randomized controlled trial for reducing sedentary behavior among prostate cancer survivors: A study protocol. *BMC Public Health*, 22. <https://doi.org/10.1186/s12889-022-13218-5>
- Weissman, S. E., Perinpanayagam, R., Wright, F. V., & **Arbour-Nicitopoulos, K. P.** (2021). Application of the behaviour change technique taxonomy (BCTTv1) to an inclusive physical literacy-based sport program for children and youth. *International Journal of Sports Science & Coaching*, 17, 174795412110165. <https://doi.org/10.1177/17479541211016580>
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- Glibbery, M., Banks, L., Altaha, M. A., **Bentley, R. F.**, Konieczny, K., Yan, A. T., Dorian, P., Deva, D. P., **Goodman, J. M.**, & Connelly, K. A. (2021). Atrial structure and function in middle-aged, physically-active males and females: A cardiac magnetic resonance study. *Clinical Cardiology*, 44, 1467–1474. <https://doi.org/10.1002/clc.23707>
- Greene, M., Rizkalla, A., **Burkhart, T.**, Mamandras, A., & Tassi, A. (2021). Friction and archwire engagement in contemporary self-ligating appliance systems. *Journal of Orofacial Orthopedics / Fortschritte Der Kieferorthopädie*. <https://doi.org/10.1007/s00056-021-00361-8>
- Arakgi, M. E., **Burkhart, T. A.**, Hoshino, T., Degen, R., & Getgood, A. (2022). Biomechanical comparison of three suspensory techniques for all soft tissue central quadriceps tendon graft fixation. *Arthroscopy, Sports Medicine, and Rehabilitation*. <https://doi.org/10.1016/j.asmr.2021.12.008>
- Blokker, A. M., Getgood, A. M., Nguyen, D., **Burkhart, T. A.**, & Holdsworth, D. W. (2021). Accuracy and precision of image-based strain measurement using embedded radiopaque markers. *Medical Engineering & Physics*, 92, 88–92. <https://doi.org/10.1016/j.medengphy.2021.05.005>
- Blokker, A. M., Wood, R., Milner, J. C., Holdsworth, D. W., **Burkhart, T. A.**, & Getgood, A. (2021). Novel quantification of the regional strain distribution in the anterior cruciate ligament in response to simulated loading using micro-CT imaging. *Journal of Experimental Orthopaedics*, 8. <https://doi.org/10.1186/s40634-021-00416-0>
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