ABOUT PERFORM: OVERVIEW

ADVANCING KNOWLEDGE IN PREVENTIVE HEALTH
Research, Education and Community Engagement:
A Recipe for a Healthy Lifestyle

Located on the Loyola Campus of Concordia University, the PERFORM Centre is a unique 8,000 m² research facility that provides an integrated and comprehensive environment to promote healthier lives through changes in behaviour and lifestyle by offering:
• research opportunities
• educational and hands-on learning opportunities
• services to the community

The creation of the PERFORM Centre was made possible through an investment from the Government of Canada and the Quebec Ministry of Economic Development, Innovation and Export Trade through the Knowledge Infrastructure Program.

RESEARCH PROJECTS
• 33 research projects conducted at PERFORM that were led by internal and external stakeholders including industry and health-care institutions

EDUCATION
• 63 internships in eight disciplines including clinical exercise physiology

SERVICES
• 869 individuals benefitted from the Athletic Therapy Clinic that • 3695 visits to the Athletic Therapy Clinic • 350 individuals benefitted from the Conditioning Floor daily • 250 individuals met with exercise or nutrition professionals for individual fitness or nutrition appointments

SHARING OUR KNOWLEDGE:
OPPORTUNITIES TO PARTICIPATE AND TO LEARN
• 15 PERFORM Talks open to the community • 6 research talks as part of the PERFORM Colloquium Series and 6 didactic talks as part of the Applied Bio Imaging Seminar Series • First annual research conference: Physical Activity and Brain Functions • 6 community health programs related to physical activity and/or nutrition offered throughout the year • 160 outreach initiatives including information booths; partnerships and collaborations

QUICK FACTS
May 1, 2014 – April 31, 2015

RESEARCHERS
37 research members
• 257 publications in some of the most prestigious journals
• 113 presentations (oral/poster at a variety of conferences and events)
• 76 external committees
• 212 students supervised (48 undergraduate; 94 masters; 48 PhD and 22 post doc)
• 188 interviews (broadcast and print) and articles on studies led by our researchers
• 5 PERFORM research members held prestigious research chairs:
  • Dr. Patrik Marier, Tier II Canada Research Chair in Comparative Public Policy
  • Dr. Jean-Philippe Gouin, Tier II Canada Research Chair in Chronic Stress and Health
  • Dr. Sylvia Santosa, Tier II Canada Research Chair in Clinical Nutrition
  • Dr. Peter Shizgal, Tier I Concordia University Research Chair in Psychology
  • Dr. Louis Bherer; PERFORM Chair in Preventive Health Science Research

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A couple of years ago, ignited from the dream of a few visionary researchers from the Department of Exercise Science at Concordia University, came the idea of a major shift in improving health and managing chronic diseases through prevention. The university seized the opportunity to make this dream come true and the PERFORM Centre was born.

Pulled into the story in 2012 by colleagues from the Department of Psychology, I was quickly overwhelmed by the size of the endeavour; like a parent realizing that he is now bound to a dream that decided to materialize. And, 2013 marked an important developmental step, when the baby started to walk and, under the guidance of an outstandingly dedicated administration team, the first PERFORM researchers launched their research projects. It took only a few months before the baby started to run and no doubt, 2015 will be filled with more outstanding advancements and occasions of “growth spurts”. In fact, as you will read in this inaugural activity report, 2014 has been an exciting and fulfilling year for our researchers, community engagement team and the many students who have passed through our doors and benefited from various internship opportunities.

PERFORM is a research centre, based in the community, with a distinctly Concordia approach to healthy lifestyle management. It represents a significant and forward-thinking investment by the Quebec and Canadian governments as well as Concordia University in addressing the broader determinants of health and disease prevention. The topic of prevention is on everyone’s mind these days. We all know that we should cut down on unhealthy “tasty” foods, that we should exercise on a regular basis and that these are key behaviours in living a long and healthy life both physically and mentally. But the formula for creating an enjoyable and sustainable healthy lifestyle remains an unsolved mystery. Here at PERFORM we strive to be part of the solution.

At PERFORM you will find the latest complement of equipment and expertise and an approach that makes us a hub for innovation in preventative health research. Our 37 researchers look at prevention through an interdisciplinary lens that combines Concordia’s research strengths across all faculties with colleagues from all universities in Montreal. PERFORM brings scientists, students, and the public together to discover and test new thinking in preventing disease and making better health choices. We offer a bridge between the medical and fitness communities and a personalized approach to healthier living.

I am proud to share with you the accomplishments of PERFORM’s early steps, as it paves the way to revolutionary thinking and action on how we preserve our greatest asset, our health. But I’m even more thrilled to look ahead and share with you the dream of a better future.

Louis Bherer, Ph.D.
Scientific Director,
PERFORM Centre
At PERFORM, we are diligent in our efforts to ensure our facilities are equipped in the most efficient and effective manner to foster innovation in research, unparalleled comprehensive and hands-on learning opportunities for students at all levels, and ample opportunities for community engagement and the dissemination of information.

Our 8,000 m² facility houses eight inter-related research platforms and forty student office spaces that allow researchers and trainees to interact in a nurturing and dynamic space that facilitates interdisciplinary research and enhances the training experience.

**ATHLETIC THERAPY CLINIC**
Staffed by athletic therapy internship students who are supervised by certified athletic therapists, the Athletic Therapy Clinic is a fully functional treatment centre with state-of-the-art equipment which includes a SwimEx 700 T Physical Therapy Pool.

**CARDIOPULMONARY SUITE**
The Cardiopulmonary Suite is equipped with the most current technology for reliable and accurate measurements of pulmonary and cardiac function.

**CLINICAL ANALYSIS SUITE**
The Clinical Analysis Suite is a series of analytical chemistry and molecular biology laboratories designed to look into behavioural changes and/or metabolic health at the molecular level.

**CONDITIONING FLOOR**
The Conditioning Floor features high-quality, well-maintained Technogym™ line of exercise equipment, free weights, a stretching area and a four-lane walking track.

**FUNCTIONAL ASSESSMENT LABORATORY**
The Functional Assessment Laboratory is designed to conduct tests that measure movement, flexibility, strength and balance.

**IMAGING SUITE**
The Imaging Suite, comprised of a 3-tesla MRI, PET-CT, SPECT-CT, and DXA scanner, is exclusively dedicated to human research helping to better understand normal physiology and anatomy as well as for the pathophysiology of disease processes.

**NUTRITION SUITE**
The Nutrition Suite consists of a leading-edge metabolic kitchen and a teaching/dining area staffed with a dietician.

**SLEEP LABORATORY**
The sleep lab contains 3 sleep rooms with cameras and polysomnograph. The facility has its own kitchen and washroom as well as a central data acquisition centre.
2014 INAUGURAL RESEARCH CONFERENCE

More than 300 researchers, academics, students, health-care professionals and stakeholders from a variety of disciplines gathered on May 9, 2014 for PERFORM’s inaugural research conference: Physical Activity and Brain Functions. The conference featured a series of lectures from internationally renowned scientists as well as poster presentations from 50 students.

Taking a Hike: Train Your Body, Enhance Your Mind and Brain
Dr. Arthur F. Kramer, University of Illinois

The relation of childhood health behaviors with brain, cognition, and achievement
Dr. Charles H. Hillman, University of Illinois

Psychobiology of pain and exercise in chronic musculoskeletal pain
Dr. Dane B. Cook, University of Wisconsin

Moderators and mediators of exercise-related brain plasticity
Dr. Kirk Erickson, University of Pittsburgh

Exercise, neurotransmitters and neurotrophic factors
Dr. Romain Meeusen, Vrije Universiteit Brussel

What aerobic exercise does to the brain as measured using magnetic resonance imaging techniques
Dr. Bradley J. MacIntosh, University of Toronto

Evolutionary links between exercise and the brain
Dr. David A. Raichlen, University of Arizona

Exercise and the Brain: enhancing space mission safety, increasing academic achievement and preventing neurodegenerative diseases
Dr. Stefan Schneider, German Sport University

In opening the PERFORM Centre, Concordia University solidified its commitment to advancing “new knowledge, approaches, and policies that inform, sensitize and provide support for people on their journeys towards healthier life choices.” This commitment to research excellence and to ensuring that our researchers and students have access to the most advanced facilities (equipment and technologies) strengthens the University’s ability to encourage and foster collaboration, creativity and the dissemination of knowledge both internally and externally.

The PERFORM Centre is home to 37 research members and specialists in health and disease prevention who play an important role in cultivating multidisciplinary and collaborative research. Our members create links between exercise, nutrition, physical activity and lifestyle in an effort to improve health across the population.

The unique nature and structure of PERFORM allows for both large and small cohorts of research participants and accommodates special needs.

RESEARCH PROJECTS

PERFORM research members as well as Concordia researchers and external stakeholders including industry and health-care institutions have lead 33 research projects this year. Projects were funded by the Canadian Institutes of Health Research; the Natural Sciences and Engineering Research Council of Canada; Concordia University and industry.

ADVANCING KNOWLEDGE TO EMPOWER FUTURE RESEARCHERS

At PERFORM we believe it is vital that researchers and students have ample opportunities to learn – opportunities to share acquired knowledge with their colleagues and for dialogue and exchange. In our endeavours to advance knowledge, we organized and hosted 6 research talks as part of the PERFORM colloquium series, 6 didactic talks as part of the Applied Bio Imaging Seminar Series and hosted a one day inaugural research conference.

PERFORM COLLOQUIUM SERIES 2014-2015

This year’s colloquium series brought internationally renowned experts to Montreal to share their most recent findings on Depression and Insomnia (Colleen Carney, PhD, Ryerson University); Epidemiology of Physical Activity and Chronic Diseases (Janet Fulton, PhD, National Center for Chronic Disease Prevention and Health Promotion, USA); Brain Activity through Multiple Modalities (Christophe Grova, PhD, Concordia University); Exercise for the Body and the Brain (Teresa Liu-Ambrose, PhD, PT, University of British Columbia); Understanding Cognition and Aging with Neuroimaging (Jason Steffener, PhD, PERFORM Centre and Institut universitaire de gériatrie de Montréal); and Neuroimaging of Pain (Tor D. Wager, PhD, University of Colorado).


http://concordia.ca/content/dam/concordia/offices/vprgs/docs/Strategic_Research_Plan_2013-2016.pdf
PERFORM RESEARCH MEMBERS

The PERFORM Centre is home to 37 research members and specialists in health and disease prevention who play an important role in cultivating interdisciplinary and collaborative research that creates links between exercise, nutrition, physical activity and lifestyle in an effort to improve health across the population.

> Louis Bherer – Scientific Director
Effect of cognitive stimulation and physical activity on cognitive decline associated with aging and chronic disease.

> Tracie Barnett
Understanding the natural history of obesity in youth, focusing on the physical and social environments that influence overweight/obesity and their behavioural precursors.

> Richard Courtemanche
Brain synchrony and behaviour.

> Thien Thanh Dang Vu
Understanding the causes of sleep disorders to better inform treatment.

> Peter Darlington
Our immunology laboratory studies environmental factors that contribute to the risk of developing autoimmunity.

> Kaberi Dasgupta
Developing and testing strategies and programs to reduce vascular disease and its risk factors by addressing physical activity, eating habits, and social determinants of health.

> Richard DeMont
Understanding the neuromuscular system as it relates to prevention and rehabilitation of orthopaedic injury.

> Geoff Dover
Correlating psychological factors to tissue pathology in chronic pain patients and athletes.

> Tiago Falk
Developing signal processing methods that enable innovative automated medical diagnostic and human performance monitoring tools.

> Claudine Gauthier
Looking at the impact of lifestyle on the brain in healthy aging.

> Jean-Philippe Gouin
How depression, worry, rumination, and sleep disturbances can amplify stress-induced immune dysregulation.

> Christophe Grova
Characterizing normal and pathological brain activity through different neuroimaging modalities.

> Lisa Kakinami
Understanding how our behaviours, lifestyles, and life circumstances relate to obesity and heart disease.

> Robert Kilgour
Assessing and evaluating rehabilitation and supportive care programs for advanced cancer patients with cachexia.

> Jordan LeBel
Which factors influence consumer food choices at home and away?

> Gabriel Leonard
Complex bimanual coordination as a marker for cognitive and motor rehabilitation in neurological patients.
> **Karen Li**  
Understanding the cognitive and motor processes involved in multiple-task performance in adulthood and healthy aging.

> **Najmeh Khalili-Mahani**  
Screen addiction, biofeedback and public health: studying physiological and neurological responses that are necessary for physical and mental adaptation.

> **Patrik Marier**  
Policy implications of changing demographic structures in comparative contexts.

> **Paul Martineau**  
Research program oriented on sport medicine and musculoskeletal trauma focused towards the development of novel treatment and diagnostic strategies.

> **Anil Nigam**  
Understanding how diet and exercise impact on cardiovascular and brain function in high-risk patients.

> **Virginia Penhune**  
Understanding the plastic changes that occur in the human brain during motor learning and performance.

> **Véronique Pépin**  
Optimizing exercise testing and training approaches in individuals with chronic cardiopulmonary diseases.

> **Alain Ptito**  
Neuroimaging and cognitive markers for the diagnosis, prognosis and rehabilitation of mTBI/concussion.

> **Natalie Phillips**  
How cognitive abilities (language, attention) change and interact as we age.

> **Tiberiu Popa**  
Research includes geometric modeling, animation, 3D and 4D surface reconstruction with applications in medical, CAD and entertainment industry.

> **Hassan Rivaz**  
Developing novel image processing algorithms to improve detection and diagnosis capabilities of medical imaging.

> **Shawn Robbins**  
Utilizing biomechanical and clinical measures to assess orthopaedic health conditions in both clinical and laboratory settings.

> **Mathieu Roy**  
Understanding how psychological factors can affect pain.

> **Sylvia Santosa**  
Studying the skinny on fat in disease development and progression.

> **Peter Shizgal**  
Neural basis of decision-making, reward, and motivation.

> **Jean-Paul Soucy**  
Understanding the pathophysiology of neurodegenerative conditions using nuclear medicine techniques and developing new approaches for diagnosis and for follow-up tests to assess response to therapy.

> **Nancy St-Onge**  
Posture, balance, and movement control in healthy and impaired populations.

> **Jason Steffener**  
Understanding the healthy aging process using brain imaging to identify lifetime exposures and behaviours providing protection from cognitive decline.

> **Truong Vo Van**  
Study of thin films and nanostructures and their applications, and the prototyping of optical metrology instruments.

> **Dajana Vuckovic**  
Developing mass spectrometry methods for targeted and untargeted metabolomics and biomarker quantitation in biofluids and tissues.

> **Carsten Wrosch**  
Psycho-social pathways to well-being and health.
Researchers and students need opportunities to learn and grow in order to thrive in their respective fields. In 2014, PERFORM awarded three postdoctoral and doctoral fellows and the Ed Whitlock Award:

**POSTDOCTORAL FELLOW**  
Caroline Fitzpatrick, a former Fulbright recipient who examines how children’s environments influence their academic performance and health.

**DOCTORAL FELLOWS**  
Halina Bruce investigates how training that combines cognitive and motor tasks can increase mobility among hearing-impaired adults.

Dmitri Sitnikov, a clinical microbiologist who studies how chemical entities act as biomarkers of behavioural manifestations.

**THE ED WHITLOCK AWARD**  
Amanda Rossi, Concordia University PhD student, was awarded the first Ed Whitlock Award for her research into the impact of physical activity and high blood pressure on the development of cardiovascular disease.

**WHO IS ED WHITLOCK?**  
Ed Whitlock is passionate about long distance running and for the last 20 years has consistently broken every long distance record in his age group. He is the only living person who at 70 was able to run a marathon in under three hours. He has repeated the feat a few times since, breaking his own records. Now at 84 years old, every time he registers for a race there is a pretty good chance that he will be breaking yet another record.
The PERFORM Centre offers university-level students unparalleled educational opportunities from within a learning facility that is unique in its kind. 63 students benefitted from a variety of internship opportunities this year. While a majority of the students were from Concordia University, the unique structure and multidisciplinary nature of the PERFORM facilities is such that internship, co-op and volunteer opportunities appealed to students from around the world.

PROVIDING STUDENTS WITH UNPARALLELED LEARNING OPPORTUNITIES

63 internships

> 44 in athletic therapy including students in physiotherapy from other institutions

> 19 in a variety of disciplines including: dietetic internships (McGill); students who worked in specific labs (Exercise Science; UBC; McGill); on research projects (Exercise Science; Fine Arts); Marketing; and Executive MBA students from the John Molson School of Business and students in clinical exercise physiology.

Of these:

- 75% from Concordia University
- 25% from other institutions

INTERNSHIPS THAT TRANSLATE TO IMPROVED QUALITY OF LIFE

Some 869 people availed themselves of the services offered by our internship students at the Athletic Therapy Clinic. This totalled 3695 visits to the Athletic Therapy Clinic and included modalities such as assessment and treatment. In some instances, interns who worked with individuals who were referred to the PERFORM Centre by physicians from the Jewish General Hospital opted to use the SwimEx.

Use of this state-of-the-art aquatic therapy pool offered our internship students a unique opportunity to garner experience in the use of both traditional methods of treatment as well as in the use of aquatic therapy sessions.

Our internship students also had the opportunity to acquire hands on experience in the use of a state-of-the-art computerized model to conduct baseline tests on 327 athletes from Concordia University’s Department of Recreation and Athletics in the following sports: football, rugby, hockey, and soccer. These tests were conducted for the Baseline Concussion and Post Injury Program. Fifteen internship students worked in the Youth Injury Prevention Program. This allowed them an opportunity to conduct tests on athletes 10 to 15 years of age in order to assess their predisposition to potential injury.

FOSTERING OPPORTUNITIES FOR MULTIDISCIPLINARY LEARNING

At PERFORM we believe that fostering multidisciplinary and interdisciplinary opportunities to learn can greatly enhance the educational experience. This year we brought our athletic therapy (AT)/physiotherapy (PT) and dietetic interns together in an exercise that fostered collaboration and exchange. Our AT interns spent a semester gathering a series of nutritional questions from their clients. The dietetic interns were asked to review and address the questions via a presentation to the AT interns. We also welcomed 18 students from across Canada as part of the Summer Research Institute Program and provided students from the International Space University with an opportunity to familiarize themselves with equipment that could be used in training astronauts.
COMMUNITY PROGRAMS

PERFORM’s community engagement team plays a leadership role in developing, organizing and offering activities and programs that provide opportunities for exchange, dialogue and participation on topics related to health prevention and chronic disease management. These activities are offered in a variety of settings both at the PERFORM Centre and through various local community organizations, not-for-profit organizations and institutions. All activities are designed specifically to engage communities and equip individuals with knowledge and/or necessary tools (information, motivation) to foster the adoption of a sustainable healthier lifestyle.

> **15 PERFORM Talks** offered by PERFORM research members or invited guests on a variety of topics such as Non Pharmacological Ways of Coping with Pain; Screen Addiction; Stress and Sweets; Alzheimer’s Disease: Let’s Talk; Navigating Sugars and Fit and Active with Arthritis

> **6 community health programs** focussing on physical activity and nutrition; and designed with an evidence-based approach through literature review and accepted best practices in health and wellness programs.

**PHYSICAL ACTIVITY PROGRAMS**
- Rehab2Fit, a transition program from clinic to community
- Welcomed over 350 daily users of the PERFORM Conditioning Floor
- Kinesis Cardio Circuit – fun and motivating for the healthy participant
- Individual fitness assessments and program design for all

**NUTRITION PROGRAMS**
- Healthy Cooking Classes – varied themes from the widely recognized DASH Diet for blood pressure management to the Mediterranean Diet that has repeatedly demonstrated an effect on cardiovascular health
- Individual nutrition assessments and counselling incorporating the eaTracker an online food journal created by the Dietitians of Canada

> **160 outreach initiatives** including information booths, partnerships and collaborations. Among our many endeavours we worked with Executive MBA students on approaches to incorporate healthy living strategies on an individual basis as well as within the workplace; hosted varsity athletes in the Concordia Healthy Athlete pilot project; worked with CLSC Cavendish/Benny Farm to enrol more than 60 community members to participate in the Défi Santé initiative; hosted Westmount Science Camp and the national certification weekend workshop for the Canadian Society of Exercise Physiology. We also participated in a variety of national activities such as Alzheimer’s Day and Canadian Fitness Day.

> **PERFORM** provided content and professional resources via distance technology to support an initiative of the Community Health and Social Services Network (CHSSN) to increase access to English language health and social services information to those living in remote areas of Quebec.
COMMUNICATING OUR RESEARCH

At PERFORM, we take great pride in our research and our potential to foster changes in behaviour and lifestyle. We are also cognisant of the fact that to be effective our research findings must be communicated and disseminated to a variety of stakeholders including healthcare professionals, researchers, academics, students and the general population. To that end, we hosted 15 PERFORM talks; 12 research talks, 160 information booths and outreach initiatives, and a one day scientific conference.

PERFORM research members are at the forefront of our communications activities. Since May of 2014, our members have:

> **Given 113 talks or presentations** in a variety of settings

> **Published 257 articles, book chapters, conference abstracts**

> **Been cited in 188 media outlets including print, television and radio**

News about research discoveries and activities at PERFORM is regularly disseminated through the PERFORM e-newsletter and cited in the University’s Now – e-newsletter which is widely disseminated to some 40,000 media outlets, not-for-profit organizations, educational institutions, faculty, staff and other stakeholders.

**IN THE “NOW” HEADLINES THIS YEAR:**

**Unlocking the secrets of sleep**  
A new grant will support crucial health research at the PERFORM Centre

**Preventing diabetes at the PERFORM Centre**  
Multi-use facility perfect for new research program

**Financial weight makes it trickier to lose pounds**  
Struggling to pay the rent is a distraction from the focus required to effectively battle the bulge

**Ed Whitlock Award underlines the significance of preventive health research**  
Outstanding doctoral candidate honoured at key PERFORM Centre conference

**How exercise keeps your mind young**  
The PERFORM Centre’s Louis Bherer has shown that physical activity can prevent cognitive decline in old age