

Centre for Research in Occupational Safety and Health
at Laurentian University



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occupational safety and health**
at Laurentian University

CROSH
CRSST

**centre de recherche sur la
santé et sécurité au travail**
à l'Université Laurentienne

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Message from Director and Associate Director

Dear Members and Supporters,

Two-thousand and nineteen marks the year that CROSH completed the design and installation of our state-of-the-art Workplace Simulator (W-SIM); fulfilling our long-term goal of building infrastructure that fully supports our Field-to-Lab-to-Field Research Philosophy. Meaning that: through community consultation and engagement, CROSH researchers identify critical research questions. We engage in innovative FIELD research to understand the problem, develop evidence-based interventions in the LAB, and then evaluate those interventions back in the FIELD. In 2017, we launched the Mobile Research Lab (M-CROSH) to enhance our field capacity and scope for partnerships. Now - W-SIM allows us to develop cutting-edge evidence-based interventions, by replicating the field data in our new W-SIM lab! This infrastructure will fast-track research solutions and allow for a closer examination of complex problems. You will see evidence of this already happening as you read this annual report.

In our outreach efforts, CROSH developed three new workshops this year, and launched matching Knowledge Transfer Kits to address specific issues related to mobile hazards.

Importantly, 2019-20 also saw the development and recruitment of OHS champions to our three Community Stakeholders Committees: one for each of the core research streams and led by our three Research Leads: Dr. Alison Godwin – Human Factors and Ergonomics; Dr. Judith Horrigan – Occupational Health and Wellness; and Dr. Dominique Gagnon – Occupational Physiology and Environment. Committee members extend from Emo to North Bay, Ontario and are helping us understand community needs across Northern Ontario, as well as helping us share the Centre's Knowledge Transfer and Exchange materials more broadly. We are grateful for the time committed by all stakeholders.

Unfortunately, this year also saw the introduction of a new challenge: the COVID-19 virus. Despite work disruptions, cancellations and high personal stressors, we would like to recognize the resilience of our staff, researchers, and students who pivoted to NOT only respond to the new demands, but actively began looking for ways to help others, and start new research that will solve COVID-related workplace health and safety issues.

We acknowledge our universities, communities, governments, and workers around the world who are working towards protecting people, keeping communities functioning, and solving a global health issue. Thank you for your ongoing support.

Sincerely,



Dr. Sandra Dorman
Director, CROSH



Dr. Alison Godwin
Associate Director, CROSH

Our Mission

We envision a Northern Ontario where workplaces partner to ensure every worker gets home safe and healthy every day. We will be an agent for innovation and discovery to solve relevant and critical problems facing northern industries so they can eliminate occupational injury and disease from their workplaces.

Our Approach

CROSH embodies a **Field-to-Lab-to-Field** research philosophy with the goal of achieving **Prevention Through Research**. Through community consultation and engagement CROSH researchers identify critical research questions. We engage in innovative **Field** research to understand the problem, develop evidence-based interventions in the **Lab**, and evaluate the interventions in the **Field**.



FIELD

Identify and understand the problem in the Field.



LAB

Drive innovation in the Lab to develop interventions aimed at prevention.



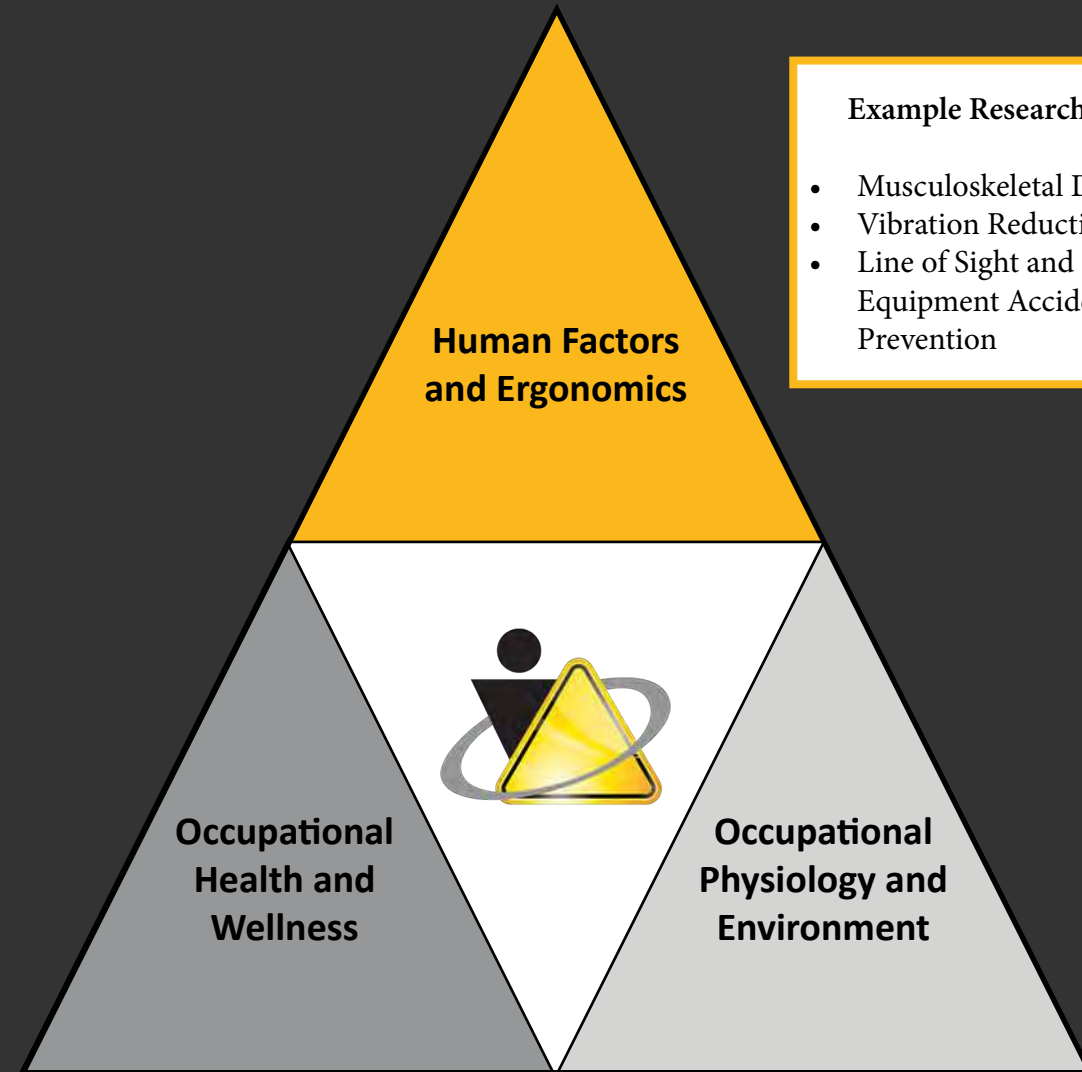
FIELD

Evaluate the intervention back in the Field.



CROSH Research Streams

To impact occupational health and safety policy and practice, the multidisciplinary team of our experts and their research partners engage stakeholders in three broad research streams: **Human Factors and Ergonomics (HFE)**; **Occupational Health and Wellness (OHW)**; and **Occupational Physiology and Environment (OPE)**.



Example Research Topics

- Musculoskeletal Disorders
- Vibration Reduction
- Line of Sight and Mobile Equipment Accident Prevention

Example Research Topics

- Mental Health
- Sleep
- Quality of Work Life
- Safety Culture

Example Research Topics

- Fatigue
- Heat Stress
- Nutrition
- Diesel Particulate Matter

CROSH Research Leads

Human Factors and Ergonomics (HFE)



Research Lead:
Dr. Alison Godwin

Occupational Physiology and Environment (OPE)



Research Lead:
Dr. Dominique Gagnon

Occupational Health and Wellness (OHW)



Research Lead:
Dr. Judith Horrigan

CROSH Staff

Dr. Katie Goggins
Postdoctoral Fellow

Dr. Zsuzsanna Kerekes
Postdoctoral Fellow

Courtney Lessel
Science Communication Intern

Tobias Mankis
Science Communication Officer

Chelsey Roy
Administrative Assistant

Giselle Thrush
Administrative Assistant

Brandon Vance
Research Technologist

Wesley Young
Workplace Simulator Technologist Intern

Advisory Board

Leo Gerard (Chair)
Past-International President,
United Steelworkers

Paul Andre
President and CEO,
Workplace Safety North

Natalie Carscadden
Manager, Occupational Health, Safety and
Wellness,
Health Sciences North

Kari Cusack
Workers Health & Safety Centre,
Northeastern Ontario Office

Ric deMeulles
OHS Consultant

Jacques Jean
USW Representative
President, Local 1-2010

Harsim Kalsi
Provincial Coordinator, Mining Program
Ontario Ministry of Labour

Jody Kuzenko
Chief Operating Officer,
Torex Gold Resources Inc.

Carol Lapointe
General Manager, Domtar
Espanola

Terry McCormick
Canadian Auto Workers Mine/Mill 598 Unifor

Kimberly O'Connell
Executive Director, Eastern and Northern
Ontario Regions, Occupational Health Clinics for
Ontario Workers (OHCOW)

Richard Weishaupt
Manager of Safety and Health,
Ontario Operations, Vale

Marcia Smith
Senior Vice-President Sustainability and External
Affairs
Teck Resources Limited

Executive Committee

Director
Sandra Dorman
Full Professor
School of Human Kinetics

Associate Director & HFE Research Lead
Alison Godwin
Associate Professor
School of Human Kinetics

Member-at-Large
Kathryn Sinden
Assistant Professor
School of Kinesiology, Lakehead University

Member-at-Large
Brent Lievers
Associate Professor
Bharti School of Engineering

Affiliate Member Representative
Caleb Leduc
PhD Candidate
Lancaster University

Research Chair
Tammy Eger
Full Professor
School of Human Kinetics

OHW Research Lead
Judith Horrigan
Assistant Professor
School of Nursing

OPE Research Lead
Dominique Gagnon
Assistant Professor
School of Human Kinetics

Member-at-Large
Ann Pegoraro
Full Professor
School of Human Kinetics

Member-at-Large
Jarius Quesnele
Associate Professor
Northern Ontario School of Medicine

Graduate Student Representative
Kimberly Friesen
MHK Candidate
School of Human Kinetics



Researchers

Dr. Randy Battochio
Adjunct Professor, School of Human Kinetics

Dr. Sandra Dorman
Full Professor, School of Human Kinetics

Dr. Tammy Eger
Full Professor, School of Human Kinetics

Dr. Dominique Gagnon
Assistant Professor, School of Human Kinetics

Dr. Sabir Giga
Senior Lecturer, University of Lancaster, UK

Dr. Alison Godwin
Associate Professor, School of Human Kinetics

Dr. Katie Goggins
Postdoctoral Fellow and Adjunct Professor, School of Human Kinetics

Dr. Basem Gohar
Adjunct Professor, School of Human Kinetics, School of Rural and Northern Health, and
Psychology Department, University of Guelph

Dr. Ratvinder Grewal
Associate Professor, Department of Mathematics and Computer Science

Dr. Judith Horrigan
Assistant Professor, School of Nursing

Dr. Zsuzsanna Kerekes
Postdoctoral Fellow, School of Human Kinetics

Dr. Aaron Kociolek
Assistant Professor, Faculty of Education and Professional Studies,
Nipissing University

Dr. Aaron Langille
Master Lecturer, Department of Math and Computer Sciences

Researchers

Dr. Nancy Lightfoot
Full Professor, School of Rural and Northern Health

Dr. Céline Larivière
Full Professor, School of Human Kinetics

Dr. Michel Larivière
Full Professor, School of Human Kinetics and Northern Ontario School of Medicine

Caleb Leduc
Research Associate, CROSH

Dr. Brent Lievers
Associate Professor, Bharti School of Engineering

Dr. Thomas Merritt
Full Professor, Department of Chemistry and Biochemistry

Dr. Behdin Nowrouzi-Kia
Assistant Professor, Department of Occupational Therapy
University of Toronto

Dr. Ann Pegoraro
Full Professor, School of Human Kinetics

Dr. Jairus Qesnele
Assistant Professor, Northern Ontario School of Medicine

Dr. Stephen Ritchie
Associate Professor, School of Human Kinetics

Dr. Kathryn Sinden
Assistant Professor, School of Kinesiology
Lakehead University

Dr. Line Tremblay
Full Professor, School of Human Kinetics

Affiliate Members

William Cole
Fire Science and Technology Program Leader
Ministry of Natural Resources and Forestry

Anik Dennie
Masters, Human Kinetics

Alexandre Dionne
Masters, Psychology

Emily Jago
Masters, Human Kinetics

Dr. Mallorie Leduc
PhD, Rural and Northern Health

Courtney Lessel
Masters, Biological Sciences

Stephanie Munten
Masters, Kinesiology

Ayden Robertson
Masters, Human Kinetics

Peg Scherzinger
Ergonomist,
Sessional Instructor Laurentian University

Jozef Stachulak
Manager of Strategic Ventilation and Diesel Research, MIRARCO

Student Members

Undergraduate Student Members

Nicholas Barclay
Kinesiology

Sarah Bourdon
Health Promotion

Shivam Chadha
Kinesiology

Vanessa De Coppi
Health Promotion

Amanda Dodaro
Health Promotion

George Flagler
Health Promotion

Sara Gauthier
Kinesiology

Michaela McGillis
Health Promotion

Lucie Ménard
Kinesiology

Santeria Mulcahey
Health Promotion

Courtney Nickel
Kinesiology

Hailey O'Grady
Health Promotion

Stephanie Pilon
Kinesiology

Elizabeth Racine-Bouchard
Health Promotion

Angèle Scott
Computer Science

Karissa Zack
Kinesiology



Student Members

Graduate Student Members

Dr. Oghenefego Akpomi-Eferakeya
Masters in Interdisciplinary Health

Mahdis Aziziderouei
Masters in Kinesiology
Lakehead University

Nathaniel Barnett
Masters in Interdisciplinary Health

Rachelle Barrette
Masters in Computational Sciences

Nicholas Beckett-Brown
Masters in Human Kinetics Graduate

Josée Bélanger
Masters in Human Kinetics

Jacob Bonin
Masters in Human Kinetics

Corey Bouwmeester
Masters in Human Kinetics

Alyssa Brunton
Masters in Human Kinetics

Brittany Culbertson
Masters in Physical Therapy
Western University

Jonah D' Angelo
Masters in Human Kinetics

Samuel Daoust
Masters in Human Kinetics

Alexie Dennie
Masters in Human Kinetics

Kimberly Friesen
Masters in Human Kinetics

Nazanin Gholami
Masters in Human Kinetics

Curtis Hancock
Masters in Human Kinetics

Margaret Kanya-Forstner
Masters in Human Kinetics

Kelsey Lefebvre
Masters in Human Kinetics

Sébastien Leroux
Masters in Human Kinetics

Alexus McCue
Masters in Human Kinetics

Liam Nesbitt
Masters in Human Kinetics

Désirée Quenneville
Masters in Human Kinetics

Sara T. Sayed
Masters in Kinesiology
Lakehead University

Chelsea Sherrington
Masters in Human Kinetics

Student Members

Graduate Student Members

Dr. Mohamed Shoukri
Masters in Interdisciplinary Health

Chelsea Villeneuve
Masters in Interdisciplinary Health

Kelsey Whelan
Masters in Human Kinetics

Beau Williams-Orser
Masters in Human Kinetics

Wesley Young
Masters in Engineering Science
(Mining-Mechanical)

Caroline Dignard
PhD Candidate, Rural and Northern Health

Tim Doan
PhD Student, Human Studies

Amy Doan
PhD Student, Human Studies

Sherry Mongeau
PhD Student, Rural and Northern Health

Mehboob Reza
PhD Candidate, Interdisciplinary Studies
University of New Brunswick



“OHS research, in partnership with industries and workers, plays a critical role in identifying and addressing workplace hazards. Deconstructing health and safety issues and finding solutions to mitigate risks is crucial in ensuring every worker goes home healthy and safe. Despite significant progress in OHS, many hazards remain unknown or poorly understood, and new hazards are constantly emerging, especially with new technology. It is therefore important that OHS research be ongoing so that we can continue to strive for healthy and safe workplaces. As a novice OHS researcher, I consider it a privilege to be part of CROSH and to learn from experienced OHS researchers. CROSH plays a very important role in making Northern Ontario workplaces healthier and safer, and I am grateful for all the learning opportunities this provides.”

- Caroline Dignard, PhD Candidate

Student Award Winners

This year, 12 graduate and undergraduate CROSH student members earned financial awards totalling \$42,500 funded by both CROSH and our industry partners. These awards allow our students to focus their time and effort on their occupational health and safety research.

- UA Local 800 Graduate Fellowship Award (\$5000): **Oghenefego Akpomi-Eferakeya**
- William Shaver Masters in Mining Occupational Health and Safety (\$5000): **Chelsea Sherrington**
- William Shaver Doctoral in Mining Occupational Health and Safety (\$5000): **Caroline Dignard**
- Goodman School of Mines – Masters in Human Kinetics Award (\$2500): **Josée Bélanger**
- CROSH Occupational Health and Wellness (OHW) Fellowship (\$3000): **Kimberly Friesen**
- CROSH Occupational Health and Wellness (OHW) Entrance Scholarship (\$3000): **Nazanin Gholami**
- CROSH Occupational Physiology and Environment (OPE) Fellowship (\$3000): **Curtis Hancock**
- CROSH Occupational Physiology and Environment (OPE) Entrance Scholarship (\$3000): **Samuel Daoust**
- CROSH Human Factors and Ergonomics (HFE) Fellowship (\$3000): **Margaret Kanya-Forstner**
- CROSH Human Factors and Ergonomics (HFE) Entrance Scholarship (\$3000): **Josée Bélanger**
- Dr. Fergal Nolan Radiation Safety Institute of Canada Graduate Award (\$5000): **Sherry Mongeau**
- United Steelworkers Graduate Scholarship (\$1000): **Beau Williams-Orser**
- United Steelworkers Undergraduate Scholarship (\$1000): **Sara Gauthier**



Student Award Winners



“The generosity of the United Steelworkers has enabled me to divert more of my energy toward advancing my education. For this, I am very grateful. OHS research is critical for the continued success and prosperity of Northern Ontario industries. This funding opens doors for more conversations to be had about the visibility of pedestrians and operators surrounding mobile equipment in Northern Ontario industries.”

- Sara Gauthier, Undergraduate Student

Student Thesis Defences

June 17 - **Sherry Mongeau**, "Mining, injuries, and the compensation process: who does it really hurt?"
Masters, Interdisciplinary Health. Supervisor: Dr. Nancy Lightfoot

July 16 - **Dr. Katie Goggins**, "Measuring and modelling human response to foot-transmitted vibration exposure."
PhD, Natural Resources Engineering. Supervisor: Dr. Tammy Eger

July 31 - **Amy Doan**, "Comparing nurse performance between an infusion pump medical device on differing mediums."
Masters, Computational Sciences. Supervisor: Dr. Ratvinder Grewal

August 12 - **Sébastien Leroux**, "Effects of high intensity interval exercise versus steady state exercise with similar energy expenditures on epoc."
Masters, Human Kinetics. Supervisor: Dr. Olivier Serresse

August 27 - **Chelsea Villeneuve**, "Perceived impact of rotating shift work on health and wellbeing."
Masters, Interdisciplinary Health. Supervisor: Dr. Nancy Lightfoot

September 10 - **Sara Sayed**, "Exposure to work-related physical and psychological load in career firefighters at three timepoints over one year."
Masters, Kinesiology. Supervisor: Dr. Kathryn Sinden

January 16 - **Caleb Leduc**, "Development, implementation, and evaluation of fitness training and psychosocial education interventions in wildland firefighting."
PhD, Organizational Health and Well Being (Lancaster University, UK). Supervisor: Dr. Sabir Giga

February 24 - **Lisa Schutt**, "Mining workers' perceptions of the barriers to and facilitators of return to work subsequent to illness or injury."
Masters, Interdisciplinary Health. Supervisor: Dr. Michel Larivière

March 4 - **Nicholas Beckett-Brown**, "The influence of local and whole-body cooling on pulmonary and muscle oxygen uptake kinetics during moderate exercise."
Masters, Human Kinetics. Supervisor: Dr. Dominique Gagnon

April 27 - **Alexie Dennie**, "The determinants of sleep quality in the mining industry."
Masters, Human Kinetics. Supervisor: Dr. Céline Larivière



Graduate student Chelsea Villeneuve giving her thesis defence presentation on August 27, 2019.

Student Internships

CROSH internships for undergraduate and graduate students provide an excellent opportunity to gain relevant field experience and contribute to OHS research.

Randy Battochio
Josée Bélanger
Shivam Chadha
Sara Gauthier
Leah Hodgson
Margaret Kanya-Fortsner
Michele Lejars
Courtney Lessel
Tobias Mankis
Clement Mindjima
Stephanie Munten
Michelle Myre
Ituno Osifero
Angèle Scott
Nicholas Schwabe
Riley Waugh
Wesley Young



For his internship, Laurentian University undergraduate kinesiology student Shivam Chadha helped evaluate the ErgoCalculator developed by Occupational Health Clinics for Ontario Workers (OHCOW).

CRafés

CRafés, or CROSH Cafés, are weekly, informal gatherings in which CROSH members share their research updates, present on and discuss OHS topics, learn about the OHS field (such as the requirements to become a Canadian Registered Safety Professional), and more. Not only informative, CRafés are also a fun way to help keep the CROSH Crew a tightly knit team.



Webinars

CROSH hosts regular webinars on occupational health and safety topics. Open to anyone, these free presentations are broadcast online and are available to watch anytime on the CROSH website at www.crosh.ca/webinars. Presenters include CROSH researchers, CROSH students, and special guests with areas of expertise in occupational health and safety.

2019/2020 Webinars

May 1 - **Examining your sleep needs in context of shift work, work-life balance, and risk.**

Presented by Dr. Sandra Dorman.

June 19 - **A primer on situational awareness.**

Presented by Dr. Alison Godwin.

September 30 - **MSDs: The risks and prevention strategies.**

Presented by Chelsea Sherrington (photo right).

October 23 - **Postural assessment at the workplace.**

Presented by Professor Marco Tarabini.

November 23 - **Respiratory hazards in the workplace.**

Presented by Dr. Katie Goggins and Kimberly O'Connell.

Dec 18 - **An overview of the workplace simulator.**

Presented by Dr. Alison Godwin and Brandon Vance.

Jan 22 - **Mino-nokiiwin: Pursuing insight into Indigenous occupational health and safety experiences in several communities in Northwest Ontario.**

Presented by Nathaniel Barnett.

Feb 26 - **Shining some light on the effects of daylight saving time.**

Presented by Dr. Alison Godwin and Amanda Dodaro.

April 29 - **Effects of multi-stressor environments on human performance.**

Presented by Stephanie Munten.



United Steelworkers Announcement

On June 28, 2019, United Steelworkers (USW) generously donated \$225,000 to CROSH to fund student training, workplace engagement, and research priorities for Northern Ontario. USW has been a steadfast supporter and key partner of CROSH since its founding.



Top photo, from left to right: CROSH Associate Director and HFE Research Lead Dr. Alison Godwin, MPP Jamie West, USW International President Leo Gerard, Interim Laurentian University President and Vice-Chancellor Dr. Pierre Zundel, MPP France G elinas, CROSH Researcher Dr. Michel Larivi ere, and CROSH Director Dr. Sandra Dorman.



“It is important that USW support research that solves workplace problems and improves the safety of all workers, including those in Northern Ontario. We are proud of our continued support of CROSH’s efforts.”

- USW International President and CROSH Advisory Board Chair Leo Gerard

“The funds announced today will strengthen CROSH’s ability to carry out research and reach evidenced-based solutions that are relevant to communities and industries in the North, in communities that have traditionally been unable to participate in research, due to their geographic isolation.”

- CROSH Director Dr. Sandra Dorman



M-CROSH

The CROSH Mobile Research Lab (M-CROSH) is a custom-designed, 12m long mobile laboratory. With built-in teaching and clinical spaces, M-CROSH connects researchers and workers in rural and remote communities, and promotes understanding of critical occupational health and safety problems through active information exchange.



2019-2020 M-CROSH Visits

- May 29 - Kapuskasing - Community Event
- May 30 - Columbia Forest Products, Hearst
- May 30 - USW Local 1-2010, District 6, Hearst
- June 4, 5, 13, 14 - Glencore's Fraser Mine - Occupational Health and Safety Days
- June 15 - Technica Mining - Family Day
- June 27 - Vale's Totten Mine - Business Day
- Sept 7 - Valley East Days, Hanmer
- Sept 20 - NOSM's Northern Health Research Conference, Little Current
- Oct 1 - Resolute Forest Products, Thunder Bay
- Oct 1 - Superior Collegiate and Vocational Institute, Thunder Bay
- Oct 2 - Lakehead University, Thunder Bay
- Oct 3 - New Gold Inc., Rainy River
- Oct 7 - Sault College, Sault Ste. Marie
- Oct 7 - Sault Area Hospital, Sault Ste. Marie
- Oct 8 - White Pines Collegiate and Vocational School, Sault Ste. Marie
- Oct 22 - Northern College Timmins Campus, Nursing Department, Timmins
- Oct 22 - Timmins and District Hospital, Timmins



Knowledge Transfer Kits

CROSH Postdoctoral Fellow Dr. Mallorie Leduc completed work on the Knowledge Transfer Kits (KTKs), which are now available for purchase. The Kits provide a comprehensive package to teach Northern Ontario workplaces about hazards (**vibration exposure, line of sight issues and situational awareness, and fatigue**) from working on and around mobile equipment. The kits discuss the hazards associated with mobile equipment used in Northern Ontario industries such as mining, forestry, construction, pulp and paper, and steel manufacturing.

The project was funded through the Ontario Ministry of Labour's Occupational Health and Safety and Prevention Innovation Program (OHSPiP).



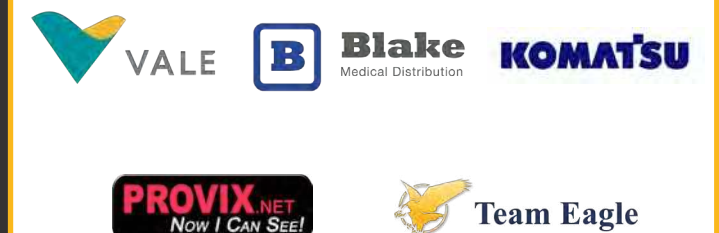
Projects with Industry

Industrial Contracts

Vale
Blake Medical
Komatsu

Industrial Partnerships

Provix
Team Eagle



Workplace Simulator Open House

December 4th, 2019 was the official Open House for the Workplace Simulator (W-SIM). CROSH welcomed over 50 industry partners, fellow researchers, local leaders, and the general public to the Cliff Fielding Research, Innovation and Engineering Building on the Laurentian University Campus to demonstrate the capabilities of this state-of-the-art laboratory.



Top photo, from left to right: CROSH Advisory Board Member and OHS Consultant Ric deMeulles, OPE Research Lead Dr. Dominique Gagnon, MPP Jamie West, Laurentian University President and Vice-Chancellor Dr. Robert Haché, CROSH Director Dr. Sandra Dorman, and CROSH Associate Director and HFE Research Lead Dr. Alison Godwin.

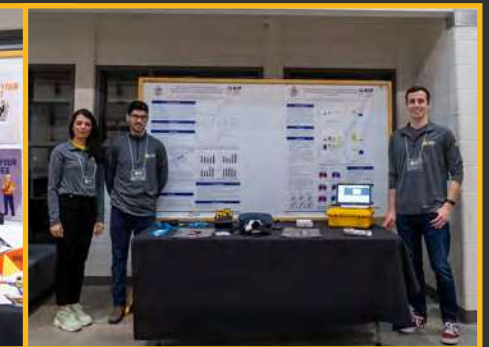


Workplace Simulator Open House

At the Open House, CROSH student members and researchers had the opportunity to share their research with the public.



Clockwise from top: Masters student Rachelle Barrette and PhD students Amy Doan and Caroline Dignard; Masters student Curtis Hancock; Masters student Margaret Kanya-Forstner; Masters students Nazanin Gholami, Beau Williams-Orser, and Curtis Hancock; Postdoctoral Fellows Dr. Katie Goggins and Dr. Malorie Leduc; and Undergraduate student Sara Gauthier and Dr. Alison Godwin.



Workplace Simulator Components and Capabilities

The **Workplace Simulator** is a one-of-a-kind facility providing state-of-the-art infrastructure for the design of research studies or service contracts that solve real-world workplace problems through work-task simulation. The Workplace Simulator consists of four main components: a robotic vibration and motion platform, a virtual reality eye-tracking system, a metabolic cart, and an environmental chamber. It is the **only lab in the world** capable of combining these pieces of equipment into one integrated system. Together, or individually, the Workplace Simulator and its components can precisely and reliably recreate workplace conditions, enabling the testing of equipment, systems, and people in standardized laboratory conditions.



The **Robotic Platform**, or rotopod, operates in six-degrees of freedom to recreate the vibration and motion of equipment in the field. Among other capabilities, the platform can be used to test the effectiveness of materials and clothing in mitigating vibration exposure and risk to people and equipment.



The **Virtual Reality Eye-Tracker** provides performance metrics to evaluate equipment design and policy interventions. Situational Awareness can be tested in the immersive VR equipment operation simulation (pictured). The **Eye-Tracker Glasses** track the user's pupils to determine what they are looking at at any moment, enabling training and performance evaluation.



The **Metabolic Cart**, or Cardiorespiratory Diagnostic System, performs comprehensive pulmonary function tests and true breath-by-breath metabolic analyses. In combination with our **Body Weight Composition Scale**, capabilities include Exercise Testing, Spirometry, and Weight Management Monitoring, with applications in both the occupational and personal fitness fields.



The **Environmental Chamber** can be set to precise temperature (from -40°C to + 40°C) and humidity levels, enabling testing and measurements under realistic environmental conditions. Applications range from exercise science and human physiology to re-creating the specific ambient conditions of a workplace for occupational fitness evaluations.



The **Workplace Simulator** components can be used together or separately in multiple configurations. All four can be combined to accurately recreate field or workplace conditions within a controlled laboratory environment that is **unlike any other in the world**. The simulator provides clients with a unique opportunity to collect data, conduct experiments, measure human physiological variables, and evaluate materials, equipment, and personnel.

Workplace Simulator Tours

- May 13 - The Honourable Kirsty Duncan, Minister of Science and Sport
- May 15 - Camps d'anticipation
- May 16 - Komatsu
- May 21 - MPP Jamie West
- May 27 - Technica Mining
- May 29 - Ontario University Procurement Management Association Members
- August 14 - Peruvian Mining Delegation, including Vice-Minister of Mines, Augusto Francisco Cauti Barrantes
- September 12 - Russian and Kazakhstan Delegation
- September 25 - Workplace Safety North Technical Advisory Committee
- October 21 - CROSH Advisory Board
- October 29 - Professor Marco Tarabini, Visiting Scholar from Politecnico Milano in Italy
- November 5 - Vale
- November 6 - Take Your Kids to Work Day
- November 7 - Northeastern University China
- November 20 - South African Mining Delegation
- December 2 - CBC's Marcus Schwabe
- December 4 - Official W-SIM Open House
- January 17 - Laurentian University School of Nursing
- January 28 - Kearns Technology and Kevin Flynn, former Ontario Minister of Labour
- February 3 - Laurentian University Engineering Monitoring and Design Class
- February 11 - International Day of Women and Girls in Science



CROSH Director Dr. Sandra Dorman discussing the Workplace Simulator with Technica Mining CEO Mario Grossi.



CROSH Director Dr. Sandra Dorman, Associate Director Dr. Alison Godwin, Advisory Board Member Ric deMeulles, and W-SIM Technologist Wesley Young give a tour of the Workplace Simulator to Kearns Technology Founder and CTO Hector Kearns, Executive Officer Joey Katuray, and former Ontario Minister of Labour, Kevin Flynn.

International Day of Women and Girls in Science

On February 11th, 2020 we welcomed 85 Grade 6 girls and boys from Greater Sudbury Area schools to the Laurentian University campus in recognition of the United Nations' International Day of Women and Girls in Science. The school children experienced a full day of demonstrations and presentations that highlighted amazing women in Science and Trades and the importance of inclusivity in STEMM (Science, Technology, Engineering, Mathematics, and Medicine).

CROSH was central to the success of this event: it was co-chaired by CROSH Director Dr. Sandra Dorman and CROSH employees and students volunteered their time.



CROSH researcher Dr. Kathryn Sinden giving a presentation to one of the groups of school children.



CROSH graduate student member Rachelle Barrette was one of the many CROSH members who volunteered their time, making the day a resounding success.

Following the day's activities, there was a free, public discussion at Dynamic Earth with a panel of acclaimed and highly successful women in STEMM, including CROSH Research Chair and Interim Vice-President Research Dr. Tammy Eger. In addition to the discussion, Dr. Eger also gave a visual presentation about her recent journey to Antarctica as a member of the esteemed Homeward Bound program.



Master of Ceremonies:
Dr. Nadia Mykytczuk

Panelists:
Dr. Jennifer Jocko
Dr. Madiha Khan
Ashley Kirwan, MSc, PGeo
Dr. Tammy Eger

Dr. Tammy Eger in Antarctica

CROSH Research Chair Dr. Tammy Eger was selected, along with 99 other women leaders in STEMM from across the globe, to be part of the prestigious Homeward Bound program. The program is a "ground-breaking, global leadership initiative ... created to increase the influence and impact of women leading with a STEMM background in making decisions that shape the future of our planet." The culmination of the program was a journey by sea to Antarctica.



Day of Mourning

April 28th is the National Day of Mourning. On this day we remember and honour those who have been killed, injured, or become ill in the course of their work. It's a day to renew our commitment to improve health and safety in the workplace and prevent further injuries, illnesses, and deaths.

Traditionally for the National Day of Mourning, a ceremony is held at Laurentian University. Due to the COVID-19 pandemic, we instead recognized this day with a video ceremony that included video messages from community leaders and over 30 community members.

The video was produced with the help of CROSH, the Sudbury District Labour Council, and local leaders.



The video can be viewed at: https://youtu.be/IO9XDiej_YA

CROSH Fun!

At CROSH, we strive to create a positive, inclusive environment where everyone is encouraged to achieve their best. Part of that includes having fun together and celebrating birthdays, thesis defences, and other memorable life events.



Advisory Board Member and OHS Consultant Ric deMeulles makes an impressive shot during a friendly game of ring toss at the CROSH holiday party.



The CROSH Crew stayed fit with outdoor yoga, organized by the Laurentian University Graduate Students' Union.



Dr. Alison Godwin made penguin cookies to help celebrate the return of Dr. Tammy Eger from Antarctica. They were as good as they looked!



One of our CRafés was hosted by local Sudbury group Kindness Rocks, who led us in painting positively-themed rocks for sharing.



The CROSH Crew joined many other teams from around Greater Sudbury to play in the Pond Hockey Festival on the Rock. The festival was in support of families affected by childhood cancer via Camp Quality Northern Ontario.

Social Media and Website

Led by CROSH Science Communication Officer Tobias Mankis, CROSH maintains an active presence on social media. You can follow us on Twitter, Instagram, and Facebook, and you can also check us out on our YouTube channel and LinkedIn page.

Our website contains information on all aspects of CROSH, from how to become a member, to our full collection of webinars, infographics, publication lists, and more.



Twitter: [@CROSH_CRSSST](https://twitter.com/CROSH_CRSSST)



Instagram: [@crosh_crssst](https://www.instagram.com/crosh_crssst)



Facebook: [CROSHatLU](https://www.facebook.com/CROSHatLU)



LinkedIn: [Centre for Research in Occupational Safety and Health \(CROSH\)](https://www.linkedin.com/company/centre-for-research-in-occupational-safety-and-health-crosh/)

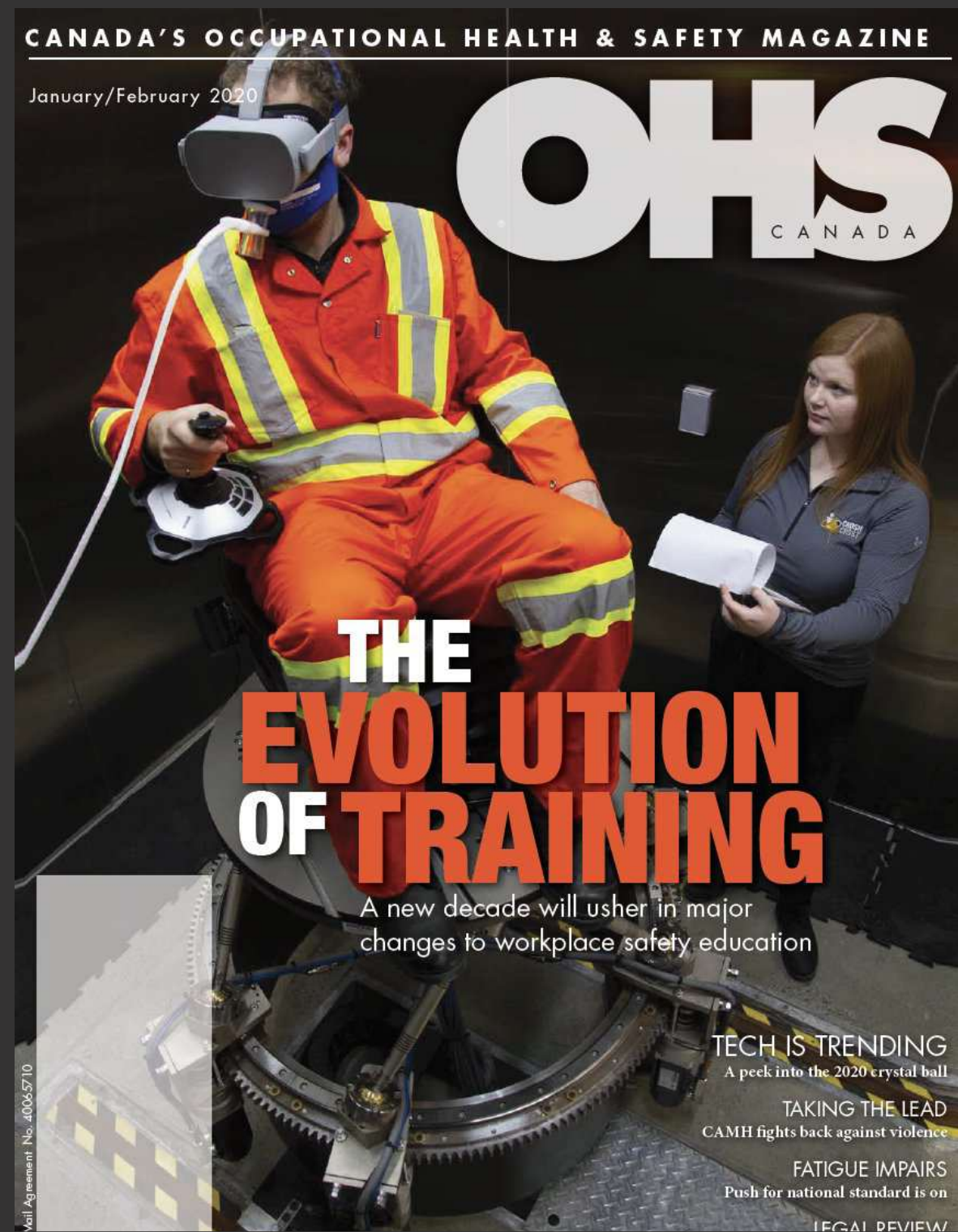


Website: www.crosh.ca



Email: crosh@laurentian.ca

CROSH in the Media



CROSH Graduate Student Member Margaret Kanya-Forstner and Workplace Simulator Technologist Wesley Young demonstrate some of the capabilities of the Workplace Simulator for OHS Canada magazine (<https://www.ohscanada.com/digital-archives/january-february-2020/>).

CROSH in the Media

CROSH

CROSH nets \$225,000 for study of health and safety. Leo Gerard and Dr. Sandra Dorman. Northern Ontario Business. June 28th, 2019. <https://www.northernontariobusiness.com/regional-news/sudbury/crosh-nets-225000-for-study-of-health-and-safety-1545955>

Steelworkers provide \$225K in research funding to LU's CROSH. Leo Gerard. Sudbury.com. June 28, 2019. <https://www.sudbury.com/local-news/steelworkers-provide-225k-in-research-funding-to-lus-crosh-1547084>

Steel contributes \$225K to research. Leo Gerard and Dr. Sandra Dorman. The Sudbury Star. June 28, 2019. <https://www.thesudburystar.com/news/local-news/steel-contributes-225k-to-research>

CROSH unit helps workers avoid workplace hazards. Dr. Kathryn Sinden and Dr. Dominique Gagnon. TB News Watch. October 5, 2019. <https://www.tbnewswatch.com/local-news/crosh-unit-helps-workers-avoid-workplace-hazards-1727848>

Women and girls encouraged to pursue careers in science and technology. Dr. Sandra Dorman. CTV News Northern Ontario. February 11, 2020. <https://northernontario.ctvnews.ca/women-and-girls-encouraged-to-pursue-careers-in-science-and-technology-1.4807537>

April 28 Day of Mourning ceremony goes virtual this year due to pandemic. Dr. Sandra Dorman. Sudbury.com. April 28, 2020. <https://www.sudbury.com/local-news/april-28-day-of-mourning-ceremony-goes-virtual-this-year-due-to-pandemic-2285142>

Workplace Simulator

Workplace simulator fast tracks solutions to workplace problems. CBC News. Dr. Sandra Dorman and Margaret Kanya-Forstner. December 4, 2019. <https://www.cbc.ca/news/canada/sudbury/workplace-simulator-crosh-laurentian-university-1.5382810>

Health and safety centre unveils Workplace Simulator in Sudbury. Dr. Sandra Dorman. The Sudbury Star. December 5, 2019. <https://www.thesudburystar.com/news/local-news/health-and-safety-centre-unveils-workplace-simulator-in-sudbury>

Sudbury workplace health and safety centre injects more life into lab testing. Dr. Sandra Dorman. Northern Ontario Business. December 5, 2019. <https://www.northernontariobusiness.com/industry-news/training-education/sudbury-workplace-health-and-safety-centre-injects-more-life-into-lab-testing-1900588>

The Evolution of Training. Dr. Alison Godwin. OHS Canada. January/February 2020. <https://www.ohscanada.com/digital-archives/january-february-2020/>

CROSH in the Media

Human Factors and Ergonomics

Sudbury airport adding the 'BATmobile'. Dr. Ratvinder Grewal. The Sudbury Star. October 1, 2019. <https://www.thesudburystar.com/news/local-news/sudbury-airport-adding-the-batmobile>

Sudbury airport using new technology to better assess and report runway conditions. Dr. Ratvinder Grewal. CBC. October 1, 2019. <https://www.cbc.ca/news/canada/sudbury/airport-runway-conditions-braking-planes-assessments-1.5304514>

Sudbury Airport taking the lead on improving airport safety. Dr. Ratvinder Grewal. Sudbury.com. October 2, 2019. <https://www.sudbury.com/local-news/sudbury-airport-taking-the-lead-on-improving-airport-safety-1726881>

Not just for chairs-Using the Science of Ergonomics to make Safer Workplaces. Written by Peg Scherzinger. Sudbury.com. March 31, 2020. <https://www.sudbury.com/discover/discover-not-just-for-chairs-using-the-science-of-ergonomics-to-make-safer-workplaces-2214398>

Occupational Physiology and Environment

Shiftwork and fatigue. Dr. Sandra Dorman. CTV News Northern Ontario. October 3, 2019. <https://northernontario.ctvnews.ca/mobile/video?clipId=1795074&binId>

Climate change brings the heat - Rising temperature puts safety of outdoor workers in spotlight. Dr. Dominique Gagnon. OHS Canada. December 19, 2019. <https://www.ohscanada.com/features/climate-change-brings-heat/>

Occupational Health and Wellness

Majority of miners fatigued: Survey. Dr. Michel Larivière. Canadian Occupational Safety. November 19, 2019. <https://www.thesafetymag.com/ca/topics/occupational-hygiene/majority-of-miners-fatigued-survey/191963>



CROSH Faculty Researcher Dr. Ratvinder Grewal is the CROSH lead on a research project on human-computer interface design for a new technology to be used at the Greater Sudbury Airport. The technology, called the Braking Availability Tester (BAT), aims to help make runways safer for aircraft (<https://northernontario.ctvnews.ca/video?clipId=1794182>).

Visiting Scholars

Dr. Anil Adishesh: Specialist physician in occupational medicine and Associate Professor in the Department of Medicine at the University of Toronto. The overarching theme of Dr. Adishesh's research is, "promoting long and healthy working lives".

Prof Marco Tarabini: Assistant Professor in the Department of Mechanical Engineering at Politecnico di Milano. Prof Tarabini's research activity includes the response of the human body to vibration.

Dr. Stephen Cheung: Professor in the Department of Kinesiology at Brock University in Canada. Dr. Cheung's research focuses on the effects of environmental stress on human physiology and performance.



Visiting Scholar Prof Marco Tarabini delivering a public presentation at Laurentian University on "Vibration: Measurement and Data Analysis."

Research Highlights

Seed Grants Awarded: **11**
Peer Reviewed Published Journal Articles: **47**
Published Abstracts: **6**
Invited Presentations: **32**
Presentations and Proceedings: **42**
Technical Reports: **11**
Workshops and Training Sessions: **27**



Seed Grant Projects

Grants Awarded under the Occupational Health and Wellness Stream

Assessing the reliability and validity of the public services health and safety association acute care Violence Assessment Tool (VAT). (\$10,000)

Principal Investigator: **Dr. J. Horrigan**, School of Nursing, Laurentian University

PTSD Information Guide: Offering support for employers, workers, and family members. (\$9,970)

Principal Investigator: **Dr. Zs. Kerekes**, Postdoctoral Fellow, CROSH

Managing critical incident exposure among subgroups of Thunder Bay Fire Rescue: Considering impacts of sex/gender and years of service. (\$9,910)

Principal Investigator: **Dr. K. Sinden**, Kinesiology, Lakehead University

Mapping critical incident exposure levels in structural firefighters across Northern Ontario. (\$10,000)

Principal Investigator: **Dr. K. Sinden**, Kinesiology, Lakehead University

Validating the Remote First Aid Self-Efficacy Scale. (\$10,000)

Principal Investigator: **Dr. S. Ritchie**, School of Human Kinetics, Laurentian University

Grants Awarded under the Human Factors and Ergonomics Stream

Vibration transmissibility evaluation of a seat gel-cushion product. (\$7,024)

Principal Investigator: **Dr. T. Eger**, School of Human Kinetics, Laurentian University

Using virtual reality to educate workers about proper ingress/egress behaviours on heavy equipment. (\$9,960)

Principal Investigator: **Dr. A. Godwin**, School of Human Kinetics, Laurentian University

Tolerance of user interface design alterations. (\$9,976.19)

Principal Investigator: **Dr. R. Grewal**, Department of Mathematics and Computer Science, Laurentian University

Grants Awarded under the Occupational Physiology and Environment Stream

Exposure assessment of PFAS and aerosol concentrations for non-remunerated/recreational ski wax technicians in Ontario. (\$10,000)

Principal Investigator: **Dr. K. Goggins**, Postdoctoral Fellow, CROSH

Understanding environmental heat exposure amongst wildland FireRangers. (\$9,654)

Principal Investigator: **Dr. S. Dorman**, School of Human Kinetics, Laurentian University

The examination of mitochondrial biogenesis in relation to core-cooling before and after exercise. (\$10,000)

Principal Investigator: **Dr. D. Gagnon**, School of Human Kinetics, Laurentian University

Peer-Reviewed Published Journal Articles

Armstrong, D.P., Sinden, K.E., Sendsen, J., MacPhee, R.S., and Fischer, S.L. (2019). Evaluating the effect of a strength and conditioning program to improve paramedic candidates' physical readiness for duty. *Work*, DOI: [10.3233/WOR-192953](https://doi.org/10.3233/WOR-192953)

Armstrong, D.P., Sinden, K.E., Sendsen, J., MacPhee, R.S., and Fischer, S.L. (2019). The Ottawa Paramedic Physical Ability Test: test-retest reliability and analysis of sex-based performance differences. *Ergonomics*, May 26:1-10. DOI: [10.1080/00140139.2019.1618501](https://doi.org/10.1080/00140139.2019.1618501)

Aubin, D., Lightfoot, N., Gauthier, A., Cote, D., and Arrandale, V. (2019). After the dust settles: a qualitative descriptive study of underground workers who received aluminum dust prophylaxis and its organizational level impact. *Journal of Inorganic Biochemistry*, 204 (2020): 110935. DOI: [10.1016/j.jinorgbio.2019.110935](https://doi.org/10.1016/j.jinorgbio.2019.110935).

Baker, M., Quesnele, J., Baldisera, T., Kenrick-Rochon, S., and Laurence, M. (2019). Exploring the role of cervical spine endurance control as a predictor of concussion risk and recovery following sports related concussion. *Musculoskeletal Science and Practice*. 2019 Jul; 42:193-197. DOI: [10.1016/j.msksp.2019.04.002](https://doi.org/10.1016/j.msksp.2019.04.002).

Barker, D., Morrison, T., Rappolt, S., and Nowrouzi-Kia, B. (2019). Fieldwork private practice in Canada: A Descriptive Cross-Sectional Study. *Annals of International Occupational Therapy*. DOI: [10.3928/24761222-20190625-01](https://doi.org/10.3928/24761222-20190625-01).

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Battochio, R.C. and Stambulova, N. (2019). Coping resources and strategies of Canadian ice-hockey players: An empirical National Hockey League career model. *International Journal of Sports Science & Coaching*, 14 (6), 726-737. DOI: [10.1177/1747954119878853](https://doi.org/10.1177/1747954119878853).

Bhatnagar, V. R., Jain, A. K., Tripathi, S. S., and Giga, S. (2020). Beyond the competency frameworks- conceptualizing and deploying employee strengths at work. *Journal of Asia Business Studies*. DOI: [10.1108/JABS-07-2019-0228](https://doi.org/10.1108/JABS-07-2019-0228).

Briglio, T., Matte, J., Heale, R., Horrigan, J., and Larocque, S. (2019). Integrative review: Women's perceived birth trauma, healthcare provider actions and implications for nurses. *Journal of Multidisciplinary Research at Trent*, 2(1), 69-79. <https://ojs.trentu.ca/ojs/index.php/jmrt/article/view/297>

Chadefaux, D., Goggins, K., Cazzaniga, C., Marzaroli, P., Marelli, S., Katz, R., Eger, T., and Tarabini, M. (In Press). Development of a two-dimensional dynamic model of the foot-ankle system exposed to vibration. *Journal of Biomechanics*, DOI: [10.1016/j.jbiomech.2019.109547](https://doi.org/10.1016/j.jbiomech.2019.109547)

Deibert, S., Ritchie, S., Oddson, B., Michel, G., and Tetzlaff, E. (2019). Reflexivity through a yoga class experience: Preparing for my Health Promotion Without Borders excursion to Mongolia. *The Qualitative Report*.

Deibert, S., Ritchie, S., Oddson, B., Michel, G., and Tetzlaff, E. (2019). Health Promotion Without Borders excursion to Mongolia: A case study. Submitted to *Health Promotion International* on September 16 2019. Submission No. HPI-2019-354.

Deibert, S., Ritchie, S., Oddson, B., Michel, G., and Tetzlaff, E. (2019). An Autoethnography of an International Service Learning Experience in Mongolia. Submitted to the *Journal of Experiential Education* on September 11 2019. Submission No. JEE-19-0075.

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- Dignard, C., Larivière, M., Larivière, C., and Schoenenberger, S. (In press).** Spécificité du contexte canadien sur les questions de santé psychologique au travail: arrêt maladie, retour en poste et stress financier. Eds., Presses Universitaires du Septentrion Villeneuve d'Ascq cedex, France.
- Donato, E., Lightfoot, N., Carter, L., and MacEwan, L. (2020).** Interprofessional education in four Canadian undergraduate nursing programs: an examination of the supporting data. *Diversity of Research in Health J 3* (February): 34-49. DOI: [10.28984/drhj.v3i0.297](https://doi.org/10.28984/drhj.v3i0.297).
- Gagnon D.D., Dorman S., Ritchie S., Jagalur Mutt S., Stenbäck V., Walkowiak J., and Herzig K.H. (2019).** Multi-day Prolonged Low- to Moderate-Intensity Exercise Mimics Training Improvements in Metabolic and Oxidative Profiles without Concurrent Chromosomal Changes in Healthy Adults. *Frontiers*, DOI: [10.3389/fphys.2019.01123](https://doi.org/10.3389/fphys.2019.01123).
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- Giffin, C., Schinke, R., Middleton, T., Kerr, G., Larivière, M., Kpazaï, G., and Petersen, B. (In press).** Understanding the Staff Cancer Through the Descriptions of Elite-level Male Soccer Players. *Qualitative Research in Sport, Exercise and Health*.
- Godwin, A., Vance, B., and Eger, T. (2019).** Findings from a visibility survey in the construction industry. *Transportation Research Interdisciplinary Perspectives*; 2. DOI: [10.1016/j.trip.2019.100056](https://doi.org/10.1016/j.trip.2019.100056).
- Goggins, K., Oddson, B., Lievers, W.B., and Eger, T. (2020).** Anatomical locations for capturing magnitude differences in foot-transmitted vibration exposure, determined using multiple correspondence analysis. *Theoretical Issues in Ergonomics Science*, DOI: [10.1080/1463922X.2020.1731623](https://doi.org/10.1080/1463922X.2020.1731623).
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- Gohar, B., Larivière, M., and Nowrouzi, B. (In press).** From contamination to staff shortage: Conceptualizing sickness absence in healthcare. *Occupational Medicine*.
- Khan, M. I., Bath, B., Kociolek, A., Zeng, X., Koehncke, N., and Trask, C. (2020).** Trunk posture exposure patterns among prairie ranch and grain farmers. *Journal of Agromedicine*, 25(2), 210-220. DOI: [10.1080/1059924X.2019.1659200](https://doi.org/10.1080/1059924X.2019.1659200).

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- Leduc, M., Vance, B., Eger, T., and Godwin, A. (2019).** Findings from a visibility survey in the construction industry. *Transportation Research Interdisciplinary Perspectives*, 2, 100056. DOI: [10.1016/j.trip.2019.100056](https://doi.org/10.1016/j.trip.2019.100056).
- Lievers, W.B., Goggins, K.A., and Adamic, P. (2020).** Epidemiology of foot injuries using National Collegiate Athletic Association data from the 2009- 2010 through 2014-2015 seasons. *Journal of Athletic Training*, 55(2):181-187. DOI: [10.4085/1062-6050-560-18](https://doi.org/10.4085/1062-6050-560-18).
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- Morin, K.A., Eibl, J.K., Caswell, J.M., Rush, B., Mushquash, C., Lightfoot, N.E., and Marsh, D.C. (2019).** Concurrent psychiatry for patients enrolled in opioid agonist treatment: A propensity score matched cohort study in Ontario, Canada. *Substance Abuse Treatment, Prevention, and Policy*, 14:29. DOI: [10.1186/s13011-019-0213-6](https://doi.org/10.1186/s13011-019-0213-6).
- Nickel, C., Knight, C., Langille, A., and Godwin, A. (2019).** How Much Practice Is Required to Reduce Performance Variability in a Virtual Reality Mining Simulator? *Safety*, 5(2), 18. DOI: [10.3390/safety5020018](https://doi.org/10.3390/safety5020018).
- Nowrouzi-Kia, B. and Fox, M. (In Press).** Work environment factors in Registered Nurses working in acute care hospitals: A cross-sectional random sample study. *Workplace Health and Safety*, IF: 0.831
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Published Abstracts

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Gagnon, D.D., Filipovic, M., and Munten, S. (2019). The effects of treadmill, elliptical, and rowing exercise on fat and CHO oxidation in healthy males. *Proc Physiological Society* 43, PC176.

Gagnon, D.D., and Munten, S. (2019). The influence of skeletal muscle temperature on muscle deoxygenation and metabolism at fixed exercise workload. *Proc Physiological Society* 43, PC098.

Hartley, G.L., Tremblay, C., Munten, S., Dickey, S., and Mady, C.M. (2019). Neuromuscular responses to combined heat stress and hypoxia during 20-km cycling time trials. *Medicine and Science in Sports and Exercise*, 51(supplement), 446.

Lightfoot, N., Maniowabi, D., Barnett, N., MacEwan, L., Holness, D.L., Larivière, M., Eger, T., Arrandale, V.H., Kerekes, Zs., Warry, W., and Fongemy, J. (2019). Mino-nokiiwin: Indigenous Occupational Health, Safety, and Compensation Experience in Some Northeastern Ontario Communities. Northern Health Research Conference. Little Current, Ontario. September 20-21, 2019.

Sinden, K., and Dorman S.C. (2020). Post-traumatic stress injury symptom severity and critical incident exposure among Thunder Bay Fire Rescue firefighters: Implications for improving firefighter mental health management. Theme Advancing a Culture of Prevention. Abstract 1059.

Invited Presentations

Eger, T. (2019). Invited Fireside Chat with the Minister of Science and Sport, The Honourable Kirsty Duncan, on Women in STEMM and EDI. Sudbury, ON. May 13, 2019.

Eger, T., Godwin, A., and Dorman, S. (2019). Hazards associated with mobile equipment operation: Fatigue, line-of-sight and situational awareness, vibration, and posture. Workplace Safety North Mining Health and Safety Conference, Sudbury, ON, April 9-11, 2019.

Eger, T., Godwin, A., Larivière, M., and Goggins, K. (2019). Mining health related research update and research capacity demonstration. Vale Occupational Health and Safety. Laurentian University, Sudbury, ON. November 5, 2019.

Eger, T., Goggins, K., and Young, W. (2019). Centre for Research in Occupational Safety and Health research overview. North Eastern University, MIRARCO, Sudbury, ON. November 6, 2019.

Friesen, K., Kanya-Forstner, M., and Gauthier, S. (2019). Interprofessional education. Interprofessional Education in Health Care (INTE 2126), Laurentian University, Sudbury, ON. September 11, 2019.

Friesen, K., Kanya-Forstner, M., and Gauthier, S. (2019). Reach Accès Zhibbi. Community Health (PHED 3507), Laurentian University, Sudbury, ON. September 18, 2019.

Invited Presentations

- Gagnon D.D. (2019).** Thermal Stress on Markers of Health. Workshop for CROSH Research Rounds, Sudbury, ON. October 12, 2019.
- Gauthier, S. (2019).** Impact of volunteering with chemotherapy patients at the Northeast Cancer Centre. Giving Tuesday Fundraiser, Health Sciences North, Sudbury, ON. December 3, 2019.
- Gauthier, S. (2020).** Effective communication with vulnerable populations. Interprofessional Education: Examining Population Health, Northern Ontario School of Medicine, Sudbury, ON. January 16, 2020.
- Gauthier, S. and Pilon, S. (2019).** Oculus Go demonstration for United Steelworkers Funding Announcement. Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON. June 28, 2019.
- Gauthier, S. and Pilon, S. (2019).** Situational Awareness Mining Simulator (SAMS) demonstration for Workplace Simulator Open House. Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON. December 4, 2019.
- Godwin, A. (2019).** Be Aware In Your Space. WSPS Partners In Prevention Northeastern Ontario Conference, Sudbury, ON. October 2-3, 2019.
- Godwin, A. and Leduc, M. (2019).** Line of Sight: CROSH Current Initiatives. Workplace Safety North Forestry, Paper, Printing and Converting Advisory Committee Meeting. Sudbury, ON. December 5, 2019.
- Goggins, K. (2020).** Effective communication in Women's Sports. U16 Girls Chill Volleyball, College Boreal, Sudbury, ON. January 27, 2020.
- Goggins, K. (2020).** Field Level Hazard Assessments (FLHAs). Centre for Research in Occupational Safety and Health Laboratory. Laurentian University, Sudbury, ON. January 21, 2020.
- Leduc, C. (2019).** Muscle physiology and adaptations to training, exercise and performance. Guest Lecture, PHED2506 Physiology I, Laurentian University, Sudbury, ON. October 1, 2019.
- Leduc, C. (2019).** Prevention through research: Keys to establishing informed and responsive health, safety and wellness initiatives among wildland fire staff. Panel Chair: Leduc, C. Panelists: Cole, B., Young, M. Leduc, C. and Dorman, S. Wildland Fire Canada 2019, Ottawa, ON. November 20, 2019.
- Leduc, M. and Goggins, K. (2019).** Chapter 15: The Special Senses–The Ear: Hearing and Balance. Laurentian University, Sudbury, ON.
- Sherrington, C. and Vance, B. (2019).** Slips, Trips, Falls Prevention. Vale Creighton Mine, Lively, ON. September 2019.
- Sinden, K.E. (2019).** Building the FIIIRE Lab: Field2Lab2Field Applied Ergonomic Research. United States Bone and Joint Institute, Rosemount, Illinois. April 26, 2019.
- Sinden, K.E. (2019).** Critical Incident Exposure among emergency response personnel: A discussion. Ontario Emergency Medical Services Section 21 Subcommittee Meeting, Mississauga, ON. September 12, 2019.
- Sinden, K.E., Bolduc R., and Sayed S. (2019).** Helping Heros. Lakehead University – Report to the Community. Thunder Bay, ON. November 27, 2019.

Invited Presentations

- Tetzlaff, E. (2020).** Chronic disease prevalent in underground mining: knowing your risks, identifying signs and symptoms, and lifestyle management. Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, ON. May 6, 2020.
- Tetzlaff, E. (2020).** Masks and Respirators: Selecting, Donning, Doffing & Disposing during COVID-19. Infectious Disease Task Force, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, ON.
- Tetzlaff, E. (2020).** Prevention, Treatment & Management of Heart Attacks & Strokes. Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, Canada. May 14, 2020.
- Tetzlaff, E. (2020).** Relating vitamin D deficiency to the seasonal safety variance from 2015-2020 at Nickel Rim South Mine. Safety Pause: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, ON. January 20, 22, 24 and 27, 2020.
- Tetzlaff, E. (2020).** Respiratory Health: Function, Protection & Disease. Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, ON. May 15, 2020.
- Tetzlaff, E. (2020).** Understanding the Immune System: Function, Forming, Supporting & Strengthening during COVID-19. Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, ON. May 15, 2020.
- Tetzlaff, E., Eger, T., Pegoraro, A., Dorman, S., and Pakalnis, V. (2020).** Analysis of Recommendations from Mining Incident Investigative Reports: A 50-Year Review. Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company, Sudbury, ON. March 8, 2020.
- Vance, B., Gholami, N., Young, W., and Gauthier, S. (2019).** Situational Awareness Mining Simulator (SAMS) demonstration for Northern Health Research Conference. Centre for Research in Occupational Safety and Health, Manitoulin Hotel and Conference Centre, Little Current, ON. September 20, 2019.
- Vance, B., Waugh, R., and Gauthier, S. (2019).** Health and safety day demonstrations with the mobile-CROSH laboratory. Centre for Research in Occupational Safety and Health, Fraser Mine, Levack, ON. June 4, 2019.
- Vance, B., Young, W., Waugh, R., and Gauthier, S. (2019).** Workplace simulator demonstration for Camp d'anticipation tours. Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON. May 15-16, 2019.



Presentations and Proceedings

- Beckett-Brown, N., McCue, A., MacLean, D., Marsh, D., Peltonen, J., Serresse, O., and Gagnon, D.D. (2019).** Whole-body cooling results in reduced muscle blood flow but faster muscle oxygen uptake kinetics. Proc. Physiol. Soc. 43, PC110. Physiological Society Annual Meeting, Aberdeen, Scotland, July 8-10, 2019.
- Belanger, J. (2020).** Presentation Chair. Women and Girls in Science Symposium, Sudbury, ON.
- Belanger, J. and Young, W. (2020).** Accelerometer and Rotopod Calibration. CROSH Crafé, Sudbury, ON.
- Bonin, J., Gauthier, A.P., Hogenbirk, J.C., and Wenghofer, E.F. (2019).** NOSM's Social Accountability Toward Northern & Rural Communities: An Analysis of French speaking students from entry to practice. Poster presented at the Northern Health Research Conference. Little Current, ON. September 20-21, 2019.
- Chadefaux, D., Goggins, K., Cazzaniga, C., Marelli, S., Marzaroli, P., Reuven Katz, R., Eger, T., and Tarabini, M. (2019).** Development of a simplified two-dimensional biodynamic model of the foot-ankle system exposed to vibration. 54th UK Conference on Human Responses to Vibration. Edinburgh, United Kingdom, September 24-26, 2019.
- Clark, D., Munten, S., and Gagnon, D.D. (2019).** Effects of exogenous ketone supplementation and cooling on substrate metabolism and exercise performance in active healthy males (Poster Presentation). European Congress of Sports Science, Prague, Czech Republic, July 3-6, 2019.
- Demers, P.A., Berriault, C., Ramkissoon, A., Do, M.T., Lightfoot, N., Zeng, X., and Arrandale, V. (2019).** Risk of cancer by ore type in mixed miners cohort. EPICOH 2019 27 International Symposium on Epidemiology in Occupational Health, Wellington, New Zealand, April 29-May 2, 2019.
- Doan, A. (2019).** CROSH Health Research Rounds: Nurses Are Not HCI Experts: Failing To Recognize Medical Device User Interface Issues. Centre for Research in Occupational Safety and Health (CROSH), Sudbury, ON.
- Doan, A. (2020).** User-Interface Design Seminar: Medical Device Interface Mismatch: Do Nurses Have A Fighting Chance? Laurentian University, Sudbury, ON.
- Dorman, S. (2019).** Applying Learnings from the Physiological-Demands Research at the 2016 IMRC Competition in Sudbury. Workplace Safety North. Sudbury, ON. April 9-11, 2019.
- Dorman, S. (2019).** Fatigue Management: understanding your sleep needs in context of shift work, work-life balance and risk. Workplace Safety and Prevention Services. Sault Ste. Marie, ON. May 14-15, 2019.
- Dorman, S. (2019).** Mobile Lab Operations: Opportunities for Collaboration. Northern Health Conference, Little Current, ON. September 20-21, 2019.
- Dorman, S. (2019).** Fatigue Management: understanding your sleep needs in context of shift work, work-life balance and risk. Forum North, Thunder Bay, ON. November 5-6, 2019.
- Eger, T., Godwin, A., and Dorman, S. (2019).** Hazards associated with mobile equipment operation: Fatigue, line-of-sight and situational awareness, vibration and posture. Workplace Safety North Conference Proceedings. Sudbury, ON, April 9-11, 2019.
- Eger, T. (2019).** Embracing ergonomics in mining. A look back and forward at the positive impact ergonomics has and can have on health, safety, and productivity. CIM Convention, Montreal, QC. April 28-May 1, 2019.

Presentations and Proceedings

- Eger, T., Godwin, A., and Dorman, S. (2019).** Mobile equipment operation; strategies to address line-of-sight, vibration, and fatigue. CIM Convention, Montreal, QC, April 28-May 1, 2019.
- Eger, T., Dorman, S., Godwin, A., Leduc, C., and Vance, B. (2019).** Going CROSH-country with a mobile lab to identify occupational health and safety concerns of northern Ontario workers and communities. Northern Ontario School of Medicine's Northern Health Research Conference, Little Current, ON. September 20-21, 2019.
- Friesen, K., Brunette, M., Tremblay, L., Little, J., and Ritchie, S. (2020).** The relationship between trail use and the health of students at a post-secondary institution. Research Week Graduate Symposium, Laurentian University, Sudbury, ON, February 26.
- Gagnon, D.D. and Munten, S. (2019).** The influences of skeletal muscle temperature on muscle deoxygenation and metabolism at fixed exercise workload. European Congress of Sports Science, Prague, Czech Republic, July 3-6, 2019.
- Gagnon, D.D. and Munten, S. (2019).** The influence of skeletal muscle temperature on muscle deoxygenation and metabolism at fixed exercise workload. Proc. Physiol. Soc. 43, PC098. Physiological Society Annual Meeting, Aberdeen, Scotland, July 8-10, 2019.
- Gagnon, D.D., Barclay, N., and Munten, S. (2019).** Effects of mild whole-body hypothermia on prefrontal cortex cerebral oxygenation during cycling at moderate, heavy and severe intensities. (Poster Presentation) Proc. Physiol. Soc. 43, PC115. Physiological Society Annual Meeting, Aberdeen, Scotland, July 8-10, 2019.
- Gagnon, D.D., Filipovic, M., and Munten, S. (2019).** The effects of treadmill, elliptical, and rowing exercise on fat and CHO oxidation in healthy males. (Poster Presentation) Proc. Physiol. Soc. 43, PC176. Physiological Society Annual Meeting, Aberdeen, Scotland, July 8-10, 2019.
- Goggins, K., Weaver, C., and Wilson, B. (2019).** Particulate respiratory hazards. Occupational Health & Hygiene Series, Prospectors & Developers Association of Canada. Golder Associates Ltd. Sudbury, ON. November 2019.
- Kanya-Forstner, M., Godwin, A., Yantzi, N., and Eger, T. (2020).** Assessing the Health Risk and Vibration Transmissibility of Children's Bicycle Trailers on Gravel and Paved Terrain. Laurentian University Graduate Symposium 2020. Sudbury, ON.
- Kerekes, Zs., Larivière, M., Tiszberger, M., and Lessel, C. (2019).** Post-traumatic stress disorder symptom screening in mining industry workers. 127th Annual Convention of the American Psychological Association. Chicago, IL, USA, Program Booklet, p. 207. August 8-11, 2019.
- Larivière, M., Hanson, K., and Kerekes, Zs. (2019).** Mining Mental Health: Ground support for developing a healthy mind strategy. Workplace Safety North Mining Health and Safety Conference, Sudbury, ON. April 11, 2019.
- Larivière, M., Kerekes, Zs., and Hanson, K. (2019).** The first public presentation of the Mining Mental Health's research findings. Workplace Safety North Conference. Sudbury, Ontario. April 11, 2019.
- Larivière, M., Kerekes, Zs., Tiszberger, M., Lessel, C. (2019).** Correlates of Sleep Quality in a Sample of Mining Industry Workers. 127th Annual Convention of the American Psychological Association. Chicago, IL, USA, Program Booklet, p. 208. August 8-11, 2019.

Presentations and Proceedings

Leduc, C., Tsimiklis, A., and Dorman, S. (2019). Understanding contributing factors to injuries in Ontario wildland firefighters. Wildland Fire Canada 2019, Ottawa, ON. November 2019.

Leduc, C., Young, M., Cole, B., Giga, S., and Dorman, S. (2019). Understanding and addressing psychosocial factors in wildland fire. Wildland Fire Canada 2019, Ottawa, ON. November 2019.

Lightfoot, N., Maniwabi, D., Barnett, N., Larivière, M., Eger, T., Holness, D.L., MacEwan, L., Kerekes, Zs., Arrandale, V., Fongemy, J., and Warry, W. (2019). Mino-nokiiwin: Indigenous occupational health, safety, and compensation experience in some northeastern Ontario communities. NOSM Northern Health Research Conference, Little Current, ON, September 20-21, 2019.

McCue, A., Gagnon, D.D., MacLean, D., Marsh, D., Peltonen, J., Beckett-Brown, N., and Serresse, O. (2019). The influence of temperature on localized muscle oxygen uptake, oxygenation, and blood flow during exercise. Proc. Physiol. Soc. 43, PC12. Physiological Society Annual Meeting, Aberdeen, Scotland, July 8 - 10, 2019.

Mongeau, S., Lightfoot, N., Eger, T., and MacEwan, L. (2020). Mining-Related Lower Back Injuries and the Compensation Process: An Injured Workers' Journey. Mining, Health, and Safety Conference, Sudbury, Ontario, April 21-23, 2020.

Mongeau, S., Lightfoot, N., MacEwan, L., and Eger, T. (2019). Mining, injuries, and the compensation process: an injured worker's perspective. NOSM Northern Health Research Conference, Little Current, ON, September 20-21, 2019.

Robertson A. (2019). Physical and Cognitive Demands Assessments. WSPS Partners in Prevention Conference. Sault Ste. Marie, ON. May 2019.

Robertson A. (2019). Physical and Cognitive Job Demands and Health in an Aging Workforce. WSPS Partners in Prevention Conference. Sudbury, ON. October 2019.

Robertson A. (2019). Physical and Cognitive Job Demands and Health in an Aging Workforce. WSPS Partners in Prevention Conference. Thunder Bay, ON. November 2019.

Sayed, S.T., Bolduc, R., Sinden, K.E. (2019). Assessing the impact of physical and psychological factors on musculoskeletal injury risk during firefighting tasks. 50th Annual Conference of the Associate of Canadian Ergonomists, St. John's, NL., August 2019.

Sinden, K.E. and Bolduc R. (2019). A proof of concept study to identify feasibility of measuring physiological load of career firefighters during one 24-hour shift. 10th International Scientific Conference on the Prevention of Work-Related Musculoskeletal Disorders (PREMUS). Bologna, Italy, September 4, 2019.

Sinden, K.E., Hay, J., and Brescacin, D. (2019). The FIIIRE Lab: Developing evidence-based solutions to improve firefighter work health. Canadian Association of Fire Chiefs. Calgary, Alberta. September 14, 2019.

Sayed, S.T. (2019). Guest speaker, "Lakehead University's Report to the Community", Community event, Lakehead University, November 2019.

Sayed, S.T., Kafka, B., Connolly, J., Hepburn, J., Jeurond, J., Bolduc, R., and Sinden, K.E. (2020). Identifying physiological response to emergency response calls experienced during sleep during one 24-hour shift among Thunder Bay Fire Rescue firefighters. 2020 Showcase of Health Research Conference, St. Joseph's Care Group, Thunder Bay, ON. February 2020.

Technical Reports

Dorman, S. Vance, B., and Godwin, A. (2020). CROSH Consulting Service: Evaluation of Office ErgoCalculator tool for [Health and Safety Association]. Sudbury, ON.

Vance, B., Goggins, K., and Eger, T. (2019). Vibration Measurement Service for [Security company]. Sudbury, ON.

Vance, B., Eger, T., and Young, W. (2019). Vibration Measurement Service for [Manufacturing company]. Orillia, ON.

Vance, B., Goggins, and K. (2020). Vibration Measurement Service for [Ontario mining company]. Sudbury, ON.

Tetzlaff, E., van Lankvelt, K., and Fabris, G. (2019). Health Risk Assessment Report: Biometrics & Lifestyle Components. Health & Safety Department, Strathcona Mill, Sudbury Integrated Nickel Operations, a Glencore Company.

Tetzlaff, E., van Lankvelt, K., and Fabris, G. (2019). Health Risk Assessment Report: Biometrics & Lifestyle Components. Health & Safety Department, Onaping Depth Project, Sudbury Integrated Nickel Operations, a Glencore Company.

Tetzlaff, E., van Lankvelt, K., and Fabris, G. (2019). Healthy Living Challenge Company Report. Health Enhancement Program, Sudbury Integrated Nickel Operations, a Glencore Company.

Tetzlaff, E., van Lankvelt, K., and Fabris, G. (2019). Anglo American Health & Wellness Survey. Safety, Health, and Environment Committee, Group Discovery & Geosciences, Technical & Sustainability, Anglo American Ltd.

Tetzlaff, E., van Lankvelt, K., and Fabris, G. (2019). Diabetes Awareness Campaign Report. Health & Safety Department, Onaping Depth Project, Sudbury Integrated Nickel Operations, a Glencore Company.

Tetzlaff, E. (2019). Ergonomics assessment: core shack lifting protocol. Geology Department, Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company.

Kerekes, Zs. (2019). The posttraumatic stress (A poszttraumás stress) In.: Bandi, Sz; Bodó-Varga, Zs.; Csókási, K. (2019) *Kötődésbekötve – Tanulmányok a klinikai pszichológia, a kötődélmélet és a személyiséglektan területeiről.* PTE BTK, Pszichológia Intézet, Pécs. ISBN: 978 – 963 – 429-450 – 4. pp. 244 – 304. https://www.researchgate.net/publication/339845433_Kotodesbekotve_Tanulmanyok_a_klinikai_pszichologia_a_kotodeselmélet_es_a_szemelyiseglektan_teruleteiről.



Workshops and Training Sessions

Dorman, S. (2019). Examining your sleep needs in the context of shift work, work-life balance and work. May 6, 2019.

Dorman, S. (2019). Fatigue Management. United Steelworkers Union, Hearst ON. May 30, 2019.

Dorman, S. (2019). Fatigue Management: understanding your sleep needs in context of shift work, work-life balance and risk. Workplace Safety and Prevention Services. Totten Mine, Worthington, ON. June 13, 2019.

Dorman, S. (2020). Fatigue Management. Lakehead University Lunch and Learn. February 25, 2020.

Eger, T., Goggins, K., and Young, W. (2019). Centre for Research in Occupational Safety and Health Overview of Research for Chinese delegation from North Eastern University. MIRARCO, Laurentian University, Sudbury, ON. November 6, 2019.

Eger, T., Kraus, C., and Belanger, R. (2019). Workshop: Equity, Diversity, and Inclusion in STEAMM. Graduate Student Workshop, Sudbury, ON, October 31, 2019.

Eger, T., and Kraus, C. (2019). Workshop: Equity, Diversity, and Inclusion in STEM. CAMphysics, Sudbury, ON.

Godwin, A. and Leduc, M. (2020). Knowledge Transfer Kits for Mobile Equipment Hazards. Forestry Paper Printing and Converting Advisory Committee, Sudbury, ON.

Godwin, A. and Dodaro, A. (2020). Shining a Light on Daylight Savings Time. CROSH Webinar, February 2020.

Godwin, A. (2019). A Brief Introduction to WSIM. CROSH Webinar, December 2019.

Godwin, A. (2019). A Primer on Situational Awareness. CROSH Webinar, April 2019.

Goggins, K. (2019). Calling for emergency assistance. Health and Safety Share. Centre for Research in Occupational Safety and Health, Laurentian University, Sudbury, ON. November 18, 2019.

Goggins, K. (2019). Occupational vibration exposure workshop: Characteristics, health risks, evaluation, and prevention strategies. Workshop delivered to United Steelworkers Union. Hearst, ON, May 30, 2019.

Leduc, M. and Vance, B. (2019). Overview of Knowledge Transfer Toolkits. Vale Smelter Joint Occupational Health and Safety Committee. Sudbury, ON. September 10, 2019.

Leduc, M. and Vance, B. (2019). Overview of Knowledge Transfer Toolkits. Vale Safety, Health, and Environment Executive Committee. Sudbury, ON. July 22, 2019.

Mongeau, S. (2020). RSI Day: "What is a Worker's Life Worth?" Presented in Partnership with the Sudbury Local Advisory Committee. February 2020.

Mongeau, S. (2019). Healthy Workers in Healthy Workplaces – Respiratory Hazards Webinar – November 2019.

Tetzlaff, E. (2019). Heat stress training for deep underground mining: an online employee module. Safety & Training Department, Onaping Depth Project, Sudbury Integrated Nickel Operations - a Glencore Company. Launched July 2019.

Workshops and Training Sessions

Tetzlaff, E. (2020). Understanding the role of body fat and measurement of body composition. Monthly Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company. January 8, 2020.

Tetzlaff, E. (2020). Sleepy solutions: optimizing sleep on the current shift schedule. Monthly Safety Meeting: Nickel Rim South Mine, Sudbury Integrated Nickel Operations, a Glencore Company. February 12, 2020.

Tetzlaff, E. (2020). Be your own sleep coach: managing the current shift schedule. June Health & Safety Month Presentation Series: Strathcona Mill, Sudbury Integrated Nickel Operations, a Glencore Company. June 6-7, 2020.

Tetzlaff, E. and Fabris, L. (2019). Travel health for base camp and international surveying. Medication and wellness. Webinar. Safety, Health, and Environment Committee, Group Discovery & Geosciences, Technical & Sustainability, Anglo American Ltd. October 15, 2019.

Tetzlaff, E. and van Lankvelt, T. (2019). Low back strength training program development. Smelter Emergency Response Team: Falconbridge Smelter Complex, Sudbury Integrated Nickel Operations, a Glencore Company. April 23 and 25, 2019.

Tetzlaff, E. and van Lankvelt, T. (2019). Grip strength development for basket carries and rope pulls. Smelter Emergency Response Team: Falconbridge Smelter Complex, Sudbury Integrated Nickel Operations, a Glencore Company. August 20 and 22, 2019.

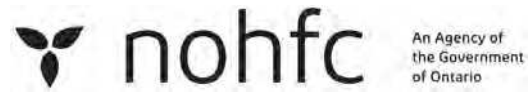
Tetzlaff, E. and van Lankvelt, T. (2019). Top fuel for top performance: cooking class and nourish session. Smelter Emergency Response Team: Falconbridge Smelter Complex, Sudbury Integrated Nickel Operations, a Glencore Company. December 10 and 12, 2019.

Vance, B. and Godwin, A. (2019). Line of Sight Workshop. Presented to workers and management at New Gold Rainy River mine. Emo, ON. October 3, 2019.

Vance, B. and Godwin, A. (2019). Line of Sight Workshop. Presented to workers and management of USW Local 1-2010. Hearst, ON. May 30, 2019.



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Dr. Fergal Nolan



William Shaver



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