



**centre for research in occupational safety and health**  
**centre de recherche sur la santé et sécurité au travail**

# ANNUAL REPORT 2012

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# About CROSH

Centre for **R**esearch in **O**ccupational **S**afety and **H**ealth (**CROSH**) was established in 2008 by Laurentian University to provide a formalized structure for industry, safe workplace associations, labour groups, government organizations and researchers to share workplace injury and disease problems and solutions

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## WHO WE ARE AND WHAT WE DO

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

### To make this happen we will:

1. engage with workplace parties in all phases of research;
2. create a network of international research partners to share and build expertise;
3. develop a framework to facilitate knowledge utilization and sharing to ensure our findings are accessible to agencies dedicated to workplace health & safety; and
4. promote new discoveries to government, industry, and health and safety agencies in order to positively influence policies and practices.

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## CROSH EXPERTISE

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CROSH brings together researchers with expertise in ergonomics, human factors, occupational health nursing, epidemiology, mental health, computer science, risk, fatigue, clinical physiology, labour studies and occupational disease.

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## MESSAGE FROM DIRECTOR

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2012 was a great year for CROSH thanks to the dedication and leadership of the CROSH Advisory Board, Executive Committee, researchers and student members. A CROSH website was launched in the summer of 2012 ([www.CROSH.ca](http://www.CROSH.ca)) and we also activated a twitter account (@CROSH\_CRSSST). A three-year strategic research plan was completed with strategies to enhance research and training, sustainability, engagement, communication, capacity building, and policy impact. However, the highlight of the year came in December with a funding announcement of \$1 million dollars from the Northern Ontario Heritage Fund Corporation to support a Research Chair in Occupational Health and Safety (OHS). An international search for the Chair in OHS will begin in 2013 and we look forward to introducing the Chair to our researchers and stakeholders in 2014.

**I wish you all a safe and healthy 2013.**

**Live well, work safe!**

**CROSH Director**



**2013**



# Leadership Team

CROSH's strategic direction is guided by a 15 member Advisory Board (AB) comprised of leaders from mining, forestry, health care, and government (Table 1) and a 10 member Executive Committee (EC). The EC is charged with operationalizing CROSH's Strategic Research Plan (SRP), and with the overall management of CROSH. The AB meets semi-annually and works closely with CROSH researchers to ensure CROSH's strategic direction by 1) providing strategic advice in terms of research directions and private sector funding opportunities, 2) supporting the development collaborative, research partnerships, and 3) encouraging effective knowledge exchange enhancing CROSH's impact to change policy and practice. General members of CROSH (Table 2), composed of faculty and graduate students, meets as required to fulfill the primary roles of conducting research, student training, and participating in knowledge dissemination.

Table 1: Composition of the CROSH Advisory Board and Executive Committee

ADVISORY BOARD	EXECUTIVE COMMITTEE
<p><b>Leo Gerard</b> International President, USW (Seat: Labour, Mining)</p>	<p><b>DIRECTOR</b> <i>Tammy Eger</i> Associate Professor, School of Human Kinetics</p>
<p><b>Richard Paquin</b> President, CAW Mine/Mill 598 (Seat: Labour, Mining)</p>	<p><b>ASSOCIATE DIRECTOR</b> <i>Michel Larivière</i> Associate Professor, School of Human Kinetics</p>
<p><b>William Shaver</b> President &amp; CEO of DMC Mining Services (Seat: Management, Mining)</p>	<p><b>SECRETARY</b> <i>Nancy Lightfoot</i> Associate Professor, School of Rural and Northern Health</p>
<p><b>Jody Kuzenko</b> General Manager of Sustainability North Atlantic Base Metals, Vale (Seat: Management, Mining)</p>	<p><b>TREASURER</b> <i>Glenn Legault</i> Associate Professor, Department of Psychology</p>
<p><b>Donna Campbell</b> Executive Director Occupational Health Clinics for Ontario Workers (Seat: Occ. Health Clinics for Ontario Workers)</p>	<p><b>COMMUNICATIONS</b> <i>Ratvinder Grewal</i> Associate Professor, Dept. of Math and Computer Science</p>
<p><b>Candys Ballanger-Michaud</b> Chief Executive Officer, Workplace Safety North (Seat: Workplace Safety North)</p>	<p><b>COMMUNITY LIAISON</b> <i>Ric deMeulles</i></p>
<p><b>Wayne Glibbery</b> Workers Health &amp; Safety Centre, Ne-ON Office (Seat: Workers' Health and Safety Centre)</p>	<p><b>RESEARCH DEVELOPMENT</b> <i>Alison Godwin</i> Associate Professor, School of Human Kinetics</p>
<p><b>Nancy Johnson</b> Labour Relations Specialist OHS/Workers' Comp., ON Nurses' Association (Seat: Labour, Health Care)</p>	<p><b>HEALTH AND SAFETY LIAISON</b> <i>Sandra Dorman</i> Associate Professor, School of Human Kinetics</p>
<p><b>Rhonda Watson</b> Vice President, Human Resources Chief HR Officer, Health Sciences North (Seat: Management, Health Care)</p>	<p><b>MEDICAL LIAISON</b> <i>Joel Anderson</i> Northern Ontario School of Medicine</p>
<p><b>Marianne Matichuk</b> City of Greater Sudbury (Seat: Northern Ontario Mayors' Council)</p>	<p><b>GRADUATE STUDENT REPRESENTATIVE</b> <i>Alexandra Clement</i> Psychology</p>
<p><b>Wayne De L'Orme</b> Director, Occupational Health and Safety Branch, Ontario Ministry of Labour (Seat: Ontario Ministry of Labour)</p>	
<p><b>John Closs</b> President, Sudbury and District Labour Council (Seat: Sudbury and District Labour Council)</p>	

Table 2: CROSH researchers and graduate student members

FACULTY RESEARCHERS	GRADUATE STUDENTS
<p><b>Dr. Celine Boudreau-Larivière</b> Director, School of Human Kinetics</p>	<p><b>AJ Boulay</b> Computer Science</p>
<p><b>Dr. Roger Couture</b> Dean, Professional Schools</p>	<p><b>Kacey Cayen</b> Computer Science</p>
<p><b>Dr. Philip Dirige</b> Associate Professor, Bharti School of Engineering</p>	<p><b>Alexandra Clement</b> Psychology</p>
<p><b>Dr. Sandra Dorman</b> Associate Professor, School of Human Kinetics</p>	<p><b>Bradley Cutler</b> Human Kinetics</p>
<p><b>Dr. Tammy Eger</b> Associate Professor, School of Human Kinetics</p>	<p><b>Katie Goggins</b> Human Kinetics</p>
<p><b>Dr. Ratvinder Grewal</b> Associate Professor, Dept. of Math and Computer Science</p>	<p><b>Basem Gohar</b> Rural and Northern Health</p>
<p><b>Dr. Alison Godwin</b> Associate Professor, School of Human Kinetics</p>	<p><b>Hilary Gordon</b> Human Kinetics</p>
<p><b>Prof. Judith Horrigan</b> Lecturer, School of Nursing</p>	<p><b>Caleb Leduc</b> Human Kinetics</p>
<p><b>Dr. Michel Larivière</b> Associate Professor, School of Human Kinetics</p>	<p><b>Mallorie Leduc</b> Graduate, Master in Human Kinetics</p>
<p><b>Dr. Glenn Legault</b> Assistant Professor, Department of Psychology</p>	<p><b>Behdin Nowrouzi</b> Rural and Northern Health</p>
<p><b>Dr. John Lewko</b> Professor, School of Rural and Northern Health</p>	
<p><b>Dr. W. Brent Lievers</b> Lecturer, Bharti School of Engineering</p>	
<p><b>Dr. Nancy Lightfoot</b> Professor, School of Rural and Northern Health</p>	
<p><b>Dr. Reuben Roth</b> Assistant Professor, Department of Sociology</p>	
<p><b>Dr. Oliver Serresse</b> Professor, School of Human Kinetics</p>	
<p><b>Dr. Liz Wenghofer</b> Director, School of Rural and Northern Health</p>	

# Research at CROSH

To impact policy and practice, the multidisciplinary team of CROSH experts and their research partners engage stakeholders in three broad streams for research - Human Factors and Ergonomics (HFE); Occupational Health (OH); Occupational Physiology and Environment (OPE) - that supports eight core research programs (Figure 1). Research activities, in 2012, in each core program are highlighted in the next section.

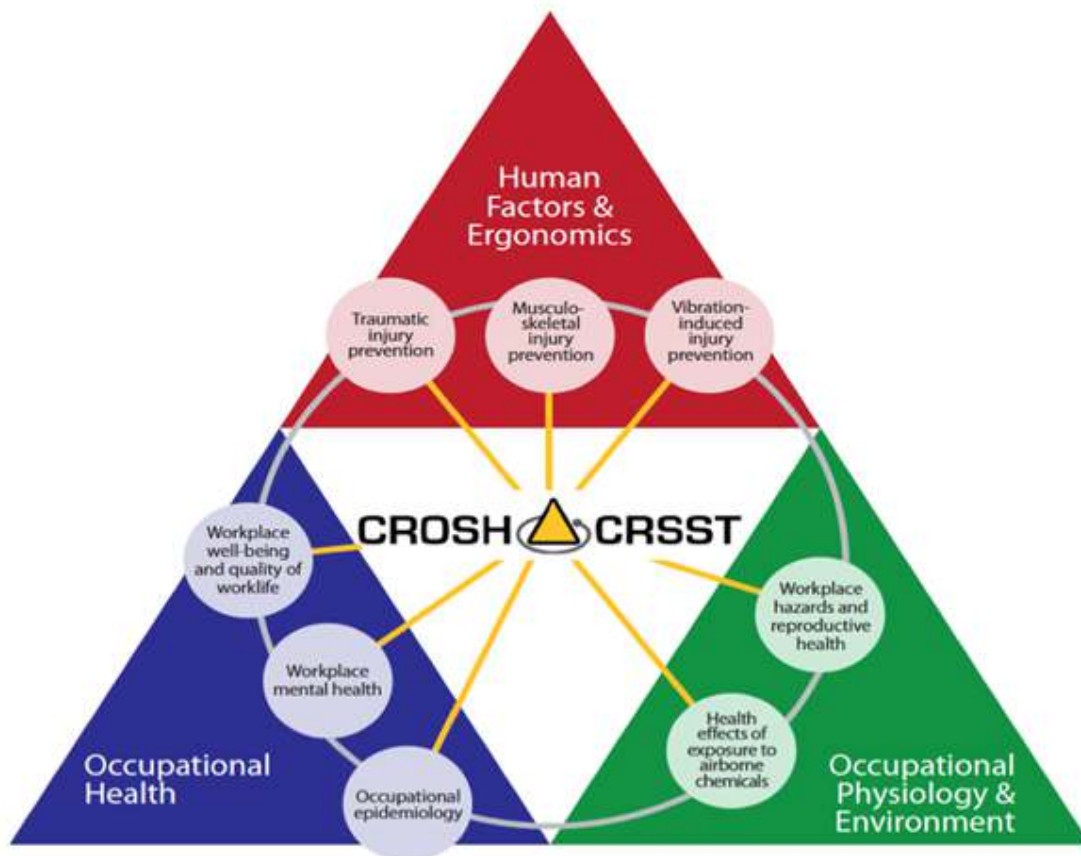


Figure 1: CROSH will support eight integrated research programs drawing from expertise in human factors & ergonomics, occupational health, and occupational physiology & environment.



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## CROSH RESEARCH OUTPUT - 2012

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Note: **Authors** are professors within CROSH and Authors are graduate students within CROSH.

### Vibration Induced Injury Prevention Research Program

*This program examines vibration exposure, vibration transmissibility, and vibration-induced disorders.*

#### 2012 Research Output

##### Journal Articles

Conrad, L., Oliver, M., Jack, R., Dickey, JP, **Eger, T.** (2012) Quantification of 6-degree-of-freedom chasis whole-body vibration in mobile heavy vehicles used in the steel making industry. Journal of Low Frequency Noise Vibration and Active Control. Vol.31(2) 85-104.

**Eger, T.**, Thompson, A., Leduc, M., House, R., Krajnak, K., Goggins, K., **Godwin, A.** Vibration induced white-feet: what you need to know about foot-transmitted vibration. Accepted in WORK.

Harnish, C., **Eger, T.**, Oliver, M., and Dickey, J.P. (2012) Predicting health risks associated with whole-body vibration exposure in steel manufacturing vehicle operators. Occupational Ergonomics (In Press).

Plewa, K., **Eger, T.**, Oliver, M., Dickey, J.P. (2012) Comparison between ISO 2631-1 comfort prediction equations and self-reported comfort values during occupational exposure to whole-body vehicular vibration. Journal of Low Frequency Noise Vibration and Active Control. Vol.31(1) 43-54.

##### Magazine Articles

**Eger, T.**, Oliver, M., and Hope, P. (2012) Protecting people from heavy equipment vibration: measurement, evaluation, and intervention. Ergonomics Canada. August, 12-15.

##### Conference Presentations

**Eger, T.**, **Lariviere, M.**, **Godwin, A.**, **Dorman, S.**, and **Boudreau-Lariviere, C.** (2012). Focus on Occupational Health and Safety in northern Ontario. CROSH Community Symposium, Dec. 6., Sudbury, ON.

**Eger, T.**, Teefy, S., and Dickey, J.P. (2012) Paired-comparison study to determine the impact of rotated trunk/neck postures, and vibration exposure on seated comfort. Proceedings of the 4<sup>th</sup> American Conference on Human Vibration. June 12-15, Hartford, Connecticut.

**Eger, T.**, **Godwin, A.**, and Dickey, J. (2012) Paired-comparison study to determine the impact of rotated trunk/neck postures, and vibration exposure on seated comfort. Canadian Society for Biomechanics Conference. June 6-9. Burnaby, BC.

**Eger, T.**, Thompson, A., House, R., **Godwin, A.**, and Krajnak, K. (2012) Vibration induced white-feet: What you need to know about foot-transmitted vibration. CARWH Conference, June 1-2, Vancouver, BC.

**Eger, T.,** Oliver, M., Hope, P. (2012) Whole-body vibration exposure in steel manufacturing: A case-study evaluation of a seating intervention. CARWH Conference, June 1-2, Vancouver, BC.

**Eger, T.** Oliver, M., Dickey, J. (2012) Vibration Project Overview. Presentation for Bose Ride Team, Framingham Massachusetts, USA. October 4.

**Eger, T.** (2012) Centre for Research in Occupational Safety and Health: 2012 Research Update. Presentation at the Ontario Mine Contractors Safety Association Meeting. December 7, Sudbury, ON, CNL.

Goggins, K., Eger, T., Godwin, A., and Dickey, J.P. (2012) Evaluation of foot-transmitted vibration: ISO 2631-1 or ISO 5349-1? Proceedings of the 4<sup>th</sup> American Conference on Human Vibration. June 12-15, Hartford, Connecticut.

Goggins, K., Eger, T., Godwin, A. (2012). Examination of vibration characteristics for miners exposed to vibration via the feet. Proceedings, 9th Annual Ontario Biomechanics Conference. Barrie, ON, March 16-18.

Goggins, K., and **Eger T.** (2012) Examination of vibration characteristics for miners exposed to vibration via the feet. Presented at 2012 Research Week Graduate Symposium, Laurentian University, Feb. 7-9.

Goggins, K. and **Eger, T.** (2012) Examination of vibration characteristics for miners exposed to vibration via the feet: Analysis of predicted injury risk according to ISO 2631-1 and ISO 5349-1. How We Come to Know Through Theory and Practice, Faculty of Professional Schools Scholarship Showcase, December 13, Sudbury, ON

Harnish, C., **Eger, T., Godwin, A.,** and Dickey, J.P. (2012) Examining the impact of non-neutral sitting postures on vibration transmissibility from seat-to head. Proceedings of the 4<sup>th</sup> American Conference on Human Vibration. June 12-15, Hartford, Connecticut.

Leduc, M., Eger, T., Godwin, A., Dickey, J.P., and Oliver, M. (2012) Evaluation of transmissibility properties and comfort of anti-fatigue mats used by workers exposed to foot-transmitted vibration. How We Come to Know Through Theory and Practice, Faculty of Professional Schools Scholarship Showcase, December 13, Sudbury, ON

Oliver, M., Conrad, L, Jack, R.J., Dickey, J.P. and **Eger, T.** (2012) Improving WBV attenuation through field vibration tested heavy equipment seat retrofitting – A field to lab to field case study. Proceedings of the 4th American Conference on Human Vibration, Hartford, Connecticut, June 12-15.

Singh, P. and **Eger, T.** (2012) Examination of floor-to-ankle vibration transmissibility and subjective discomfort of males and females with different foot arch classifications when exposed to foot-transmitted vibration. How We Come to Know Through Theory and Practice, Faculty of Professional Schools Scholarship Showcase, December 13, Sudbury, ON

Singh, P. and **Eger, T.** (2012) Examination of floor-to-ankle vibration transmissibility and subjective discomfort of males and females with different foot arch classifications when exposed to foot-transmitted vibration. Presented at 2012 Research Week Graduate Symposium, Laurentian University, Feb. 7-9.

Teefy, S., **Eger, T.** (2012). Paired-comparison study to determine the impact of rotated trunk/neck postures, and vibration exposure on seated comfort. Proceedings, 9th Annual Ontario Biomechanics Conference. Barrie, ON, March 16-18.

### **Community Presentations**

**Eger, T.** (2012) CROSH: 2012 Research Highlights. Ontario Mine Contractor's Safety Association Meeting, Sudbury, ON, December 6, 2012.

**Eger, T.** (2012) Seats, fires, cameras and reproductive health: How CROSH brings research to practice. Presented at Research Awareness Week, Laurentian University Feb. 10.

## **Prevention of Traumatic Injury Research Program**

*This program examines mobile equipment accidents from three perspectives: a) Machine Design and Driving Behaviour, b) Machine Interface Design and Cognitive Load and c) Fatigue and Traumatic Injury Occurrence.*

### **2012 Research Output**

#### **Journal Articles**

Nothing to report.

#### **Conference Presentations**

Dickey, J.P., Nield, D.R., Delgado, G., **Eger, T.**, Beauchemin, S., Macpherson, E. (2012) Proof of principle: assembly of an immersive virtual reality simulation for lift trucks. Proceedings of the 4<sup>th</sup> American Conference on Human Vibration, Hartford, Connecticut, June 12-15.

Dickey, J.P., and **Eger, T.** (2012) Whole-body vibration for vehicle drivers and the compounding effects of posture. Research Exchange Forum Presentations, 2012 Partners in Prevention Conference, Toronto May 1-2.

**Godwin, A.** Sabel, C. & **Eger, T.** Implementation of the PROVIX camera system for improved line of sight on underground machinery. Proceedings of the Association of Canadian Ergonomists 2012 Conference, Halifax, NS, Canada, Aug 16-18.

Sabel, C, Scarfone, S., **Eger, T.** and **Godwin, A.** (2012) Quantification of helmet design ergonomics and modeling of line of sight and risk factors for musculoskeletal injury using Classic Jack. Proceedings, 9<sup>th</sup> Annual Ontario Biomechanics Conference. Barrie, ON, March 16-18.

#### **Community Presentations**

Nothing to report.

#### **Media Presentations**

Nothing to report.

#### **Other**

**Godwin, A.** & **Eger, T.** Evaluating line of sight and secondary viewing devices. Published with Earth Moving Equipment Safety Round Table. <http://www.emesrt.org/case-study/case-study-2/>

**Godwin, A. Eger, T., Grewal, R. (2012)** Ergonomic Analysis of LH517. Report for Sandvik Mining and Construction.

**Godwin, A. (2012)** Line of sight analysis for Provox camera installation on Elphinstone 1600G. Report for Goldcorp, Hoyle Pond, Timmins Operation.

## Musculoskeletal Injury Prevention Research Program

*Using advanced methods of biomechanical analysis, CROSH researchers explore how skill acquisition and motor control affect spine stability and spine loading. The impact of cumulative spinal load associated with the operation of work equipment (including mobile equipment) is also evaluated to identify opportunities for intervention aimed at MSD injury reduction. The design and implementation of personal protective equipment is also considered.*

### 2012 Research Output

#### Journal Articles

**Godwin, A. & Eger, T.** Ergonomic and usability ratings of helmets and head-mounted personal protective equipment in industry. Accepted to WORK.

#### Conference Presentations

Cutler, B., Eger, T., Merritt, T., and Godwin, A. (2012) 3D Biomechanical evaluation of musculoskeletal injury risk factors and performance variables in fixed seat rowing. Proceedings, 9th Annual Ontario Biomechanics Conference. Barrie, ON, March 16-18.

Cutler, B., Eger, T., Merritt, T., Godwin, A. (2012) 3D Biomechanical evaluation of musculoskeletal injury risk factors and performance variables in fixed seat rowing. Presented at 2012 Research Week Graduate Symposium, Laurentian University, Feb. 7-9.

Cutler, B., Eger, T., Merritt, T. Godwin, A. (2012) Kinetic analysis of ergometer handle forces in the adaptive rowing setups. Canadian Society for Biomechanics, Vancouver, ON, Canada, June 6-9.

Cutler, B., Eger, T., Merritt, T. Godwin, A. (2012) Kinetic analysis of ergometer handle forces in the adaptive rowing setups. Canadian Society for Biomechanics, June 6-9. Burnaby, BC.

**Eger, T. and Godwin, A.** (2012) Improving design of underground metaliferous equipment. MISHC Human Factors for Mining Equipment Seminar. Brisbane, Australia. November 9<sup>th</sup>.

**Eger, T.** (2012) Keynote Address: Is technology the answer to improved workplace health and safety or part of the problem? The Human Factors & Ergonomics Society of Australia 48th Annual Conference. Canberra, Australia. November 11-14<sup>th</sup>.

**Godwin, A. & Eger, T.** Discomfort and visibility ratings for various types of arborist helmets. Proceedings of the Association of Canadian Ergonomists 2012 Conference, Halifax, NS, Canada, Aug 16-18.

Gordon, H., Larivière, M., Eger, T., Gauthier, A., & Leduc, C. (March 2012). Physical and psychological determinants of workplace injuries: A prospective study of seasonal forest fire fighters. *Ontario Biomechanics Conference; Barrie, ON.*

Gordon, H., Larivière, M., Eger, T., Gauthier, A., & Leduc, C. (February 2012). Physical and psychological determinants of workplace injuries : A prospective study of seasonal forest fire fighters. *Laurentian University Graduate Student Symposium; Sudbury, ON.*

### **Community Presentations**

Nothing to report.

### **Media Presentations**

Nothing to report.

### **Other**

Nothing to report.

## **Occupational Epidemiology**

*CROSH researchers conducted surveillance studies of mortality and cancer incidence in various occupational cohorts and compared the results to standard populations.*

### **2012 Research Output**

#### **Journal Articles**

**Lightfoot, N.**, Berriault, C. 2012. Mortality and cancer incidence in a copper-zinc cohort. *Workplace Safety & Health.* 60(5): 223-233.

#### **Conference Presentations**

Gauthier-Frohlick, D., Garceau, M.L., Kauppi, C., **Lightfoot, N.** Inequity in Access to Pediatric Cancer Care for Rural and Northern Families: Journey in Photographs. Oral presentation at the 2012 Annual Canadian Association for Health Services and Policy Research (CAHSPR) Conference "Innovations for Health System Improvement: Balancing Costs, Quality and Equity", Montréal. May 29-31, 2012.

Gauthier-Frohlick, D., Garceau, M.L., Kauppi, C., **Lightfoot, N.** Rural and Northern Families' Problematic Pediatric Cancer Journey. Poster presented at the 2nd National Rural Research Workshop "Policy and Research in Community Investment, Ottawa. May 24-25, 2012.

Gauthier-Frohlick, D., Garceau, M.L., Kauppi, C., **Lightfoot, N.** Inequity in access to pediatric cancer care for rural and northern families: journey in photographs. Annual Canadian Association for Health Services and Policy Research Conference. Innovations for Health Systems Improvement: Balancing Costs, Quality, and Equity. Montreal, Quebec. May 29-31, 2012.

**Lightfoot, N.**, James, S., Cote, D., Price, S. Ten common difficulties encountered in ethics applications. Canadian Rural Health Research Society, Levis, Quebec, October 25-27, 2012.

Nowrouzi, B., Rukholm, E., Koren, I. & Mian, O. *Sustaining the Nursing Workforce in Northeastern Ontario*. Rendez-Vous 2012. October 9-14, 2012. Thunder Bay, ON, Canada

Nowrouzi, B., Rukholm, E., Koren, I. & Mian, O. *Sustaining the Nursing Workforce in Northeastern Ontario*. Northern Ontario School of Medicine - Northern Research Health Conference. May 10-11, 2012. Thunder Bay, ON, Canada

### **Community Presentations**

Nothing to report.

### **Media Presentations**

Nothing to report.

### **Other**

Nothing to report.

## **Workplace Mental Health and Cognitive Factors**

*CROSH researchers are interested in understanding the complex interactions between mental health, sleep pathology, fatigue, cognitive impairment, and workplace accidents and illness.*

### **2012 Research Output**

#### **Journal Articles**

Boucher, V., Tremblay, L., **Larivière, M.**, Bagaoui, R., & Guindon, B., (2012) *“Study on the Effectiveness of an Adapted Cognitive-Behavioural Treatment – SNAP™ – in Children with Conduct Disorders in a Rural setting*. In *“Adolescent Behaviors”*. Cherylynn Bassani, Ed. Nova Publishers Inc.

Gohar, B., Winter, C. R., Benander, M., Mandell, B., Hobgood, C., & Brewster, K. Z. (2012). Treating depression with ECT: An objective review. *Open Journal of Depression*, 1(2), 9-14. doi:10.4236/ojd.2012.12002

**Horrigan, J.M., Lighfoot, N.E., Larivière, M.,** & Jacklin, K. (2012). The importance of evaluating nurses’ health and the quality of work life. *Workplace Health & Safety Journal*. Ten page double spaced article accepted for publication November 2012 with revisions Manuscript number: MS # AAOHN-2012-035 Version 1.

Kabaroff, L., Eys, M., Schinke, R., and **Eger, T.** (2012) The analysis of a group-mediated cognitive-behavioral corporate physical activity intervention: A case study of the “Tragically Fit”, *WORK: A journal of prevention, assessment and rehabilitation* (In Press).

Kulig, J., Edge, D., Townshend, I., **Lightfoot, N.**, Reimer, W. Community resiliency: emerging theoretical insights. (In press).

**Larivière, M., Couture, R.T.,** Ritchie, S.D., Côté, D., Oddson, B. and Wright, J. (2012), Behavioural assessment of wilderness therapy participants: Exploring the consistency of observational data. *Journal of Experiential Education*. Vol.35, (1), pp. 290-302.

Reimer, B., Kulig, J., Edge, D., **Lightfoot, N.**, Townshend I. 2012. The Lost Creek Fire: Managing social relations under disaster conditions. Disasters doi:10.1111/j.1467-7717.2012.01298.x.

Mansfield, B., Oddson, B., Whissell, C., Turcotte, J., **Couture, R.T.** (2012). A Possible Physiological Correlate for Mental Flow. *Journal of Positive Psychology*. Vol.7, (4), pp. 327-333.

### Conference Presentations

Clement, A., Rouleau, N., & Legault, G. (2012, December). *Cognitive consequences of shift work and sleep deprivation for underground miners*. Poster presented at the 3<sup>rd</sup> Annual Symposium of the Centre for Research in Occupational Safety and Health, Sudbury, ON.

**Horrigan, J.** (2012). Evaluating the Quality of Work Life (QOWL) of Northeastern Ontario Urban, Rural, & Remote Registered Nurses. Laurentian University School of Human Kinetics Seminar, oral presentation November 16<sup>th</sup>, 2012. Sudbury, Ontario.

**Horrigan, J.**, RN, MScN, **Lightfoot, N.** Ph.D, **Larivière, M.** Ph.D. & Jacklin, K.Ph.D. (2012). The Importance of Evaluating Nurses' Health and the Quality of Work Life. Laurentian University Faculty of Professional Schools Scholarship Show Case, oral presentation, December 13<sup>th</sup>, 2012, Sudbury, Ontario.

Leduc, C. & Larivière, M. (June 2012). Identifying return to work predictors among individuals obtaining psychological services. *73<sup>rd</sup> CPA Annual Convention; Halifax, NS.*

Leduc, C. (March 2012). Identifying predictors of return to work and exploring the role of exercise and active leisure time. *School of Human Kinetics Conference*, Laurentian University; Sudbury, ON.

### Community Presentations

Leduc, C. & Larivière, M. (December, 2012). Identifying return to work predictors among individuals obtaining psychological services. 3rd Annual CROSH Research Symposium; Sudbury, ON.

**Larivière, M.** (2012). Facteurs psychologiques et santé au travail. 19<sup>E</sup> Journée des sciences et savoirs de L'Association Canadienne Française pour l'Avancement des Sciences (ACFAS). Sudbury ON.

### Media Presentations

Nothing to report.

### Other

Kulig, J.C., Townshend, I., Awosoga, O., Shepard, B., Reimer, W., Edge, D., **Lightfoot, N.** 2012. School Survey Results Slave Lake, AB 2012. 8 pp.

Kulig, J.C., Townshend, I., Awosoga, O., Shepard, B., Reimer, W., Edge, D., **Lightfoot, N.** 2012. Household Survey Results, Slave Lake, AB 2012. 8 pp.

Kulig, J.C., Pujadas Botey, A., Townshend, I., Awosoga, O., Shepard, B., Edge, D., Reimer, W., **Lightfoot, N.** 2012. Families and Children: Responses to Wildfires - Links to Community Resiliency. 31 pp.

## Workplace Well-being and the Quality of Worklife

*CROSH researchers are interested in the link between physical fitness, leisure, work-life/work-family balance as these relate to worker health and wellbeing and workplace effectiveness and productivity.*

### 2012 Research Output

#### Journal Articles

Brewster, K. Z. & Gohar, B. (2012). Assessing obesity and bariatric surgery awareness. *Canadian Bariatrics*, 12(3), 7-19.

Gauthier, A. P., **Larivière, M.**, Pong, R., Snelling, S., & Young, N. L. (2012). Differences in Occupational, Transportation, Domestic, and Leisure-Time Physical Activities: Do Geographical Location and Socio-Cultural Status Matter?" *Journal of Physical Activity & Health*, 9, 163-172.

Gohar, B. & Brewster, K. Z. (2012). The Importance of goal setting in weight management. *Canadian Bariatrics*, 12(3), 4-5.

#### Conference Presentations

Gordon, H., **Larivière, M.**, **Eger, T.**, Gauthier, A., & Leduc, C. (April 2012). Physical and psychological determinants of workplace injuries : A study of seasonal forest fire fighters. *Human Dimensions of Wildland Fire Conference; Seattle, WA.*

Gordon, H., **Larivière, M.** (2012). A workplace on fire: Human dimensions of forest firefighting injuries. *Laurentian University Faculty of Professional Schools Conference : Research Informing Professional Practices and Theory.* Sudbury, ON.

Gordon, H., with **Horrihan, J.**, Berriault, C., **Boudreau-Larivière, C.**, & Gohar, B. (2012). CROSH Research Updates. *School of Human Kinetics Research Seminar Series.* Sudbury, ON.

Gordon, H., **Larivière, M.**, **Eger, T.**, Gauthier, A., & Leduc, C. (2012). Ontario is burning: Can we predict injuries to forest firefighters? *Laurentian University School of Human Kinetics Conference.* Sudbury, ON.

Gordon, H. (2012). The forest as a workplace: Predicting injuries among seasonal forest firefighters in Ontario: Preliminary results. *School of Human Kinetics Research Seminar Series.* Sudbury, ON.

Nowrouzi, B., **Lightfoot, N.**, Carter, L., **Larivere, M.**, Schinke, R., Rukholm, E. Quality of Work Life: Quality of Work Life: Investigation of Occupational Stressors Among Obstetrics Nurses in northeastern Ontario. Quality Worklife-Quality Healthcare Collaborative. Vancouver, BC. March 1-2, 2012.

Nowrouzi, B., **Lightfoot, N.**, Carter, L., **Larivere, M.**, Schinke, R., Rukholm, Quality of Work Life:



Quality of Work Life: Investigation of Occupational Stressors Among Obstetrics Nurses in northeastern Ontario. Canadian Association for Health Services and Policy Research. Montreal, PQ. May 29-31, 2012.

### **Community Presentations**

Gordon, H. (2012). Physical and psychological determinants of workplace injuries: A study of seasonal forest firefighters. *Northeast Regional Forest Fire Management Centre*. Sudbury, ON.

Gordon, H. (2012). Physical and psychological determinants of workplace injuries: A study of seasonal forest firefighters. Dissemination to workplace partner: Ontario Ministry of Natural Resources, Aviation, Forest Fire and Emergency Services. Sault Ste. Marie, ON.

### **Media Presentations**

Nothing to report.

### **Other**

Nothing to report.

## **Health Effects of Exposure to Airborne Chemicals in the Workplace**

*CROSH researchers examine the health effects of air quality in the workplace, specifically the inflammatory effects in the airways and blood.*

### **2013 Research Output**

#### **Journal Articles**

Nothing to report.

#### **Conference Presentations**

Nothing to report.

#### **Community Presentations**

Nothing to report.

#### **Media Presentations**

Nothing to report.

#### **Other**

Nothing to report.

## **Workplace Hazards and Reproductive Health**

*CROSH researchers are interested in the link between workplace hazards and reproductive health.*

### **2012 Research Output**

#### **Journal Articles**

Nothing to report.

### *Conference Presentations*

Nothing to report.

### *Community Presentations*

**Boudreau-Larivière, C.** and **Dorman, S.** CROSH 3rd Annual Symposium. Occupational Physiology and Environment Research Program Highlights. Dec 6, 2012.

**Boudreau-Larivière, C.** Partnerships in Public Health Research. Joint meeting between the Sudbury & District Health Unit and Laurentian University. Public Health Related Research at Laurentian University conducted through the Centre for Research in Occupational Safety and Health. November 13, 2012.

### *Media Presentations*

**Boudreau-Larivière, C.** November 26, 2012 - Media Interview with Radio-Canada's Nael Shiab - "La santé sexuelle des mineurs à risque". <http://www.radio-canada.ca/regions/Ontario/2012/11/26/007-sante-sexuelle-mineurs.shtml>

**Boudreau-Larivière, C.** December 4, 2012 - Radio Interview - Le matin du nord with Yves Dubuc - "La santé sexuelle des mineurs"

**Boudreau-Larivière, C.** October 12, 2012, Vol 32, No 12, p. 8 - Northern Ontario Business - Health & Safety Section. "Research sheds light on occupational safety. University safety group seeking research chair" by Lindsay Kelly.

### *Other*

**Dorman, S.** and **Boudreau-Larivière, C.** 2012. [A guide to healthy pregnancies in the mining workplace.](#)

## **Other CROSH Research Dissemination Activities**

Research Shed Lights on Occupational Safety  
Northern Ontario Business. October, 2012  
<http://www.northernontariobusiness.com/Around-the-North/121022/Research-sheds-light-on-occupational-safety.aspx>

Vale to help make objective a reality in Sudbury  
Tuesday, December 11, 2012  
<http://www.thesudburystar.com/2012/12/11/vale-to-help-make-objective-a-reality-in-sudbury>

Flight delay pays off for LU  
Thursday, December 20, 2012  
<http://www.thesudburystar.com/2012/12/20/flight-delay-pays-off-for-lu>

Province grants funds for research in occupational health and safety  
Northern Ontario Business (December 20, 2012)  
<http://www.northernontariobusiness.com/Around-the-North/121217/Province-grants-funds-for-research-in-occupational-health-and-safety.aspx>

Vale contributes to workplace safety research  
 Northern Ontario Business (December 12, 2012)  
<http://www.northernontariobusiness.com/Around-the-North/121203/Vale-contributes-to-workplace-safety-research.aspx>

Gorhman, R., Carter, L., Nowrouzi, B., McLean, N., & Gulmond, M. (2012). Social Media and Health Education: What the Literature Says. *The Journal of Distance Education*, 26(2).

Nowrouzi, B., Souza, R. P., Zai, C., Shinkai, T., Monda, M., Lieberman, J., . . . De Luca, V. (2012). Finite mixture regression model analysis on antipsychotics induced weight gain: Investigation of the role of the serotonergic genes. *Eur Neuropsychopharmacol*. doi:10.1016/j.euroneuro.2012.05.008

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## RESEARCH GRANTS

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### Principal Investigator: T. Eger

2009-2013 NSERC Grant, Examining the impact of non-neutral sitting postures on vibration transmissibility up the spine.  
 Total: \$102,160

2010 – 2012 WSIB Grant, Field study to document and evaluate the characteristics of vibration for workers exposed to vibration via the feet.  
 Total: \$64,000

### Co-Investigator: T. Eger

2008 – 2012 WSIB Grant, Assessment of the effectiveness of heavy machinery seats for multi-axis vibration environments. (\$300,000)  
 Principal Investigator (J. Dickey, University of Western Ontario)

2011-2012 CRE-MSD Grant, Evaluating ergonomics of helmets and risk factors for musculoskeletal neck injury. (\$8420)  
 Principal Investigator (A. Godwin, Laurentian University)

2011-2012 CRE-MSD Grant, Physical and psychological determinants of workplace injuries: A study of seasonal forest fire fighters (\$8,000)  
 Principal Investigator (M. Lariviere, Laurentian University)

2011-2012 WSIB Grant, Proof of principle: assembly of an immersive virtual reality simulation for lift trucks. (\$40,000)  
 Principal Investigator (J. Dickey, Western University)

2012-2013 CRE-MSD Seed Grant: Determination of optimal in-cab screen placement to minimize awkward postures and operator discomfort on underground machinery (\$8,200)  
Principal Investigator (A.Godwin, Laurentian University)

**Principle Investigator: Nancy Lightfoot**

**Title:** Occupational epidemiology study.

**Funding Source:** Industrial funding

**Overall Award:** \$86,205

**Date of tenure:** 2011-2013

**Title:** The impact of the determinants of health on prostate cancer progression and survival

**Funding Source:** Northern Cancer Research Foundation (NCRF).

**Date of tenure:** 2008-2013

**Amount:** \$16,944

**Co-Investigator: Nancy Lightfoot**

**Title:** A Satellite Pediatric Cardiology Clinic in Northeastern Ontario: Evaluation, Impact, and Client Satisfaction.

**Funding Sources:** Labatt Family Heart Centre Innovations Fund

**Overall Award:** \$29,909

**Date of tenure:** 2011-2013

**Title:** Preconception social marketing.

**Funding Source:** Louise Picard Public Health Research Grant

**Overall Award:** \$5,000

**Date of Tenure:** 2011-2013

**Principal Investigator: M.Lariviere**

Internship placement in psychometrics and research

Source of funding: Northern Ontario Heritage Fund (NOHFC)

Type of Grant: Provincial

Amount: **\$27,500**

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## GRADUATE STUDENTS

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Boulay, A.J. Social Media Networking for Occupational Health and Safety.

Recent evidence of positive effects of online Social Media Network designs that apply clustering architecture and related connections upon the development of health behaviors has prompted inquiry into the benefit of using such network media designs in the area of Occupational Health and Safety. This is a review of the current literature and brief proposal regarding the mounting of formal investigations regarding the efficacy of different online Social Media Network designs with regard to the improvement of Human-Computer Interaction as measured by successful health and safety behavior modifications within workplace populations. The final objective is to obtain a 'gold standard' for measuring the quality of online Social Media Network design in the task of behavioral diffusion regarding occupational health and safety in real work environments, including Mining environments and Forest Fire Fighting applications.

Clement, A. Cognitive consequences of sleep deprivation, shift work, and heat exposure for underground miners and forest firefighters.

My primary research focus is how fatigue resulting from shift work, disturbed sleep, and heat exposure can affect alertness and decision-making of underground miners and forest firefighters on the job. Fatigue in workers can impair physical, emotional, and especially cognitive function whether it is a result of sleep deprivation, circadian rhythm disruption, or experiencing high environmental temperatures. A better understanding of these factors and the extent of fatigue in workers is important to provide health and safety in the workplace.

Goggins, K. Foot-transmitted vibration: Exposure characteristics and the bio-dynamic response of the foot.

The purpose of the project is to better understand the characteristics of foot-transmitted vibration (FTV) in order to identify potential injury risks and determine the most appropriate method of assessing injury. The objectives of the field study include: (1) to measure and document the characteristics and dominant frequencies of vibration entering the body via the feet on various underground mining equipment; (2) to determine and compare predicted health risks based on both ISO 2631-1 (1997) and ISO 5349-1 (2004); and (3) to examine differences in operator reported musculoskeletal discomfort. The objectives of the lab testing component include: (1) to measure and document the transmission of FTV from (a) floor to ankle, and (b) floor to hallux, when exposed to different levels of vibration while standing; (2) to determine if independent variables (vibration exposure frequency, mass, arch type) influence dependent variable transmissibility through the foot.

Gohar, B. The Accuracy of Risk Assessment for Workplace Accidents: Creating a Meta-analytically Informed Instrument for Injury Prediction in Northern Ontario's Workplace.

To create a psychometrically sound instrument based on existing literature through meta-analysis to accurately predict workplace injury. The instrument in question will be validated on

sub-samples of workers predominantly based on Northern Ontario's occupational characteristics (Health Care - Nurses; Resource-based sectors - Miners)

Gordon, H. Physical and psychological determinants of workplace injuries: A study of seasonal forest firefighters.

This is an occupational health and safety study, in which workplace injuries were investigated among an occupational group that is continuously exposed to physical demands. The purpose of this research is to identify the predictors of workplace injuries among seasonal forest firefighters in Ontario. The study was conducted in partnership with the Ontario Ministry of Natural Resources (OMNR), Aviation, Forest Fire and Emergency Services (AFFES). Physical and psychological variables were quantified, with a view of developing a predictive model for occupational accidents. Variables of measure included age, gender, fitness, history of injury, worker experience, stress, and personality. The current research project was province-wide, and the research team hopes to extend the scope to include other provinces and possibly create a nation-wide study. Results from this study are expected to help refine policy and practice among the OMNR, AFFES.

Leduc, C. Identifying return to work predictors among individuals obtaining psychological services.

Predicted to be the leading work disability by 2020, mental health problems have particularly incapacitating effects on an individual's capacity to hold and maintain employment. While estimates maintain 1 in 5 Canadians experience a mental illness in their lifetime, over half a million Canadians are absent from work due to mental health problems every day costing Canadian companies 14% of their net annual profit. Individuals off work for mental health reasons often experience longer periods of absence, and return to work at a much lower rate than individuals absent for other reasons. Regrettably, empirically based return to work interventions focused on mental health problems are severely lacking. As a result, the current study seeks to identify factors that influence the likelihood of successful re-entry into the workforce.

A review of patient files from a private psychological practice yielded the sample. Potential participants were selected based on their satisfaction of one central criterion: having experienced workplace absence due to a mental health problem. Recruitment letters and consent forms were mailed to 74 eligible participants in August, 2011. Thorough file reviews are underway on 50 (response rate of 68%) of the patients who have consented to inclusion to date. Results will be presented, and best practice implications for stakeholders will be discussed.

Nowrouzi, B. Quality of work life among obstetric nurses in urban northeastern Ontario: a population-based cross-sectional study.

I am a 4<sup>th</sup> year PhD candidate in the School of Rural and Northern Health at Laurentian University. My research activities stem from my clinical work as an occupational therapist and

interests in in the area of occupational health, physical and mental workplace stress and return to work issues.



# Strategic Planning Update

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## 2013-2016 CROSH Strategic Research Plan

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### MEETING SUMMARY

In 2012 CROSH researchers met to develop the Strategic Research Plan – which was endorsed by the Advisory Committee. Highlights of the 2013-2016 Strategic Research Plan are listed below.

### RESEARCH AND TRAINING

**CROSH will be an agent for innovation and discovery to solve relevant and critical problems facing northern industries**

We will develop a focused agenda:

By 2014: in collaboration with our board we will consult with workplaces to identify three high-priority research areas

We will enhance our research strength and perceived credibility:

By 2014: we will enhance our research team by adding a research Chair whose work will address one of these areas of priority

### SUSTAINABILITY

**A sustainable structure and funding are required to produce effective results**

We will obtain operational funding through industry donations, government grants, and research grants:

By 2015: we will enhance our infrastructure to provide greater support to the Chair and research team, improving the quantity of research activity in areas of priority

We will build the personnel and physical infrastructure:

By 2016: we will have secured space for CROSH researchers, students and staff to facilitate collaborative activities

By 2016: we will hire the required support positions to assist with proposals, research and administration improvements (½ Director; ½ secretary; ½ technician; grant writer; 6 graduate student fellowships; post-doctoral fellow)

### ENGAGEMENT

**CROSH will engage with workplace parties in all phases of research**

We will develop a process that will facilitate participatory research



By 2014: in collaboration with our board we will hold at least two community forums annually to discuss local issues and priorities and to communicate our research findings

By 2015: we will work with our board to develop the framework for researchers and workplace parties to engage in participatory action research

## COMMUNICATION

**CROSH will develop a framework to facilitate knowledge utilization and sharing to ensure our findings are accessible to agencies dedicated to workplace health & safety**

We will develop links with organizations who have established relationships with workers and industry

By 2014: we will make annual presentations at three major northern OH&S conferences

By 2016: we will establish partnerships that will allow our findings to be translated into usable products.

We will improve access to our findings by non-researchers

By 2014: we will develop a website and social media strategy to improve access to our findings

## CAPACITY BUILDING

**CROSH will create a network of national and international research partners to share and build expertise**

We will develop relationships with high-quality, credible research organizations whose work can enhance ours and subsequently provide an improved output from CROSH to workplaces in the north

By 2014: we will establish research relationships with complimentary research Centres at Laurentian University, and with selected OH&S research Centres and organizations in Canada and internationally

We will improve our capacity to do future research by getting more students involved in the topics of most concern to northern workplaces

By 2015: we will develop an internship program with industry, and double the number of workplaces that students have access to.

By 2016: we will double the number of students doing field research

## POLICY AND PRACTICE

**CROSH will promote new discoveries to government and industry in order to positively influence policies and practices**

CROSH researchers will find a position of influence on standard setting bodies and inform them of our research findings

By 2015: we will make 4 annual presentations to key government standard setting bodies, and to labour and industry forums

By 2016: we will become an ex-officio member of key standard setting bodies

# Funding Update

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## RESEARCH CENTRE FUNDING

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### **Northern Ontario Heritage Fund Application for a Chair in OHS**

Value: \$2,000,000 (over 5-years)

\$1,000,000 from NOHF, \$500,000 from private sector funding, \$500,000 from Laurentian University

Status:

NOHFC announced \$1,000,000 in funding (December, 2012)

Vale announced \$125,000 in funding (December, 2012)

Overview: Funding will support the establishment of a Research Chair in Occupational Health and Safety associated with the existing Centre for Research in Occupational Safety and Health (CROSH) at Laurentian University. The Research Chair will build on existing research and foster the export of best practices in OHS nationally and globally. Through the research activities of the Chair, CROSH plans to promote better government standards and legislation based on research findings, improve the quality of workplaces, and decrease workplace injuries and illnesses that result in lost time and decreased productivity.

### **FedNor Phase 1 Application for an Industry Liaison Person**

Value: \$300 000 (over 3 years)

Status: Funding request is ongoing.

Overview: CROSH is seeking funding for an industry liaison person. This executive would interface with university researchers and local enterprises with a view of establishing long-term partnerships, translating academic knowledge into workplace solutions, implementing innovations, and facilitating worker well-being, and local prosperity.



# Symposium

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## 3<sup>RD</sup> ANNUAL CROSH SYMPOSIUM | COMMUNITY BASED

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The CROSH symposium was held at Laurentian University in West Residence (W-132) on Thursday, December 6<sup>th</sup>, 2012. CROSH researchers presented research highlights in three specific sections: occupational mental health, human factors and ergonomics, and occupation physiology and the environment. After each section was highlighted, community partners were invited to present their concerns and ideas for relevant future research in a facilitated discussion. Approximately 90 people attended. The program is shown below.

### **EVENING PROGRAM**

**WELCOME: CROSH NEWS AND UPDATES: TAMMY EGER**

**7:00-7:15**

**SPECIAL ANNOUNCEMENT**

**7:15-7:25**

**OCCUPATIONAL MENTAL HEALTH RESEARCH PROGRAM HIGHLIGHTS:**

**MICHEL LARIVIÈRE**

**7:25-7:45**

**FACILITATED DISCUSSION WITH PARTICIPANTS**

**7:45-8:00**

**BREAK AND REFRESHMENTS**

**8:00-8:15**

**HUMAN FACTORS AND ERGONOMICS RESEARCH PROGRAM HIGHLIGHTS:**

**ALISON GODWIN**

**8:15-8:35**

**FACILITATED DISCUSSION WITH PARTICIPANTS**

**8:35-8:50**

**OCCUPATIONAL PHYSIOLOGY AND THE ENVIRONMENT RESEARCH**

**PROGRAM HIGHLIGHTS: SANDRA DORMAN AND CELINE BOUDREAU-**

**LARIVIÈRE**

**8:50-9:10**

**FACILITATED DISCUSSION WITH PARTICIPANTS**

**9:10-9:25**

**SUMMARY OF FACILITATED DISCUSSION**

**9:25-9:40**

**RECEPTION & RESEARCH POSTER VIEWING**

**9:40-9:55**

**CLOSING REMARKS: DR. TAMMY EGER, CROSH DIRECTOR**

**9:55-10:00**

## SUMMARY OF THE RESEARCH DISCUSSION

### ***What areas of research would you like CROSH to address?***

- Mental health and stress
- Effects of shift work on return to work planning
- Job satisfaction on indicators
- Violence/Harassment in the workplace (health care)
- Workplace clothing visibility
- Workplace risk management programs
- Respiratory use in the workplace and exposure limits with carcinogens
- Health care accident rates – tracked over the next 5 years – address training, management, and culture around safety
- Respiratory disease and respiratory dysfunction

### ***What research is needed in Occupational Health?***

- Coalition between mental stress – i.e. downsizing, hours of work, stress, globalization of industry – as it relates to lost time, absenteeism, etc.
- Bullying culture and mental health
- Work/life balance
- Safety culture in hospitals/health care
- Mental fatigue: MSDs – shift work, in hospitals, emergency services, mining
- Fatigue from over-time and increase accidents and incidents during regular shift and broken down hourly from start to finish
- Intervention research – follow-up to predictive models for workplace injury or barriers to return to work and how to overcome and prevent injury and improve return to work times
- Reliable tool to assess/rate patients/clients for risk of violence and acting out behaviours

### ***What research is needed in Human Factors and Ergonomics?***

- MSD prevention in health care workers – does this require safety education
- MSD prevention importance of exercising and stretch throughout workday versus no exercise and stretching?
- Best goggles to be used in isolation care
- Interference of PPE on situational awareness (visibility, sound, etc.)
- Applied foot vibration – insoles, boot construction to reduce exposure
- Vibration – rock bolting, how heat impacts lower extremities

### ***What research is needed in Occupational Physiology and the Environment?***

- Soil study in Northern Ontario – Smelter towns
- Heat/Cold stress
- Best equipment to in hospitals for patient handling/moving

- What variables affect mental health?
- Sensitizers – incidence, frequency in Northern Ontario
- Effects of obesity on accident and incident rates
- Workplace hazards for pregnant workers and accommodation strategies
- Correlation between occupation and fertility rates



# Social Media

## WEBSITE

CROSH launched a website ([www.crosh.ca](http://www.crosh.ca)) in 2012, which includes information on:

- CROSH History
- Mission Statement
- Leadership Team
- Contact
- Partners
- Researchers
- Research Programs
- Publications and Reports
- Events
- Media



**CROSH**  **CRSST**  
 Centre for research in occupational safety and health  
 centre de recherche sur la santé et sécurité au travail

Centre for Research in Occupational Safety and Health  
 School of Human Kinetics  
 Laurentian University  
 935 Ramsey Lake Road  
 Sudbury, ON P3E 2C6  
 Canada  
 Fax: 1-705-675-4845  
 Email: [osh@laurentian.ca](mailto:osh@laurentian.ca)

Home Researchers Research Publications Events Media Support CROSH

**About CROSH**  
 The Centre for Research in Occupational Safety and Health (CROSH) was established by Laurentian University to provide a formalized structure for industry, safe workplace associations, labour groups, government organizations and researchers to share workplace injury and disease problems and solutions.

**WHO WE ARE AND WHAT WE DO**  
 Because we envision a northern Ontario where workplaces join together to ensure that every worker gets home safe and healthy everyday, we will be an active agent for discovery and innovation to solve the most relevant and pressing problems facing northern industries – such as

## TWITTER

A twitter account has also been created for CROSH (@CROSH\_CRSSST). The twitter account is updated daily with current events happening with CROSH. Meetings, events and public presentations by faculty and student researchers are highlighted.



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**CROSH**  
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 Centre for Research in Occupational Safety and Health; Laurentian University (Sudbury, ON, CAN) Sudbury, Ontario · [crosh.ca](http://crosh.ca)

599 TWEETS 238 FOLLOWING 172 FOLLOWERS [Follow](#)

**Tweets**

 **CROSH** @CROSH\_CRSSST  
 Later tomorrow we will be having our Annual General Meeting from 3-4PM @LaurentianU. Excited to hear updates from all faculty and students!  
 Expand



# Appendix A

## Other Occupational Safety and Health Research Centers in Canada

In 2012 CROSH continued to connect with existing OHS Research Centres in Canada. Centers include:

1. Centre for Rural and Northern Health Research
1. CN Centre for Occupational Health and Safety
2. Safety-Net Centre for Occupational Health and Safety Research
3. Centre for Research Expertise in Musculoskeletal Disorders
4. Centre for Research Expertise in Occupational Disease
5. Centre for Workplace Health and Safety
6. Canadian Centre for Occupational Health and Safety
7. Institut de Recherche Robert-Sauvé en santé et en sécurité du travail (IRSST)
8. Occupational Health Clinics for Ontario Workers
9. Workers Health and Safety Centre
10. Canadian Centre for Health and Safety in Agriculture
11. Institute for Work and Health
12. National Institute for Occupational Safety and Health | USA
13. Minerals Industry Safety and Health Centre | Australia
14. Centre for Excellence in Mining Innovation

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