

2019

ACTIVITY
Report

Science **AT WORK**



Institut de recherche
Robert-Sauvé en santé
et en sécurité du travail

Declaration of Data Reliability

I declare that I have every reason to believe that the observable facts and measurable data presented in this activity report accurately reflect the situation as at December 31, 2019. This information falls under my responsibility as president and CEO of the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST). I hereby attest to its accuracy and the reliability of the controls relating thereto. The indicators retained are developed using reliable and accurate data, and allow us to assess the IRSST's production over the course of the year. Recommended by the members of the Institute's Scientific Advisory Board and approved by the Board of Directors, this 2019 activity report faithfully describes the Institute's mission, vision, and principal achievements.

Lyne Sauvageau
President and CEO

Table of Contents


- 4** Mission and Vision
 - 6** Message from the President and CEO
 - 8** Message from the Chief Scientific Officer
 - 10** 2019 in Numbers
 - 12** Research
 - 22** Our Laboratories
 - 26** The New Generation in OHS
 - 30** Research Partners
 - 31** Human Resources
 - 32** Highlights
 - 36** Financial Results
 - 37** Governance
 - 38** Organization Chart
- 



Mission

- To contribute, through research, to the prevention of industrial accidents and occupational diseases and to the rehabilitation of affected workers;
- To disseminate knowledge and serve as a scientific reference centre and expert;
- To provide the laboratory services and expertise required to support the public occupational health and safety network.

Vision

- Through its leadership in occupational health and safety research, the IRSST seeks to:
- consolidate its role as a reference centre vital to the operations, activities, and strategies of the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) and its network;
 - be used by all its social partners in a spirit of joint collaboration;
 - win recognition at the national and international levels; and
 - derive maximum benefit from a well-established network of research and development collaborators.
- 

MESSAGE from the President and CEO



Lyne Sauvageau,
President and CEO,
IRSST

Collaborating for Better Understanding

It is with great pride that I now present the IRSST's annual activity report for the first time. As I only took up my post in August 2019, the vast majority of the accomplishments documented here were achieved under the governance of Marie Larue, whose long and productive career in occupational health and safety I salute. During her 12 years at the IRSST's helm, Ms. Larue succeeded in forging strong ties with international occupational health and safety research organizations, thus expanding the Institute's influence and outreach.

Unique in its category, the Institute brings together under one roof a team of seasoned researchers, professionals, technicians, and knowledge transfer and dissemination specialists, not to mention laboratories, which work with a wide range of contaminants present in the workplace. The IRSST is also an agency that funds studies conducted in Québec universities and public research centres. Again this year, the many and diverse activities and achievements detailed in this report are nothing short of impressive. A large number of collaborators were also involved, and the vast majority of Québec's universities were affiliated with occupational health and safety research work. To underscore the exceptional collaboration between the IRSST and the École de technologie supérieure (ÉTS) in joint research activities, the Institute was named "*Partenaire d'excellence en recherche-innovation*" (outstanding innovation-research partner) at the Gala Excellence ÉTS on April 8, 2019. Moreover, a glimpse at the IRSST's internal operations attests to the great rigour and constant attention to quality that are applied in all its research, knowledge transfer, and dissemination projects, and in its laboratory analyses.

Responding to the knowledge needs of workplaces as identified through, the IRSST can only accomplish its mission by research organic ties with workplaces and anticipating their future needs. It forges these essential ties either directly or with the help of its main partners, namely, the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST), joint sector-based associations, and the occupational health network. To address these needs more effectively, the entire approach to facilitating exchanges between researchers and the workplaces concerned was re-examined this year, with the aim of regrouping our partners by major industry sector and by research theme. We thus hope to maximize the impact of the knowledge produced on an

increasingly diverse number of interested workplaces, while promoting open and ongoing discussion on transformations occurring in the world of work and on current and future knowledge needs.

The IRSST has many assets for tackling the societal challenges facing the world of work and potentially causing risks for workers. These challenges involve every aspect of its mission and provide ideal opportunities for demonstrating organizational agility, creativity, and most certainly, a touch of daring. One only has to think of the radical changes in the labour market and of the labour shortages in certain economic activity sectors, all of which point to new risks, and of the climate changes and ecological transitions that are causing new situations of exposure or emerging risks that we once thought were well-controlled. Faced with these developments, the Institute must continue to play its role as a reference centre and provide support for a new generation of high-calibre scientists in the field. It must continue to assist this new generation, notably through its grant and scholarship programs, while strengthening young people's interest in pursuing research careers in occupational health and safety.

In closing, I must stress that the IRSST's mission is pursued on a daily basis through the efforts of nearly 140 employees dedicated to the prevention of occupational risks and the rehabilitation of workers with injuries or occupational diseases. As we approach our 40th anniversary, I can assure you that each and every one of the Institute's employees embodies this mission daily, and I am privileged to be able to count on this committed team that prides itself on serving the workplace community.

Lyne Sauvageau

MESSAGE

from the Chief Scientific Officer



Kannan Krishnan,
Chief Scientific Officer,
IRSST

Expanding Our Horizons

The year 2019 marked the second year of implementation of the IRSST's 2018-2022 Five-Year Scientific and Technical Production Plan. It was crucial for the Institute to adopt such a plan in order to prioritize its future research orientations, while remaining mindful of and concerned about emerging problems. The constant changes in the labour market raise many complex occupational health and safety research issues, while the arrival of new technologies opens the door to promising new research niches. All these changes are obliging us to expand our horizons and approach the world of work from a new angle.

THE KEY TOPICS IN 2019

For the Scientific Division, the year was marked by work on developing new thematic programs, including those on pesticides, functional limitations, and integrated prevention strategies for small businesses. These issues are of prime importance, both for scientific communities and OHS professionals and for Québec workplaces, as they will lead to the production of new knowledge that will serve as the foundation for developing and implementing appropriate means of prevention and rehabilitation.

Industry 4.0 also remained an indispensable research topic. Our goal was to launch an operational collaborative robotics laboratory in 2019, and we can proudly say "mission accomplished!" This laboratory positions the IRSST and its researchers favourably to conduct state-of-the-art studies. In addition, our acquisition of exoskeletons will enable us to develop in-depth knowledge of this new technology and to identify the risk factors associated with its use in a work context.

The end of 2019 was also marked by our annual institutional colloquium, which took stock of the main outcomes of our manual handling research and informed attendees about the latest and upcoming scientific advances. The finding was clear: manual handling is a complex task, often carried out under changing conditions that require workers to have strong adaptive and anticipatory skills.

ATTRACTING THE NEW GENERATION

I am proud to announce that, again in 2019, the IRSST continued its efforts to attract the new generation, notably through its Graduate Studies Scholarship and Postdoctoral Fellowship Program. Thirty-six students at the master's, doctoral, and postdoctoral levels,

whose research work fits with our mission, benefitted from the program. Moreover, the Institute, together with the Fonds de recherche du Québec's three research funding agencies (Nature and Technology, Health, Society and Culture) awarded three career scholarships to deserving young researchers in occupational health and safety. Totalling nearly \$775,000 over four years, these scholarships ensure contributions from high-calibre scientists in fields that the IRSST deems priority, as well as assisting the recipients during their careers. Also noteworthy are the two Acfas-IRSST awards (master's and doctoral) handed out this year, and the scholarships for excellence given to students at various conferences. These included four at the Forum for Back and Neck Pain Research in Primary Care and another four at the 26th International Congress on Sound and Vibration (ICSV26).

LOOKING TO THE FUTURE

To maintain our leadership position in OHS research, we continued our reflections and activities to proactively meet the needs of our partners and workplaces, while carrying out prospective studies. Two prime examples come to mind. First was the joint drafting by the IRSST and the Institut de recherche en santé publique de l'Université de Montréal (IRSPUM) – recently renamed the Centre de recherche en santé publique (CReSP) – of a brief for the Québec government's Parliamentary Committee on Pesticides. Second, we participated in an expert capacity in the Bureau d'audiences publiques sur l'environnement (BAPE) hearings on asbestos. Both attest to our expertise and relevance.

The Institute has many assets in its toolkit, such as the impressive diversity of disciplines which its researchers represent and the many collaborative projects carried out with researchers from other establishments. This wealth of resources will enable us to leverage the full potential of interdisciplinary and multisectoral research in conducting productive, useful, and relevant research in the years ahead.

Kannan Krishnan

2019 IN NUMBERS

RESEARCH AND EXPERTISE

167 ACTIVE PROJECTS AND ACTIVITIES

41 projects under development

23 projects began
(11 joint, 6 external, 6 internal)

35 projects completed

68 projects in progress

102 REQUESTS FOR EXPERTISE

205 EXTERNAL RESEARCHERS

from 26 universities, 20 research centres, and 2 college centres for the transfer of technologies (CCTTs) formed part of the IRSST's network of scientific collaborators.

31 EXTERNAL COMMITTEES

included at least one IRSST representative: 9 committees of the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) and its network, 11 national and international standards committees, and 11 other local, national, and international committees.

OUR LABORATORIES

51,771 ENVIRONMENTAL, TOXICOLOGICAL, AND MICROBIOLOGICAL ANALYSES

were performed in response to our clients' requests.

9,232 HOURS

were devoted to calibrating, maintaining, and repairing direct-reading instruments and to sampling, including 85% for the OHS and inspection-prevention network.

DISSEMINATION AND KNOWLEDGE TRANSFER

78 IRSST-PRODUCED MATERIALS

34 research reports, including 25 in French and 9 in English

11 guides and technical and awareness-raising tools, including 9 in French and 2 in English

33 videos (lectures and news reports)

97 SCIENTIFIC PUBLICATIONS

related to projects carried out or funded by the IRSST:

45 peer-reviewed journal articles

52 peer-reviewed articles published in conference proceedings

11 POSTERS AND 21 OTHER PRESENTATIONS

given by IRSST personnel or IRSST-funded researchers at congresses, scientific conferences, or events organized by partners

26 SIMPLIFIED ARTICLES

+ 31 news briefs published in the *Actualités* column of *Prévention au travail*, the magazine published jointly by the CNESST and the IRSST

681,653 SESSIONS

on the IRSST's Web sites

51,771 VIEWINGS

of IRSST-produced videos

743,136 UNIQUE DOWNLOADS

of IRSST publications

6,487 SUBSCRIBERS


to *InfoIRSST*, the IRSST's electronic newsletter

19,371 SUBSCRIBERS

to the IRSST's various social media networks

SCHOLARSHIPS AND FELLOWSHIPS

The IRSST awarded 36 graduate studies scholarships and postdoctoral fellowships to master's, doctoral, and post-doctoral candidates whose research programs dealt specifically with the prevention of industrial accidents and occupational diseases or the rehabilitation of affected workers.



Sabrina Jocelyn
and Damien Burlet-Vienney,
researchers, IRSST



Research

Every year, the IRSST's scientists and its external researchers conduct research and publish results that contribute to the advancement of knowledge on industrial accident prevention and worker rehabilitation.

In 2019, 167 activities and projects were active. Of this number, 35 were completed. Here are some examples for each priority research field.



PROJECTS COMPLETED IN 2019

Acoustic Antenna

The research team comprised of Franck Sgard from the IRSST, Olivier Doutres and Thomas Padois from the École de technologie supérieure (ÉTS), and Alain Berry from Université de Sherbrooke created an antenna capable of mapping the noisiest sound sources in an industrial setting. The device – a small spherical antenna equipped with a microphone array and positioned on a tripod with an overlooking panoramic camera – feeds the recorded data into a computer program that superimposes the sound on the photograph (R-1038). Research and development work continued in order to perfect this cutting-edge technology designed to improve hearing protection.

Horizontal Lifeline System (HLLS)

Inspired by an IRSST study and supervised by one of its researchers, Bertrand Galy, the Institute joined forces with the Association paritaire pour la santé et la sécurité du travail du secteur de la construction (ASP Construction) to develop a prevention fact



Bertrand Galy,
researcher, IRSST



Franck Sgard,
researcher, IRSST



sheet on this system (RF-1076). Its primary aim is to publicize the horizontal lifeline system (HLLS) developed by Gaétan Sirois Construction to protect workers against falls from heights during residential roofing jobs.

Lockout Procedure for Mobile Equipment

Interventions performed in the danger zone of mobile equipment expose workers to numerous risks. To raise awareness in organizations that use, supply, or procure such equipment, Damien Burlet-Vienney, an IRSST researcher, headed the drafting of a practical guide titled *Energy Control Process: Lockout and Other Methods* (RG-1040), in collaboration with the Institute's Communications and Knowledge Transfer Division. This document is intended for occupational health and safety professionals, such as accident prevention advisors, OHS committee members in workplaces, and managers.



PROJECT BEGUN IN 2019

Two-Post Above-Ground Vehicle Lifts (2018-0002)

Vehicle lifts are used for vehicle maintenance and repairs. When using them, mechanics have to work under or near elevated loads weighing several tonnes, representing a high-risk activity. In Québec, two-post above-ground (2PAG) vehicle lifts are the most widely used. Accidents resulting from vehicle falls are caused by, among other things, inappropriate lifting methods and poor maintenance of the lift's swing arms and accessories. Led by Damien Burlet-Vienney, the research team is identifying and characterizing the main technical determinants of the lifting stability of these 2PAG lifts and of the actual work activity, both of which influence the adoption of lifting methods in garages.



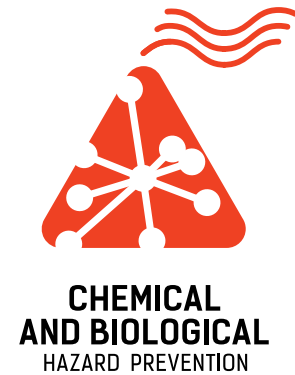
Damien Burlet-Vienney,
researcher, IRSST

PROJECTS COMPLETED IN 2019



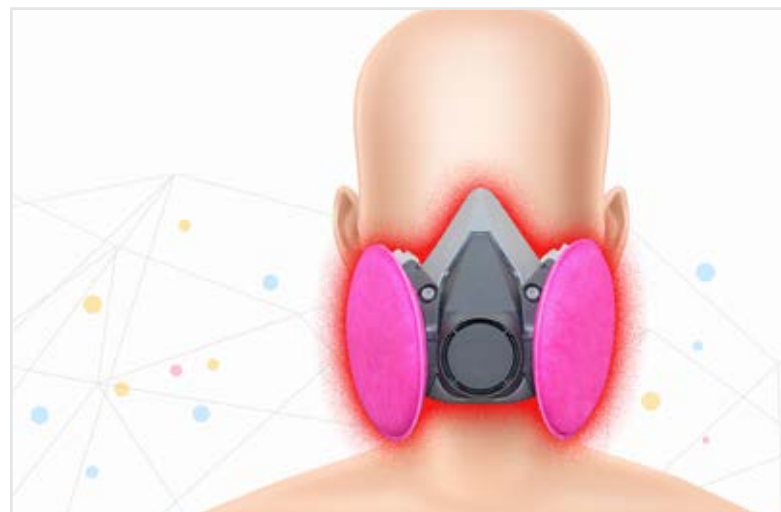
Pesticides Used in Agriculture

One of the pyrethroid insecticides widely used in Québec to control insect pests in agriculture is lambda-cyhalothrin. Despite the widespread use of this product, little data existed on the biological behaviour of this molecule in humans. It was therefore deemed essential to acquire knowledge that would allow proper assessment of worker exposure to this family of pesticides during spraying or work in treated zones. The research team of Michèle Bouchard, a researcher, full professor, director of the Département de santé environnementale et santé au travail (DSEST, or environmental and occupational health department), and holder of the Chaire d'analyse et de gestion des risques toxicologiques (Chair in toxicological risk analysis and management) at Université de Montréal, reconstituted the behaviour of these molecules in the human body by observing metabolites. The results of this IRSST-funded study (R-1043) showed that it is possible to interpret biomonitoring data on workers' exposure to lambda-cyhalothrin or other pyrethroids, as well as to reconstitute the doses absorbed for various exposure scenarios.



French-Language Version of the Users Instruction Manual for NIOSH's Respirator Selection Tool

At the request of workplace representatives, the IRSST produced and published a French-language version of the Users Instruction Manual for NIOSH's Certified Equipment List (CEL) in September 2019. The CEL is the respirator selection tool produced by the National Institute of Occupational Safety and Health (NIOSH) in the United States. It is a decision-making aid intended to help respirator users, individuals responsible for safety, industrial hygienists, and other OHS professionals choose appropriate protective equipment. The French-language manual (DT-984) allows them to verify the equipment's NIOSH certification status and to identify the correct replacement parts and components for respirators that provide protection against chemical, biological, radiological, and nuclear hazards.



Simon Aubin, chemist, Certified Industrial Hygienist (CIH) and Registered Occupational Hygienist (ROH)

HSR Bitumen and its Effects on Workers

Mixed with crushed mineral materials (aggregate), bitumen forms the asphalt used to pave most roads. The gases, vapours, and particles emitted when bitumen or asphalt is heated are composed of a complex group of chemical compounds regulated under the name of asphalt (or bitumen) fumes, in particular under Quebec's *Regulation respecting occupational health and safety*. To counteract the lack of adherence, an anti-stripping agent (chemical additive) may be added to it, thus creating high stripping resistance (HSR) bitumen. Paving workers complain about irritations to their eyes and respiratory system after using HSR bitumen that contains this type of additive. Simon Aubin, a scientific professional in the IRSST's Laboratory Division, and his team published a research report (R-1063, in French only) that sheds light on this problem.

PROJECT BEGUN IN 2019

Workplace Accommodation Measures to Address the Effects of Climate Change (2018-0023)

Posing a potential threat to workers' health and safety, the dangers related to climate change now constitute an international research priority. The threefold aim of this study, headed by Joseph Zayed of Université de Montréal, is to identify the priority dangers related to climate change and the types of jobs at highest risk; to document existing accommodation measures; and to assess, propose, and develop ways and means of protecting workers' health to counteract the anticipated effects of climate change.

PROJECTS COMPLETED IN 2019



Denys Denis, researcher at UQAM and head of the Occupational Rehabilitation research field at the IRSST

Integrated Prevention Strategy for Manual Handling (IPSMH)



The IRSST funded numerous research projects on manual handling, with a particular focus on risk assessment, work organization, documentation of know-how, training, and the development of a new preventive approach. It has called this approach the Integrated Prevention Strategy for Manual Handling (IPSMH).

The key to this approach is the material handler's ability to exercise judgment in various handling situations and work contexts. Developed by Denys Denis, a researcher at UQAM and head of the Occupational Rehabilitation research field at the IRSST, this strategy is now supported by a document aimed at raising awareness about the prevention of musculoskeletal disorders (MSDs) related to manual handling tasks (DS-1088). Combining training and intervention, this strategy is based on understanding, observing, and analyzing certain action principles. The document was released in November 2019 at the IRSST's annual colloquium, which ran under the theme *La manutention, plus qu'un simple geste* (manual handling: more than simple movements).



Mitigating the Impacts of Emotionally Demanding Work

Certain economic activity sectors constitute particular contexts where heavy emotional demands can compromise workers' health and safety. In fact, there is growing recognition of the impacts of emotionally demanding work (EDW) on workers' physical and psychological health and on the organizations that employ them.

The main objective of a study funded by the IRSST and headed by the researcher Nathalie Jauvin of the CIUSSS de la Capitale-Nationale was to implement and assess an employer/employee preventive intervention aimed at mitigating EDW impacts on workers in a youth centre. The research team specifically sought to identify psychosocial stressors and protective factors, develop appropriate interventions, assess the intervention implementation process, and measure the intervention's effects. Published in March 2019, the research report (R-1042) presented the benefits of the process.



PROJECT BEGUN IN 2019



Assessment of Muscle Fatigue Related to Repetitive Work (2017-0016)

Repetitive movements are a major risk factor for the development of musculoskeletal disorders (MSDs). Since muscle fatigue is considered an early indicator of this risk, its detection in the workplace could help in the development and assessment of preventive and rehabilitation interventions for workers. The objective of the study, led by Fabien Dal Maso of Université de Montréal, is to develop a method for early detection of muscle fatigue during repetitive tasks involving small loads in the workplace. The results will improve our understanding of the connection between repetitive movements, fatigue, and the onset of MSDs.

PROJECTS COMPLETED IN 2019

Intercultural Encounters

Québec's labour market has changed significantly in the past few years, particularly with the slower growth of the labour force, an aging population, higher education levels among workers, and an increasing proportion of immigrants in the workforce. Daniel Côté, a researcher at the IRSST, investigated workers in vulnerable situations, including immigrant workers. Developed and published in October 2019, the resulting awareness-raising and information document (DS-1078) was intended to inspire reflection, and ultimately, promote development of the intercultural competencies of professionals within organizations to better equip them to assist and support immigrant workers.

Daniel Côté,
researcher, IRSST



Critical Incidents in the Railway Industry

Thanks to work done by the researcher Cécile Bardon and her team from Université du Québec à Montréal (UQAM), it is now possible to lend better support to personnel involved in critical incidents and thus reduce the effects of such incidents. The research results were published in 2018 and identified practices for applying management protocols pertinent to such incidents in the rail industry. To raise awareness among and assist managers in handling critical incidents and supporting their employees, this scientific team, in collaboration with the IRSST's Communications and Knowledge Transfer Division, published the document titled *Prévenir les effets psychologiques négatifs chez les ingénieurs et les conducteurs de locomotive* in French (DS-1055), and the English version (DS-1070) titled *Preventing Negative Psychological Effects in Locomotive Engineers and Train Conductors*, in the fall of 2019.



Program for Improving the Return to Work

Many individuals who have sustained injuries in the workplace present symptoms of both pain and depression that can have potentially negative impacts on their recovery. These types of symptoms can interfere with their ability to perform numerous important activities of daily living, including occupational activities. Studies have shown that injured workers with depressive systems are off work for twice as long as those without depression. This study was conducted by Dr. Michael J.L. Sullivan of McGill University and funded by the IRSST, and the research report (R-1044) was published in November 2019. Its aim was to evaluate the feasibility and impact of an intervention designed specifically to meet the needs of injured workers exhibiting symptoms of pain and depression. This type of intervention is referred to as the Progressive Goal Attainment Program (PGAP).

NEW IN 2019

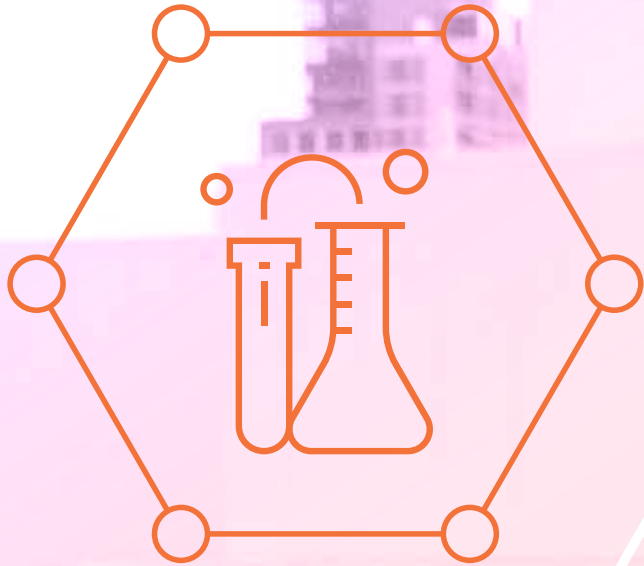
Exoskeletons

The potential for exoskeletons to reduce muscle demands appears quite promising in the laboratory. However, it is difficult to determine the real value of their contribution in a workplace due to a number of factors. Wishing to explore this issue in greater depth, the IRSST acquired exoskeletons in 2019 to support two research projects.



Our Laboratories

While responding to requests for analyses from the CNESST and its network, every year the staff of the IRSST's laboratories also carry out activities and take part in research projects that could not happen without their industrial hygiene expertise.



Lucile Richard,
laboratory technician,
IRSST



In 2019, the laboratories developed **15 new analytical methods** and participated in one research project.

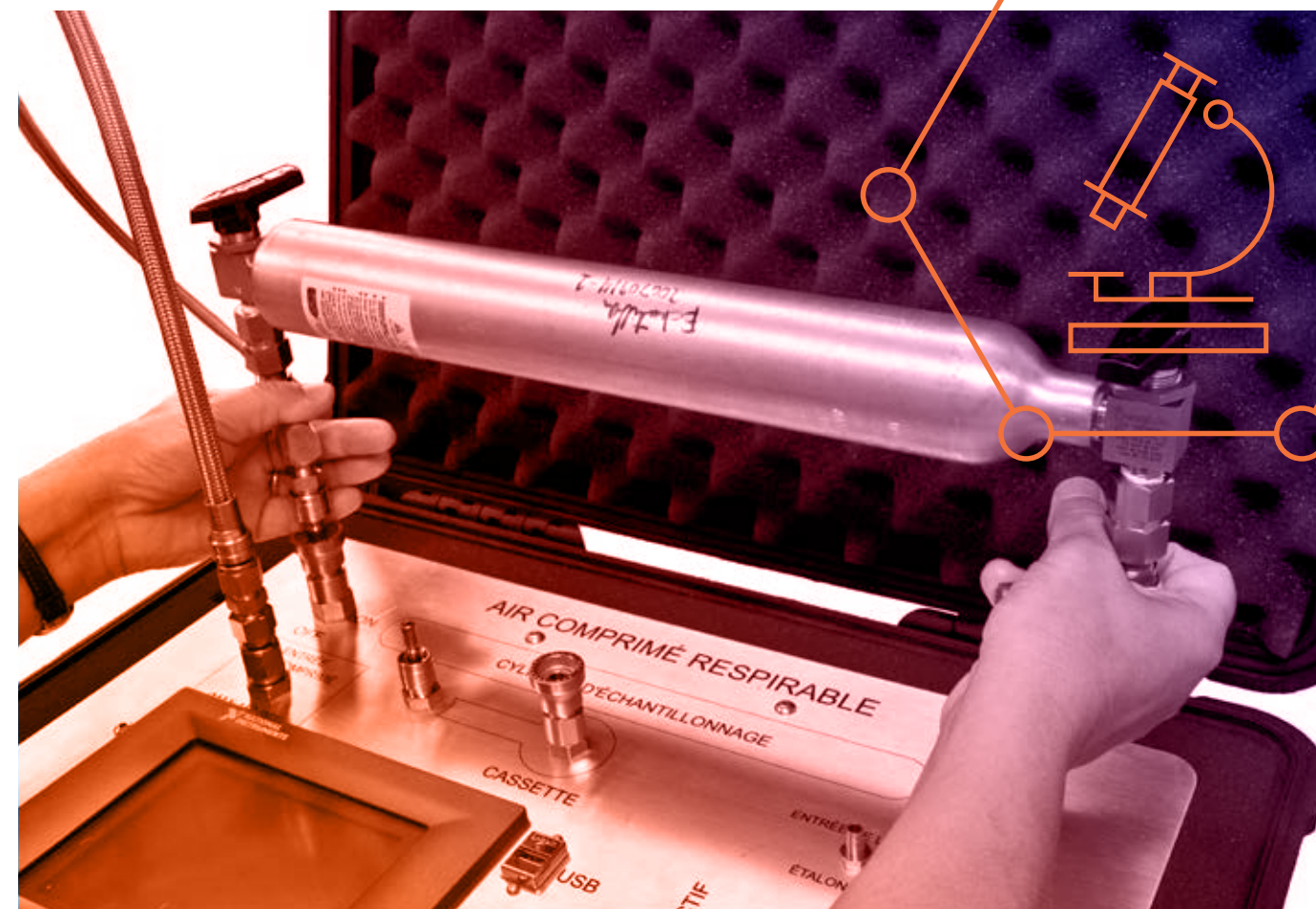
In addition, **nine activities** were carried out in the Institute's laboratories and **two accreditations** were renewed.

- Analytical validations for adjusting methods to the permissible exposure values (PEVs) of the American Conference of Governmental Industrial Hygienists (ACGIH) for diesel, kerosene, ethylene glycol monobutyl acetate, diethylene monobutyl glycol ether, ethylene glycol monoethyl glycol, methylglycol acetate, pentane and its isomers, octane and its isomers, heptane and its isomers, and hexane and epichlorohydrine isomers on active charcoal tubes
- Validation and implementation of a method for identifying bacteria, and specifically bacteria in the genus *Legionella*, using the MALDI-TOF system (Biomérieux's Vitek® MS system)
- Personalization of the *ClicLab* portal to facilitate online requests for *Legionella* analysis in water cooling towers regulated by the Régie du Bâtiment du Québec (RBQ)
- Addition of a new piece of equipment for sampling biofilms, thus permitting diversification of the types of matrices analyzed using the method for detecting and identifying bacteria of the genus *Legionella*.



NEW ACTIVITIES

- Laboratory validation, field expertise, and commissioning (for clients) of a new sampling device (sampling device code 922) for assessing inhalable airborne dusts
- Production of the *Guide de prélèvement des échantillons de sols contaminés à l'amiante en milieu de travail* (available in French only)
- Development and implementation of a method for testing 4,4'-methylenedianiline (biomarker for diphenylmethane diisocyanate, or MDI) in hydrolyzed urine
- Development of a combined method for testing 1,6-hexamethylenediamine, 4,4'-methylenedianiline, and 2,4/2,6-toluenediamine (biomarkers for HDI, MDI and TDI) in hydrolyzed urine
- Development of a method for analyzing non-fibrous particles in lung tissues, using transmission electron microscopy (preparation step)



RENEWAL OF ACCREDITATIONS

- The Institute's environmental and microbiological analyses laboratories were assessed with regard to their current scope when they applied for their accreditation renewals under the American Industrial Hygiene Association Laboratory Accreditation Programs (AIHA-LAP, LLC). Their accreditations were renewed until August 2021.
- The Institute's laboratory for analyzing asbestos in non-friable materials by means of transmission electron microscopy took steps to prepare for renewal of its accreditation under the Environmental Laboratory Approval Program (ELAP) of the New York State Department of Health (NYSDOH). Its representatives will visit the IRSST during the first quarter of 2020.



The New Generation in OHS

The IRSST uses every possible means to motivate a competent and creative new generation to opt for careers in OHS research. In addition to welcoming students, trainees, and collaborators in 2019, it awarded **36 scholarships** and fellowships to deserving students under its Graduate Studies and Postdoctoral Fellowship Program.



The Institute also awards a number of scholarships in partnership with other organizations that share its mission of securing a high-calibre new generation of scientists. In 2019, **three career scholarships** (junior 1 level) in occupational health and safety, offered over a four-year period and **totalling \$775,000**, were given out as a joint initiative with the Fonds de recherche du Québec (FRQ).

The recipients were:

STEVE GEOFFRION
of Université de Montréal,

for his research project titled *Vers une prévention durable de la violence au travail et une prise en charge probante de ses répercussions dans les milieux de la santé* [toward sustainable prevention of workplace violence and evidence-based management of its repercussions in healthcare settings].

ALEXANDRA LECOURE
of Université Laval,

for her research project titled *Mesure et développement du comportement préventif au travail chez les travailleurs ayant subi une atteinte à la santé nécessitant des services de réadaptation* [measurement and development of preventive behaviour at work in workers having sustained a health problem requiring rehabilitation services].

LUDWIG VINCHES
of Université de Montréal,

for his research project titled *Évaluation de l'exposition des travailleurs aux nanoparticules, aux particules ultrafines et aux composés organiques volatils produits lors de procédés industriels récents* [assessment of worker exposure to nanoparticles, ultrafine particles, and volatile organic compounds during recent industrial processes].

ENHANCEMENT OF THE IRSST'S SCHOLARSHIP AND FELLOWSHIP PROGRAM

In 2019, the IRSST enhanced its Graduate Studies Scholarship and Postdoctoral Fellowship Program to remain competitive with other provincial programs. Annual amounts of \$16,625 were set for master's students and of \$55,000 for postdoctoral work outside Québec. These scholarships and fellowships offer up to eight months of paid parental leave and now span four years instead of three for doctoral work, and three years instead of two for postdoctoral work.

The complete list of scholarships and fellowships can be found on the IRSST's Web site at irsst.qc.ca/bourses.



ACFAS-IRSST AWARDS

In 2019 as in past years, the Institute joined with the Association francophone pour le savoir (Acfas) to hand out two awards designed to foster the next generation of scientists and underscore the outstanding university results obtained by one master's student and one doctoral student.

*The Prix Acfas IRSST
Santé et sécurité du travail:
MAÎTRISE*

went to **Andréia Matta-Dias**, a student in the Department of Social and Preventive Medicine of the Faculty of Medicine at Université Laval. Her research examined the effects of cumulative exposure to psychosocial demands at work on back problems among white collar workers.

*The Prix Acfas IRSST
Santé et sécurité du travail:
DOCTORAT*

was awarded to **Caroline Duchaine**, a doctoral candidate at the Centre de recherche du CHU de Québec-Université Laval. Her research assessed the effect of psychosocial stressors on the cognitive function of a large worker cohort in the specific context of an aging labour force.



(from left to right) **Caroline Duchaine**, **Lyne Sauvageau**, **Kannan Krishnan** and **Andréia Matta-Dias**

Research Partners



Research partnerships allow the IRSST to increase both its research capability and its influence in scientific communities and the world of work. They also expand the Institute's reach and influence on the local, national, and international stages. By sharing human, financial, and physical resources, the partners involved acquire means they would not have had on their own. This in turn enables them to make significant advances in various fields.

In 2019, the IRSST collaborated with over 30 partners in Québec, the rest of Canada, and around the world.

QUÉBEC

- Association francophone pour le savoir (Acfas)
- Centre d'expertise en analyse environnementale du Québec (CEAEQ) of the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC)
- Centre intégré universitaire de santé et de services sociaux (CIUSSS) de l'Est-de-l'Île-de-Montréal
- École de technologie supérieure (ÉTS) – Laboratoire d'acoustique
- Institut de la statistique du Québec
- Fondation Lucie et André Chagnon
- Ministère de l'Éducation, du Loisir et du Sport
- Ministère de la Famille
- Fonds de recherche du Québec (FRQ)
- Groupe CTT
- The Montreal Chest Institute of the McGill University Health Centre (MUHC)
- IMMUNIT RIMOUSKILAB INC.
- INRS – Institut Armand-Frappier
- Réseau provincial de recherche en adaptation-réadaptation (REPAR), thematic network supported by the Fonds de recherche du Québec – Santé (FRQS)
- Société du Palais des congrès de Montréal
- Concordia University – Research platform on particle and gas filtration
- Centre de recherche du Centre hospitalier de l'Université de Montréal (CRCHUM)
- Université de Montréal – École de santé publique
- Université de Montréal – Équipe RENARD
- Université de Sherbrooke – Groupe d'acoustique de l'Université de Sherbrooke (GAUS)
- Université de Sherbrooke – Laboratoire de biomécanique pour la prévention des troubles musculosquelettiques
- Université du Québec à Montréal (UQAM) – Laboratoire d'environnement contrôlé (LEC)

CANADA

- Agrivita Canada Inc., Saskatchewan
- Occupational Cancer Research Centre (OCRC), Ontario
- Employment and Social Development Canada (ESDC)

EUROPE

- Health and Safety Executive (HSE), United Kingdom
- Institut national de recherche et de sécurité (INRS), France
- Institute for Occupational Safety and Health (IFA) of the DGUV, Germany

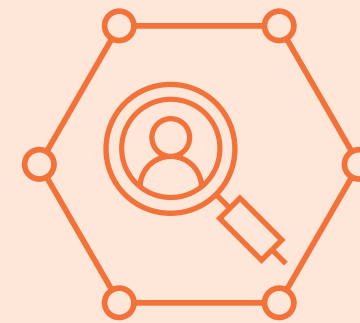
UNITED STATES

- National Institute of Occupational Safety and Health (NIOSH)
- International Isocyanate Institute (III)

ASIA

- Japan National Institute of Occupational Safety and Health (JNIOSH), Japan
- Workplace Safety and Health Institute (WSHI), Singapore

Human Resources



The IRSST's most valuable resource is its personnel, with their diverse expertise in disciplines such as chemistry, physics, engineering, ergonomics, industrial hygiene, psychology, sociology, anthropology, and demography. As at December 31, 2019, there were 131 people on staff. Over two-thirds were scientific personnel, including 19 researchers, 41 professionals, and 29 technicians.

During the year, the Institute hired 20 new permanent employees and 15 other employees to meet temporary needs. A number of positions were also filled to offset retirements. In addition to these new resources, the Institute welcomed 29 trainees to its offices and laboratories. These included bachelor's, master's, doctoral, and postdoctoral students, as well as nine collaborators (several entering the OHS field for the first time) and one guest professor.

The IRSST remains true to its mission by consistently striving to provide its staff with a safe and healthy work environment. Again this year, its assessment rate at the CNESST was lower than the unit rate charged to organizations operating in the same activity sector.

It also continues its efforts to secure its internal succession, and 2019 was no exception. Three employees working on their doctorates were targeted for a research career:

Sabrina Gravel, a doctoral student in toxicology, will begin her career as a researcher in the Chemical and Biological Hazard Prevention research field.

Caroline Jolly is working on an interdisciplinary health and society doctorate in the Sustainable Prevention and Work Environment research field.

Simon Aubin in the Laboratory Division is registered in an analytical chemistry doctoral program.

Also in 2019, the IRSST promoted **Jessica Dubé** to the position of researcher in the Sustainable Prevention and Work Environment field. In the Laboratory Division, **Alberto Morales** earned the title of Certified Industrial Hygienist (CIH).



Sabrina Gravel



Caroline Jolly



Simon Aubin



Jessica Dubé



Alberto Morales

Highlights



(from left to right) **Manuelle Oudar**, **Lyne Sauvageau** and **Marie Larue**

APPOINTMENT OF LYNE SAUVAGEAU TO THE EXECUTIVE OFFICE

The Institute welcomed Lyne Sauvageau to the post of president and CEO on August 19 in the presence of Manuelle Oudar, chair of the IRSST's Board of Directors. With a doctorate in public health from Université de Montréal and a master's degree in political science from Université Laval, she has held various positions in research organizations and the university community. Ms. Sauvageau took over from Marie Larue, who retired after 37 years of service in the field of occupational health and safety, first as a manager at the CNESST (formerly the CSST) and then at the Institute's helm for nearly 12 years.

COLLABORATION WITH UNIVERSITÉ DE MONTRÉAL

The IRSST and the Institut de recherche en santé publique de l'Université de Montréal (IRSPUM), now known as the Centre de recherche en santé publique (CReSP), have been actively engaged for a number of years in occupational health and safety studies on the use of pesticides in agriculture in Québec. Both institutes have also combined their efforts with those of numerous other actors in the agricultural sector to gain a better understanding of the health effects of pesticides and propose safe practices for users of these products.



In 2019, this collaborative initiative was marked by the drafting of a joint brief that was filed with the secretariat of the Québec government's Parliamentary Committee on Pesticides. In this brief, the two organizations presented numerous findings and submitted recommendations for government and regulatory authorities and scientific communities to raise awareness of the importance of taking into account and protecting the health of agricultural workers exposed to these products.



ORGANIZATION OF INTERNATIONAL CONFERENCES

The members of the EPICOH Scientific Committee of the International Commission on Occupational Health (ICOH) retained the IRSST's application to hold the 28th International Symposium on Epidemiology in Occupational Health (EPICOH). The two event co-chairs are Dr. France Labrèche, researcher at IRSST, and Dr. Marie-Élise Parent, professor and researcher at France's Institut national de la recherche scientifique (INRS) – Centre Armand-Frappier Santé Biotechnologie.

During the summer of 2019, the IRSST, in collaboration with the École de technologie supérieure (ÉTS), successfully hosted the 26th International Conference on Sound and Vibrations (ICSV-26), bringing together experts on this topic from around the world. Jérémie Voix, a professor at the ÉTS, and Franck Sgard, an IRSST researcher and leader of its Mechanical and Physical Risk Prevention research field, served as General Chair and Scientific Chair respectively at this conference.

CREATION OF A GOVERNANCE AND ETHICS COMMITTEE TO OVERSEE THE IRSST'S BOARD OF DIRECTORS

A governance and ethics committee was formed in April 2019 to ensure the proper functioning of the IRSST's Board of Directors and committees, in particular, through constant oversight of the Institute's governance. The committee met twice during the year, once on April 15 and again on December 13, 2019.

POLICY OF OPEN ACCESS TO SCIENTIFIC LITERATURE

In 2019, the Institute implemented its revised Policy of Open Access to Scientific Literature to promote broader dissemination of scientific articles resulting from IRSST-funded research. From now on, each IRSST-funded scientific article will be archived on the Institute's Web site after the embargo set by the scholarly journal has expired.



REORGANIZATION OF FOLLOW-UP COMMITTEES

Follow-up committees are made up of representatives of organizations interested in our research. They bring their knowledge of workplaces to our researchers when they are defining, developing, and carrying out their projects, during the transfer and application of their results in workplaces, and lastly, during assessment of the results of this knowledge transfer. In 2019, the IRSST rethought and reorganized the follow-up committees to bring together and mobilize partners around problems and optimize implementation of conditions that will foster knowledge uptake by means of comprehensive and integrated strategies. What were previously project committees have now become thematic committees.

VISITS FROM DELEGATIONS

Well-renowned Canadian partners visited the IRSST in 2019



(from left to right) **Matthieu Girard, Terry Baker, Caroline Jolly, Marie Larue, Dr. Niels Koehncke, Kannan Krishnan, Martin Beauparlant, Ludovic Tuduri, Dr. Shelley Kirychuk, Caroline Duchaine and François Hébert**

- On May 2, the IRSST welcomed members of the boards of directors of the Canadian Centre for Health and Safety in Agriculture (CCHSA) and Agrivita Canada Inc. to its premises. Both organizations are dedicated to research and training in the agricultural sector. Their members' visits provided an ideal opportunity to showcase the Institute's research on personal protection against pesticides, with researchers Ludovic Tuduri and Caroline Jolly presenting their work on this topic. Researchers Caroline Duchaine from the Centre de recherche de l'Institut universitaire de cardiologie et de pneumologie de Québec and Stéphane Lemay from the Institut de recherche et de développement en agroenvironnement presented their IRSST-funded research on worker exposure to odours, dusts and pathogens in pig buildings. IRSST president and CEO, Lyne Sauvageau, sits on both boards of directors.

- On August 28, the IRSST received the visit of Anne Tennier, president and CEO of the Canadian Centre for Occupational Health and Safety (CCOHS). Possible collaboration activities between the CCOHS and the IRSST were explored and discussed, with a particular focus on the knowledge transfer products created by the Institute in the past few years.

A Québec institution also paid us a visit

- On November 5, the IRSST welcomed representatives from Revenu Québec. They are hoping to set up a research centre in their agency. Governance, prioritization of research activities, and follow-up mechanisms were discussed at this meeting.

A few international partners also set foot in Québec to meet with IRSST administrators and employees

- From May 26 to 29, 2019, the IRSST hosted the Sheffield Group, which brings together the heads of the world's leading OHS research institutes. The Institute has been a member of this group since its founding in 1988, and took this opportunity to establish new partnerships and enhance existing ones. The IRSST previously hosted the Group's annual meetings in 1993 and 2012.
- On September 11, 2019, the IRSST received a delegation from the Association de médecine du travail SEST (Services aux entreprises pour la santé au travail) based in Île-de-France, France, and comprising stakeholders in companies. These representatives were touring Canada to explore quality of life at work, strategies for keeping employees at work, and risk prevention in light of evolving working conditions and technologies.

Élise Ledoux, leader of our Sustainable Prevention and Work Environment research field, and researchers Alessia Negrini and Jessica Dubé, all of the IRSST, updated the delegation on the Institute's current activities and upcoming developments related to these themes.



Alessia Negrini,
researcher, IRSST



Jessica Dubé,
researcher, IRSST



Élise Ledoux,
head of OSH and
Sustainable Prevention Work
Environment, IRSST

SPOTLIGHT ON THE IRSST'S EXPERTISE

The IRSST was named "*Partenaire d'excellence en recherche-innovation*" (outstanding innovation-research partner) at the Gala Excellence ÉTS of the École de technologie supérieure, held on April 8, 2019. This mention underscores its exceptional collaboration with the ÉTS in ongoing joint research activities. The two institutions have frequently worked together on a number of major projects over the past few years.

THE IRSST'S CONTRIBUTION TO THE PAHO/WHO ACTION PLAN

On October 18, the IRSST welcomed Julietta Rodriguez-Guzman, regional advisor at the Pan American Health Organization (PAHO), which is the regional office for the Americas at the World Health Organization (WHO). This provided the perfect opportunity to discuss the PAHO/WHO Plan of Action on Workers' Health 2015-2025 and advances made in the plan and in occupational health initiatives supported by the PAHO/WHO collaborating centres in the Americas.



(from left to right) **François Hébert, France Labrèche, Lyne Sauvageau, Julietta Rodriguez-Guzman and Kannan Krishnan**

The IRSST's input into the PAHO/WHO Plan of Action 2015-2025 concerned mainly occupational cancers, exposure to chemical contaminants (antineoplastic products and electronic waste materials), use of exposure measurement data bases, and assessment of the profitability of investments in occupational injury prevention. The Institute's Scientific Division earned the status of a PAHO/WHO collaborating centre in 2013. Valid for four years, this designation was renewed in March 2017.

VISIT TO JAPAN

Collaboration with researchers at JNIOOSH (National Institute of Occupational Safety and Health, Japan) continued, with members of the IRSST's Mechanical and Physical Risk Prevention research department paying a visit to the Japanese institute's testing laboratory at the end of 2019. The newly envisaged avenues of cooperation will be the subject of discussions in 2020.

SILENCE: FILMING IN PROGRESS!



Researcher **Geneviève Marchand** of the IRSST and **François-Étienne Paré**, program host, during filming

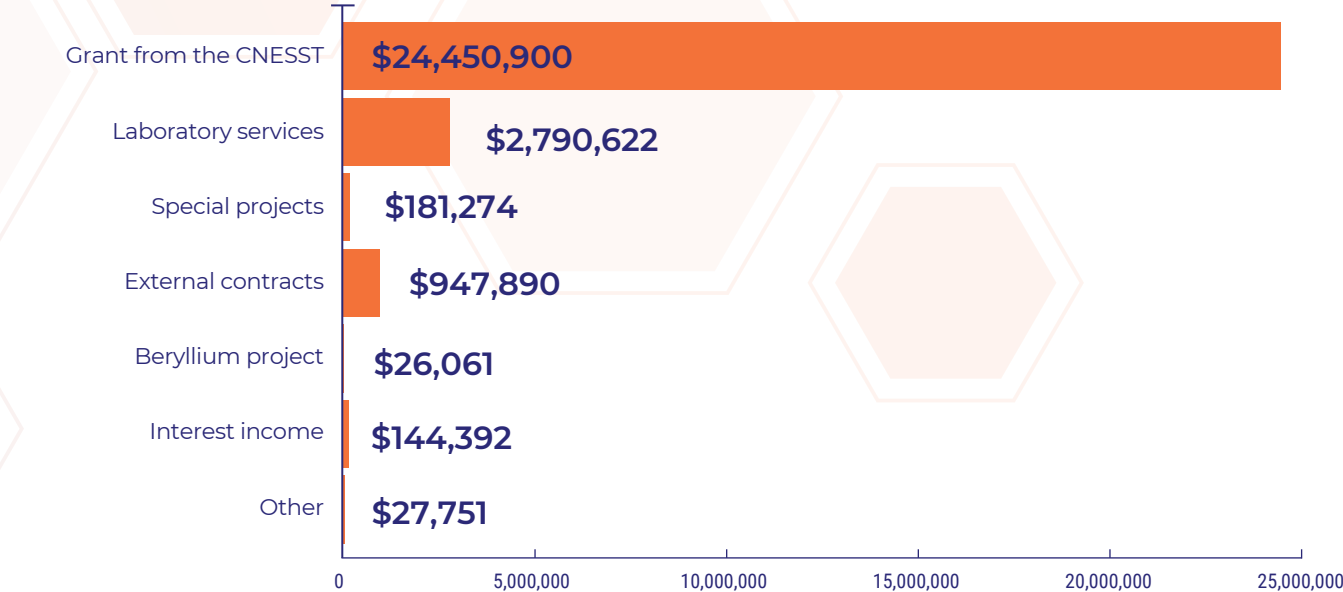
Produced by Savoir Média in collaboration with the IRSST, the *Facteurs de risque* series was filmed during the summer and fall of 2019. A total of 30 employees and close collaborators of the Institute were central to this television project, which will be broadcast during the winter of 2020. Six episodes covered the following themes: air quality, chemical products, noise, mechanical and physical risks, new risks, and the body at work. This constitutes a new way of promoting the relevance and quality of occupational health and safety research.

Financial Results

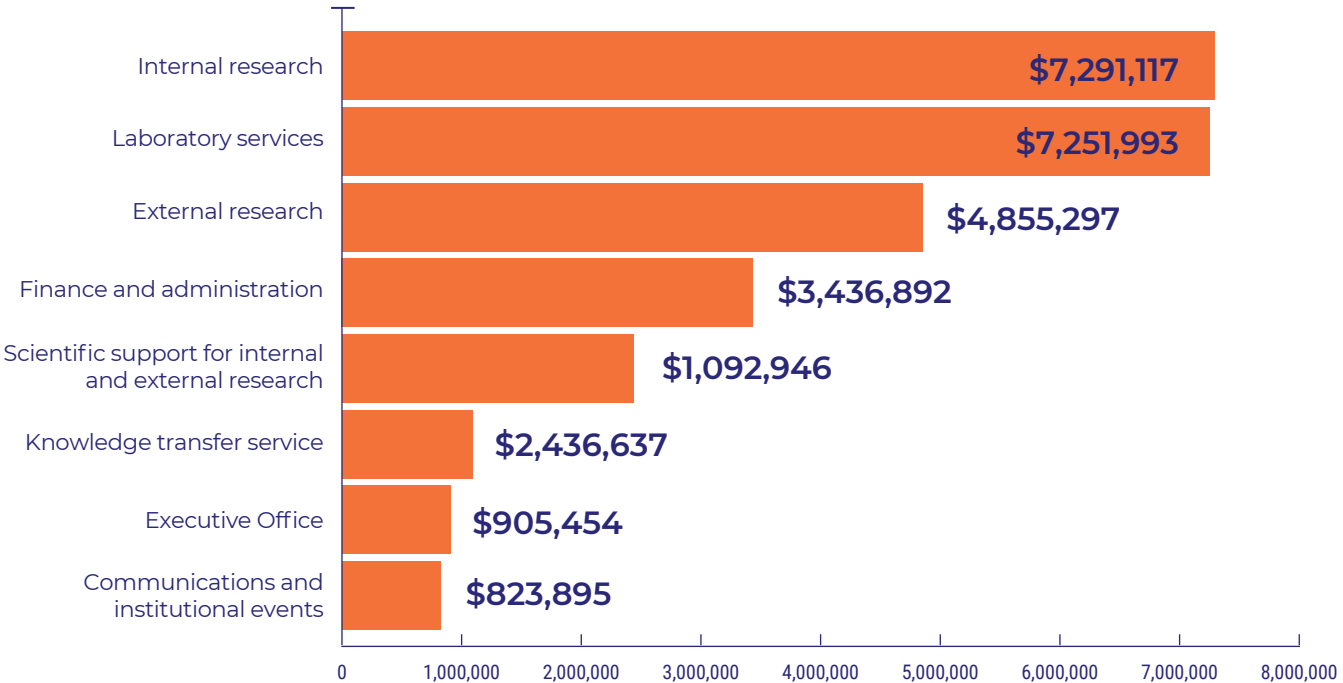
The financial results as at December 31, 2019 were:



Total revenues of **\$28,568,890**, distributed as follows:



Total expenditures of **\$28,094,231**, distributed as follows:



Governance



BOARD OF DIRECTORS

The Board of Directors is composed of seven representatives each of employers and workers, and a chair. It operates on the principle of equal (labour/management) representation. Appointed by the Québec government, its members manage the Institute's affairs, including its strategic orientations, development framework, and financing.

The members of the Board and those of the Executive Committee met seven times respectively in 2019.

Chair

Manuelle Oudar*

Employer representatives

Yves-Thomas Dorval*
France Dupéré
Patricia Jean
Norma Kozhaya
Isabelle Leclerc
Two vacant positions

Worker representatives

Denis Bolduc
Alain Croteau
Jean Lacharité*
Simon Lévesque
Caroline Senneville
Two vacant positions

IRSST representative

Lyne Sauvageau

Observer

Anne Racine

Appointments

Isabelle Leclerc
Simon Lévesque
Caroline Senneville
Anne Racine

Departures

Martine Bélanger
Martine Hébert
Serge Cadieux
Stéphane Forget
Martin L'Abbée
Francine Lévesque
Yves Ouellet

* Members of the Executive Committee

SCIENTIFIC ADVISORY BOARD

The tripartite Scientific Advisory Board (SAB) is composed of four representatives each of employers and workers, and of six members of the scientific and technical community. Chaired by the Institute's president and CEO, the SAB issues opinions on the relevance, priority, and scientific merit of internal and external research projects.

The SAB met 11 times in 2019.

Chair

Lyne Sauvageau

Employer representatives

Lionel Bernier
Dominique Malo
Gilles Rousseau
Marie-France Turcotte

Worker representatives

Jean Dussault
Denis Mailloux
François Ouellet
Ana-Maria Seifert

Scientific and technical representatives

André-Pierre Contandriopoulos
Christophe Guy
Denis Harrisson
Benoit Lévesque
Alain Rondeau
Paul-Joseph Villeneuve

Observer

Luc Castonguay

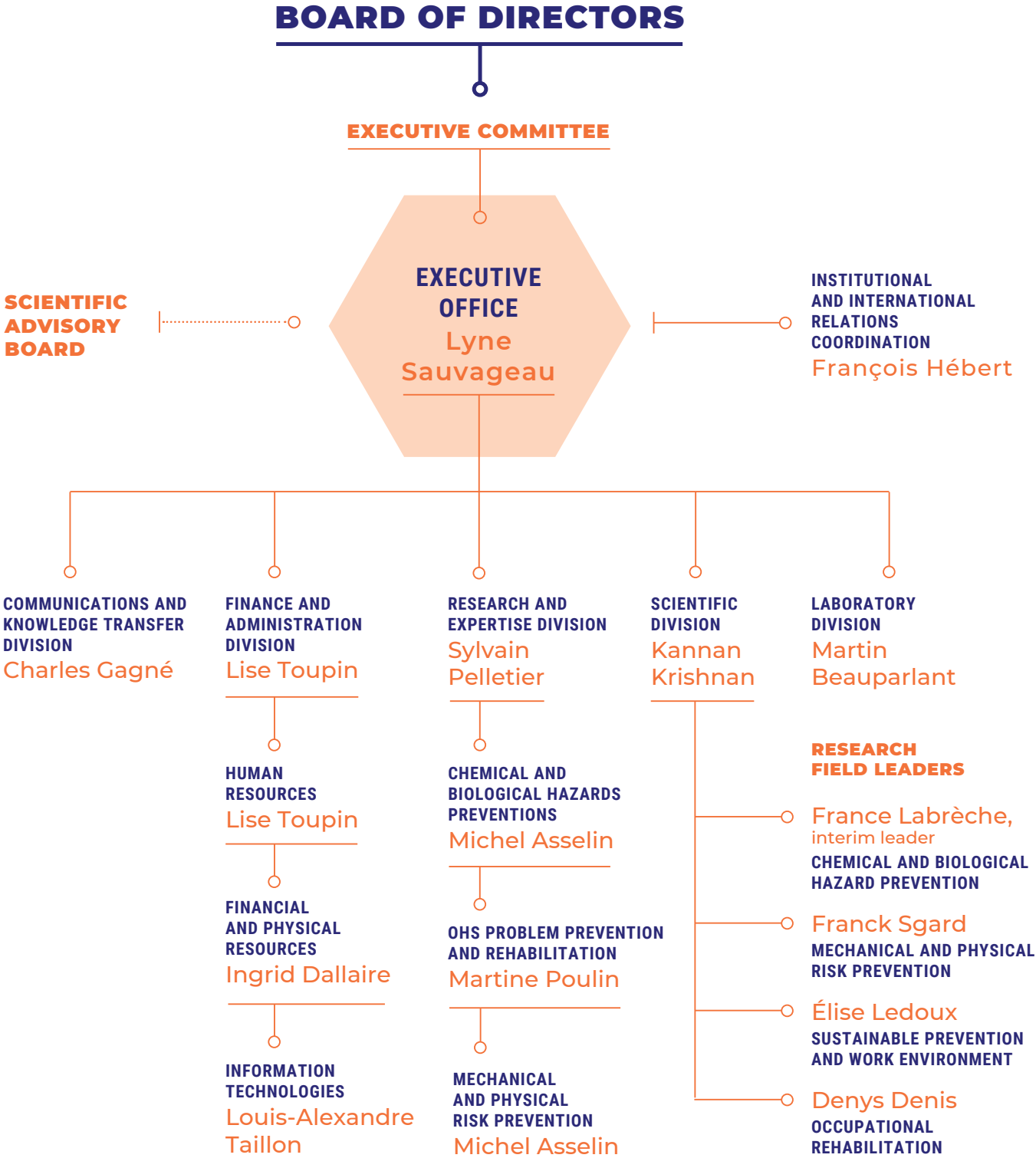
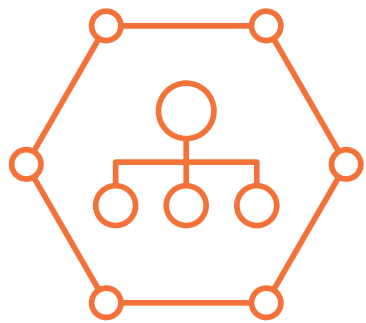
Appointments

Luc Castonguay
Christophe Guy
Denis Harrisson
François Ouellet
Paul-Joseph Villeneuve

Departures

Léonard Aucoin
Gaétan Lantagne
Marie Larue
Claude Sicard

Organization Chart



Production

IRSST, Communications and Knowledge Transfer Division
Charles Gagné, Director

Drafting and coordination

Noémie Boucher

Revision

Patricia Labelle, Manon Lévesque,
Claire Thivierge, Maura Tomi

English translation

Leslie Macdonald

Graphic design

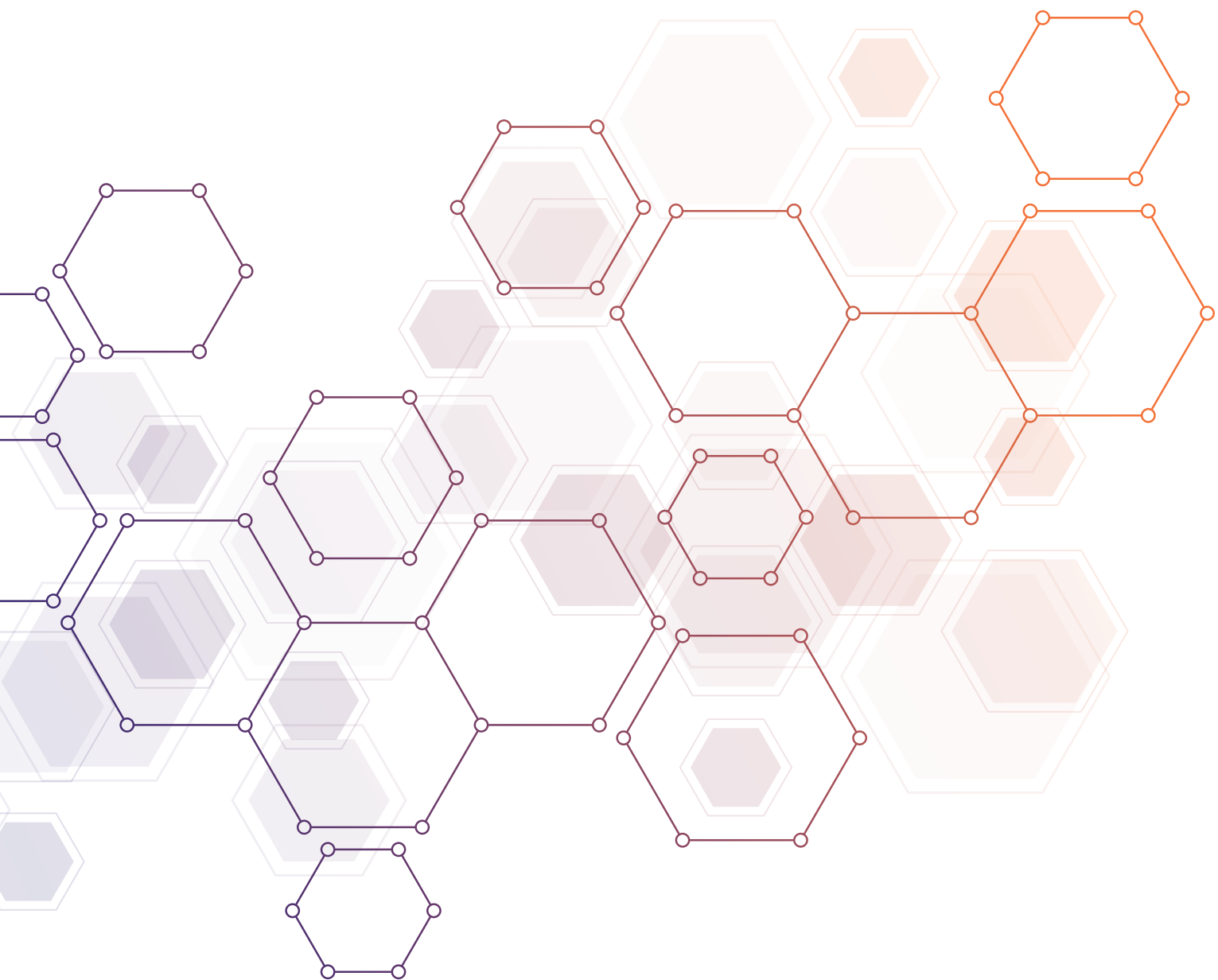
Tabasko Communications

Photos

Pierre-Luc Dufour
Philippe Lemay
Julian Haber

IRSST

505 De Maisonneuve Boulevard West
Montréal, Québec H3A 3C2
Phone: 514-288-1551
ISSN: 0820-8409
ISBN: 978-2-89797-109-0
IRSST.QC.CA



Institut de recherche
Robert-Sauvé en santé
et en sécurité du travail