



WE ARE RESEARCH

Memorial University Research Report 2014

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**MESSAGE FROM
DR. RICHARD MARCEAU**
Vice-president (research)

We are research at Memorial University.

Every year, the *Research Report* is a celebration of discovery. It is a reminder of the captivating and impactful research taking place in our corner of the world that will eventually traverse far beyond our province's rugged coast.

In the stories ahead, whether you are a student, staff or faculty member, or esteemed friend and supporter of Memorial University, you will follow the journey of a few of our amazing researchers as they seek knowledge and creation, and perhaps be inspired by them.

However, the important research we do at Memorial could not take place without the unrelenting support of our entire university community and friends. This report not only serves to champion the efforts and talents of Memorial's researchers, it is an act of gratitude to the entire university and beyond.

Every one of us in the Memorial University community, in our own particular way, contributes to our impactful research. Together, we are building the world of tomorrow.

Together, WE ARE RESEARCH.

Most Sincerely,
Richard J. Marceau, PEng, PhD, FCAE
Vice-president (research)

CONNECTS GENERATION

DR. JASON CASLOR

School of Music

DR. YUANZHU CHEN

Faculty of Science

Being a musician on an island in the middle of the North Atlantic has its advantages; the landscape can be an inspiration, but also a challenge. Dr. Jason Caslor, a conductor and assistant professor in the School of Music, wanted his students to receive the benefit of workshops and clinics with world class conductors and composers, but flying folks in is not always feasible and, because music rehearsals are all about sound quality, neither are current videoconferencing technologies.

FUNDERS

President's Office,
Memorial University

Office of the Provost and
Vice-President (Academic)

So, Dr. Caslor teamed up with Richard Blenkinsopp, music technologist with the School of Music, and Dr. Yuanzhu Chen, an associate professor in the Department of Computer Science, to develop Connect!, a user-friendly iPad application that provides a pristine audio exchange, allowing ensembles to work with artists from around the world via the internet. All that is required is that each party have a high-speed internet connection and an iPad. Plans are underway to expand the application so that it will work on other platforms as well.

With the right software now in place, students rehearsing in a band at Memorial can benefit from the expert ears of a conductor listening from Texas or a composer offering detailed insight from Shanghai. This same technology will also allow a university-based conductor to lend his expertise to a high school band in a rural location. Best of all, the software is designed to be as user-friendly as applications like Skype, so that neither party requires a technical support team.

Designed at Memorial University via collaboration between music and science, Connect! is about being part of the global music community. "We're on this island, but we're also part of the global economy," Dr. Caslor says. "We want to be able to connect with people, whether we're talking about the School of Music or engineering or business, and have it come across in high quality audio so we can make the best possible connection and not have technology get in the way."

CULTIVATING INNOVATION

DR. JOINAL ABEDIN
Labrador Institute

Farmers' fields don't usually pop to mind when we think of Labrador, but research at Memorial's Labrador Institute may soon bring more farmland to the Big Land.

FUNDERS

Agriculture Research Initiative
of the Department of Natural
Resources

Growing Forward 2 Program

Harris Centre for
Applied Research

Dr. Joinal Abedin, research associate in soil science at the Labrador Institute and adjunct professor with the Earth Sciences Department, St. John's Campus, and Division of Science, Grenfell Campus, is conducting research to evaluate the use of biochar to enhance soil fertility and safety in Labrador.

"The sandy soils of Happy Valley-Goose Bay have low soil fertility and there are a number of soil and water contamination issues," Dr. Abedin explains. "Biochar, a carbonaceous material produced from waste wood or other organic waste, is reported to have many advantages in reducing greenhouse gas emissions and mobility of contaminant metals, improving soil fertility and facilitating crop productivity."

By applying varying amounts of biochar to crops in field studies, Dr. Abedin is exploring how this charcoal-type substance might be effectively used in the sandy soils of Labrador. Initial results are encouraging for both Dr. Abedin and the farmers he's working with, suggesting that biochar application helps to improve plant establishment, growth and yield. With start-up funds from the Agriculture Research Initiative of the Department of Natural Resources, additional research funds have been secured from the Growing Forward 2, a federal-provincial-territorial Framework for Canada's agriculture and agrifood sector and the Harris Centre for Applied Research.

With the vast majority of food currently shipped in from elsewhere, this research has the potential to greatly improve food security in Labrador. And it fits perfectly with the institute's mission to bring the needs and interests of Labradorians to the university, and to facilitate actions that bring the capacities of the university to bear on those needs and interests, ploughing the way to better farmland on the Big Land.

THEY SEE ME ROLLIN'

DAIGO KAMADA

Marine Institute

SUPERVISOR

DR. DOMINIQUE ROBERT

Center for Fisheries and
Ecosystems Research (CFER)

FUNDERS

Department of Fisheries
and Oceans

NSERC

Fried, roasted or dried and salted, capelin are a familiar sight on the beaches and dinner plates of Newfoundland and Labrador, but what are the capelin eating? That's the question Daigo Kamada is looking to answer.

Mr. Kamada is a PhD student with the Marine Institute's Centre for Fisheries Ecosystems Research (CFER). Graduate students play a vital role in the research conducted at the centre. Since its creation in 2010, graduate student numbers have more than doubled. The experience of students like Mr. Kamada, who has studied zooplankton dynamics in Lake Winnipeg and is co-author of the Guide of Paraguayan Fish Fauna, adds to the centre's diversity of expertise and helps to create dynamic and exciting research teams.

Working with supervisor Dr. Dominique Robert, research scientist with the CFER, and in collaboration with the Department of Fisheries and Oceans, Mr. Kamada is researching the feeding ecology of Newfoundland capelin from the larval to the adult stages. The project combines field sampling for capelin larvae and juveniles in Trinity Bay and the analysis of a time series of adult capelin stomach content to understand how variability in prey availability may control population dynamics of that key species.

"We want to know what capelin have been feeding on for the last several years," Mr. Kamada explains. "Are they eating good quality food or junk food? What implications could that have in terms of their biology?"

Originally from Paraguay, Mr. Kamada notes that learning from researchers who've been studying capelin off the shores of Newfoundland and Labrador for many years is an important part of the process.

"Capelin have a huge history for the province in terms of culture," Mr. Kamada says. "Many species have not recovered since the northern cod moratorium of the early 1990s, especially capelin. This research is part of trying to figure out why that is, and will hopefully be a step forward in terms of fisheries management and recovery."

LET THEM EAT CAKE

DR. PETER STEWART
Grenfell Campus

Whether you're taking photos for your food blog, thinking of opening a café or simply trying to impress dinner guests, food presentation is an important consideration, and it's not just about looking good.

“Research indicates that all kinds of environmental stimuli influence taste perception,” Dr. Peter Stewart, an assistant professor of psychology, Grenfell Campus, explains. “Background music, the colour of the walls, the cutlery—all of these things influence the way we perceive food taste and quality.”

When Dr. Stewart and psychology honours student Erica Gosse began looking into this area of research, they noticed that while many of these contextual factors had already been explored, the influence of plate shape and colour had not been fully investigated. And so they devised a study to examine the interaction of plate colour (black vs. white) and plate shape (round vs. square) on taste perception.

In a makeshift café, which they set up in a section of the Grenfell Campus cafeteria, Dr. Stewart and Ms. Gosse found that judgments made on simple elemental properties (sweetness and flavour intensity) and higher level compound property judgments (quality or liking) were differentially influenced by the interaction of plate colour and plate shape—cheesecake served on round white plates was judged to taste sweeter and more intense, while cheesecake served on black square plates was judged to be of a higher quality. This suggests that consumers' gustatory judgments are influenced by the colour and shape of their plates, and these results could benefit the culinary industry.

Dr. Stewart acknowledges that this is an eccentric research project, beginning with some initial confusion around using research funds to purchase plates, napkins and cake. However, the study has garnered quite a lot of attention. The team's research paper, “Plate shape and colour interact to influence taste and quality judgments,” published in the peer-reviewed journal *Flavour*, has been accessed over 9,000 times, Dr. Stewart has been interviewed by *Shape* magazine and the unusual little study has been featured on numerous food blogs and BBC Online. Given the overwhelming interest, Dr. Stewart plans to expand the study to include other plate colours, and the perfect cheesecake companion—coffee.

CLOSE TO THE BONE

DR. CHRISTOPHER KOVACS
Faculty of Medicine

FUNDERS

CIHR

RDC

Janeway Research Foundation

Medical Research Foundation,
Memorial University

Faculty of Medicine,
Memorial University

Discipline of Medicine,
Memorial University

Bone loss, as ads for calcium supplements remind us, is a frightening prospect. Breastfeeding women are commonly encouraged to consume more calcium to meet the needs of their growing baby. But even with a dairy cow and a field of broccoli out back, a breastfeeding woman will lose 5-10% of the bone in her skeleton to provide milk to baby. Once the infant is weaned, calcium levels in the mother's skeleton will be completely restored.

Dr. Christopher Kovacs, professor of medicine (endocrinology), Faculty of Medicine, and his research team are studying this remarkable borrowing and restoration process in the hopes that by discovering the mechanism that guides bone recovery in breastfeeding women, they will also be able to find better solutions to treat bone loss in patients with osteoporosis and other skeletal conditions.

The lab's pregnant mothers are mice. Mice have a very rapid skeletal recovery rate, losing up to 55 per cent of bone mass during three weeks of lactation, but fully restoring the skeleton within 10 to 14 days after weaning.

"In adults, bone metabolism is regulated by several key hormones," explains Dr. Kovacs, who holds Memorial's prestigious University Research Professor designation. "Many of the available treatments for osteoporosis are based on these hormones. We've already discovered that these hormones aren't required to restore the skeleton after lactation, which tells us that unknown factors must be regulating the skeleton during and after breastfeeding—factors that we intend to identify."

This search for the unknown is part of the appeal of this work for Dr. Kovacs, who notes that very few people are working in the area globally, placing his lab at the leading edge of this fascinating research. Dr. Kovacs is particularly proud of his students' work: "Students in the lab have been very keen and productive. In the last 14 years they've received 47 different awards for excellence in research internationally, nationally and through the university."

Dr. Kovacs' research lab recently received a five-year operating grant renewal from the Canadian Institutes of Health Research (CIHR), signifying more than 20 consecutive years of Dr. Kovacs being funded by the Medical Research Council/CIHR since beginning his research career at Memorial.

ORIENTATION AT WORK

**HEATHER CLARKE
& DR. KARA ARNOLD**
Faculty of Business
Administration

Choosing a topic of research can be a challenge for PhD students who want their work to be meaningful and innovative, and to help launch a career in their chosen field. Students find their research topics in many different places. Heather Clarke, doctoral candidate in management with the Faculty of Business Administration, found her unique area of research in a graduate-level course in gender and diversity.

One of the topics explored in this course, taught by Dr. Kara Arnold, associate dean (research), Faculty of Business Administration, was the influence of gender stereotypes on perceptions of competence and likeability for female leaders in the workplace. This led Ms. Clarke to wonder what happens when sexual orientation is factored into the equation. Upon further investigation, Ms. Clarke and Dr. Arnold discovered that little research has investigated how sexual orientation influences how individuals are evaluated in the workplace, which makes their research project, Sexual Orientation and Gender-typed Work: Integrating Role Congruity and Implicit Inversion Theories, a ground-breaking one.

“Research demonstrates that gender stereotypes about homosexuals tend to be in the opposite direction to gender stereotypes about heterosexuals,” Ms. Clarke explains. “We tend to assume that heterosexual women are feminine and lesbian women are masculine, heterosexual men masculine and gay men feminine. So we want to know, when information is given about sexual orientation, how does that change our assumptions about gender conformity and therefore our assumptions about a person’s suitability for or competence to do a job?”

This innovative research has been well received by colleagues and could eventually develop into its own stream or program of research. Novel and timely, this project contributes to a larger theme of social justice.

“Looking at under-represented groups in the workplace and what kinds of things are barriers to their full participation is an important piece of this research,” Dr. Arnold adds. “And the social justice aspect of this work certainly fits in with some of the broader strategic research themes that Memorial is interested in as a diverse and progressive university.”

KING OF THE DRILL

DR. STEVE BUTT

Faculty of Engineering
and Applied Science

Dr. Steve Butt is leading a project to develop tools and technologies to improve offshore oil and gas drilling safety and efficiency. The work of this process engineering professor and his team will also increase drilling research capacity at Memorial.

FUNDERS

RDC

AIF

Husky Energy

Suncor Energy Inc.

Advanced Drilling Project

The Advanced Drilling Laboratory, a key component of the Atlantic Innovation Fund (AIF) Advanced Drilling Technology Project, is a major university-industry partnership with funding from the AIF, Research and Development Corporation (RDC), Husky Energy and Suncor Energy Inc.

One of the primary objectives of the project is the development and evaluation of Vibration Assisted Rotary Drilling (VARD), a technology intended to increase drilling performance by increasing drilling penetration rates and decreasing the rate of bit wear and damage.

“Our preliminary work focused on confirming if, in fact, vibration had a positive impact on penetration rate,” Dr. Butt explains. “Then we focused on understanding how that worked and why. We developed technology to test the process in the lab and that was transferred to tools that we could test in the field. Under field conditions, drilling penetration rates were increased by 25-60% in weaker materials and three to four times in stronger materials.”

Given that drilling is one of the single largest expenditures for offshore oil and gas exploration and production, these findings are significant. And while improving penetration rate is important for the drilling industry worldwide, it is especially relevant in cold-water climates, where drilling seasons are short. Faster drilling times increase the types and locations of targets that can be drilled in icy locations.

Faculty members, project engineers, postdoctoral fellows, interns and students have all played a role in the project, which has so far generated 25 publications, 20 graduate theses, one patent (with others under development) and several additional research projects and industrial collaborations.

While Dr. Butt has been the principal investigator of the lab since its inception, he credits the success of the project to teamwork. “A lot of people with a lot of different expertise and backgrounds have contributed to this work. We couldn’t have gotten this far without the participation of people with many different capabilities and skills. It’s been a team effort.”

MINE OVER MATTER

DR. STEVE PIERCEY

Faculty of Science

FUNDERS

NSERC

Memorial University

RDC

AIF

Canadian Mining
Innovation Council

Canadian Mining Industry
Research Organization

Geological Survey of Canada

Canadian mining and mineral
exploration companies

Natural resources play a big role in Newfoundland and Labrador's relatively new status as a "have" province. The landmass of the province is like a natural laboratory for geologists studying mineral deposits. Dr. Steve Piercey, professor in the Department of Earth Sciences, is using a combination of outdoor fieldwork and high-tech lab work to do research aimed at better understanding mineral deposits and how best to explore for them.

Dr. Piercey and his research team are part of a project that includes 16 other universities and 24 leading mining companies across Canada. The project recently benefited from the largest Collaborative Research and Development Grant ever awarded by the Natural Sciences and Engineering Research Council of Canada (NSERC). The financial investment by NSERC and the Canadian mining industry is supporting a pan-Canadian research partnership that will lead to innovation in the country's mining industry.

Conducting research to understand how deposits form through geological time, and using geological, geochemical and mineralogical methods, Dr. Piercey, who holds the NSERC-Altius Industrial Research Chair in Mineral Deposits, provides valuable information to geological explorers and contributes to the development of new exploration models to help find and develop new resources.

"Mineral resources are important to our province historically as well as right now in the present day," Dr. Piercey notes. "What our research does is contributes baseline data and information that can be used by the minerals industry in Newfoundland and Labrador, but also globally."

With a diverse group of research associates, visiting researchers, postdoctoral, PhD, master's and undergraduate students on his team, there's a human as well as a natural resources component to Dr. Piercey's work. "We are training undergraduate and graduate students to become good field geologists and good exploration geologists," Dr. Piercey explains. "When they leave Memorial University they can go work in this province, elsewhere in Canada or around the world and effectively become the next explorers."

HALL OF KNOWLEDGE

DR. PAM HALL

Faculty of Arts

Dr. Pam Hall knows art and community, and she knows knowledge creation. An interdisciplinary artist who has been creatively engaging the province's communities in her work for over 30 years, Dr. Hall is Memorial University's first Public Engagement Postdoctoral Fellow.

FUNDERS

Office of Public Engagement,
Memorial University

Faculty of Arts,
Memorial University

Shorefast Foundation

Established by the university's Office of Public Engagement in collaboration with the Faculty of Arts and the Shorefast Foundation, this new fellowship contributes to research and learning on a topic of mutual interest to the communities of Fogo and Change Islands, the university and the Shorefast Foundation.

A recent graduate of Memorial's Interdisciplinary PhD program, Dr. Hall will continue to work across disciplines as she builds and expands upon her doctoral project, Towards an Encyclopedia of Local Knowledge.

The first instalment of the encyclopedia was created in collaboration with more than 20 communities on Newfoundland's west coast. An art-and-knowledge project, it combines images and text to explore, document and celebrate local ecological, social, historical, technical, material and cultural knowledge. This collaborative community-based knowledge-sharing project will now continue in Fogo and Change Islands.

"The central impulse in my work as an artist is to use art as a way to participate in larger conversations," Hall explains. "In an historical moment when a single form of knowledge cannot solve the problems we've created for the planet, what can art do? It can engage people, it can put things into new configurations, it can turn old ideas upside down and it can make us question what we think knowledge is."

"We need to recognize that there are many kinds of knowledge and many diverse knowers in every community, especially those in rural and coastal settings where people work closely in, and with, their local environments. This ongoing project aims to reveal this vital community-based knowledge, because we need to work with more than a single kind of knowledge to build a sustainable future together."

A BIGGER DATA PLAN

DR. LISA KAIDA

Faculty of Arts

As anyone with a cell phone data plan knows, more data equals more possibilities. Memorial University has increased its data access exponentially with the establishment of a new Research Data Centre (RDC) to access Statistics Canada data on the St. John's Campus.

FUNDERS

Office of the
Vice-President (Research),
Memorial University

Faculty of Arts,
Memorial University

Faculty of Business
Administration,
Memorial University

Faculty of Medicine,
Memorial University

The culmination of many years of careful planning and preparation, the RDC is funded by Memorial's Office of the Vice-President (Research), the QEII Library and the faculties of Arts, Business Administration and Medicine. Part of the Canadian Research Data Centre Network, a national network of research data centres located at select universities across Canada, Memorial's RDC is located in the QEII Library and is the first centre of its kind in Newfoundland and Labrador. This new resource opens exciting possibilities for researchers in the province, providing them with access to confidential, large-scale data on Canadians in a secure university setting.

This is exactly the type of data the centre's newly appointed academic director, Dr. Lisa Kaida, Department of Sociology, specializes in. With an expertise in immigration research, Dr. Kaida's most recent work focuses on the impact of poverty on the work experiences of children of immigrants to Canada. By analyzing nationally representative survey data, her research will help communities gain insight into issues of poverty, immigration and labour market inequality. This important research would not be possible without access to the data available at the RDC.

With an impressive background in big data analysis, Dr. Kaida is well prepared to direct the RDC and aware of its value and exciting potential.

"Only about 20 universities across Canada have a Research Data Centre," Dr. Kaida notes. "So Memorial now offers one of the best resources available when it comes to using Statistics Canada's data. This resource not only benefits researchers and faculty, but it also allows us to teach students how to analyze data, developing a whole new generation of scholars too."

TEAM WORKS

**PROFESSOR
CYNTHIA BROWN**
School of Nursing

With a background in emergency room nursing, Cynthia Brown knows that working in health care is a team sport. When patient errors happen, chances are there's been a communication breakdown on the team.

“Teamwork is a requisite skill for health care professionals,” explains Ms. Brown, a clinical faculty member in the School of Nursing. “Health care professionals are expected to be able to contribute as a functioning team member, yet we don't actually work on that enough in their undergraduate education. Nursing, medicine, pharmacy, social work—they're all learning in separate silos, yet once they graduate they're expected to function as a cohesive team.”

Acutely aware of the relationship between patient safety and a high-functioning health care team, Ms. Brown decided to look at ways to improve inter-professional education in health care for her master's degree in nursing. She examined how high-fidelity simulation might help improve communication, teamwork and mutual understanding of complementary roles.

High-fidelity simulation incorporates highly realistic mannequins that breathe, blink and bleed. While this type of simulation is not uncommon in health care training situations, bringing undergraduate students from different disciplines together for high-fidelity simulation exercises is innovative and new.

For this project, teams of medical and nursing students worked together in a simulated acute care setting to save a high-fidelity mannequin nicknamed “Stan the Man.” The environment was realistic, the scenario true to life and the patient survived. Independent evaluators confirmed that the experience was valuable for learning and team building.

High-fidelity human patient simulation and inter-professional education are big research areas at institutions across Canada and internationally, which makes combining the two, as Ms. Brown has done, ground-breaking and timely. She hopes that further, larger-scale research projects in this area will lead to the integration of high-fidelity simulation in undergraduate programs to help students graduate with a better sense of how to work as team players, because excellent teamwork, leads to excellent patient care.

FIELD OF HONOUR

**BERT RIGGS
& DAVID MERCER**
QEII Library

FUNDER

Memorial University

Now an entrenched part of our community, Memorial University exists because it was built as a living memorial to honour Newfoundlanders and Labradorians who served in the First World War. Lasting Remembrance: Newfoundland, Labrador and War, a multi-disciplinary research project operating out of the Queen Elizabeth II Library, is set to help us better understand and pay tribute to this important piece of our history.

Bert Riggs, head of Archives and Special Collections, QEII Library, and information specialist David Mercer are creating a research portal that incorporates a Historical Geographic Information System (HGIS) to bring together information on the Newfoundlanders and Labradorians for whom Memorial University is named. The database will provide biographical, geographical, family and military information, including information about people's pre- and post-war lives, what battles they took part in, what communities they came from and their family connections. This information will then be mapped to illustrate the geographic relationships between these various elements to show where people came from, where they served, where they fell and, where possible, what happened to them after the war.

Lasting Remembrance: Newfoundland, Labrador and War is the product of many hands. Students have played an important role in helping to develop the database and many have maintained an interest in the project long after graduation; some have discovered information about their own family members who served, a rewarding experience for everyone involved.

“One thing that really strikes me from all of this research, is that these aren't just names on a plaque,” Mr. Mercer says. “These were real people, they had real lives and families who loved them.”

“We are one of only three universities in the world that have ‘Memorial’ in their name,” Mr. Riggs adds. “This project allows us to provide information to our students and to the research community at large about who we are and why we're here—which is important because it's difficult to know where we're going, if we don't know where we've been.”

STEPS IN THE RIGHT DIRECTION

DR. PATRICIA CANNING

Faculty of Education /
Faculty of Science

LYNN FRIZZELL

Faculty of Science

SARAH HOPKINS

Faculty of Education

FUNDER

Medavie Health Foundation

When “adult onset diabetes” starts showing up in adolescents and children, what do we do? Faculty member Dr. Patricia Canning, project director Lynn Frizzell and community partner Melissa Blake, director of the Gander Bay Area Family Resource Centre, got together and developed HealthSTEPS, a six-week program to help parents provide healthy eating and activity environments for their young children.

Dr. Canning, a professor in education and psychology, and her research team, which also included graduate student assistant Sarah Hopkins, worked together with parents, communities and Family Resource Centres (FRCs) across the province to develop this hands-on program, which is the culmination of 10 years of work in child health and development. The program offers practical solutions to parents, from healthy cooking skills and packing lunches, to understanding portion size and setting screen-time guidelines.

Collaboration has been key. “Parents were consulted throughout this process,” Ms. Frizzell explains. “The program took shape based on their feedback, so we knew we were developing HealthSTEPS in a way that was acceptable and useful to parents. While we incorporated what research—our own and others’—is telling us about what parents need to know, we weren’t just coming in and telling them what to do.”

The team also stresses the value of strong community partnerships. Community partners such as FRCs have made this program possible. With funding from the Medavie Health Foundation, the program has been developed to adapt to rural and urban community needs, and it is through FRCs in the province and across the country that a program like HealthSTEPS will be able to have national reach and long-term sustainability.

“The ultimate long-term goal for this project is to ensure that we have children growing up to be healthy,” Dr. Canning says. “It is much easier to talk about healthy weight and to help families establish healthy habits right from the start—prevention is always better.”

SMOKE ON THE WATER

**MARK WAREHAM
& JOHN TUCKER**
Marine Institute

STUDENTS
JORDAN HARRIS
JUSTINA KEARLY
STEPHEN QUANN
JAY BABSTOCK

FUNDER

Marine Institute

A group of Memorial University students are set to help the shipping industry get a little greener, inspired by the Technical Projects course offered at the Marine Institute's School of Maritime Studies. Under the direction of Marine Institute faculty members Mark Wareham and John Tucker, four senior Marine Engineering students—Jordan Harris, Justina Kearly, Stephen Quann, and Jay Babstock—are designing and building a series of exhaust gas scrubbers, tools used to remove impurities in diesel engine exhausts.

The international community has become increasingly concerned about the environmental consequences of these harmful exhaust emissions. As a result the International Maritime Organization and Transport Canada are implementing new regulations that will require vessel owners and operators to use cleaner, greener technologies.

Recognizing the importance of environmental stewardship, as well as the monetary costs of implementing new technologies, the students will create an index to rate the performance and efficiency of the scrubbers they test. This index can then be used by shipping companies to help them choose the best technology for their vessels based on factors such as scrubbing performance, impacts on engine efficiency and implementation and maintenance costs.

Mr. Tucker and Mr. Wareham see this project as both contributing to the environmental health of our oceans, as well as being an excellent learning opportunity for their students. "The Marine Institute has an interest in green shipping," Mr. Tucker notes. "This is a technology that the students work with currently and it's also something that almost every ship is going have in the near future due to changes in the international laws governing shipping. One of the primary aims of the School of Maritime Studies is to train the people who go out and work on these vessels and who develop these vessels. These are exactly the people who will be doing this as a vocation when they graduate from our programs."

SHELF LIFE

DR. JOHN-MICHAEL GAMBLE
School of Pharmacy

Drug research doesn't end after Health Canada gives pharmacies the go-ahead to stock their shelves. And with the plethora of pills that saturate the pharmaceutical sales industry, it's difficult to know which choice is best.

FUNDERS

Heart and Stroke Foundation
of Canada

Research and Development
Corporation (RDC)

Canadian Institutes
of Health Research (CIHR)

Canadian Diabetes
Association

To help patients, clinicians and pharmacists make the best choice possible, Dr. John-Michael Gamble, an assistant professor, pharmacist and pharmacoepidemiologist with Memorial's School of Pharmacy, is collaborating with researchers from across the country to investigate the post-marketing safety and effectiveness of medications used to treat type 2 diabetes. This new research initiative is supported by the Heart and Stroke Foundation of Canada, the Research and Development Corporation of Newfoundland and Labrador (RDC), and the Canadian Institutes of Health Research (CIHR).

"Although medications are studied extensively before they hit pharmacy shelves, there are inherent limitations in pre-approval studies," explains Dr. Gamble, who holds a New Investigator Award in Drug Safety and Effectiveness from the CIHR and a Clinician Scientist Award from the Canadian Diabetes Association. "Specifically, those trials are often of short duration and don't capture the long-term effects of medications. They also have a limited number of participants and are not able to precisely measure uncommon, adverse side effects."

Thus the chance of rare adverse side effects, and conversely, the potential long-term benefits of certain medications are largely unknown.

Dr. Gamble and his research team, which includes faculty members and student trainees, are working to identify evidence gaps and to fill those gaps by studying traditional type 2 diabetes treatments, such as insulin injections, as well as emerging treatments like incretin-based medications. Given that Newfoundland and Labrador has the highest rate of type 2 diabetes in Canada, these findings will be particularly applicable to the residents of this province.

"Information obtained from this study will provide front-line pharmacists and physicians with high-level evidence on the use of treatments for type 2 diabetes," Dr. Gamble adds. "Our aim is to directly impact health policy and patient care."

KIDS SAY THE DARNDEST THINGS

KIRK LUTHER
Faculty of Science

When a crime is committed, eyewitness and victim testimony can be crucial for the delivery of justice. But what happens when the eyewitness or victim is a child?

SUPERVISOR
DR. BRENT SNOOK
Department of Psychology

Legal practitioners once thought that children were incapable of offering sound eyewitness testimony. We now know that very young children are able to provide a great deal of information and they can be quite accurate; however, a key factor in a child's recall ability is how they are interviewed by police officers, social workers and other professionals.

FUNDER

SSHRC

For his doctoral work in forensic psychology, Kirk Luther, working with Dr. Brent Snook, a professor in the Department of Psychology, has conducted a systematic evaluation of transcripts of police interviews with child witnesses and alleged victims. His research findings show that police officers do not always follow best practices when interviewing children, a situation that may narrow the scope of an investigation by limiting the information elicited from the child or even tainting the child's memory.

Mr. Luther's cutting-edge research has garnered national and international media attention and numerous awards. His doctoral work is funded by the Social Sciences and Humanities Research Council (SSHRC), he is the recent recipient of the 2014 SSHRC Impact Talent Award and he took top prize at both the local and regional Three-Minute Thesis (3MT) competitions, winning the People's Choice Award at the national 3MT competition.

"Our research here at Memorial helps us to understand the way the world works and to improve the procedures and practices of the world around us," Mr. Luther says. "There's a lack of training provided to police officers across the country on how to properly interview child witnesses and victims. This research project actively engages academics and professionals and will supply information to policy makers and police organizations so they can make the necessary changes to provide police officers with proper training and minimize miscarriages of justice."

IT'S IN THE CARDS

EARL WALKER

School of Human Kinetics
and Recreation

SUPERVISORS

DR. T. A. LOEFFLER &

DR. ANNE-MARIE SULLIVAN

School of Human Kinetics
and Recreation

In today's stress-riddled world, the importance of leisure cannot be underestimated. Earl Walker, a recent graduate of Memorial University, is serious about leisure. As a master's student in the School of Human Kinetics and Recreation, he completed an ethnographic study of a group of players of the trading card game Magic: The Gathering and asked, does participation in fantasy-based games qualify as serious leisure?

"Serious leisure is a way of classifying leisure behaviour for individuals," Mr. Walker explains. "The classification ranges from casual participation, which is what most of us do for leisure on a daily basis, up to serious leisure, where people are so involved in their leisure activity that it becomes almost like a non-paid career. They become so involved, so engrossed that in some cases it consumes their lives."

"One of the significant findings of this research was that for participants in this study, Magic: The Gathering wasn't just a card game, but in many cases was a source of personal and social identity. The game acted as a source of expression, of interaction, of developing friendships and was most definitely a form of serious leisure."

With more than 12 million Magic players worldwide, it would seem that many people take this type of leisure seriously.

Mr. Walker, who also completed his bachelor of recreation (honours) at Memorial University, is currently pursuing a PhD in recreation & leisure studies in the Faculty of Applied Health Sciences at the University of Waterloo. And while a fantasy-based trading card game may seem like an unusual topic for a student of human kinetics and recreation, Mr. Walker's research helps to provide a contextualized understanding of leisure and its place in our lives.

"Developing a better understanding of this particular leisure activity will help us so much in the future when it comes to delivery of recreation and leisure services." Mr. Walker explains. "From a community perspective or even a therapeutic perspective, it's about understanding what these leisure activities mean to people so that we can better serve them in the future."

FINANCIALS

TOTAL RESEARCH FUNDING 2002/03 – 2013/14

YEAR	DOLLAR AMOUNT
2002/03	\$51,079,000
2003/04	\$73,935,000
2004/05	\$81,610,000
2005/06	\$90,177,000
2006/07	\$88,774,000
2007/08	\$87,128,000
2008/09	\$90,196,000
2009/10	\$90,674,000
2010/11	\$97,871,000
2011/12	\$110,005,000
2012/13	\$101,461,000
2013/14	\$91,612,000

FINANCIALS

EXTERNAL RESEARCH SUPPORT BY TYPE 2013/14

TYPE	DOLLAR AMOUNT	PERCENTAGE
Chairs	\$2,445,267	3%
Council Partnerships	\$1,750,147	2%
Infrastructure	\$17,040,412	19%
Operating Contract	\$35,501,204	38%
Operating Grant	\$31,182,330	34%
Research Personnel	\$2,978,219	3%
Other*	\$714,652	1%

* Other includes conferences/workshops/symposia, equipment, general support grants, publications, travel and other.

FINANCIALS

RESEARCH SUPPORT BY FEDERAL GRANTING COUNCILS 2002/3 – 2013/14

YEAR	DOLLAR AMOUNT			
	NSERC ¹	SSHRC ²	CIHR ³	OTHER*
2002/03	\$6,540,000	\$1,657,000	\$4,183,000	\$6,510,000
2003/04	\$7,638,000	\$1,903,000	\$4,409,000	\$10,369,000
2004/05	\$7,836,000	\$1,706,000	\$5,054,000	\$8,994,000
2005/06	\$8,478,000	\$2,590,000	\$5,348,000	\$11,403,000
2006/07	\$7,995,000	\$2,497,000	\$5,039,000	\$9,326,000
2007/08	\$8,213,000	\$2,517,000	\$4,815,000	\$10,041,000
2008/09	\$10,044,000	\$3,324,000	\$4,236,000	\$10,449,000
2009/10	\$11,074,000	\$3,153,000	\$4,354,000	\$10,470,000
2010/11	\$10,420,000	\$3,604,000	\$4,505,000	\$8,717,000
2011/12	\$9,860,000	\$3,970,000	\$3,881,000	\$8,341,000
2012/13	\$7,755,000	\$3,307,000	\$4,227,000	\$10,297,000
2013/14**	\$7,458,000	\$3,604,000	\$4,372,000	\$5,600,000

¹ **NSERC:** Natural Sciences and Engineering Research Council of Canada

² **SSHRC:** Social Sciences and Humanities Research Council

³ **CIHR:** Canadian Institutes of Health Research

* **Other:** includes Networks of Centres of Excellence, Canada Research Chair and Canada Foundation for Innovation.

** **2013/14 total:** \$21,032,438

FINANCIALS

EXTERNAL RESEARCH SUPPORT 2002/3 – 2013/14

	DOLLAR AMOUNT				
YEAR	FED. GOVT. ¹	PROV. GOVT. ²	BUSINESS	NON-PROFIT	OTHER*
2002/03	\$30,577,000	\$2,754,000	\$13,265,000	\$4,196,000	\$287,000
2003/04	\$46,098,000	\$1,617,000	\$20,386,000	\$5,202,000	\$633,000
2004/05	\$46,391,000	\$5,289,000	\$24,190,000	\$4,884,000	\$856,000
2005/06	\$50,858,000	\$4,287,000	\$27,577,000	\$6,443,000	\$951,000
2006/07	\$47,129,000	\$8,953,000	\$20,713,000	\$10,975,000	\$1,005,000
2007/08	\$51,260,000	\$6,876,000	\$18,686,000	\$8,962,000	\$1,344,000
2008/09	\$49,351,000	\$8,916,000	\$19,966,000	\$9,833,000	\$2,129,000
2009/10	\$49,930,000	\$10,389,000	\$20,580,000	\$9,018,000	\$756,000
2010/11	\$44,976,000	\$22,605,000	\$22,793,000	\$6,963,000	\$534,000
2011/12	\$46,332,000	\$29,245,000	\$26,474,000	\$7,353,000	\$601,000
2012/13	\$47,814,000	\$25,968,000	\$21,995,000	\$5,263,000	\$421,000
2013/14	\$40,729,000	\$17,202,000	\$28,211,000	\$5,263,000	\$205,000

¹ **Federal Government:** Includes Granting Councils

² **Provincial Government:** Newfoundland & Labrador

* **Other:** includes individual, provincial government (not NL), U.S. government and other.

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