FOREWORD

Do unto others.

Those iconic words—the Golden Rule—hung on the wall of Dr. Richard Marceau’s office as a daily reminder of how he approached life and work. Richard wanted the best for friends and colleagues. He also wanted the best for Memorial and Newfoundland and Labrador.

In the three years he spent at our university, Richard touched and inspired many people at Memorial and in our wider community. His positive impact will be felt for years to come.

Always generous with his time, Richard was passionate about the critical role Memorial’s research—across all disciplines—plays in increasing our understanding of important issues, in addressing opportunities and challenges, and in strengthening Newfoundland and Labrador.

This report captures our university’s diverse research activities covering the period of 2014–2016, during which—under Richard’s leadership—we focused on intensifying our strategic research efforts.

Research Infosource recently released new rankings for Memorial, noting our research growth in various areas. We place second among Canada’s medical/doctoral universities for research income growth from 2001–2015, an increase of 204.6%. Richard would have been delighted with that news and our progress.

Memorial is a better university because of Dr. Richard Marceau. This report is a tribute to his vision and achievements.

Richard was a valued colleague and friend and he is certainly missed.

— Dr. Ray Gosine, Vice-President (Research) Pro Tempore
Oct. 28, 2016
GREETING FROM THE VICE-PRESIDENT (RESEARCH)

September, 2016

From a modest start nearly seven decades ago to multi-disciplinary, multi-national, multi-million dollar collaborations, Memorial University’s commitment to research excellence has been unwavering.

As Newfoundland and Labrador’s university, we have a special obligation to the people of our province—a commitment that’s exemplified through the visionary work of our faculty, staff and students.

Two years ago, the Board of Regents approved our Strategic Research Intensity Plan (SRIP), a roadmap that builds on our institutional Research Strategy Framework supporting Memorial’s vision “…to be one of the most distinguished public universities in Canada and beyond…” by 2020.

We’re well underway to meeting that goal.

MAKING A DIFFERENCE

SRIP is working. Since its launch, funding from Tri-Agency competitions has increased; graduate programming has expanded; and investments for critical infrastructure have surged. We have streamlined processes and renewed models of customer service, which are key research enablers; and there are now more specialized researchers conducting more specialized research.

On each of our campuses, in every discipline, school and faculty, researchers share a common goal: to make a difference.

Whether that’s empowering the next generation, saving lives, advancing knowledge or creating new technologies, we’re lucky to have such passionate creators, inventors and critical thinkers here at Memorial.

Through the ongoing, and increasingly important, support of our funding partners and collaborators, the impact of Memorial’s research is being felt throughout our province and around the world like never before. And, the best is yet to come!

Warm regards,
Richard J. Marceau
Vice-President (Research)
# RESEARCH PROJECTS

FROM THE GROUND UP  
DR. ADRIAN UNC  

SENIORS HELPING SENIORS  
DR. CAROLINE PORG & DR. LAN GREN  

PUSHING THE POINT  
DR. CHRISTOPHER SMITH  

MUSIC OF THE HEART  
DR. JANE GOSINE  

CONFIDENCE BUILDERS  
DR. KAREN GOODNOUGH  

BLOWIN' IN THE WIND  
DR. KEVIN POPE  

A FIGHTING CHANCE  
DR. LALEH ALISARAEI  

PEERING INTO THE PAST  
DR. MEGHAN BURCHELL  

ALL IN THE FAMILY  
DR. PATRICK PARFREY  

NON-NATIVE WILDLIFE INVASION  
DR. SHAUN LEROUX  

WASTE NOT, WANT NOT  
DR. JOINAL ABEDIN  

IMPROVING SAFETY AT SEA  
ROBERT BROWN  

BANKING ON BRIGHTER FUTURES  
DR. TOM COOPER  

WORLD OF WELLNESS  
SCHOOL OF HKR

# ADDITIONAL INFORMATION

FROM THE PAST YEAR  
OTHER STORIES  

2014–16 REPORTS  
FINANCIALS  

INVOLVED PARTIES  
CREDITS
Researchers are starting from the ground up to understand Newfoundland's boreal forest soil and how farmers can turn that land into productive agricultural acreage.

Dr. Adrian Unc, associate professor of soil science with Grenfell Campus's Boreal Ecosystem Research Initiative and its Environmental Science Program, says without a clear understanding of the fertility of the island's unique boreal forest soil, farmers won't be able to efficiently fertilize their land.

He’s working with researchers at Memorial, graduate students in Grenfell's new master of science program in boreal ecosystems and agricultural sciences, as well as the provincial and federal governments.

“Everything starts and ends with the soil.”
– Dr. Adrian Unc

With every soil sample, Dr. Unc is finding the soil systems are more complex than he expected. In other parts of the world, efforts to ensure soil fertility target the top four to 10 inches of earth. However, using these traditional management systems might not work for Newfoundland’s unique soil.

It’s still a working hypothesis, but Dr. Unc believes deeper layers of soil have a greater impact on the biology and biochemistry of the top layer. So, managing only the top layer of soil may not work here—meaning researchers need to develop new management practices specifically for Newfoundland that account for the particularities of soil layers a little deeper into the earth.

And the work doesn’t end there.

The province also faces the challenge of developing infrastructure to enable the smooth transfer of information among agriculture researchers in both the provincial government and Memorial.

Dr. Unc and his team are trying to identify the best research while at the same time create an infrastructure that does not exist—yet.

FUNDER
• Research & Development Corporation of Newfoundland and Labrador

SPECIAL THANKS
• Nagels Hill Agri-Products

Return to table of contents
Seniors liked the idea of sharing expert information with one another. As a result, the team is working with the Centre for Innovation in Teaching and Learning to provide tailored dietary advice to rural diabetic seniors through a series of easy-to-access videos.

COLLABORATIVE APPROACH
These videos and lesson plans will offer clear and relatable advice from other seniors, dietitians and the Canadian Diabetes Association. The team is also collaborating with the Seniors Resource Centre, folklorists and even a linguistics expert to ensure that Newfoundland and Labrador's dialect and culture are captured and represented accurately.

Bridging the gap for seniors between diets and dialects, diabetes self-management and accurate information, and healthy foods and traditional dishes won’t be easy, but it’s a feat this team hopes will become a little less challenging thanks in part to their research project.

While many seniors living with diabetes express an interest in changing their diets to improve their health, most don’t know where to start.

Drs. Caroline Porr and Lan Gien from the School of Nursing and their team want to change that.

MANAGING DIABETES
They're working on a research project that aims to clarify dietary information and make it more accessible to seniors attempting to better manage their diabetes in rural Newfoundland and Labrador.

Research shows that seniors have a hard time changing their diet because the educational materials they receive don’t relate well to their traditional foods. Some of the Newfoundland and Labrador dishes seniors have enjoyed throughout their lives are precluded or should be consumed in moderation. Foods that are approved for everyday consumption tend to be too expensive or inaccessible for most seniors living in the province.

FOCUSBING ON PRACTICAL ADVICE
The team held a research focus group in Conception Bay North to find out what types of information seniors thought they needed to better manage their diabetes. Most notably they wanted to know what kind of foods they should eat and if the recommended foods could be bought at the local grocery.

“Considering the province has one of the highest rates of diabetes in Canada, it’s critically important we promote self-management.” – Dr. Caroline Porr

Drs. Porr and Gien and the team then explored with seniors how information could best be communicated. Most seniors rely heavily on advice from friends and family for information, whether out of trust or due to literacy barriers.

Seniors helping seniors

DR. CAROLINE PORR & DR. LAN GIEN

Collaborative approach brings dietary advice to seniors living with diabetes in rural N.L.

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Newfoundland and Labrador has a lot of catching up to do when it comes to developing harm reduction policies and programs, as well as carrying out critical drugs studies research involving people who use substances.

Dr. Christopher Smith, assistant professor in the School of Social Work, aims to change that with a new Research Exchange Group he founded through the Newfoundland and Labrador Centre for Applied Health Research that began meeting in July 2015.

The interdisciplinary, inter-sectoral, user-centred group is helping identify policy-relevant research priorities related to substance use, harm reduction and addiction treatment services across Newfoundland and Labrador.

The group consists of academics, policy-makers, front-line public health service providers and people with direct experience of substance use, past or present.

MEANINGFUL IMPACT
Dr. Smith’s policy-driven scholarship seeks to make a meaningful impact on the every day lives of people who use drugs, with the hope of situating Newfoundland and Labrador as a Canadian leader in harm reduction practice and drug policy reform.

His primary goal is to ensure those who use drugs are involved in research and policy-making.

“There is no precedent for a group of this nature in Newfoundland and Labrador.” – Dr. Christopher Smith

CONDUCTING NEEDS ASSESSMENT
Dr. Smith has assembled a large multidisciplinary research team, including researchers from the Faculty of Medicine, School of Nursing and School of Social Work, and has met a multitude of community partners. These include Eastern Health, the Department of Health and Community Services, THRIVE, Street Reach, Choices for Youth, Stella’s Circle, the Safe Harbour Outreach Project and the AIDS Committee of Newfoundland and Labrador, which will serve as the primary project partner.

The team is conducting a needs assessment of injection drug users in the greater St. John's region. Dr. Smith says data collected as part of this large-scale, community engagement assessment would be useful for the development of new harm reduction programs.

The second project involves the development of a “peer training” program that will enable people with lived experience of substance use to become actively involved in the provision of harm reduction services, and, eventually, other aspects of harm reduction policy and practice such as outreach, research, evaluation and policy development/implementation.

SAVING LIVES
There’s plenty of work to do. But Dr. Smith’s goal is the creation of an independent, user-run, user-led organization in St. John’s that will serve as a source of empowerment among people who use drugs. Currently there’s no such organization in this region of Canada.

The intent is to create opportunities for past or present people who use drugs to train researchers, policy-makers and front-line social service providers and, in turn, help save lives.

Since January 2016, Dr. Smith has published two books related to his research: Addiction, Modernity, and the City: A Users’ Guide to Urban Space and Critical Approaches to Harm Reduction: Conflict, Institutionalization, (De-)Politicization, and Direct Action, which he co-edited with Zack Marshall, a Canadian Institutes of Health Research Fellow and doctoral candidate in the Division of Community Health and Humanities in the Faculty of Medicine. Dr. Smith wrote the book’s preface and contributed one of the 11 chapters, which includes contributions from leading researchers in the fields of public health, history, epidemiology and sociology from areas including Canada, the United States and Portugal.
Researchers explore social, expressive and cultural benefits of community music therapy

Music has the power to energize, calm or evoke intense emotional responses.

It’s been said that music can be far more powerful than language as it can help individuals with disabilities overcome communication barriers. For Dr. Jane Gosine of the School of Music, that’s the kind of experience she searches for in her research.

As a result of volunteering with Easter Seals Newfoundland and Labrador, Dr. Gosine embarked on a three-year research project. The goal was to examine the benefits of music therapy on teens and young adults primarily with a diagnosis of cerebral palsy. She collaborated with Deborah Hawksley and Susan LeMessurier Quinn, accredited music therapists and professional associates in the School of Music.

BUILDING A SENSE OF COMMUNITY

Music therapists take an eclectic approach to developing both a musical and therapeutic relationship with their clients. They utilize therapeutic interventions such as improvisation, song writing, vocalization, movement to music, music listening and lyric analysis to promote physical, social, emotional and spiritual health.

The project examined how music therapy and collaboration with well-known local musicians, such as Kellie Walsh, Kellie Loder, Whitney Rowe, Ashelin and Séan McCann, could increase participants’ self-confidence, communication skills and sense of community.

“One thing clearly evident was that participants used music as a form of communication or a form of expression. Considering some of the individuals in the group were non-verbal or experienced severe limitations to how they could move or perform with instruments, this finding was significant. The desire to participate with the group motivated and enabled participants to overcome some of their everyday challenges to perform.” — Dr. Jane Gosine

INTERNATIONAL COLLABORATION

The research benefited from collaboration with Dr. Leonard Lye and students from the Faculty of Engineering and Applied Science, who built a special guitar stand to allow greater independence for group members with limited mobility. It also led to an international collaboration in the United Kingdom with music therapist Ray Travasso who works with the East Anglia Children’s Hospices and its Treehouse Choir. The project is examining how singing together can build a sense of community and contribute to increased well-being for the choir’s participants.

Through her research, Dr. Gosine has seen how music can promote inclusion and create a sense of community and belonging—an experience that has left a profound impression on her—one she’ll carry through with her into future research projects.

FUNDERS

• Social Sciences and Humanities Research Council of Canada/Vice-President’s Research Grants Program

COLLABORATORS

• Music Therapists Deborah Hawksley and Susan LeMessurier Quinn
• Dr. Leonard Lye and students from the Faculty of Engineering and Applied Science

PARTNERS

• Easter Seals Newfoundland and Labrador
• East Anglia Children’s Hospice (EACH) Treehouse Choir
All across the province, the classroom setting where children sit attentively in their seats is quickly becoming a thing of the past. Traditional learning methods are being disrupted; students are bustling about the classroom and teachers are enjoying every minute of it.

While it may sound chaotic, it’s exactly what many teachers are relying on to teach subjects like science, technology, engineering and mathematics (STEM). Dr. Karen Goodnough, a researcher in the Faculty of Education, says not all primary/elementary teachers feel confident teaching STEM subjects and are open to trying new methods.

NEW STYLE OF TEACHING
With increasing demands, teachers find it hard to stay up-to-date on STEM subjects. Some are not specialists in STEM subjects; others may not have the tools or know where to start; while others lack the resources, time or opportunity. Often it requires embracing a new style of teaching to better inform and instruct students in these subjects.

Dr. Goodnough and her team lead The Memorial University/Hibernia STEM Teacher Inquiry Program, a project funded by the Hibernia Management and Development Company Ltd. Each year they help between 60-80 teachers build confidence through inquiry-based classroom practices in STEM subjects.

“This program is not just about engaging students and getting them excited about the material they are learning but it’s also about teachers gaining confidence in what they’re teaching.”
– Dr. Karen Goodnough

What this looks like in the everyday classroom is often the introduction of new tools or new teaching styles to capture students’ attention and help them better understand the material.

INTERACTIVITY KEY TO LEARNING
Some classrooms incorporate iPads as a new means of interacting with subject content. Others have explored video games or computer coding to teach children about building models, programs or applications. Some teachers ask students to review teacher-made videos before class, while other teachers eschew the traditional desk and chair arrangement in favor of a more fluid and active learning spaces.

Interactivity is key. Children collaborate via whiteboards and observe how other children approach problem solving. They write. They ask questions. They are active and engaged. These new tools and teaching approaches enable students to learn at their own pace and help make the subject matter relevant to their lives.

ENHANCING TEACHER EXPERIENCES
Dr. Goodnough and her research team are in constant contact with teachers, providing support. For their part, the teachers are committed to intensive learning; they re-group with the research team and other educators, sharing their experiences and ideas for the classroom. In the end, it’s all about enhancing the experience for teachers and helping foster student success.

The program is headed into its third year with no signs of slowing down. Learn more about the program online.
All across the world, energy demands are at an all-time high. This global issue is complex—no two regions are exactly alike and each faces a unique challenge. Managing the global energy crisis requires some mass-scale creative problem solving.

Dr. Kevin Pope, an expert in thermo-fluids and renewable energy in the Faculty of Engineering and Applied Science, and his team of graduate students have joined the global brigade by helping small, remote communities in Newfoundland and Labrador lessen their dependence on diesel-generated power by utilizing readily available natural resources to create renewable energy.

“This is one of the first projects in the world to integrate generation from wind, hydrogen and diesel in an isolated electricity system.” – Dr. Kevin Pope

**HOME COURT ADVANTAGE**

As an island in the Atlantic Ocean, positioned at the crossroads of the Labrador and Gulf currents, Newfoundland receives plenty of wind. In fact, the onshore gales of the province have the highest wind velocity of any in Canada. While this can be troubling for many other industries, it's an advantage for the energy sector.

Dr. Pope and his engineering research team are assisting Nalcor Energy in its integration of wind turbines and hydrogen equipment with the existing diesel generators in Ramea, a small remote community on the south coast of the island. The turbines support the community’s electrical grid during high-load periods. When the load is low the wind energy is used to produce hydrogen gas that is then converted back to electricity through a hydrogen-fuelled generator. This helps support the community when wind speeds are too low to operate the turbines.

**SEARCHING FOR NEW SOLUTIONS**

High precipitation and ice accretion, unsteady wind conditions and limited accessibility are the main barriers the province faces in creating a reliable wind power development. Using data collected in their research, Dr. Pope and his team tackle these challenges by proposing new solutions for site selection, improving performance and energy storage technologies.

Nalcor Energy says the project at Ramea is one of the first in the world to integrate wind, hydrogen and diesel generation into one isolated electrical system. They've documented an average reduction in Ramea's diesel fuel usage by approximately 18 per cent annually. That's essentially 710 less tonnes of greenhouse gas emissions and a reduction of 190,000 litres of diesel every year.

Dr. Pope recognizes that the solutions he and his team create for Ramea could have a global impact if utilized in other similar regions throughout the world. This capacity to make an impact is the motivation that drives the team to continually overcome the challenges they face in their work.

**FUNDER**

- Research & Development Corporation of Newfoundland and Labrador

**PARTNER**

- Nalcor Energy, with funding from the Atlantic Canada Opportunities Agency
A fighting chance

DR. LALEH ALISARAIE

It’s a small step in the right direction and one that could have a big impact, giving fresh hope to some of the most vulnerable.

Cystic fibrosis (CF) is the most common fatal genetic disease affecting children and young adults in Canada. For those living with it, every day can be a battle to breathe comfortably. Symptoms vary, but more importantly, there’s still no known cure.

Dr. Laleh Alisaraie wants to change that. She would like to give those living with CF—particularly infants—the fighting chance they deserve to live longer, healthier lives.

HEALTH-RELATED RESEARCH

CF is caused by a mutation in a gene affecting the movement of salt in and out of cells. The result is salty sweat, plus thick mucus, that can obstruct the lungs and making it hard to breathe. CF knows no limits; it can also affect the pancreas, liver and kidneys. Dr. Alisaraie is leading a new research study in the School of Pharmacy with the long-term goal of developing drugs for infants diagnosed with CF. Effective treatments at an early stage would help prevent organ damage, allowing more babies to survive.

“My hope is that our research effort brings us to a point that we find an effective and affordable cure for CF patients that also improves their quality of life.” – Dr. Laleh Alisaraie

Utilizing computer calculations and molecular modelling simulations, Dr. Alisaraie hopes to better understand why CF occurs in the first place.

MENTORING NEXT GENERATION

Not only is she advancing CF research, Dr. Alisaraie is also motivating a new generation of researchers. One such researcher is Blake Power, an undergraduate student in the Department of Chemistry, Faculty of Science. He received funding from the University Student Summer Internship Program (USSIP) and the Memorial Undergraduate Career Experience Program (MUCEP) to work with Dr. Alisaraie. Both programs are net gains of Memorial’s Strategic Research Intensity Plan, which is structured to strengthen research at Memorial on all levels.

CHALLENGING BUT CRITICAL

Dr. Alisaraie’s team is made up of scientists and collaborators, such as Dr. John Hawboldt, a pharmacist clinician with the School of Pharmacy. The team’s next step is to design drugs based on the knowledge gained from their research. The goal is ambitious and challenging, but a critical one.

Current disease modifying therapy for CF is restricted to two expensive medications. Their research—and potential subsequent breakthroughs—would help put Memorial on the map and hopefully develop novel medications that will allow greater patient access to state-of-the-art therapy and a cure for the troubling disease.

FUNDER

• Memorial University of Newfoundland

COLLABORATOR

• Dr. John Hawboldt, School of Pharmacy

STUDENT

• Blake Power, undergraduate, Department of Chemistry, Faculty of Science
You’ve probably heard of people reading used tea leaves to predict the future, but one Memorial researcher is using seashells to peer into the past.

Dr. Meghan Burchell, an environmental archaeologist with the Faculty of Humanities and Social Sciences, is examining shell middens in British Columbia, which are essentially large deposits of shells created by the harvesting, consumption and disposal of shellfish. Some of these shell middens date back thousands of years.

The first to integrate the biology and chemistry of shells into archaeological interpretation, Dr. Burchell is using shells to build a precise environmental and cultural record to interpret how people lived and interacted with the environment thousands of years ago. With a PhD in anthropology—and trained in archaeology and earth sciences—she’s curious about the strategies these people employed in times of environmental and ecological change.

“I’m trained in anthropological archaeology, so my questions always circle back to the people.”
– Dr. Meghan Burchell

She uses the example of the decline of the salmon industry between 2,000-4,000 years ago on the central coast of British Columbia. The salmon disappeared from the archaeological record, only to reappear later on. She examines shells from that period to see if there’s environmental change in their chemistry, which would impact salmon—and other fish—populations.

A typical research mission involves collecting living and archaeological shells and analyzing their micro-structure, daily growth lines and shell chemistry. Dr. Burchell performs this analysis with a custom-designed microscope with a mounted drill and a precision saw, among other instruments.

Just as trees lines record a tree’s life, shell lines do the same for shellfish. Shell midden sites that have built up by people over thousands of years provide considerable information about the environment, like water temperature and salinity.

With a team of undergraduates and one master’s student in the areas of archaeology and engineering, Dr. Burchell is able to get an incredibly precise sea surface reconstruction and seasonal data from shells. This data denotes climatic and environmental change and can provide archaeologists perspective as to how and why people made the decisions they did in the past.

“Using biology and chemistry of shells for archaeological interpretation”

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Just as trees lines record a tree’s life, shell lines do the same for shellfish. Shell midden sites that have built up by people over thousands of years provide considerable information about the environment, like water temperature and salinity.
Newfoundland and Labrador has the highest incidence of familial colon cancer in the world.

Having the highest rate of all colorectal cancers in Canada, a person from Newfoundland and Labrador has a 30 per cent higher risk of contracting the disease and of dying from it than someone from Ontario.

While diet plays a role in the prevalence of colorectal cancer, the high frequency by which Newfoundlanders and Labradorians contract the disease led some researchers at Memorial, including Dr. Patrick Parfrey of the Faculty of Medicine, to believe there’s something bigger at play.

“If you can assure people who have a big family history of colon cancer that they don’t have the gene mutation and enrol those that do in screening programs, you can significantly improve their health outcomes.”
– Dr. Patrick Parfrey

INTERNATIONAL COLLABORATION

Genes determine many of your traits such as your eye color, hair type or if you’ll have dimples. It may also play a role in whether or not you’re at risk for colon cancer. Dr. Parfrey and his team are investigating which genetic factors predisposing to this deadly disease make its occurrence so prevalent in Newfoundland and Labrador and whether that knowledge can play a role in preventing the cancer.

In collaboration with the University of Toronto and with international consortia, the multidisciplinary project has integrated input from molecular biologists, molecular geneticists, pathologists, clinical geneticists, surgeons, clinical epidemiologists, qualitative researchers, data management and health policy experts. The project enrolled 750 consecutive incident patients from the population in the Newfoundland Familial Colorectal Cancer Registry to collect data on family history, epidemiology, diet, tumour pathology and genes.

The work has yielded many insights that helped form the Familial Colorectal Cancer Clinic in 2010. Participants from Central and Eastern Newfoundland had their family risk assessed to recommend colonoscopy screening frequency, among other lifesaving information.

HUNT FOR KNOWLEDGE

During the last 15 years, the project has identified that the high rate of familial cancer was not the result of a high penetrance (inherited mutations causing susceptibility to cancer) but perhaps a missing hereditability yet to be discovered.

Now with further funding, the team is preparing to develop a genetic mutation panel to hold all known mutations that cause familial colorectal cancer in the province. What started as a mission to identify the genetic cause of colon cancer has since become a hunt for the gene mutations responsible.

It’s worth noting that in addition to potentially saving lives and improving health outcomes for people around the world, the project is also providing invaluable experience for students who’ll pave the way for future genetic discoveries.
Newfoundland and Labrador is a hot-spot for visitors but a research team has uncovered just how popular the island portion of the province is for non-native terrestrial mammals. The Rock—as it turns out—is so popular that almost half of the terrestrial mammals living there come from away.

Understanding the island’s community of terrestrial mammals, both native and non-native, and their impacts, is the topic of Dr. Shawn Leroux’s collaborative research project with Memorial alumnus and current biology PhD student Justin Strong. Dr. Leroux is an assistant professor in the Department of Biology.

Not much is known about the relationships among different terrestrial mammal species or the impact of non-native mammals on the island’s terrestrial mammal food web.

**FIRST-EVER TERRESTRIAL MAMMAL FOOD WEB**

Using data collected from provincial documents on native and non-native terrestrial mammals, as well as consulting existing research from Memorial and beyond, the team set out to better understand when non-native terrestrial mammals appeared on the island—and ultimately the impact of their arrival over time.

Their research led to the development of the first-ever terrestrial mammal food web for the island. A food web is a map of who eats whom, which is typically gleaned from animal diet studies. The hope is that the research will help inform future resource management decisions.

“Some introduced animals, such as moose and snowshoe hare, are very important for the livelihood of Newfoundlanders, but these same species are having detrimental impacts on the island’s forest ecosystems by preventing the boreal forest from regenerating.”

– Dr. Shawn Leroux

**BIG CONSEQUENCES**

The team discovered there are some big consequences when non-native species are introduced. For a large animal with few predators—such as the mighty moose—it has had free reign over forests and it appears they are preventing the natural regeneration of boreal forest communities on the island.

The arrival of some non-native species has increased the number of prey available for predators such as the coyote, a top non-native predator, which has flourished since they first arrived on the island around 1985. The thriving coyote population could have a devastating impact on native mammals if not effectively monitored and managed.

However, the increase in prey species due to the arrival of some non-native species may have a positive impact on some terrestrial mammals previously considered endangered in Newfoundland. For example, the arrival of the southern red-backed vole to Newfoundland may be contributing to the recovery of the previously endangered and native species, American marten.

More detailed information about Dr. Leroux and Mr. Strong’s research has been published in the peer-reviewed, open access journal PLoS ONE.

**STUDENT**

- Justin Strong, PhD student

**FUNDER**

- Natural Sciences and Engineering Research Council of Canada
Waste not, want not

Dr. Joinal Abedin

Industry can save money and protect environment: soil scientist

Saving money and creating a cleaner, greener environment.

That’s the vision Dr. Joinal Abedin has for Labrador. For him, opportunities in his adopted home are as immense as the Big Land itself. The soil scientist at the Labrador Institute is heading up a new project that could dramatically change the mining industry and, in turn, help keep harmful pollutants from seeping into surface water.

LABRADOR RESOURCES
Dr. Abedin is studying the effectiveness of biochar, a centuries-old practice of turning forestry waste into a soil enhancer. With mega-projects such as the Lower Churchill hydroelectric development well underway in Central Labrador, forests are being harvested to make room for progress. He wants to see that waste wood used to produce biochar.

“The outcomes of this research could affect future generations for years to come.” – Dr. Joinal Abedin

Doing so would be beneficial to another longstanding and economic vital industry in Labrador: mining. As exploration of sulfide-bearing ore continues, waste rock turns into sulphuric acid known as acid mining drainage (AMD) when it’s combined with water and air. AMD is harmful to fish and other aquatic life.

ECONOMICAL AND SUSTAINABLE
Adding biochar to mine waste is a no-brainer, contends Dr. Abedin. If it were, it could offer an economically viable and sustainable solution for managing sulfidic mine waste, preventing Labrador’s vital and rich natural ecosystem from being contaminated.

That innovative research is important to industry—and future generations—of the Big Land.

It’s also the kind of work that defines Memorial’s leadership when it comes to world-class research addressing provincial, national and international issues.

FUNDER
• Research & Development Corporation of Newfoundland and Labrador
Every second counts when finding and rescuing an offshore worker who has accidentally entered the sea.

This fundamental truth isn’t lost on Dr. Robert Brown, a professional engineer and research scientist at the Marine Institute’s Offshore Safety and Survival Centre Research Unit. He and his team are testing personal locater beacons—devices worn by offshore workers to help locate them quickly should they find themselves in the ocean.

COMMITMENT TO SAFETY
Safety is paramount within the offshore sector. The industry is continually working to advance equipment and procedures; this research project is a testament to that commitment.

“In emergency situations at sea, every second counts.”
– Dr. Robert Brown

The devices currently used in the offshore industry are regulated to withstand harsh conditions of a maritime survival situation while still successfully transmitting a distress signal.

BASELINE RESULTS
As part of his research, Dr. Brown will perform baseline tests with the devices on special mannequins that replicate the standard height and weight of real people. Once complete, the baseline results will represent optimal performance of the locater beacons and act as a point for comparison when the team performs followup tests with the beacons in harsher offshore conditions.

In addition to the offshore industry, different beacon designs are being utilized throughout various sectors.

Dr. Brown and his colleagues aim to improve the understanding of how these devices work in realistic conditions and hope their research will provide guidance to manufacturers, regulators and industry. In the end, he hopes efforts can help improve emergency response for all people who work and play at sea.
Banking on brighter futures

DR. TOM COOPER


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DR. TOM COOPER

Financial institutions may need to adapt their approach to aboriginal entrepreneurs, researchers say

A research team in the Faculty of Business and Administration—led by Dr. Tom Cooper—is examining the unique challenges faced by Aboriginal entrepreneurs in accessing financing from mainstream banking institutions.

Research by Dr. Cooper, as well as Prof. Pauline Downer and recently retired Dr. Alex Faseruk, indicates financial institutions may need to adapt their approach in working with Aboriginal entrepreneurs and band-owned enterprises.

Dr. Cooper, who has studied Aboriginal businesses since 2007, says the credit profiles of Aboriginal business people may be very different than those of their non-Aboriginal counterparts. He notes that people living in an Aboriginal community don’t own their homes—rather, the band retains ownership. Therefore, that rules out a common financing avenue of mortgaging a home to start or expand a business.

Aboriginal business owners also face two complex taxation regimes—they’re not taxed when they sell goods and services on First Nations land, but they are taxed once they sell products or work outside their communities.

These challenges can make working for a band-owned enterprise more appealing for a young Aboriginal entrepreneur than starting a small business.

“If you look at the demographics the only growing populations of young people, especially in rural Canada, are predominantly Aboriginal … they’re looking to better their community and better themselves.” – Dr. Tom Cooper

COMPLEX CHALLENGES

Band-owned enterprises also face their own challenges. While they’re more likely to be trusted in their communities than non-Aboriginal businesses, this trust demands that the Aboriginal business align its interests with the culture and expectations of the community, or risk failure.

They may also face changes in business leadership following band council elections that are held every two years. In an earlier study of Aboriginal-owned fishing enterprises in Atlantic Canada, Dr. Cooper found this had a direct effect on the bottom line.

As it turns out, this Memorial-led research is increasingly important as more Aboriginal communities and entrepreneurs try to start more businesses with help from land-claim settlement dollars, through joint ventures or financing from mainstream banking institutions.

CREATING FUTURES

Dr. Cooper says a better understanding of Aboriginal entrepreneurs and the challenges they face can lead to better policy decisions—and it can’t come soon enough as growing Aboriginal populations in rural parts of Canada seek better economic opportunities for themselves and their communities.

COLLABORATORS

• Dr. Alex Faseruk, retired professor, Faculty of Business and Administration
• Prof. Pauline Downer, Faculty of Business and Administration

FUNDER

• Ulnooweg Development Group Inc.
World of wellness

SCHOOL OF HUMAN KINETICS AND RECREATION

Nurturing wellness in children is about more than just being physically active; it encompasses all dimensions of health: physical, mental, emotional and spiritual.

This holistic perspective shapes the work of a research project in School of Human Kinetics and Recreation that was led by Drs. Michelle Kilborn, Erin Cameron, Erin McGowan and Linda Rohr as well as graduate students John-Ray Baird and Megan Cummings.

HOLISTIC FOCUS

Their project, Healthy Active Living in Newfoundland, aims to gain a better understanding of existing provincial initiatives, programs and activities to support children and youth to be healthy and well.

The research is important. We all know the future of the province is only as healthy as the next generation.

The study reveals some interesting information regarding perceptions of healthy active living. Participants, which included stakeholders from health, education, sport and recreation communities, said that healthy active living should be holistic and focus on all dimensions of health. More collaboration from different sectors on multiple levels would help ensure a more balanced approach to promoting healthy active living for children.

The team’s research highlights the dedication of volunteers and champions that lead programs in our communities, but it has also raised some concerns about the amount of fee-based programming, which could present financial barriers for families. They also found very little evaluation is happening to assess the success and effectiveness of existing programs in communities.

PHASE 2 UNDERWAY

The project provides valuable insight into how future programs and activities could positively impact the wellness of children and youth and is essential for developing new initiatives designed to support a healthy, active provincial population. Phase 2, Healthy Active Living in Labrador, is currently underway with results expected to be released by fall 2016.

The team is hoping its research will help communities create programs that focus on shaping the “whole” child—helping support the physical, spiritual, emotional and mental health of our next generation.
Advancing ocean exploration and discovery
Historic investment creates ocean frontier institute

Investing in infrastructure
Government of Canada invests more than $14 million in Memorial

Economic asset
More than $1.6 million in federal-provincial funding for Genesis Centre

Turning heads
Genesis Centre graduate making waves on international stage

Street legal
Improving young people’s understanding of legal rights

Circle of conversation
Memorial partners with Nunatsiavut Government to protect, preserve and revitalize Labrador Inuit culture and language

Grand slam
Four new Canada Research Chairs named

Behind bars
PhD researcher examining effects of prison life post-incarceration

Protecting Canada’s resources
More than $6.5 million for Memorial-led natural resources research

Thinking big
Terra Nova Young Innovator Award for Earth Sciences professor

Cultural renaissance
New generation of Aboriginal Peoples reclaiming identities

Sound investment
Memorial-led hearing loss research focus of R&D centre in Central N.L.

Improving outcomes
New research examines experiences of young people with type 1 diabetes

Fellows on Fogo
Unique research partnership on Fogo Island proves productive

Exploration and discovery
Memorial researchers receive more than $6.7 million from NSERC

‘What happened is horrific’
Grenfell Campus teaching chair collecting Magdalene laundry stories

Unearthing a mystery
Undergraduate archaeology student studying ancient forms of cancer

Strengthening capacity
Green light for Technology Transfer and Commercialization Office

It’s no stretch
International study examines best stretching methods

Creative solutions
Using art to improve HIV/AIDS education, prevention programming
<table>
<thead>
<tr>
<th>Category</th>
<th>Title</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greener ships</td>
<td>Using technology to transform ship operations</td>
<td></td>
</tr>
<tr>
<td>Big thrill</td>
<td>Memorial musicians, engineer elected to Royal Society of Canada</td>
<td></td>
</tr>
<tr>
<td>Critical thinkers</td>
<td>$2.1 million federal investment empowers social sciences and humanities researchers</td>
<td></td>
</tr>
<tr>
<td>International investment</td>
<td>Tech startup with Memorial roots announces Chinese partnership</td>
<td></td>
</tr>
<tr>
<td>Big fish</td>
<td>Researcher invents first genetically modified animal approved as food in the U.S.</td>
<td></td>
</tr>
<tr>
<td>Building the future</td>
<td>Federal and provincial funding supports construction of core science facility</td>
<td></td>
</tr>
<tr>
<td>Cooing dinosaurs</td>
<td>Biology professor co-authors paper about bird and dinosaur vocalization</td>
<td></td>
</tr>
<tr>
<td>Historic win</td>
<td>Dr. Robert Sweeney receives national book prize</td>
<td></td>
</tr>
</tbody>
</table>
TOTAL RESEARCH FUNDING

Total Research Funding
2006/07 – 2015/16

2015/16 Total: $90,267,000

SOURCES OF RESEARCH FUNDING

Research
2011/12 – 2015/16

2015/16 Total: $90,267,031

*Other includes Individual, Provincial Government (Other), United States Government and Other.
Note: *For the 2011-12 fiscal years, the increase in research revenue is due to changes in the methodology of allocating expenses on R&D. Specifically, expenditures on research infrastructure have been included. Effective 2011-12, and subsequent years, Total Research Spend has included expenditures on research infrastructure.
SPECIAL THANKS

Memorial University
  Office of the Vice-President (Research) Portfolio
  Division of Marketing and Communications
  Financial and Administrative Services
  Ocean Sciences Centre
  Offshore Safety and Survival Centre
  Centre for Innovation in Teaching and Learning
  Students, staff, researchers and faculty featured in this report

Moira Baird

Perfect Day

David Howells

Nagels Hill Agri-Products

St. Andrew’s Elementary

Easter Seals Newfoundland and Labrador

Bay Roberts 50+ Club

Mallard Cottage

AIDS Committee of Newfoundland and Labrador

Lester’s Farm

Funding partners and research collaborators featured in this report